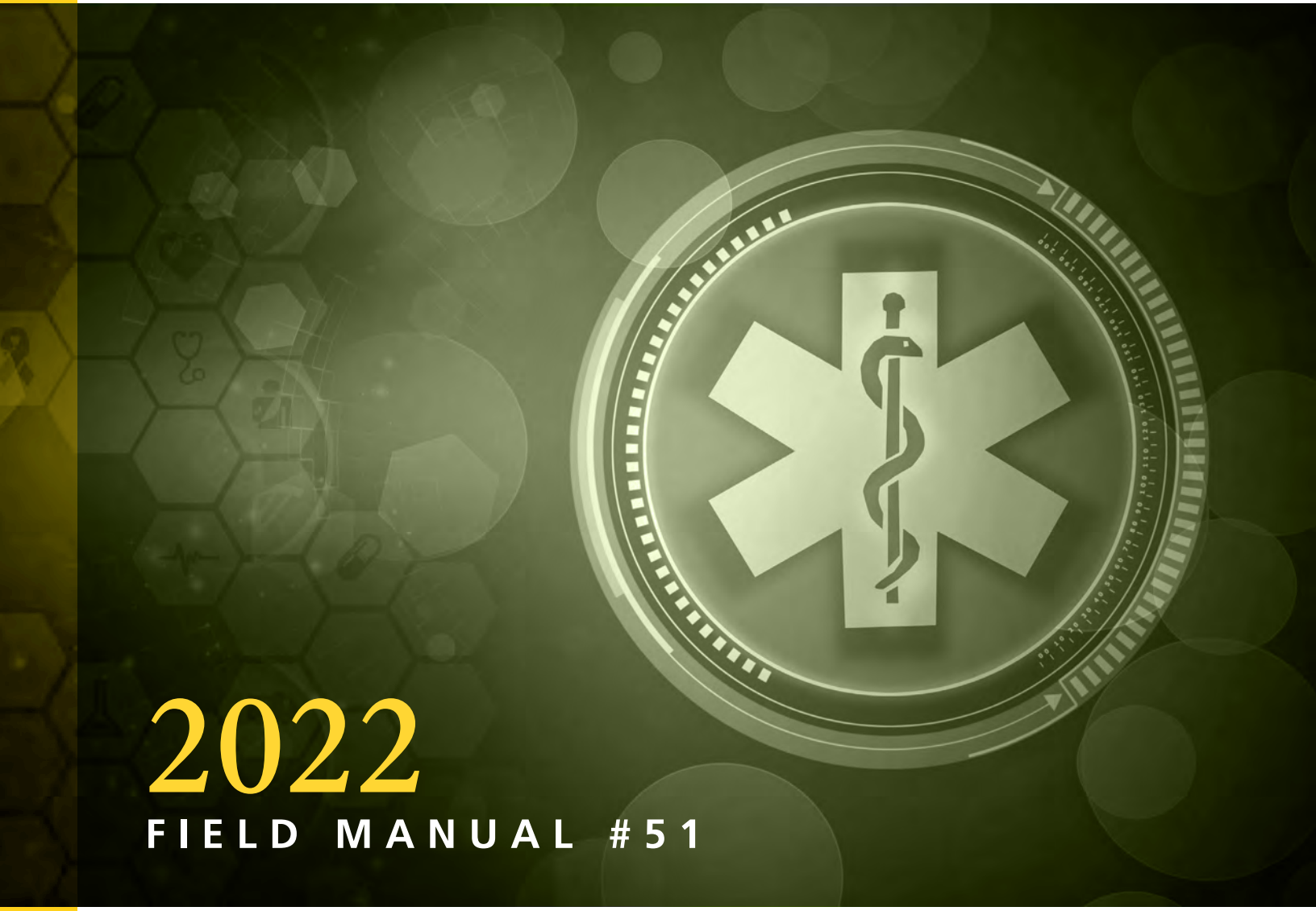
National Park Service
U.S. Department of the Interior

Emergency Medical Services Protocols and Procedures

NATIONAL PARK SERVICE



2022

FIELD MANUAL #51

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SCOPE

NES: Nationally Expanded Scope
LES: Locally Expanded Scope
APO: Assist Patient Only
AIO: Autoinjector Only
INO: Intranasal Only
ODT: Oral Dissolving Tablet Only

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Introduction: How to Use this Manual

MANUAL ORGANIZATION

Sections

This manual is organized into four sections. Subjects are organized alphabetically within the sections and numbered as follows (see Table of Contents):

General Information Section	0000-0999
Procedures	1000-1999
Protocols	2000-2999
Medications	3000-3999

Table of Contents:

Each Procedure, Protocol, and Drug is listed by section, in alphabetical and numerical order whenever practical. Gaps in the number sequence allow future entries to be inserted in a logical order.

PROTOCOL ORGANIZATION AND DEFINITIONS

EMR, EMT, Parkmedic and Paramedic Protocols

Each protocol is organized in a flowsheet style clearly delineating standing orders and Base Hospital/Medical Control orders according to level of certification. For the purposes of this version of the protocols, AEMT scope of practice is similar to Parkmedic, although Parkmedic scope includes some items AEMTs are not endorsed to perform. A "Special Considerations" section precedes each protocol and contains background information for the protocol and is for reference.

Standing Orders

Items under "Standing Orders" may be performed prior to base hospital contact. Unless otherwise stated, they are written to be completed sequentially.

Parks without Base Hospitals

A base hospital is defined as the typical communications center providing online medical direction (i.e., where medical consultation is available in real-time by telephone or radio). Providers in a park without a base hospital essentially operate in constant communication failure but should establish other avenues online medical direction. Their local medical adviser will establish policies identifying which base order interventions may be performed under the circumstances.

Base Hospital/Online Medical Direction Communication Failure Orders

Items labeled "Base Hospital/Communication Failure Orders" may be performed by the EMT or Parkmedic only after base hospital contact and approval, OR base contact has been attempted and was unsuccessful. Reasonable attempts to contact base/online medical control must be made, and communication failure documented. Please refer to the Medical Control Protocol.

Base Hospital/Online Medical Control Orders Only

Items listed under "Base Hospital Orders Only" require base hospital or online Medical Direction approval and may NOT be performed in communication failure.

Treatment Discontinuation

In general, initiated treatment should remain in place unless discontinued under specific guidance from base hospital (e.g., advanced airways, tourniquets). See specific protocols for details.

Navigation

Once a protocol is selected, care should be continuous under that protocol.

Exceptions to this rule are:

- **GO TO:** If an order directs you to "GO TO PROTOCOL: *XXXXX*" (protocol named in italics), then patient care should move to the specified protocol, IF the patient meets the stated criteria. If the patient does not meet the criteria, then continue with the original protocol.
- **Cardiac Arrest:** If a patient experiences cardiac arrest while being cared for under another protocol, then the Provider should immediately change to the appropriate cardiac arrest protocol. Base contact, however, should be attempted as soon as possible without compromising patient care.
- **REFERENCE:** Additional relevant information is available in another protocol or procedure if an order directs you to "REFERENCE PROTOCOL or PROCEDURE: *XXXXX*" (protocol or procedure named in italics). This information is intended to supplement knowledge, but patient care should continue to follow the original protocol.

Protocols

Protocols are chief complaint driven and are designed for patient care. Protocols contain orders for the appropriate care of the patient.

Procedures

Procedures are step by step instructions in how to carry out a specific action in the care of a patient (e.g., Intraosseous [IO] needle insertion).

Medication Pages

Medication pages are designed to be informational. Therefore, as drug dosing may vary depending on the selected protocol, the range of dosing used throughout the manual is listed in the drug page; when caring for a specific patient, the administered dose is that designated in the protocol. Depending on the drug, the dose may be listed as mg/kg or milliliter (ml/kg). Generic names are always used and in cases where the brand name is commonly used, this will also be listed (e.g., midazolam/Versed).

Pediatric Patients

Most protocols and procedures apply to both adults and children; pediatric considerations are generally commented on within a protocol. Certain protocols apply only to pediatric patients and are listed separately under Pediatric. Depending on the procedure, protocol, or drug dose, the age definition of pediatric varies; if age is not specifically defined, then assume that pediatric refers to prepuberty.

PARK SPECIFIC SCOPE OF PRACTICE MODIFICATIONS

In general, this EMS) Field Manual is designed to be a comprehensive set of Protocols and Procedures requiring little to no modification as it is part of Reference Manual 51 (RM 51), and under Director's Orders 51 (DO 51). Therefore, it carries the weight of the policies. However, given the wide range of needs and unique environments within the National Park Service, some local modifications may be necessary and appropriate for specific parks. The modifications (additions or deletions) will be made and approved by the Local EMS Medical Advisor (LEMA) and are authorized within an individual park under his/her medical license. For example, parks with no high-altitude areas may have no need for the Altitude Protocols.

If local (i.e., park specific) modifications are made to the EMS Field Manual:

- The Field Manual should contain a copy of the local unit's Scope of Practice Modifications (Procedures, Protocols, and Drugs), inserted in the appropriate section(s).
- Modified, deleted, or added (Procedures, Protocols, and/or Drugs), should be listed and identified as such in the Table of Contents.
- Procedures and Protocols removed from practice at a local park should be included in the General Information section so that EMS Providers have access to the information should they be detailed to or transfer to another park.

If a local park chooses to modify the EMS Field Manual (Procedures, Protocols, and/or Drugs), these steps should be followed:

- The modification must be approved in writing by the LEMA. The modified version will include the local park acronym, e.g., SEKI, and revision date in the version data in the subject footer (i.e., Version SEKI 3/09). The local version will have the same topic number if it is a modified version of an existing protocol or procedure (e.g., 2010.SEKI). The modified version should be inserted into the NPS Field Manual, in numerical order, for local use. The modified version should be listed in appropriate order on the Field Manual contents page.
- Procedures or protocols that are additions to the Field Manual will be locally designated as above, but given a unique number that places them in appropriate alphabetic order in the local version of the Field Manual.

MANUAL UPDATES/MODIFICATION GUIDELINES

Most organizations update their medical guidelines periodically (e.g., AHA). Although the updates will be reviewed and incorporated into the Field Manual, if relevant, the changes will usually be adopted during the normal Field Manual revision cycle.

Submitting suggestions: Comments may be submitted through a local EMS Coordinator to be forwarded as needed to other levels or by emailing either NPS_EMS@nps.gov. There are EMS Advisory Committees in various government organizations that review protocols and suggestions regularly.

DOCUMENT DEFINITIONS

Refer to RM-51 for NPS

0020

Medical Control

Online Medical Control or Base Hospital is not required in all circumstances and may be at the EMS provider's discretion, except:

It the EMS provider has questions about the above or concerns, they should contact OLMC. Medical control should be contacted if:

- Directed by the individual procedure, protocol, or guideline
- If no protocol exists for the patient's presentation or complaint
- If there is inadequate direction for the situation
- If the EMS provider has any questions about treatment and/or transport
- For all patients being released against medical advice. EMS provider discretion may be utilized in the following situation:
    - » If a patient with normal vital signs, normal mental status and a nonlife-threatening complaint refuses treatment/transport and wishes to sign out AMA. The patient must have decision making capacity. If the patient is pediatric, a parent or authorized legal guardian must be on scene to sign.

IF ATTEMPTS TO CONTACT ONLINE MEDICAL CONTROL OR THE BASE HOSPITAL FAIL:

- Proceed with patient care following the appropriate protocol and utilize best judgement
- **Document** all attempts to communicate with OLMC in the PCR
- **Document** all care rendered and any needed explanations or justifications for decisions
- Continue to attempt contact, even if the patient has been delivered to a receiving facility.

Refusal/AMA

Past Medical History | Assessment | Differential

PURPOSE: To establish which patients may be assessed and not transported by EMS, and to describe the process of documenting a refusal of care and/or ambulance transport, either as "assess and refer" or "against medical advice (AMA)."

DEFINITIONS

Against medical advice (AMA)

The refusal of treatment and/or ambulance transport by an unstable patient, or their designated decision-maker, against the advice of medical personnel on scene and/or of Online Medical Control (OLMC). The patient must demonstrate decision-making capacity to sign out AMA.

Assess and refer (referral)

The patient is assessed by medical personnel on scene and determined to potentially benefit from further medical evaluation, either at a medical clinic, by a medical professional, or emergency department (ED). The patient is stable for transport via personal vehicle.

Decision-making capacity

The patient's ability to make an educated decision about the need for medical care based on the following criteria:

- Understanding: The patient's ability to comprehend his/her medical condition, as well as why the prescribed treatment/plan is indicated and the risks and benefits of the treatment plan.
- Expressing a choice: The patient's ability to communicate a choice when presented with treatment options.
- Appreciation: The patient's ability to recognize how facts about their medical condition are relevant to the patient's personal situation.
- Reasoning: The patient's ability to compare options and infer consequences of their choice.

Emergency medical condition

A condition manifesting itself by acute symptoms of sufficient severity (including severe pain) such that the absence of immediate medical attention could reasonably be expected to result in placing the individual's health (or the health of an unborn child) in serious jeopardy, or to result in serious impairment to bodily functions, or serious dysfunction of bodily organs.

Impaired decision-making capacity

The inability of a patient to understand the nature of their medical condition, to articulate the risks and consequences of refusing care/transport, and/or to provide a reasonable alternative or choice based on the patient's beliefs or values. This can be influenced by altered mental status, psychiatric or neurologic conditions, intoxication, chronic medical conditions, or other factors.

Stable

Vital signs are within normal limits, mental status is normal, and the patient's medical condition has a predictable course that is unlikely to acutely deteriorate.

Unstable

Vital signs are outside of normal limits, mental status is altered, an emergency medical condition exists, and/or medical condition is likely to have frequent/unpredictable changes that could reasonably result in deterioration.

NOTES AND PRECAUTIONS

- Legal guardian(s) must be on scene to sign for a minor to refuse treatment/transport. If accompanied by an authorized adult and legal guardian is not on scene, the EMS provider must speak with the parent by phone, confirm identity, and get verbal consent for refusal. The authorized adult on scene should sign the refusal form.
- EMS providers may treat and/or transport a person who requires immediate care under the doctrine of implied consent. If a provider believes a minor (refer to local law) requires treatment/transport, this may be done without parental consent if the parents/guardians are not present, and a good faith effort is made to contact them.
- Adults with decision-making capacity have the right to refuse care/transport. Online Medical Control (OLMC) may be able to talk to the patient and convince them to accept recommended care. EMS providers should not discuss nonclinical subjects (e.g., specific costs, unit availability) with the patient regarding refusing care/transport.
- Every effort should be made to transport patients with their consent, regardless of capacity. Contact law enforcement and OLMC for assistance with transport of individuals with impaired capacity. Disagreement with the provider does not itself constitute a lack of decision-making capacity.

PROCEDURE

1. Determine if there is an identified patient. OLMC contact is not required if no patient is identified.

2. If a patient is refusing treatment and/or ambulance transport:
   A. Determine if the patient appears to have impaired decision-making capacity (see above definition).
   B. Consider conditions that may be impairing the patient's ability:
      a. Head injury
      b. Toxic exposure
      c. Drug or alcohol intoxication
      d. Language barrier (e.g., consider a translator)
      e. Medical conditions (e.g., hypoglycemia)
      f. Psychiatric problems

3. For a patient with **IMPAIRED** decision-making capacity:
   A. Treat/transport a person who is incapacitated and has a medical need. Consult OLMC.
   B. Coordinate with other EMS providers, law enforcement, and the patient's family and friends as appropriate.

4. For **STABLE** patients with **ADEQUATE** decision-making capacity, who refuse treatment and/or transport (assess and refer):
   A. Explain the risks and possible consequences of refusing care and/or transport by ambulance.
   B. Recommend an appropriate referral facility (ED, clinic, etc.), mode of transport, and time frame to seek further care. Complete the patient refusal form and obtain the patient's signature.

5. For **UNSTABLE** patients with **ADEQUATE** decision-making capacity, who refuse treatment/transport (AMA):
   A. Explain the risks and possible consequences of refusing care and/or transport by ambulance.
   B. **Contact OLMC for all AMAs.** OLMC may help convince patient to accept transport.
   C. With permission from the patient, enlist family, friends, or other responders to help convince the patient. Protect the patient's privacy and do not breach confidentiality.
   D. If the patient still refuses, ensure they sign the patient refusal form.
   E. Document thoroughly per section below

DOCUMENTATION

In addition to documentation required for all PCRs, the following must be included in a referral/AMA PCR:

- An assessment of the patient's decision-making capacity, using criteria listed in the definitions.
- Risks/consequences of refusal of care/transport that were discussed with the patient.
- Communication with family, friends, law enforcement, and/or OLMC regarding refusal process.
- Include the patient's signature in the patient refusal section of the disposition form. Signed disposition forms must be completed and attached to the PCR.
- Use of alcohol/drugs should not be solely used to determine decision-making capacity. Contact OLMC.

Advance Directives/DNR/POLST/MOST

PURPOSE

To establish how Advance Directives will be utilized regarding a patient's right to accept or refuse medical care.

NOTE: Refer to state's laws as applicable

DEFINITIONS

Advance Directive

A document that contains a health care instruction or a power of attorney for health care in the case of an emergency to ensure the patient's wishes/preferences are carried out if the patient is unable to communicate his or her desires to the healthcare provider.

Do Not Resuscitate (DNR)/Do Not Attempt Resuscitation Order (DNAR)

An order written and signed by a physician stating that in the event of cardiopulmonary arrest, cardiopulmonary resuscitation will not be administered. DNR/DNAR orders apply only if the patient is pulseless and apneic.

Living Will

A document that may confirm an Advance Directive or Directive to Physician informing her/him that if the patient has a terminal illness and death is imminent, the patient will wish or not wish to be placed on artificial life support. In general, the traditional Living Will document alone is not helpful in the prehospital setting because of its multiple restrictions and lack of clarity on when it takes effect. A Living Will is not a medical order and not applicable in the prehospital setting.

Power of Attorney for Health Care (PAHC)

A legal document that designates a person to make healthcare decisions for a patient.

Durable Power of Attorney for Health Care (DPAHC)

A legal document that designates a person to make healthcare decisions for a patient in the event that the patient becomes incapacitated. DPAHC documents are not medical orders and not generally applicable to prehospital providers.

Physician's Orders for Life-Sustaining Treatment (POLST)/Medical Orders for Scope of Treatment (MOST)

A document that serves as a medical order, signed by a physician, honoring the specific treatment preferences of seriously ill or frail patients in an emergency. It does not replace an Advance Directive/DNR/DNAR and may work in conjunction with these.

- ***In the pulseless and apneic patient (cardiopulmonary arrest),*** resuscitation may be withheld or discontinued if:
  - » EMS is provided with a valid written DNR/DNAR order.
  - » EMS is provided a valid Advance Directive or POLST/ MOST that specifically directs them not to provide cardiopulmonary resuscitation.
  - » The patient's validated Durable Power of Attorney for Health Care (DPAHC) directs EMS not to resuscitate the patient (legal documentation establishing DPAHC must be available to EMS); or
  - » OLMC directs the EMS provider to discontinue resuscitation.
- ***In the patient who is NOT in cardiopulmonary arrest,*** EMS may follow treatment preferences and honor the patient's wishes as conveyed by a valid POLST/MOST. Other Advanced Directives presented to EMS may be considered as directed by the patient's validated PAHC.
- It is always appropriate to provide comfort measures as indicated.
- If resuscitation or other treatment has begun prior to Advance Directives or a DNR/DNAR being available to EMS, Online Medical Control should be contacted before discontinuing resuscitation or other care.
- The form number must be documented in the PCR and a copy of the Advance Directive, DNR/DNAR, or other legal document used to make treatment decisions should be attached to the PCR.
- Alternatively worded directives to limit medical care, such as Supportive Care Only, Limited Terminal Care, Justified Use of Conservative Treatment, Living Wills or other documents are not acceptable substitutes for a DNR as they are not universally understandable or verifiable. Contact medical control for guidance.

If there are questions regarding the validity or enforceability of a directive or the intent of the patient or guardian, begin resuscitation and contact Medical Control.

0050

Acronyms and Abbreviations

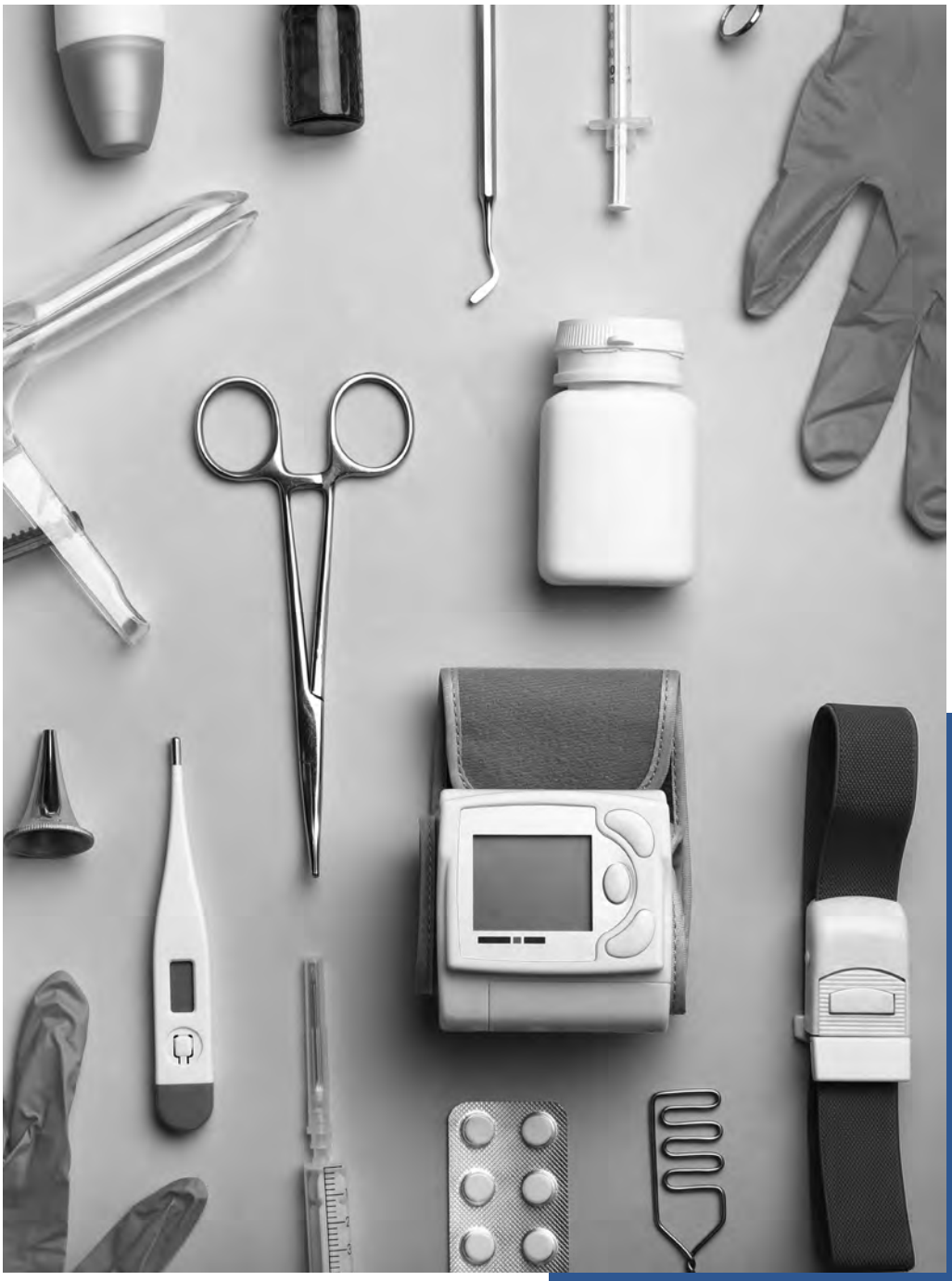
ABCs	Airway, Breathing, Circulation
ACLS	Advanced Cardiac Life Support
AED	Automated External Defibrillator
AEMT	Advanced Emergency Medical Technician
ALOC	Altered Level of Consciousness
ALS	Advanced Life Support
AMA	Against Medical Advice
AMS	Acute Mountain Sickness
ASA	Aspirin
BP	Blood Pressure
BLS	Basic Life Support
BVM	Bag Valve Mask
CC	Chief Complaint
CHF	Congestive Heart Failure
CNS	Central Nervous System
C/O	Complaining Of
CO	Carbon Monoxide
COPD	Chronic Obstructive Pulmonary Disease
CO2	Carbon Dioxide
CPAP	Continuous Positive Airway Pressure
CPR	Cardiopulmonary Resuscitation
CSM	Circulation, Sensory, Motor
D50	Dextrose 50%
DBP	Diastolic Blood Pressure
DKA	Diabetic Ketoacidosis
DNR	Do Not Resuscitate
ECD	Electronic Control Device (Taser)
ECG	Electrocardiogram
EMR	Emergency Medical Responder
EMS	Emergency Medical Service
EMT	Emergency Medical Technician
EtCO2	End Tidal Carbon Dioxide
ETT	Endotracheal Tube
FBAO	Foreign Body Airway Obstruction
GCS	Glasgow Coma Scale
GSW	Gunshot Wound
GI	Gastrointestinal
HACE	High Altitude Cerebral Edema
HAPE	High Altitude Pulmonary Edema
HR	Heart Rate
HTN	Hypertension
IM	Intramuscular
IN	Intranasal
IO	Intraosseous
IUD	Intrauterine Device
IV	Intravenous
IVF	Intravenous Fluid
IVP	Intravenous Push
JVD	Jugular Vein Distension
LE	Law Enforcement
LMP	Last Menstrual Period
LOC	Level of Consciousness
LR	Lactated Ringers
MAD	Mucosal Atomizer Device
MCI	Multiple Casualty Incident
MDI	Metered Dose Inhaler
MI	Myocardial Infarction
MOI	Mechanism of Injury
NG	Nasogastric
NPA	Nasopharyngeal Airway
NRB(M)	Nonrebreather (Mask)
NS	Normal Saline
NSAID	Nonsteroidal Anti-Inflammatory Drug
NTG	Nitroglycerin
N/V	Nausea and Vomiting
O2	Oxygen
OD	Overdose
ODT	Oral Disintegrating Tablet
OLMC	Online Medical Control
OPA	Oropharyngeal Airway
OTC	Over The Counter
P	Paramedic
PCR	Patient Care Report
PE	Pulmonary Embolism
PM	Parkmedic
PMH	Past Medical History
PO	Per Os/Per Oral (By Mouth)
POV	Privately Owned Vehicle
PPE	Personal Protective Equipment
PRN	Pro Re Nata (As Needed)

q	Per or every
PTA	Prior to Arrival
ROM	Range of Motion
ROSC	Return of Spontaneous Circulation
RR	Respiratory Rate
SAR	Search and Rescue
SBP	Systolic Blood Pressure
SC or SQ	Subcutaneous
SCUBA	Self-Contained Underwater Breathing Apparatus
SCBA	Self-Contained Breathing Apparatus
SIVP	Slow IV Push
SL	Sublingual
SOB	Shortness of Breath
S/S	Signs, Symptoms
STD	Sexually Transmitted Disease
TBSA	Total Body Surface Area
TCA	Tricyclic Antidepressant
TIA	Transient Ischemic Attack
TKO	To Keep Open
T-POD	Traumatic Pelvic Orthotic Device
TTJI	Trans Tracheal Jet Insufflation
VS	Vital Signs
Y/O	Year Old
>	Greater than
≥	Greater than or equal to
<	Less than
≤	Less than or equal to


0.5
1
1.5
2
2.5
3ml

Procedures

SECTION 1000



12-lead ECG

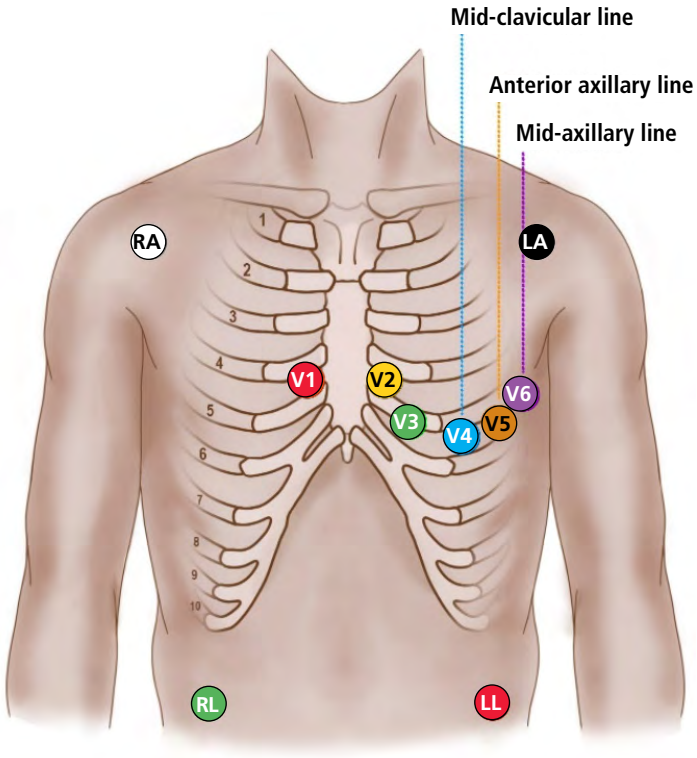
Follow local area protocol regarding availability of 12-lead ECG and transmission to medical control

CLINICAL INDICATIONS

- Suspected cardiac patient
- Chest pain (medical or traumatic)
- CHF
- Suspected cardiogenic shock (hypotension)
- Return of spontaneous circulation (ROSC)
- Suspected overdose (TCA, ASA, etc.)
- Electrical injuries
- Syncope/severe weakness
- Shortness of breath in the setting of possible pulmonary edema
- New onset stroke symptoms (< 24 hours old)
- Heartburn/epigastric pain

PROCEDURE

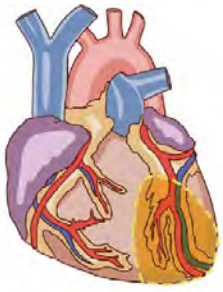
1. Assess the patient and monitor their cardiac status.
2. If patient becomes unstable, definitive treatment is the priority. If the patient is stable or stabilized after treatment, perform a 12-lead ECG.
3. Expose the chest and prep as necessary. The modesty of the patient should be respected; use gloved, back of the hand for tissue movement.
4. Apply chest leads and extremity leads using the following landmarks:



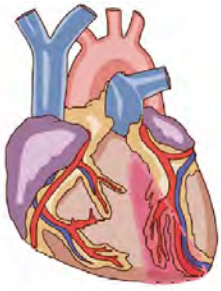
Key:

RA	Right Arm	**V1** (place 1st)—4th intercostal space at right sternal border
LA	Left Arm	**V2** (place 2nd)—4th intercostal space at left sternal border
RL	Right Leg	**V3** (place 4th)—Directly between V2 and V4
LL	Left Leg	**V4** (place 3rd)—5th intercostal space at midclavicular line
		V5 (place 6th)—5th intercostal space at left anterior axillary line
		V6 (place 5th)—5th intercostal space at left midaxillary line

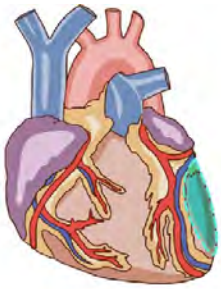
5. Instruct patient to remain still and stop talking.
6. Enter the patient's demographic data (manufacturer's settings or manually) and obtain 12-lead ECG.
7. Document results in the patient care report (PCR).
8. Print the patient's name and date of birth on the printed copy of the 12-lead ECG to give to receiving facility/provider.
9. If system allows—consider sending electronically to receiving hospital.
10. Attach ECG to ePCR.



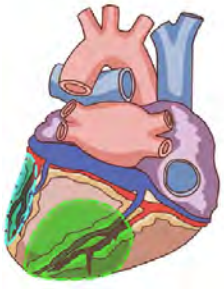
Anterior : V3, V4



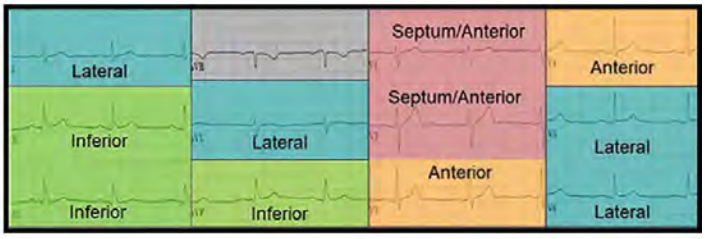
Septal: V1, V2



Lateral: I, AVL, V5, V6



Inferior: II, III, AVF



NOTES AND PRECAUTIONS

- **Show all ECG results immediately to a physician for initial interpretation.**
- If first ECG is within normal limits but chest discomfort remains, repeat ECG in 10 minutes.
- Transport by wheelchair if available—minimize walking if feasible.
- Women and diabetic patients are more likely to present with atypical symptoms.
- Elderly patients may have symptoms such as generalized weakness, altered mental status or syncope as their only sign of acute heart attack.

AED (Automated External Defibrillator)

CLINICAL INDICATIONS

- Patients in cardiac arrest (pulseless, nonbreathing, unresponsive)
- Age > 8 years, use Adult Pads
- Age 1-8 years, use Pediatric Pads if available, if not available, adult pads may be used one on chest and one in back. Use pediatric attenuator "key" if available.
- Age > 28 days < 1 year, use Pediatric Pads if available, if not available, adult pads may be used: one on front, one on back. Use pediatric attenuator "key" if available.

CONTRAINDICATIONS

Obvious fatal trauma, has a DNR, meets criteria for declaration of death (refer to Determination of Death in the Field, Do Not Resuscitate Orders)

PROCEDURE

Refer to PROTOCOL Cardiac Arrest AED/BLS

1. If applicable, remove patient from water and dry off wet skin. Remove medication patches on the chest and wipe off residue including nitro paste.
2. Apply defibrillator pads per manufacturer recommendations. Place pads at least 1" from an implanted device such as an automatic implantable cardioverter-defibrillator (AICD) or a pacemaker. Alternate pad placement may be used but DO NOT delay defibrillation with pad placement.
3. Stop CPR and clear the patient for rhythm analysis. Assertively state "CLEAR" and visualize that no one, including you, is in contact with the patient during analysis. Keep interruption in CPR brief (no longer than 10 sec).
4. Defibrillate if indicated by depressing the "shock" button.
5. Immediately begin CPR (chest compressions and ventilations) after the delivery of the defibrillation.
6. After two minutes of CPR, analyze rhythm (AED may be automatically timed to re-analyze) and defibrillate if indicated. Repeat this step every two minutes.
7. If "no shock advised" appears, perform pulse check, if no pulse continue CPR for two minutes and then reanalyze.
8. Transport and continue treatment as indicated.
9. Keep interruption of CPR compressions as brief as possible (less than 10 seconds). Adequate CPR is a key to successful resuscitation. If possible, deliver interventions (e.g., airway, Intravenous [IV], medications) during CPR.
10. **If pulse returns:** See PROTOCOL *Cardiac Arrest-Return of Spontaneous Circulation.*

NOTES AND PRECAUTIONS

- If pads are too large and overlap when placed on the front of the chest (such as in children or infants) place one pad on the right upper chest and the other on the upper back, slightly left of midline.
- Do not use AEDs in moving vehicles. Stop vehicle to prevent interference with AED analysis.
- Do not focus only on the AED. Monitor the patient for signs of resuscitation (e.g., color change, pupil response, spontaneous respirations). Deliver other interventions for airway, IV, and medications.
- AEDs may have different programming. If the AED prompts conflict with the protocol/procedure, follow prompts and call MC.
- If declaration of death OR if pulse returns, leave the pads attached to the patient.
- Save data stored by the AED regardless of patient outcome. AED should be delivered to EMS Director for download.

Be familiar with the AEDS available at your site.

Airway Management
provider level indicated with adjunct

CLINICAL INDICATIONS:

- A patient who does not have a patent airway
- A patient who is not breathing adequately
- A patient who meets criteria for oxygen administration (see *Oxygen* medication page)

AIRWAY MANAGEMENT OVERVIEW

Proper airway management is the highest priority of the EMS Provider. There are several adjuncts used for airway control and protection and the adequate oxygenation and ventilation of patients. Airway management may become necessary for patients who cannot maintain their own airway (respiratory arrest or prearrest).

Always weigh the risks and benefits of airway management in the field. If BLS ventilation and oxygenation is adequate, transport may be the best option.

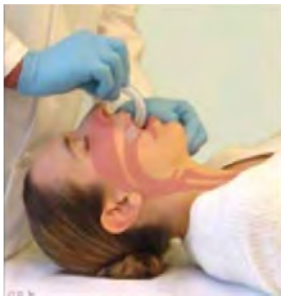
The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (BVM).

BASIC LIFE SUPPORT (BLS) AIRWAY ADJUNCTS:

BLS airway adjuncts are indicated when the airway is not patent.

Manual Airway Techniques:

- In suspected trauma patients, use jaw-thrust to open the airway. In patients without suspected spinal injury, a head-tilt-chin-lift may be used.
- Manual airway techniques are a bridge maneuver until an adjunct can be safely inserted.

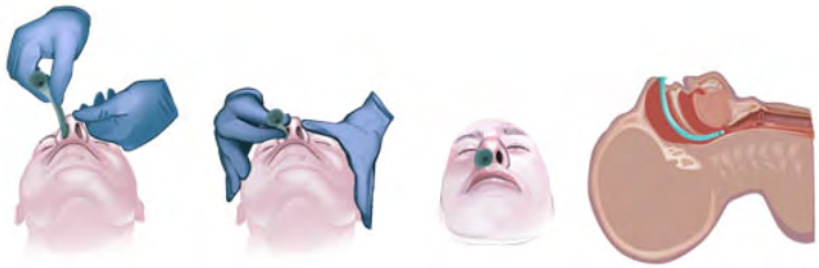


Oropharyngeal Airway (OPA)

- Use an OPA to maintain a patent airway in a patient without a gag reflex.

Nasopharyngeal Airway (NPA):

- Use an NPA to maintain a patent airway in patients with a gag reflex or who cannot tolerate an OPA.
- Do not use in severe facial or nasal trauma that precludes safe insertion of the NPA.



POSITIVE PRESSURE VENTILATION DEVICES:

Bag Valve Mask (BVM)

- BVM ventilation is indicated in patients who are not breathing adequately (apnea or too fast/slow/shallow).
- Proper mask seal and head positioning are required to effectively ventilate the patient. This is a two-rescuer device (one rescuer holds mask and keeps airway open with two hands while the other squeezes bag).
- Breaths are administered in a slow, controlled manner over one second.

Continuous Positive Airway Pressure (CPAP) (Parkmedic, Paramedic)

- See *Continuous Positive Airway Pressure (CPAP)* Procedure for more information.
- CPAP is ***never*** a substitute for BVM ventilation when the patient cannot participate in breathing (e.g., apnea, very slow respirations).

OXYGEN DELIVERY DEVICES:

For additional drug information, see the *Oxygen* medication page.

Nasal Cannula:

- Used when smaller concentrations of oxygen are required.
- Flow rates are generally 2-6 liters/minute, which provides 24-40% inspired oxygen.
- Exception to this is during PROCEDURE: *Apneic Oxygenation.*

Nonrebreather Mask:

- Used when a higher concentration of oxygen is needed.
- Flow rates are generally 10-15 liters per minute, which provides 90%+ inspired oxygen.

"Blow-by" Oxygen:

- Typically used in infants/toddlers or those who cannot tolerate a cannula or nonrebreather mask.

Nebulizers (Hand-held or Aerosol Mask): (Parkmedic, Paramedic)

- For administration of nebulized medications or humidified oxygen (flow rates are generally 6-8 liters/minute).
- Can be used in conjunction with BVM or CPAP.
- See *Nebulizer Inhalation Therapy Procedure* for more information.

ADVANCED LIFE SUPPORT (ALS) AIRWAY DEVICES:

Supraglottic Airway Devices (SGA): A-EMT/ Parkmedic/Paramedic: (EMT - ESOP Med Director approval)

- Used in patients who are unconscious and not breathing (i.e., no gag reflex).
- SGAs are designed to be inserted blindly (i.e., without laryngoscope).
- See *Supraglottic Airway Devices* procedures for further information.

Removal of FBAO using Laryngoscope and McGill forceps (Paramedic):

- See *Foreign Body Airway Obstruction* procedure for further information.

Endotracheal Intubation is a park/unit specific guideline.

DIFFICULT AIRWAY ASSESSMENT (TIPS FOR AIRWAY ASSESSMENT) DIFFICULT BVM VENTILATIONS

(MOANS)

M Difficult Mask seal due to facial hair, anatomy, blood, or secretions/trauma
O Obese or late term pregnancy
A Age > 55 years
N No teeth
S Stiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Difficult Supraglottic Airway (RODS)

R Restricted mouth opening
O Obstruction/Obese or late pregnancy
D Distorted or disrupted airway
S Stiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Difficult Cricothyrotomy/Emergency Airway (SHORT)

S Surgery or distortion of airway
H Hematoma overlying neck
O Obese or late pregnancy
R Radiation treatment skin changes
T Tumor overlying neck

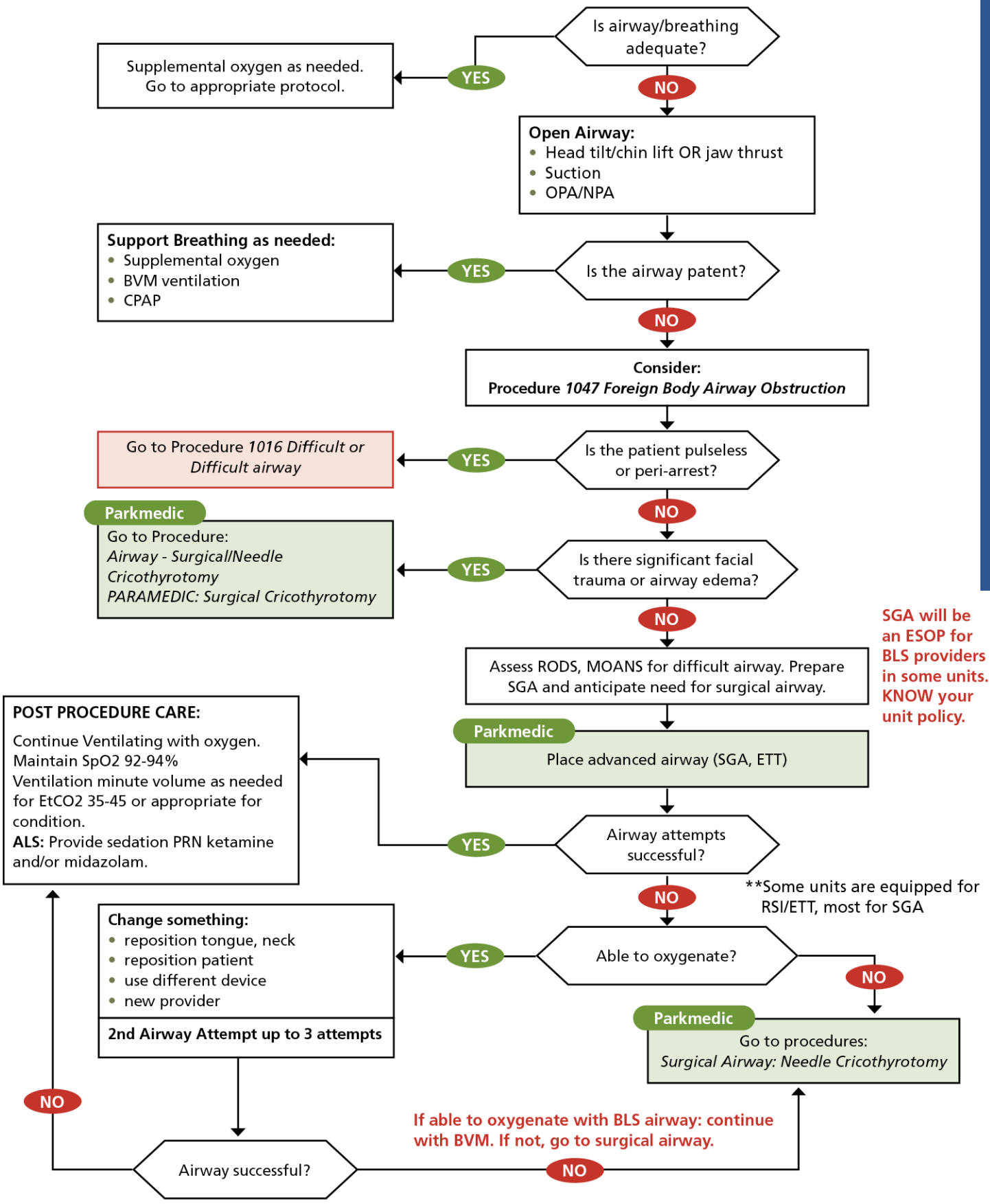
Trauma:

- Utilize in-line C-Spine during SGA or BVM use.
- During advanced airway maneuvers, the C-Collar front may be open or removed to facilitate translation of the mandible/mouth opening.
- Have another provider stabilize the neck manually during the procedure.

SPECIAL CONSIDERATIONS

- Waveform capnography (EtCO2) is required (if available) for the monitoring of all patients with an advanced airway.
- If an effective airway is being maintained by a BVM and/or basic airway adjuncts (e.g., OPA, NPA) with continuous pulse oximetry values > 90%, it is acceptable to continue with basic airway measures. Consider CPAP as indicated by protocol and patient condition.
- For the purposes of this protocol, a secure airway is achieved when the patient is receiving appropriate oxygenation and ventilation.
- An advanced airway attempt is defined as passing the advanced airway device past the teeth.
- An appropriate ventilation rate is typically one that maintains an EtCO2 of 35-45.
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO2 of 30-35 with medical control contact.
- Do not assume hyperventilation is psychogenic—use oxygen for goal SpO2 of 90-99%, not a paper bag.
- Gastric tube placement should be considered in all ventilated patients if available and will not delay transport.
- It is important to secure the advanced airway device well. Manual stabilization of the advanced airway device should be used during all patient moves/ transfers. Reassess device placement after all moves and transfers.

AIRWAY MANAGEMENT



SCOPE:

CLINICAL INDICATIONS (BOTH MUST BE MET):

- Respiratory insufficiency or respiratory arrest
- GCS < 8 with no gag reflex

CONTRAINDICATIONS:

- Presence of gag reflex
- Suspected narcotic overdose prior to administration of naloxone. If no response to naloxone, attempt endotracheal intubation
- Valid Advanced Directive/DNR/POLST form

EQUIPMENT:

- Endotracheal tube, 10 ml syringe, laryngoscope handle and blade, BVM, suction, capnography, pulse oximetry

NOTES AND PRECAUTIONS

- Do not delay BLS airway management, defibrillation, or CPR to place and endotracheal tube.
- In most patients, a properly placed ET tube will have a depth of three times the tube size in centimeters (e.g., 7.0 tube-depth of 21 cm).
- Esophageal intubation most commonly occurs when the operator cannot visualize the tube passing through the vocal cords. **Failure to recognize esophageal intubation is a common and fatal error.** If verification of tube placement (Step 13) is uncertain, remove the tube, oxygenate the patient and re-attempt.
- Placement of an oversized ET tube can damage the arytenoid cartilage and damage the vocal cords. If resistance is felt after inserting the tube through the vocal cords—it is probably too large and needs to be replaced with a smaller tube.
- Vomiting and aspiration during endotracheal intubation can occur whether the gag reflex is intact. Be prepared to suction and place and OG tube if available and trained.

Airway Mangement: Intubation - Endotracheal

PROCEDURE:

1. Maintain C-Spine protection if indicated, if not indicated, place the patient's head in a "sniffing position" (ears aligned with the sternal notch).
2. Preoxygenate with a BVM and 100% oxygen for one minute.
3. Prepare suction equipment and make sure it is easily accessible.
4. Select the appropriate size ET tube based on the patient's age and size.
   A. PEDIATRIC: (age in years + 16)/4
5. Check cuff integrity by fully inflating it, deflating it after confirmation.
6. Lubricate tube.
7. Insert stylet.
8. If present, remove dentures, broken teeth, OPA.
9. Have failed airway equipment prepared.
10. DIRECT LARYNGOSCOPY
    A. Lift tongue and lower jaw with the laryngoscope blade in your left hand, directing the force 45° from the patient with a gentle upward/forward lift—do not pry on the teeth.
    B. Hold the ET tube in your right hand so the distal tip curves up.
    C. Visualize the epiglottis and vocal cords.
    D. Introduce the ET tube from the corner of the mouth, advance until the cuff is past the cords.
    E. If attempt fails within 30 seconds—stop—place and OPA and ventilate the patient with a BVM and 100% oxygen for one minute.
    F. Do not exceed three attempts (i.e., defined as cessation in ventilation to perform laryngoscopy).
       a. Place supraglottic airway, continue BLS ventilatory maneuvers, or perform surgical airway.
11. Inflate the balloon.
12. Attach EtCO2 monitor and ventilate with a BVM at 15L (100% FIO2).
13. Verify ET tube placement.
    A. Place capnography and observe wave form, use colorimetric EtCO2 if capnography unavailable.
    B. Observe chest rise and fall.
    C. Listen with a stethoscope while ventilating for absence of epigastric air.
    D. Listen with a stethoscope while ventilating for bilateral lung sounds.
    E. Look for fogging of the ET tube.
    F. If unable to ventilate, rapidly troubleshoot (e.g., suction, kinks, biting, obstruction), and remove the tube if the problem is not resolved. Insert OPA, ventilate with BVM and consider supraglottic airway.
    G. If unable to ventilate with basic techniques (BVM/OPA) or supraglottic airway; perform surgical airway.
14. Secure ET tube with commercial device or tape.
15. Ensure tube placement (Step 13) every time patient is moved.
16. Consider analgesia and sedation—MC contact necessary.
17. Document ET tube size, number of attempts (and results), and placement location by marks on tube in reference to the patient's teeth or lips.
18. Document tube confirmation methods after all movements.

CLINICAL INDICATIONS

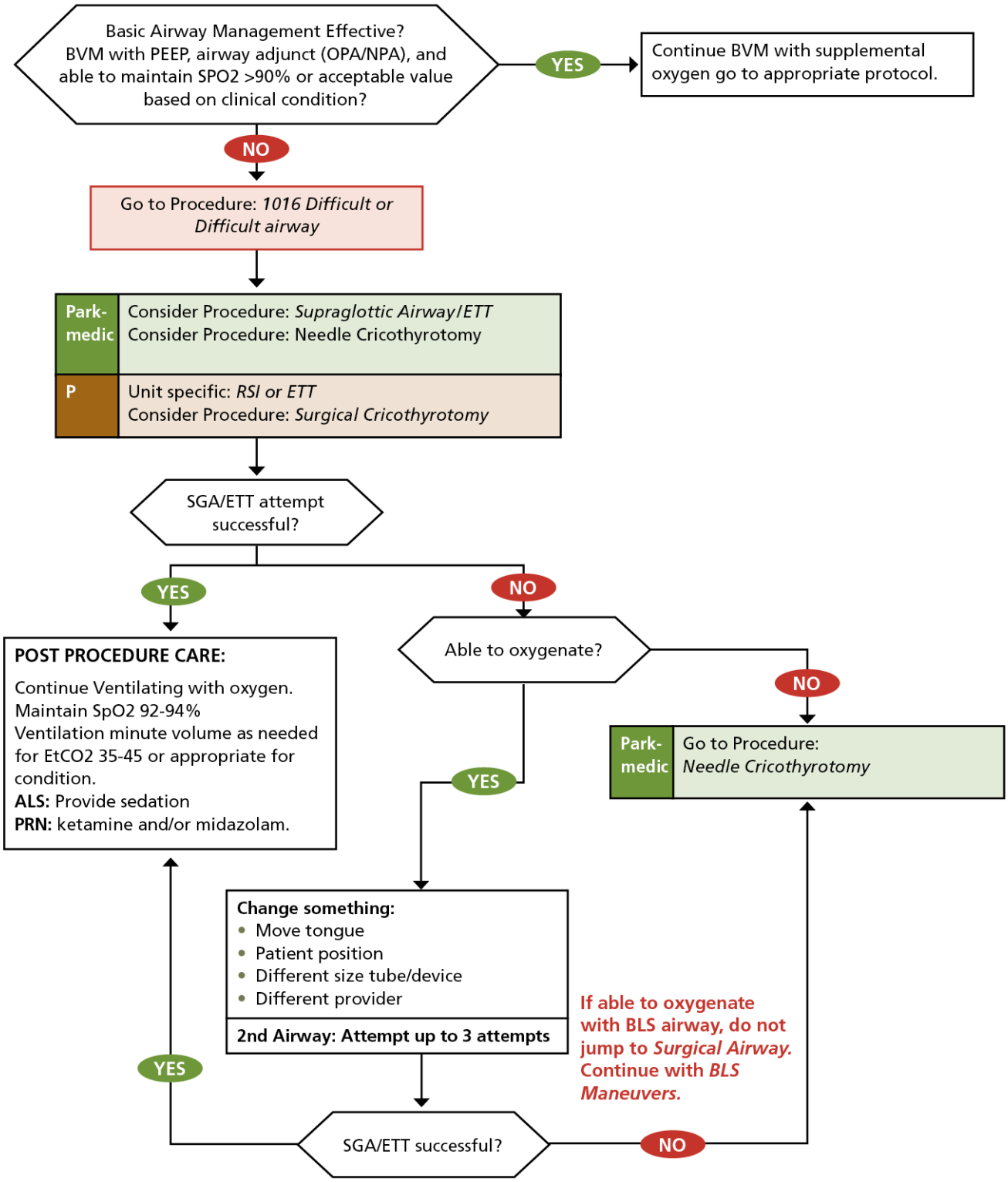
- A difficult or difficult airway is an airway that cannot be managed adequately by the provider's level of training.
- Contact MC as soon as possible when a difficult airway is recognized.

NOTE: A patient with a "difficult airway" is one who is near death or dying or not stable or improving. Patients who cannot be intubated or who do not have an oxygen saturation greater than 90% do not necessarily have a failed airway. Many patients who cannot easily accept an advanced airway device may be sustained by basic airway techniques and BVM.

SPECIAL CONSIDERATIONS

- If first advanced airway attempt fails, make an adjustment and consider:
  - » Move tongue
  - » Change head positioning
  - » Different tube size
  - » Different provider.
- Continuous pulse oximetry and EtCO2 must be utilized in all patients with an inadequate respiratory function.
- Notify MC as soon as possible when a difficult airway is recognized.
- If an effective airway is being maintained by a BVM and/or basic airway adjuncts (e.g., OPA, NPA) with continuous pulse oximetry values > 90%, it is acceptable to continue with basic airway measures. Consider CPAP as indicated by protocol and patient condition. Contact MC regarding decision making for patients with difficult or failed airways.

Airway Management: Difficult airway



Airway Management: i-Gel Supraglottic

CLINICAL INDICATIONS

The patient needs a secured airway.

DEFINITION

The i-Gel airway is a disposable supraglottic airway, or SGA, created as an alternative to tracheal intubation or mask ventilation. The supraglottic airway is designed for positive pressure ventilation as well as spontaneously breathing patients.

CONTRAINDICATIONS

- Intact gag reflex
- Upper airway obstruction
- Known or suspected caustic ingestion or esophageal disease
- Suspected narcotic overdose prior to the administration of naloxone (may be used if the patient does not respond to naloxone).

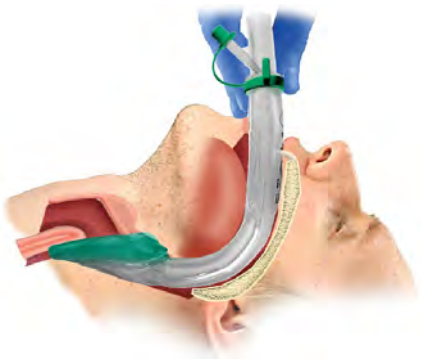
PROCEDURE

MAINTAIN cervical motion restriction if indicated

1. Attach a pulse oximeter to the patient and prepare capnography, if available.
2. Provide apneic oxygenation by nasal cannula before and during procedure at 15 L/min in addition to BLS maneuvers (BVM ventilation).
3. Estimate the patient's weight (i.e., for sizing of i-Gel airway).
4. Select the appropriate size based on the patient's weight. See table, below.
5. Lubricate the back, sides, and tip of the cuff with KY-Jelly or other water-based lubricant.
6. Remove broken teeth, dentures, OPA.

	Code	Description	Size	Weight	Box Qty.	
●	8205000	i-gel®, supraglottic airway	5 Large adult	90+kg	25	S
●	8204000	i-gel®, supraglottic airway	4 Medium adult	50-90kg	25	S
●	8203000	i-gel®, supraglottic airway	3 Small adult	30-60kg	25	S
○	8225000	i-gel®, supraglottic airway	2.5 Large paediatric	25-35kg	10	S
●	8202000	i-gel®, supraglottic airway	2 Small paediatric	10-25kg	10	S
●	8215000	i-gel®, supraglottic airway	1.5 Infant	5-12kg	10	S
●	8201000	i-gel®, supraglottic airway	1 Neonate	2-5kg	10	S

7. 

8. 

7. Remove the i-Gel from the protective cradle. Grasp the lubricated i-Gel firmly along the integral bite block. Position the device so that the i-Gel cuff outlet is facing towards the chin of the patient. The patient should be in the "sniffing" position with head extended and neck flexed. The chin should be gently pressed down before proceeding. Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate.
8. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until definitive resistance is felt.
9. The tip of the airway should be in the upper esophageal opening and the cuff should be located against the laryngeal framework. The incisors should be resting on the integral bite-block.
10. Attach a BVM to the tube and ventilate the patient. Evaluate breath sounds and verify absence of epigastric sounds. Monitor oxygen saturation, chest rise, and capnography.
11. Secure i-Gel with the support strap provided in i-Gel packaging or with tape
12. Continue monitoring for adequate ventilations and possible dislodgement.

MEDICATIONS

With MC consultation, sedation (MEDICATIONS: 3148 Ketamine or 3160 midazolam) and analgesic (MEDICATIONS: 3107 Fentanyl or 3170 morphine sulfate) administration may be indicated for intubated patients who have become agitated or combative following intubation.

NOTES & PRECAUTIONS

- Do not delay BLS airway techniques, ventilations, CPR, or defibrillation to place an i-Gel airway.
- The i-Gel gastric access lumen allows insertion of up to a 12 Fr orogastric tube for adult I-gel sizes and 10 Fr for Pediatrics.

Airway Management: King LTS-D Supraglottic Airway

CLINICAL INDICATIONS

The patient needs a secured airway.

DEFINITION

The King airway is a disposable extraglottic airway (e.g., referred to as supraglottic here, or SGA) created as an alternative to tracheal intubation or mask ventilation. The supraglottic airway is designed for positive pressure ventilation.

CONTRAINDICATIONS

- Intact gag reflex
- Upper Airway obstruction
- Known or suspected caustic ingestion or esophageal disease
- Suspected narcotic overdose prior to the administration of naloxone (i.e., may be used if the patient does not respond to naloxone)

PROCEDURE

1. Maintain c-spine precautions if indicated.
2. Have suction equipment ready. ONLY SUCTION MAIN AIRWAY TUBE.
3. Attach pulse oximeter and monitor oxygen saturation.
4. Provide apneic oxygenation by nasal cannula before and during procedure at 15 L/min.
5. Estimate patient's height and weight (for sizing of supraglottic airway) and place their head in a neutral position.
6. Use for both pediatric and adult patients:
   - < 5 kg—Size 0 (Transparent)
   - 5-12 kg—Size 1 (White)
   - 35-45 inches tall or 12-25 kg—Size 2 (Green)
   - 41-51 inches tall or 25-35 kg—Size 2.5 (Orange)
   - 4-5 feet tall—Size 3 (Yellow)
   - 5-6 feet tall—Size 4 (Red)
   - 6-7 feet tall—Size 5 (Purple)
7. Check the integrity of both balloons by inflating briefly, then deflate.
8. Lubricate distal end of the supraglottic airway with KY-Jelly or water.
9. Remove dentures, broken teeth, and OPAs.
10. Lift tongue and lower jaw with nondominant hand. Use gauze on tongue for friction if needed.
11. With the supraglottic airway rotated laterally 45-90° such that the blue orientation line is touching the right corner of the mouth, introduce tip into mouth and advance behind the base of the tongue.
12. As the tube gently advances, rotate the tube back to midline so that the blue orientation line faces chin.
13. Advance tube until base of connector aligns with teeth or gums. This should be completed in 30 seconds otherwise insert NPA/OPA, preoxygenate for one minute and reattempt tube placement.
14. Inflate the cuffs using the supplied syringe. The supraglottic airway may rise as it seats itself in the airway.
15. Attach BVM to the tube and ventilate patient.
16. Verify supraglottic airway placement: Look for chest rise; Listen with stethoscope for absence of epigastric air entry while bagging; Listen with stethoscope for breath sounds in both axillae while bagging; Attach EtCO2 and monitor capnography waveform. If air is leaking around balloon and out of mouth, add small quantities of air to the balloon (5-10 ml at a time) to ensure oropharyngeal seal.
17. If unable to ventilate the patient after placement, deflate balloons and adjust depth of tube to optimize ventilation. If unsuccessful, insert OPA/NPA and ventilate with BVM. If still unable to ventilate, consider Cricothyrotomy per PROCEDURE Cricothyrotomy.
18. After successful placement, secure tube and continue to monitor for adequate ventilations.
19. Reassess adequate tube placement every time patient is moved.
20. Consider orogastric tube placement (Procedure: *Orogastric Tube Insertion*).

MEDICATIONS

With MC consultation, sedation (MEDICATIONS: 3148 Ketamine or 3160 midazolam) and analgesic (MEDICATIONS: 3107 Fentanyl or 3170 Morphine Sulfate) administration may be indicated for intubated patients who have become agitated or combative following intubation.

NOTES AND PRECAUTIONS

- Do not delay BLS airway, ventilations, CPR, or AED to place a supraglottic airway.
- If during tube placement patient begins to gag and/or vomit, remove the supraglottic airway, suction as needed, and reassess mental status prior to further attempts.
- If unable to fully insert the supraglottic airway despite changing the angle of insertion, remove the tube, coil it tightly to increase its curvature, and then reinsert it quickly before it fully uncoils.
- If narcotic overdose is suspected as the cause of ALOC, give naloxone (Narcan) per PROTOCOL: *Altered Mental Status* prior to inserting the supraglottic airway. If no effect, insert tube as indicated.

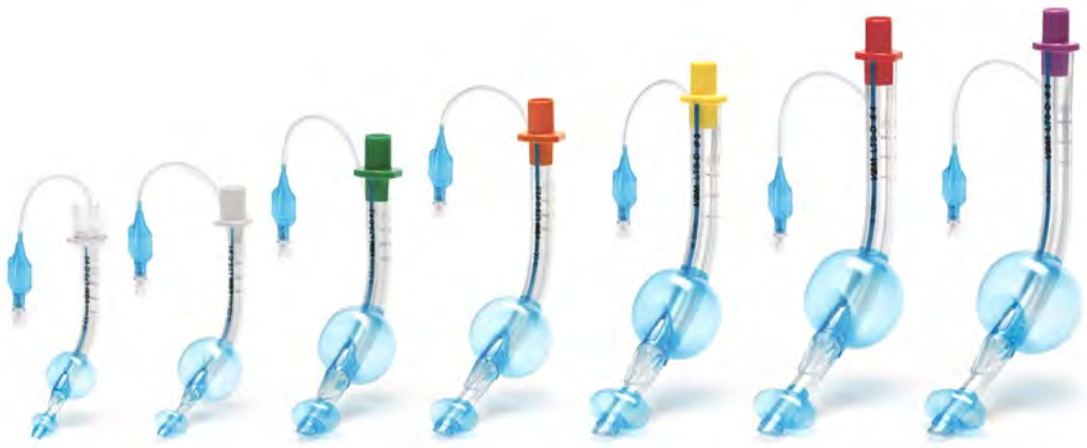
KING LTS-D SIZING

Pediatric

Tube Size	Size 0	Size 1	Size 2	Size 2.5
Connector Color	Transparent	White	Green	Orange
Patient Criteria	< 5 kg	5-12 kg	26-55 lb. 35-45 in	55-77 lb. 41-51 in
Recommended Cuff Volume	10 ml	20 ml	35 ml	40-45 ml
Max. Cuff Pressure	60 cm H_2O	60 cm H_2O	60 cm H_2O	60 cm H_2O
External Diameter of the Tube	9 mm	9 mm	14 mm	14 mm
Bronchoscopy Via Ventilation Lumen	< 3.0 mm	< 3.0 mm	< 4.0 mm	< 4.0 mm
Suction Catheter	10 Fr	10 Fr	16 Fr	16 Fr

Adult

Tube Size	Size 3	Size 4	Size 5
Connector Color	Yellow	Red	Purple
Patient Criteria	4-5 feet	5-6 feet	> 6 feet
Recommended Cuff Volume	50-60 ml	70-80 ml	80-90 ml
Max. Cuff Pressure	60 cm H_2O	60 cm H_2O	60 cm H_2O
External Diameter of the Tube	17.6 mm	17.6 mm	17.6 mm
Bronchoscopy Via Ventilation Lumen	< 6.0 mm	< 6.0 mm	< 6.0 mm
Suction Catheter	18 Fr	18 Fr	18 Fr



Airway Management: Cricothyrotomy - Needle

CLINICAL INDICATIONS

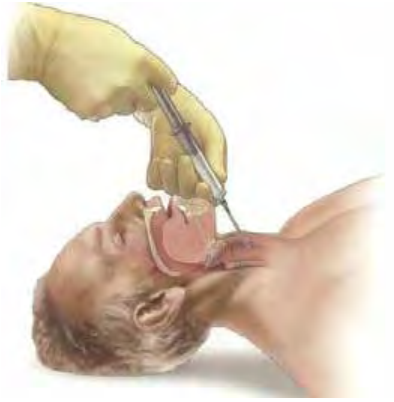
- Complete airway obstruction not relieved by manual procedures
- Inability to insert ALS airway and inability to successfully ventilate using BVM ventilation

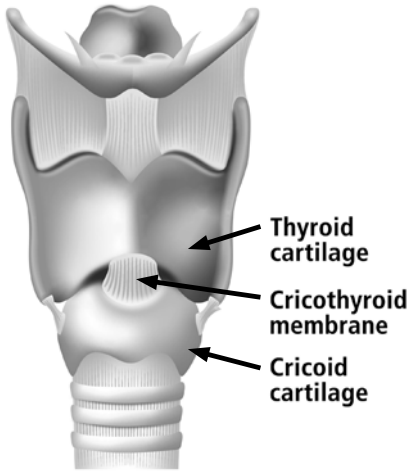
EQUIPMENT

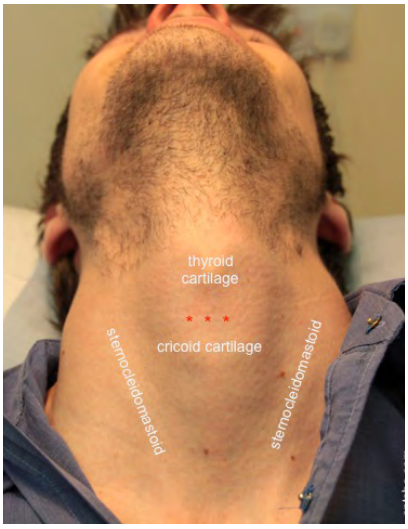
- 10 ga Angio catheter
- 3 ml syringe
- 3.0 & 3.5 ETT adapters, or 7.0 ETT adapter into 3ml syringe
- BVM attached to oxygen

PROCEDURE - NEEDLE CRIC

1. Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck unless C-spine injury is suspected.
2. Palpate the neck in the midline and locate the slight depression just below the notch of the thyroid cartilage, between the thyroid cartilage and the 1st tracheal ring. This is the position of the cricothyroid membrane.
3. Prepare the area with antiseptic solution (iodine preferred unless patient allergic.)
4. Stabilize the airway between thumb and forefingers.
5. Attach a 3ml syringe to the needle with catheter then insert into the cricothyroid membrane at a 45-degree angle toward the feet.
6. Aspirate for air return as catheter is inserted. The trachea is usually ½"-¾" deep to skin surface. Once air return is obtained, remove needle while advancing catheter.
7. Hold manually to stabilize catheter and attach the ETT adapter to the syringe and begin ventilations with the BVM with oxygen.
8. Secure the IV cannula with tape after confirming correct placement:
    - Assess chest rise
    - Verify absence of gastric sounds
    - Check adequacy of breath sounds
    - Assess for complications: reassess ventilation and placement if subcutaneous air is noted





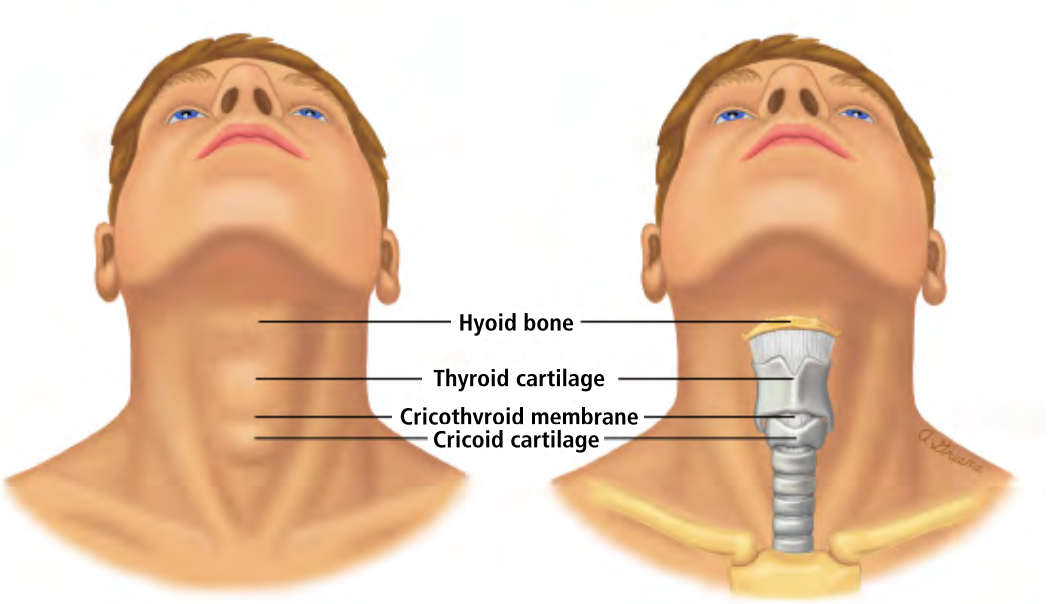


NOTES AND PRECAUTIONS

- Hazards in performing this procedure are primarily those of damage to nearby structures and major vessels on either side of the midline, to the vocal cords if the puncture is made too high, or a through and through injury of the trachea if the puncture is made too deeply.
- Palpation of the cricothyroid membrane is very difficult in the infant and young child. The key to success is immobilization of the trachea throughout the procedure.
- Needle Cricothyrotomy is for use only as a temporary measure providing of oxygenation and does not provide adequate ventilation if used for more than 20-30 minutes. If using pulse oximetry and capnography, expect low O2 saturation levels and high EtCO2 levels. Watch for chest hyperinflation, stopping bagging may be necessary to allow for exhalation. Continue attempts to obtain an advanced airway and remove obstructions.
- Due to the small caliber of this rescue airway, a prolonged exhalation phase is often required. Allow adequate time for exhalation.
- Reassess placement every time patient is moved.
- Different manufacturers may have slight variations in their angiocath and supraglottic airway adapters. The BD 10g Angiocath & Kimberly Clark 3.0 ET tube adapter fit well together. However, manufacturer's equipment may be used if it fits well and forms an air-tight seal. This set of equipment should be checked and prepackaged prior to patient care.

MEDICATION CONSIDERATION

Sedation (MEDICATIONS: 3148 Ketamine or 3160 midazolam) and analgesic (MEDICATIONS: 3107 Fentanyl) administration may be indicated for patients who have become agitated or combative following cricothyrotomy.



https://aomcfoamed.com/2020/12/13/cricothyrotomy/

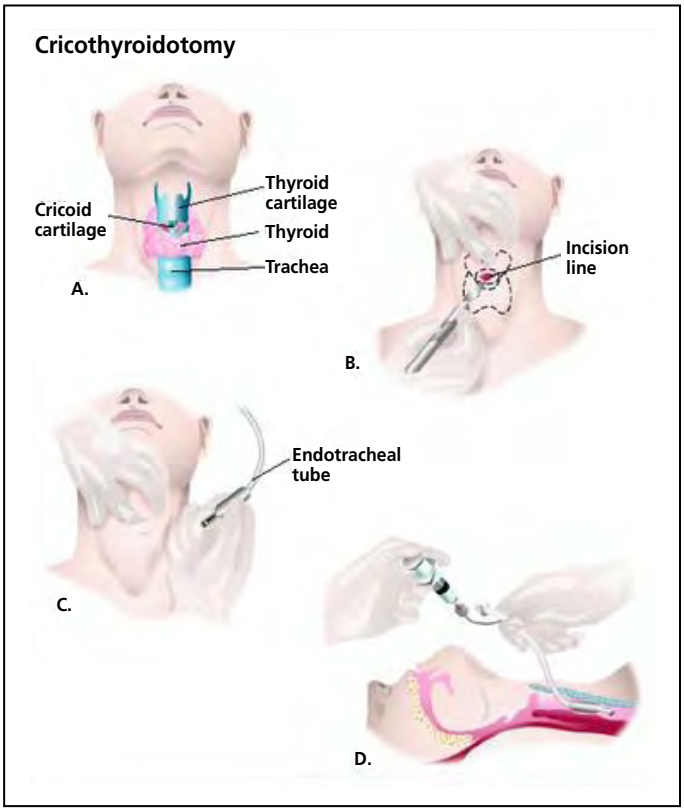
Airway Management: Cricothyrotomy - Surgical

EQUIPMENT

- Cricothyrotomy kit:
  - » Scalpel (#20 blade preferred)
  - » Gum elastic bougie
  - » 6.0 Cuffed tracheostomy tube or ETT
  - » 10ml syringe
  - » securement device

PROCEDURE

1. Place the patient in a supine position with support under the shoulders.
2. Stabilize the thyroid cartilage with the fingers of your non dominant hand.
3. Palpate the neck in the midline and locate the cricothyroid membrane, a slight depression just below the notch of the thyroid cartilage, between the thyroid cartilage and the 1st tracheal ring.
4. Prepare the area with antiseptic solution.
5. Make a 2-4 cm vertical incision through the skin overlying the cricothyroid membrane.
6. Using a scalpel, puncture the cricothyroid membrane horizontally.
7. Insert your finger or mosquito hemostats through the incision, if tracheal hook is available—utilize to keep the incision open.
8. Slide the gum-elastic bougie through the incision, guiding it inferiorly into the trachea.
9. Pass the cuffed endotracheal tube or tracheostomy tube over the bougie until the balloon is no longer visible.
10. Secure in place.
11. Attach the connecting tube to the BVM to ventilate and confirm placement.
12. Confirm placement by visualizing chest rise, checking breath sounds, SPO2, EtCO2, and absence of gastric sounds.



Cricothyroidotomy
To perform a cricothyroidotomy, the surgeon makes an incision into the cricoid cartilage of the throat (B). The incision is held open while an endotracheal tube is inserted (C). The tube is secured in the trachea to maintain an airway for the patient (D). (Illustration by GGS Inc.)

Read more: https://www.surgeryencyclopedia.com/Ce-Fi/Cricothyroidotomy.html#ixzz7q88AXdB5

1047

Airway Management: Cricothyrotomy via QuickTrach

EQUIPMENT

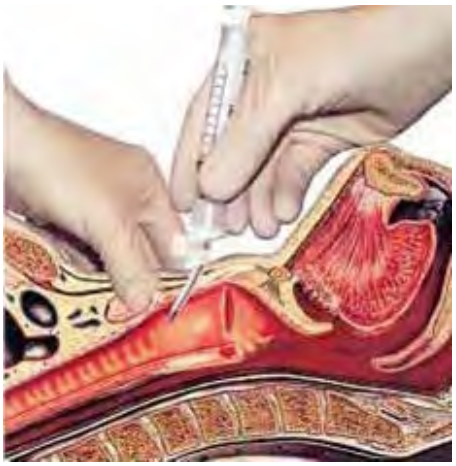
- QuickTrach—Emergency Cricothyrotomy Kit
- Contents—1 QuickTrach syringe with stopper, 1 connecting tube with 15 mm adapter, 1 cushion neckband

  ADULT—4.0mm for 77 lbs (35kg) and heavier
  PEDIATRIC—2.0 mm for 22 lbs to 77 lbs (10kg to 35 kg)
  Under 10kg, use Needle Cric

- BVM attached to oxygen.

PROCEDURE

1. Place the patient in a supine position with support under the shoulders and mild hyperextension of the head, unless C-spine injury is suspected.
2. Identify the structures of the Larynx.
3. Stabilize the thyroid cartilage with the fingers of your non dominant hand.
4. Palpate the neck in the midline and locate the cricothyroid membrane, a slight depression just below the notch of the thyroid cartilage, between the thyroid cartilage and the 1st tracheal ring.
5. Prepare the area with antiseptic solution.
6. With dominant hand, insert the QuickTrach needle with catheter into the cricothyroid membrane at a 90-degree angle.
7. Aspirate for air return as catheter is inserted. A saline flush with 1-2 ml of saline can be used in place of the included syringe. The trachea is usually ½-¾" deep to skin surface.
8. Once air return is obtained, incline QuickTrach to 45 degrees and advance to the stopper.
9. Remove the stopper.
10. Hold the needle still while advancing the catheter until the flange is against the skin. Then remove the needle.
11. Secure with the padded strap.
12. Attach the connecting tube to the BVM to ventilate.
13. Confirm placement by visualizing chest rise, checking breath sounds, SPO2, EtCO2, and absence of gastric sounds.



Apneic Oxygenation

Apneic oxygenation (ApOx) is the passive flow of oxygen into the alveoli during apnea. This passive movement occurs due to the differential rate between alveolar oxygen absorption and carbon dioxide excretion producing a mass flow of gas from the upper respiratory tract into the lungs.

Ideally, this process requires a de-nitrogenating of the airway circuit—flooding the airways with oxygen—which allows oxygen to move into the bloodstream and tissues due to bulk flow down and across a pressure gradient. Do not delay performing this step.

Note that without ventilation, CO2 will continue to build up in the bloodstream and tissues.

Apneic oxygenation should be used during the preoxygenation phase of RSA. It can also be used during hands-only (compression only) CPR as a stop-gap measure until high-quality BVM ventilations can be performed.

EQUIPMENT:

Airway Adjuncts—NPAs and OPA

Nasal Cannula attached to oxygen source (15L/min) AND

NRB mask attached to separate oxygen source—15L/min OR

BVM with PEEP valve at 10-15cm H20 attached to separate oxygen source at 15L/min

Note: BVM mask seal with PEEP valve may provide expiratory pressure to splint the alveoli open—like CPAP

PROCEDURE:

1. Start preoxygenation with head elevated if possible.
2. During preoxygenation, keep the nasal cannula on underneath your primary preoxygenation technique. Consider taping cannula to face to prevent dislodgement
3. Normal adjunctive airway techniques/equipment (jaw thrust, oropharyngeal airway) remain useful. In particular, a NPA can maintain patency of at least one NARES.
4. Attach the nasal cannula to a separate oxygen source at 15L/min.
5. After preoxygenation, leave the nasal cannula on after removing NRB or BVM mask. It should not get in the way of the introduction of the SGA.

1055

Blood Glucose Analysis (BGL)

CLINICAL INDICATIONS

Patients with suspected hypoglycemia (e.g., diabetic emergencies, change in mental status, seizures, syncope)

EQUIPMENT

Test strips, gauze 2x2, lancet, alcohol pad, glucometer

PROCEDURE

1. Gather and prepare equipment.
2. Clean site with an Alcohol Prep Pad or other cleansing swab. Allow the area to dry.
3. Perform finger stick with a lancet. Blood may also be obtained from an IV stick.
4. Place correct amount of blood on reagent strip per the manufacturer's instructions. Dispose of lancet in sharps container.
5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol.
6. Repeat glucose analysis as indicated for re-assessment after treatment and as per protocol.
7. Device may need calibration or control test before use on patient, per instruction manual. Check expiration date of test strips and control solution (both may have different opened and unopened expiration dates).

Protect Glucometer kit from heat, light, and freezing.

Blood Sample Collection

PURPOSE

The collection of evidentiary blood by a qualified EMS provider when requested by law enforcement.

DEFINITIONS

Qualified Provider: Is an NPS ALS-provider (Parkmedic or Paramedic) who has been trained in evidentiary blood draw procedures and is approved to conduct this procedure.

DOCUMENTATION

- All blood draw collections will be documented in according to the Blood Collection Kit instructions.
- A patient care report (PCR) is not to be completed unless this person is considered a patient by another procedure, policy, or protocol. Document blood collection on PCR as event during patient care.

EQUIPMENT

- Chief Ranger-approved Blood Collection Kit
- Vacutainer hub
- Butterfly needle or fresh IV site
- Povidone iodine prep pad (or prep pad provided in kit)—do not use alcohol prep pads
- Tourniquet

PROCEDURE

Follow Blood Collection Kit Instructions in conjunction with instructions below.

1. Receive verbal request by law enforcement. LE officer needs to remain present throughout procedure by policy.
2. Prep equipment.
3. Complete "Subject Specimen" labels, "Expiration Date on Tubes" and "Lot # on Tubes" on "CHECKLIST FOR MEDICAL STAFF" (on "BLOOD TEST REQUEST FORM").
4. Apply tourniquet and prep draw site with iodine pad or provided wipe. Do NOT use alcohol prep pads.
5. Complete venipuncture in new site. (Never inject ANYTHING through the same site, including saline).
6. Remove the tourniquet.
7. Fill both blood collection tubes. DO NOT REMOVE VIAL CAPS OR POWDER.
8. Note the time of collection.
9. Mix blood with powder in tube.
10. Affix completed "SUBJECT SPECIMEN" labels to tubes. Seal collection tubes with completed "SPECIMEN SECURITY SEALS" placed over vial cap.
11. Place sealed vials in bubble wrap, seal with initialed "EVIDENCE" seals (one over each pouch). Place bubble wrap package in Ziploc with absorbent pad.
12. Complete "CHECKLIST FOR MEDICAL STAFF" paperwork supplied with Blood Collection Kit. Do NOT complete paperwork intended for Officers.
13. Immediately turn over custody of samples and unsealed collection kit to Law Enforcement Officer.

NOTES AND PRECAUTIONS

- Confirm with law enforcement that scene is safe for noncommissioned personnel.
- Noncommissioned staff are not to engage in controlling a suspect. Remove yourself from situation if indicated.
- Always ensure professionalism by all providers. This is a medical procedure, not punishment.

BEST PRACTICES (IF ABLE):

- This is a time sensitive procedure; avoid delays whenever possible.
- Have a provider separate from investigating officer do the collection.
- Utilize video recording (could be body-worn camera) during entire process.

Example of test kit: may not be the same in all units

1065

CO2 - Capnography

CLINICAL INDICATIONS

- Patient with an advanced airway in place (Supraglottic Airway) or requiring assisted ventilations
- Altered patients (e.g., suffering from an inhaled poison, toxin, or overdose, DKA, etc.)
- Patients with respiratory distress

DEFINITIONS

Capnometry is the numeric value of expired CO2 from the patient. This provides an important measurement of patient ventilation (clearance of CO2).

Capnography is the waveform display of expired CO2 from the patient. This is an important confirmation technique for proper airway monitoring.

PROCEDURE

1. Manage airway according to the appropriate PROCEDURE: *1015 Airway Management.*

2. Attach side-stream capnography device to the supraglottic airway. It can also be attached to an oxygen delivery device or a nasal cannula specific to CO2 monitoring can be used on patients who are breathing adequately themselves.

3. Note CO2 level and maintain EtCO2 output between 35-45 mmHg.

   The following approximates the degree of ventilation:

   > 45 mmHg = hypoventilation
   35-45 mmHg = normal ventilation
   30-35 mmHg = hyperventilation
   > 30 mmHg = aggressive hyperventilation (avoid in all patients)

4. Patients who are posturing or who have other clinical presentations indicative of head trauma (blown pupil, focal motor findings) should be ventilated to maintain an EtCO2 level between 35-45 mmHg.

5. The capnography device shall remain in place with the airway and be monitored throughout the prehospital care and transport.

Document the procedure and results on the Patient Care Report (PCR).

NOTES AND PRECAUTIONS

- Do not delay medication administration to apply CO2 monitoring devices.
- Remember, pulse oximetry does not equate to ventilation. You can have a poorly ventilated patient displaying an oxygen saturation of 100%. Excessively high PaCO2 levels can be detrimental to your patient's outcome.
- A sudden drop in CO2 output from normal (35-45 mmHg to 15-20 mmHg) and an obvious change in waveform are indicative of tube displacement, most likely into the hypopharynx. Re-assess tube placement immediately and take corrective action.
- DO NOT rely on pulse oximetry or EtCO2 monitoring solely to determine the efficacy of the intubation. It is an adjunct tool and does not replace clinical assessment or judgement.

INTERPRETING CAPNOGRAPHY

Alterations of the normal capnograph or EtCO2 values are the result of changes in metabolism, circulation, ventilation, or equipment function.

There are four phases of the waveform that requires analysis.

1. A to B is the flat baseline segment or Respiratory Baseline representing the beginning of exhalation of CO2: free gas that is contained in dead space from the conduction airways (e.g., trachea, bronchi). This value is normally zero.

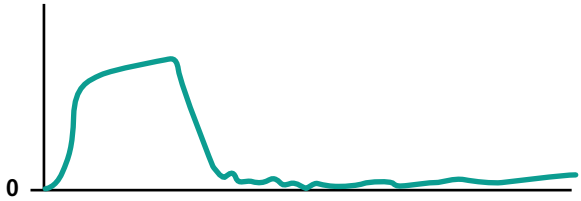
2. B to C is the Expiratory Upstroke segment, which is a sharp rise representing exhalation of a mixture of dead space gases and alveolar gases.

3. C to D represents the alveolar plateau segment characterized by exhalation of mostly alveolar gas. Point D is the end tidal (EtCO2) value that is recorded and displayed by the monitor (peak concentration of CO2 occurring at the end of expiration).

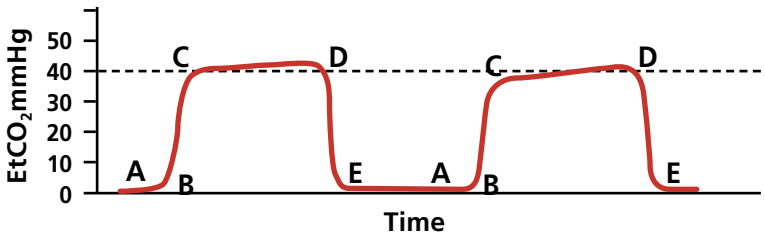
4. D to E represents the Inspiratory Downstroke segment, which is a sharp fall and reflects the inhalation of gases that are CO2—free such as room air or supplemental oxygen.

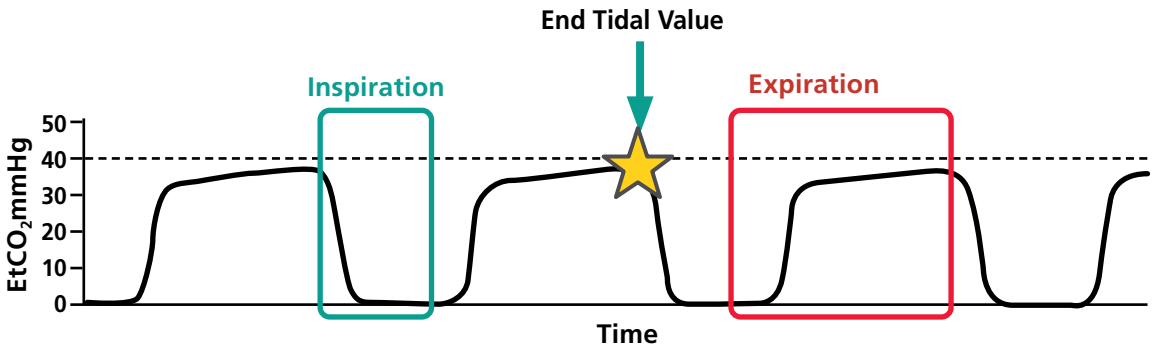
1. Sudden loss of EtCO2 to zero or near zero:

- Possible Causes:
  - » Supraglottic airway is in esophagus
  - » Apnea
  - » Supraglottic airway is not connected to oxygen supply/capnography detector
  - » Total obstruction/mucus plugging
  - » Capnography malfunction—if abnormal waveform persists with change in capnography adapter, the supraglottic airway MUST be withdrawn and supraglottic airway placement reattempted.



NORMAL WAVEFORM





CPR: Cardiopulmonary Resuscitation

CPR GUIDELINES

Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age less than 1 Year, excluding Newborns)
Verifying scene safety	Make sure the environment is safe for rescuers and victim		
Recognizing cardiac arrest	• Check for responsiveness • No breathing or only gasping (i.e., no normal breathing) • No definite pulse felt within 10 seconds • (Breathing and pulse check can be performed simultaneously in less than 10 seconds)		
Activating emergency response system	***If a mobile device is available, phone emergency services (9-1-1)***		
	If you are alone with no mobile phone, leave the victim to activate the emergency response system and get the AED before beginning CPR. Otherwise, send someone and begin CPR immediately; use the AED as soon as it is available	***Witness collapse*** Follow steps for adults and adolescents on the left ***Unwitnessed collapse, single rescuer*** • Give 2 minutes of CPR • Leave the victim to activate the emergency response system and get the AED • Return to the child or infant and resume CPR; use the AED as soon as it is available	
Compression-ventilation ratio *without advanced airway*	***1 or 2 rescuers*** 30:2	***1 rescuer*** 30:2 ***2 or more rescuers*** 15:2	
Compression-ventilation ratio *with advanced airway*	Continuous compressions at a rate of 100-120/min. Give 1 breath every 6 seconds (10 breaths/min).	Continuous compression at a rate of 100-120/min. Give 1 breath every 2-3 seconds (20-30 breaths/min)	
Compression rate	100-120/min		
Compression depth	At least 2 inches (5 cm)*	At least one third AP diameter of chest Approximately 2 inches (5 cm)	At least one third AP diameter of chest Approximately 1½ inches (4cm)
Hand placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)	***1 rescuer*** 2 fingers or 2 thumbs in the center of the chest, just below the nipple line ***2 or more rescuers*** 2 thumb-encircling hands in the center of the chest, just below the nipple line If the rescuer is unable to achieve the recommended depth, it may be reasonable to use the heel of one hand.
Chest recoil	Allow complete recoil of the chest after each compression; do not lean on the chest after each compression.		
Minimizing interruptions	Limit interruptions in chest compressions to 10 seconds or less with a CCF goal of greater than 80%.		

NEONATAL GUIDELINES

- Assisted ventilations should be delivered at a rate of 40-60 breaths/minute: ventilations should be performed for 30-60s prior to chest compressions even if there is no pulse.
- If HR is 60 or faster: no compressions.
- HR < 60 start compressions. The ratio of compressions to ventilations is 3:1: three compressions with 1 breath (compression rate of 90/ min, ventilation rate of 30/min)
- Compressions should be delivered to lower 1/3 of sternum at a depth of 1/3 anterior or posterior diameter of chest.

CPR - Lucas Chest Compression System

CLINICAL INDICATIONS

The LUCAS Chest Compression System is used for performing external cardiac compressions on adult patients who have acute circulatory arrest, defined as the absence of spontaneous breathing and pulse as well as loss of consciousness. LUCAS must only be used in cases where chest compressions are likely to help the patient.

EQUIPMENT

Upper Part which contains the proprietary and rechargeable LUCAS Battery and the compression mechanism with the disposable Suction Cup.

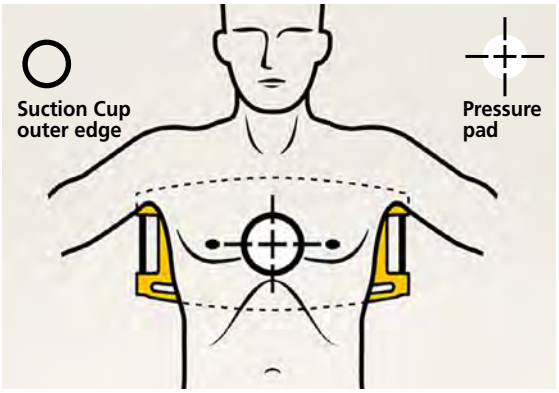
Back Plate which is positioned underneath the patient as a support for the external chest compressions.

Stabilization Strap(s) which helps to secure the position of the device in relation to the patient.

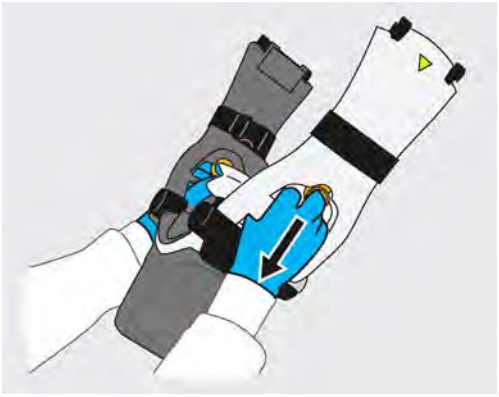
PROCEDURE

1. Push ON/OFF on the Control Panel for 1 second to power up LUCAS device and start the self-test. The green LED adjacent to the ADJUST key illuminates when the device is ready for use.

2. Pause manual CPR briefly while putting the LUCAS Back Plate under the patient, immediately below the arm pits. MINIMIZE INTERRUPTIOIN TO MANUAL CPR WHEN PLACING THE LUCAS DEVICE. See diagram for proper placement:



3. Resume manual CPR immediately.
4. Pull the release rings to make sure that the claw locks are open.



5. During manual CPR, attach the support leg nearest to you to the back plate.
6. Stop manual CPR while attaching the other support leg to the back plate.
7. Listen for a click. Pull up once to make sure the parts are correctly attached.
8. Use your finger to ensure that the lower edge of the suction cup is immediately above the end of the sternum.
9. Place the LUCAS device in the ADJUST MODE (1) and then push the suction cup down with two fingers until the pressure pad touches the patient's chest without compressing the chest.
10. Push PAUSE (2) to lock the start position. Use a Sharpie to outline the position of the suction cup.
11. Push ACTIVE (continuous) or ACTIVE (30:2) to start compressions (3).
12. Install the neck strap, place the padded portion as close to the patient's shoulders as possible.
13. Secure the patient's arms to the legs of the LUCAS device using the installed straps.

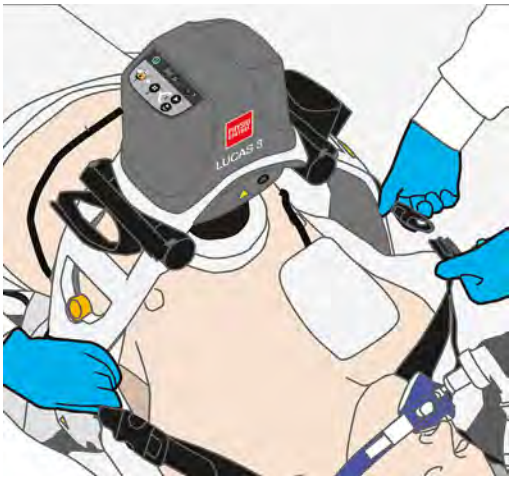
14. IF SUCTION CUP SHIFTS POSITION: Immediately push ADJUST and adjust the position back to the original position outlined by the Sharpie earlier.

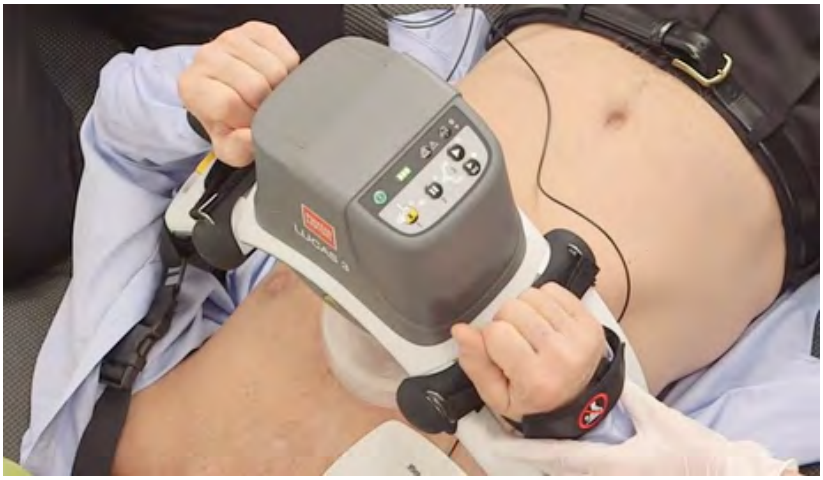
15. To lift the patient to a stretcher:

    A. Push PAUSE to temporarily stop the compressions.
    B. Lift and move the patient to a stretcher or other transportation device.
    C. Make sure that the suction cup is in the correct position.
    D. Push ACTIVE (continuous) or ACTIVE (30:2) to re-start compressions.

16. To remove the LUCAS Device:

    A. Push ON/OFF for 1 second.
    B. Remove all straps.
    C. Pull the release rings to remove the upper part from the back plate.
    D. If patient's condition allows, remove the back plate.





LUCAS® 3 Chest Compression System

Quick reference guide

ON/OFF

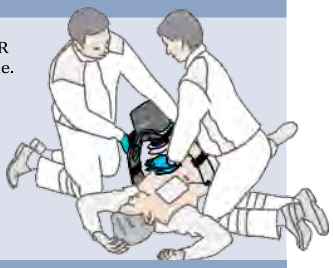
ADJUST

Manual positioning of the Suction Cup

ADJUST

PAUSE

30:2 ACTIVE

Rescuer 1 (LUCAS device operator)	Rescuer 2
1. Power on the LUCAS device	
 • Push ON/OFF to start self-test and power up the LUCAS device. • The device will be ready and in the ADJUST mode.	• Provide manual CPR. 
2. Place the LUCAS BACK PLATE	
 • Pause manual CPR briefly. • Put the BACK PLATE under the patient, immediately below the armpits.	• Assist BACK PLATE placement. • Resume manual CPR. 
3. Attach the UPPER PART	
 • Pull the RELEASE RINGS once to open CLAW LOCKS. Then let go of the rings.  • Stop manual CPR briefly while attaching the UPPER PART to the BACK PLATE. Listen for "CLICK" sound. Pull up once to assure attachment.	• Continue manual CPR for as long as possible. • Help to attach the UPPER PART. 
4. Push down SUCTION CUP. Adjust position if needed.	
 • Push down the SUCTION CUP • The lower edge of SUCTION CUP should be immediately above the end of the sternum • Adjust if necessary (stay in ADJUST mode) 	• Assist 
5. Lock position. Start compressions.	
 • Push PAUSE to lock START POSITION. • Push ACTIVE (continuous) or ACTIVE (30:2) to start compressions.	• Assist 
Attach stabilization strap. Follow CPR protocols	

1080

Cardioversion: Defibrillation (Manual Defib)

PURPOSE

- Unsynchronized cardioversion (defibrillation) is a HIGH ENERGY shock which is delivered as soon as the shock button is pushed on a defibrillator. This means that the shock may fall randomly anywhere within the cardiac cycle. Unsynchronized cardioversion (defibrillation) is used when there is no coordinated intrinsic electrical activity in the heart (pulseless VT/VF) or the defibrillator fails to synchronize in an unstable patient.
- Unsynchronized cardioversion (defibrillation) is used for pulseless ventricular tachycardia or ventricular fibrillation.

CLINICAL INDICATIONS

- Pulseless ventricular tachycardia, ventricular fibrillation
- Other unstable rhythms with pulses to which the defibrillator cannot sync to provide shock

PROCEDURE - GENERAL GUIDELINES

1. Assess patient to ensure patient is pulseless and/or unstable.
2. Consider premedication per MEDS:

   A. 3160 midazolam or
   B. 3107 Fentanyl and
   C. 3148 Ketamine Hydrochloride.

3. Apply pads to the patient's chest in the proper position: Adults: Anterior-Posterior or both pads on chest Children: Anterior-Posterior positions

   NOTE: Place ECG electrodes on arms and legs to avoid interference with pads on the chest.

4. Print baseline rhythm strip.
5. Set the defibrillator by setting the joules to either the manufacture recommended setting 150J or the maximum setting of 200 J (for biphasic).

   Pediatric dosing:
   A. 1st shock: 2 Joules/kg, Subsequent shocks: 4 Joules/kg.

6. Continue chest compressions while the defibrillator is charging.
7. Follow the directions for the type of defibrillator being used.
8. Immediately resume chest compressions and ventilations for 2 minutes; After 2 minutes of CPR, analyze rhythm and check or pulse only if appropriate for rhythm.
9. Repeat the procedure every two minutes as indicated by patient response and ECG rhythm. Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.

Cardioversion: Synchronized

PURPOSE

- Synchronized cardioversion is an ENERGY SHOCK that uses a sensor to deliver electricity that is synchronized with the peak of the QRS complex (the highest point of the R-wave). When the "sync" option is engaged on a defibrillator and the shock button pushed, there will be a delay in the shock. During this delay, the machine reads and synchronizes with the patients ECG rhythm. This occurs so that the shock can be delivered with or just after the peak of the R-wave in the patients QRS complex.
- Synchronization avoids the delivery of a LOW ENERGY shock during cardiac repolarization (t-wave). If the shock occurs on the t-wave (during repolarization), there is a high likelihood that the shock can precipitate VF (Ventricular Fibrillation).
- Synchronized cardioversion is timed off the peak of the QRS wave and is used to treat clinically unstable tachycardia in patients with a pulse. Note that the synchronized cardioversion, there is a pause between hitting the button and the actual cardioversion.
- In the prehospital setting, stable patients should be monitored and transported, unstable patients should receive cardioversion/defibrillation as indicated below, and patients with borderline vitals should generally have medical control for consultation prior to electrical therapy.

CLINICAL INDICATIONS

- Regular, wide-complex tachycardia with a pulse
- Unstable atrial fibrillation, atrial flutter, or supraventricular tachycardia
- Patient has a pulse (i.e., the pulseless patient requires unsynchronized cardioversion/defibrillation)

PROCEDURE - GENERAL PRINCIPLES

1. Assess patient and initiate IV if appropriate and patient is stable.
2. Print baseline rhythm strip.

   NOTE: Place ECG electrodes on arms and legs to avoid interference with pads on the chest.
3. Pad placement; per the specific device being used.
4. Be prepared for unsynchronized cardioversion/defibrillation.
5. Consider premedication per MEDS: *3160 Midazolam* or *3107 Fentanyl* and *3148 Ketamine Hydrochloride.*

1090

CPAP (Continuous Positive Airway Pressure)

CLINICAL INDICATIONS

CPAP is indicated in patients with inadequate ventilation but who are conscious, breathing spontaneously, and are able to follow commands. This could be as a result of bronchospasm (COPD or asthma), pulmonary edema, CHF, pneumonia, HAPE, or postdrowning hypoxemia.

CONTRAINDICATIONS

- Altered level of consciousness and unable to protect their airway
- Respiratory arrest
- Hemodynamic instability characterized by a systolic blood pressure below 90 mmHg
- Suspected pneumothorax and/or other chest trauma
- Patient has a tracheostomy
- Significant facial trauma and/or lacerations or anatomical incompatibility
- High risk of aspiration i.e., actively vomiting, actively coughing foreign body airway occlusion

PROCEDURE

1. Explain procedure to patient.
2. Ensure adequate oxygen supply available. Call for additional tanks or ambulances if needed.
3. Attach CPAP mask and associated equipment.
4. Assemble required equipment and personnel for ***1016 Difficult/Difficult airway*** in the event the patient deteriorates or is unable to tolerate CPAP.
5. Place patient on continuous pulse oximetry, capnography, and cardiac monitoring.
6. Turn oxygen source on to 15 L/min. to start airflow. Start at 100% oxygen and titrate for O2 sat. > 95% if possible.
   A. ADULTS: Start CPAP at 10cm H2O and decrease if possible.
   B. PEDS < 12 yo: Start CPAP at 4 cm H2O, increase by 2 prn up to a max of 12-14 cm H2O
7. Place the mask over the mouth and nose and if not possible instruct patient to hold mask until comfortable.
8. Secure the mask with straps and check for air leakage.
9. Monitor and document the patient's respiratory response to treatment, including full vitals.
10. If patient deteriorates esp. SBP<90, discontinue CPAP and assess the patient for positive pressure ventilations (BVM) and the need for ***1016 Difficult/Difficult Airway***. If SBP=80-100, decrease CPAP to 5cm H20.
11. Continue to coach patient to keep mask in place and readjust as needed.
12. Notify receiving EMS service or destination hospital that CPAP has been used
13. If patient is experiencing anxiety, attempt to coach breathing and calm patient. Consider medication for anti-anxiety (ketamine (preferred); midazolam (beware respiratory depression)). Contact MC for direction.
14. Check around the mask for leaks and adjust the mask and/or head straps accordingly.
15. If the patient requires suctioning of the oral cavity, insert a suction catheter through the opening of the CPAP system. CPAP pressure will not be affected.
16. EtCO2 is to be monitored with a nasal EtCO2 adapter.
17. A nebulizer can also be attached to the CPAP mask if indicated; insert the male end of the nebulizer into the face mask, then insert the white end of the CPAP into the nebulizer **NOTE:** You will need an additional oxygen supply source to run the nebulizer.

NOTES AND PRECAUTIONS

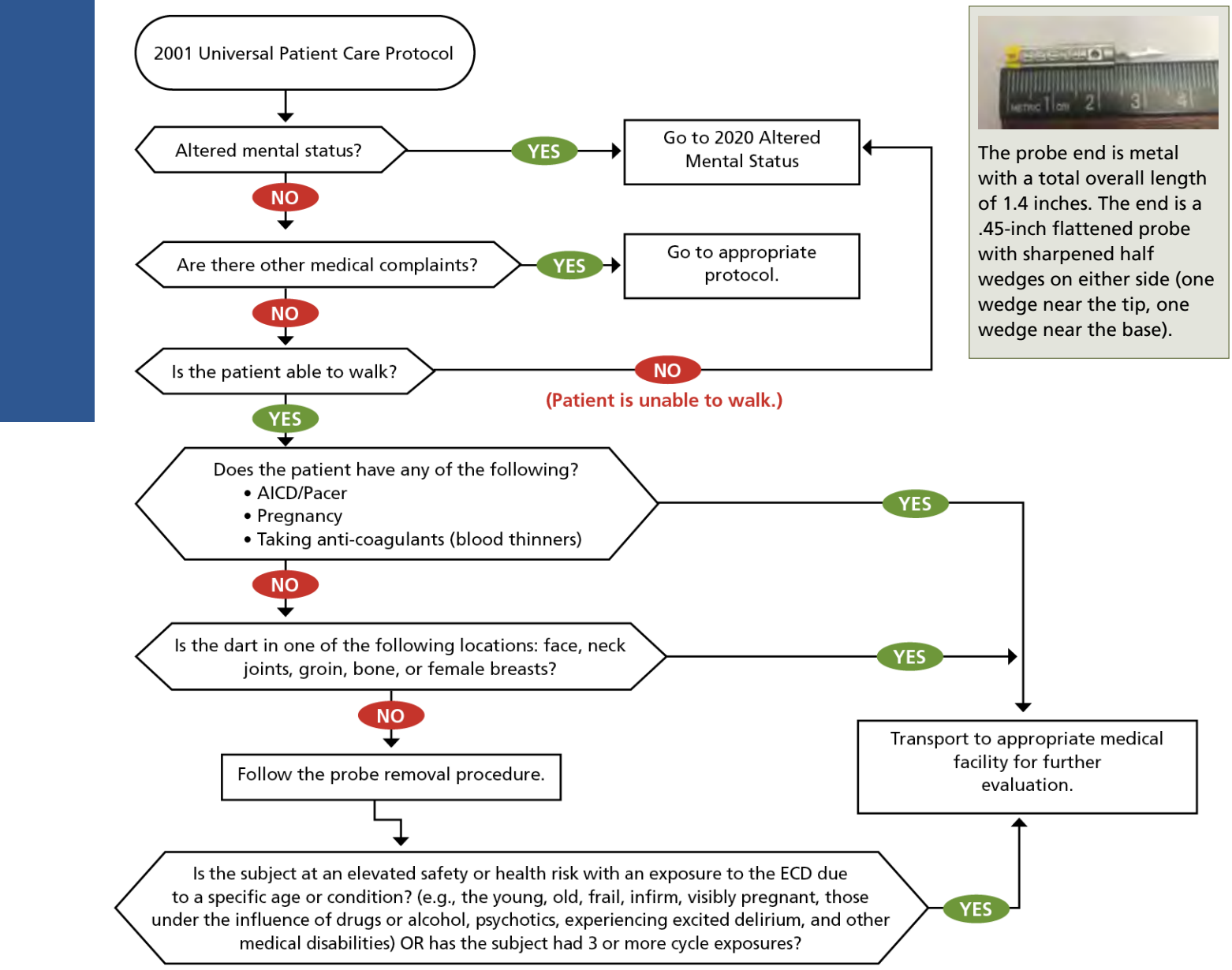
- Purpose of CPAP is to "splint" the airways open with constant pressure of air to reduce the work of breathing. In CHF, to force the excess fluid out of the alveoli and interstitial space back into the vasculature. In asthma and COPD, splinting the constricted airways open allows for more effective air exchange. CPAP may introduce transient hypotension via decreased venous return secondary to elevated intrathoracic pressure.
- Most patients will improve in 5-10 minutes. If no improvement within this time, consider intermittent positive pressure ventilation.
- Due to changes in preload and afterload of the heart during CPAP therapy, a complete set of vital signs needs to be obtained every five minutes.
- Depending on patient's underlying problem (CHF, COPD, etc.) follow appropriate protocol
- In hypertensive CHF patients, do not delay initial sublingual nitroglycerin administration to apply CPAP.
- If patient vomits or has high risk of aspiration, remove CPAP unit, clear the airway and provide respiratory assistance with BVM or advanced airway adjunct.

Electronic Control Device (ECD) - Probe Removal

CLINICAL INDICATIONS

EMS personnel may be requested to assess patients post electrical control device (ECD) or "Taser" application, with retained and/or removed probes. Be aware that secondary injuries may result from falls sustained after the device has been deployed or other patient medical emergencies prior to ECD application. If a patient exposed to an ECD is transported to a medical facility for further evaluation, a law enforcement officer shall accompany the patient.

PREPROCEDURE ASSESSMENT



The probe end is metal with a total overall length of 1.4 inches. The end is a .45-inch flattened probe with sharpened half wedges on either side (one wedge near the tip, one wedge near the base).

PROCEDURE

1. Universal precautions for infection control will be followed and probes will be treated as bio-hazard sharps.

2. Confirm that the taser cartridge is not connected to the ECD device. It is not necessary to break the wires.

3. When practical and appropriate, photographs of ECD probe impact sites should be taken before and after probe removal by LE. Photographs of probes should also be taken after their removal. Drive stun sites should be photographed as well.

4. Place open hand firmly against the subject approximately 6-8 inches away from the probe. With your other hand, grasp the probe firmly using your thumb and index finger and pull up forcefully. Once removed, check the probe to verify everything is intact and nothing remained in the skin. Photograph probe if practical. Apply direct pressure as necessary to control bleeding, then dress the wound.

5. Place the probe into the cartridge's wire spool bay (or a sharps container) to provide protection from the probes and place into a marked evidence bag.

6. Document procedure on a Patient Care Report (PCR).

NOTES AND PRECAUTIONS

- Subjects who are at an elevated safety or health risk with an exposure to the ECD due to a specific age or condition, such as the young, old, frail, infirm, visibly pregnant, those under the influence of drugs or alcohol, psychotics, experiencing excited delirium, and other medical disabilities MUST be transported to a medical facility for further evaluation.
- Subjects who have had three or more cycle exposures must also be transported to a medical facility for further evaluation.
- Probes embedded in nonsensitive areas may be removed by a law enforcement officer according to Taser procedures outlined in training. (See RM-9, ch 32).
- Probes and their expended cartridge will be taken custody of and placed into evidence by a commissioned employee. This evidence will be labeled as "bio-hazard." Generally, probes will be placed backwards into the expended cartridge's wire spool bay or a sharps container to provide protection from the probes and placed into a marked evidence bag.
- Review PROTOCOLS: *Behavioral Emergencies* and *Altered Mental Status* to help determine why the patient may have needed the use of an ECD to begin with: causes include drug and alcohol intoxication, psychiatric illness, developmental delay, head injury and any causes of altered mental status (e.g., hypoglycemia, hypoxia, infection, etc.).
- Re-examine patient thoroughly looking for secondary injuries. These may include, but are not limited to:
  - » Fall-related injuries such as fractures, lacerations/abrasions, sprains, and intracranial hemorrhage
  - » Muscle contraction-related injuries such as rhabdomyolysis, or renal failure
  - » Other injuries related to subduing an agitated individual.
- **NOTE:** Anticoagulated patients (e.g., taking warfarin, apixaban, rivaroxaban) or patients on antiplatelet agents (aspirin, clopidogrel, etc.) are at an increased risk for secondary injuries.
- Arrest-Related Death (ARD): Should one or more of the following behaviors manifest, the person may require immediate medical assistance due to preexisting conditions: possible overdose, cocaine psychosis, excited delirium, etc. Persons with agitated or excited delirium are at increased risk of serious illness and death and may require immediate medical assistance after restraint. Excited delirium signs include bizarre or violent behavior, signs of overheating/profuse sweating, disrobing, violence toward/attacking glass, lights, and reflective surfaces, superhuman strength and endurance, impervious to pain, self-mutilation, loss of consciousness, and/or disturbance in respiratory pattern.
- Patients with AICD/Pacer are potentially at higher risk of cardiac dysrhythmias or damage to the AICD/Pacer. Patients should be transported for evaluation and assessment of AICD/Pacer function.

1100

Epinephrine Autoinjector

CLINICAL INDICATIONS

Anaphylaxis (allergic reaction with respiratory distress)

Respiratory distress—Upper Airway Obstruction Nonmechanical or Bronchospasm

PROCEDURE

1. Refer to PROTOCOLS: *2010 Allergic Reaction/ Anaphylaxis* and *2230 Respiratory Distress* for indications, dosages, and detailed assessment.
2. Confirm patient is appropriate candidate to receive epinephrine.
3. Inform the patient they will be receiving an injection; side effects may include feeling shaky or heart racing.
4. Clean skin of the outer thigh with alcohol prep pad if possible.
5. Familiarize yourself with the autoinjector unit.
6. Once you are ready to use the epinephrine autoinjector, start by grasping the unit with neither end covered. The needle comes out of the end of the unit, so make sure you never press, push, or put your fingers or hand over it.
7. Form a fist around the epinephrine autoinjector, with the needle-end tip down.
8. With your other hand, pull off the safety release.
9. To inject, hold the needle-end tip near outer thigh. Then firmly push against outer thigh at a 90-degree angle, until you hear the epinephrine autoinjector click. The epinephrine autoinjector is made to work through clothing, although heavy clothing may inhibit the performance.
10. Continue to hold the epinephrine autoinjector firmly against thigh for approximately 10 seconds to deliver the medicine.
11. Now that the injection is complete, remove the epinephrine autoinjector and massage the injection site for 10 seconds.
12. Note that most of the liquid (~90%) remains in the autoinjector and cannot be reused.
13. Carefully put the unit (needle-end first) back into the carrying case. Dispose of it in a sharps container as soon as possible.
14. Observe patient for improvement or worsening of condition. Repeat exam and vitals after each dose.
15. Document procedure, vitals, and response to treatment.

NOTES

- Never put thumb, fingers, or hand over needle-end tip.
- Do not remove activation cap until ready to use.

Epinephrine Vial or Ampule

CLINICAL INDICATIONS

Anaphylaxis (allergic reaction with respiratory distress)
Respiratory distress - Upper Airway Obstruction
Nonmechanical or Bronchospasm

EQUIPMENT

Epinephrine: vial of 1 mg/ml, 1:1000 epinephrine; 1ml syringe with 25 ga needle; alcohol prep pad; band-aid

PROCEDURE

- Refer to PROTOCOLS: *Allergic Reaction/Anaphylaxis* and *Respiratory Distress* for indications, dosages, and detailed assessment.
- Inform the patient they will be receiving an injection; side effects may include feeling shaky or heart racing.
- Select and cleanse area with alcohol swab for injection. Primary sites include Deltoid (upper arm), Gluteal (upper buttock or hip site), or Vastus Lateralis (thigh) muscles. See PROCEDURE: *1068 Injections, Intramuscular* for site locations.
- Using one hand to stabilize skin, insert needle at 90 degrees into administration site and draw back checking for blood return. If there is blood return, discard the needle, start over with a fresh syringe and needle.
- If there is no blood return, administer appropriate dose of epinephrine per protocol.
- If an additional dose of is required, consult PROTOCOLS: *Allergic Reaction/Anaphylaxis* and *Respiratory Distress.*

1110

Foreign Body Airway Obstruction (FBAO)

CLINICAL INDICATIONS

A patient with a suspected blocked airway (foreign body)

PROCEDURE FOR RESPONSIVE PATIENT

DEFINITIONS:

Choking: If the patient can make sounds and cough loudly, encourage patient to continue to cough.

Choking with obstruction: If the patient cannot breathe, has a silent cough, cannot talk, or makes the universal choking sign, continue to the BLS Maneuver.

CHILD OR ADULT (one year or older):

BLS Maneuver (abdominal thrusts, sometimes called the Heimlich Maneuver):

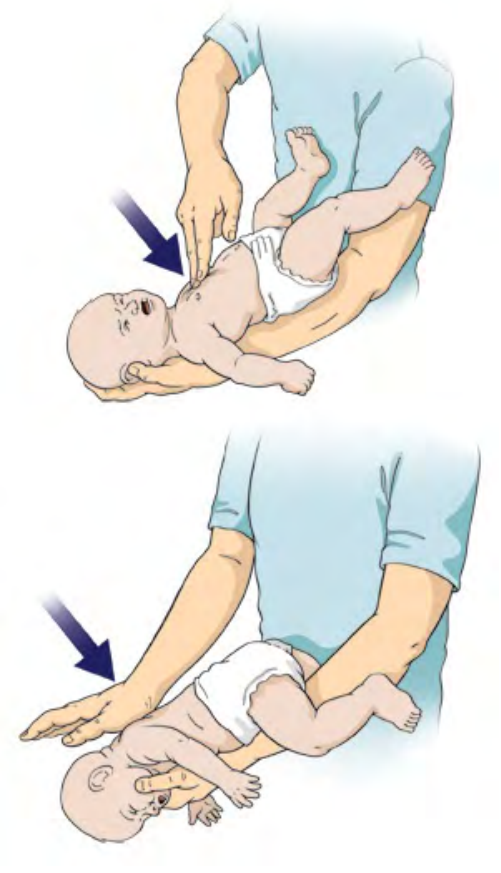
1. Ask the patient if they are choking, if they indicate "yes"—identify yourself as a medical provider and request permission to help them.
2. Stand behind the patient and wrap your arms around the patient's body.
3. Make a fist with one hand with the thumb side slightly above the belly button; make sure the fist is well below the sternum (breastbone).
4. Grasp your fist with your other hand and give quick upward thrusts to the abdomen.
5. Continue to thrust until the object is forced out and the patient can breathe, cough, or talk—or until they become unresponsive.

NOTE: For an **obese** or a **pregnant** patient, give thrusts on the chest instead of the abdomen. Place your arms under the armpits and your hands on the lower half of the breastbone, as shown.

INFANT (<ONE YEAR):

BLS: Back slaps and Chest Thrusts:

1. Hold the infant face down on your forearm. Support the infant's head and jaw with your hand.
2. Give up to five back slaps with the heel of your other hand between the infant's shoulder blades.
3. If the object does not come out after five back slaps, turn the infant onto its back, supporting the head.
4. Give 5 chest thrusts using two fingers of your other hand to push on the chest in the same place you push for CPR.
5. Repeat giving five back slaps and five chest thrusts until the patient can breathe, cough, cry, or becomes unresponsive.



PROCEDURE FOR UNRESPONSIVE PATIENT

NOTE: Interruptions to patient ventilations should not exceed 30 seconds in duration.

BLS MANEUVERS:

CONTRAINDICATION: Patient with an intact gag reflex

Initiate basic life support treatment measures, including suction and removal of visible foreign material.

1. Visually inspect the oropharynx to see if the obstruction has been removed or dislodged by manual removal or abdominal thrusts.
2. If unable to remove the foreign body or ventilate using basic airway maneuvers, begin CPR starting with 30 chest compressions:
   A. Procedures: Cardiopulmonary Resuscitation.
3. Reassess the airway to determine if the foreign body has been dislodged by compressions—if visible, remove the material and continue CPR.

ALS MANEUVERS (Laryngoscopy/Magill forceps are used by Paramedic only):

CONTRAINDICATIONS: Patient has an intact gag reflex

1. If the foreign body is not evident, visualize the entire upper airway using a laryngoscope.
2. If the foreign body is visualized by laryngoscopy, attempt to grasp and remove it using Magill forceps.
   A. You must visualize the foreign body before attempting to remove it. Do not blindly probe the pharynx.
3. If the foreign body is removed, withdraw the laryngoscope, and attempt to ventilate with a BVM.
   A. Continue basic life support protocols and prepare for immediate transport. If patient's mental status does not improve despite successful foreign body removal and basic airway maneuvers (OPA/NPA/BVM), proceed to advanced airway maneuvers (**Supraglottic Airway** placement).
4. If the foreign body remains visible but cannot be removed perform a cricothyrotomy and transport immediately.
   A. Refer to PROCEDURE: *Cricothyrotomy*.
5. If no foreign body is visible. Proceed to advanced airway maneuvers (PROCEDURE: *Supraglottic Airway*).
6. Monitor and reassess patient's airway and vital signs enroute.
7. Notify receiving facility of patient's condition and maneuvers performed.

1200

Fracture and Dislocation Management: General

NOTE: ALL Reductions MUST have MC approval prior to performing

CLINICAL INDICATIONS

- Immobilization of an extremity due to suspected fracture, sprain, or injury.
- Immobilization of an extremity to secure medically necessary devices, i.e., IV catheters.
- Reduction of fractures with compromised distal circulation, sensation, and/or motor function.

PROCEDURE

Splinting

1. Assess distal circulation, sensation, and motor function.
2. Irrigate and dress open wounds per PROCEDURE: *1190 Wound Care.*
3. Reduce dislocations if indicated by specific procedure.
4. Reduce potential fractures, if indicated, per section Reduction of Fracture, below.
5. Immobilize the joint if the joint is the site of primary injury. Immobilize joints above and below long bone injuries.
6. Suspected mid-shaft femur fractures may be immobilized with a traction splint per PROCEDURE: *1058 Fracture and Dislocation Mgmt—Traction Splint.*
7. Suspected hip and/or femur fractures may be immobilized on a long board/vacuum mattress.
8. Suspected pelvic fractures may be immobilized per PROCEDURE *1135: Pelvic Stabilization.*
9. Splint should be well padded.
10. Distal pulse sites (e.g., dorsalis pedis, radial) must be accessible for repeat assessments.
11. Elevate the injury—if practical.
12. Consider ice packs for pain management and swelling control—do not place directly on the skin.
13. Consider pain management protocol if immobilization is not adequate for managing pain.
14. Reassess distal circulation, sensation, and motor functions regularly throughout transport.
15. Document all procedures and interventions performed during the patient encounter.

Reduction of Fracture

1. Identify the site of injury.
2. Assess distal circulation, sensation, and motor function.
3. Irrigate open fractures per PROCEDURE: *1190 Wound Care.* Use NS or sterile water if available, otherwise potable water. If an open fracture, DO NOT apply traction.
4. Provide analgesia if available per PROTOCOL: *2175 Pain Management.*
5. Grasp extremity above and below injury (use two rescuers if available).
6. Apply steady gentle traction below—distal to—injury in direction of long axis of extremity.
7. Continue until the patient complains of intolerable pain, resistance is felt, or reduction is accomplished.
8. Apply splint, then reassess distal CSM, and document the procedure.

NOTE: For deformed femur fractures, reduction is best performed using a traction splint.

NOTES AND PRECAUTIONS

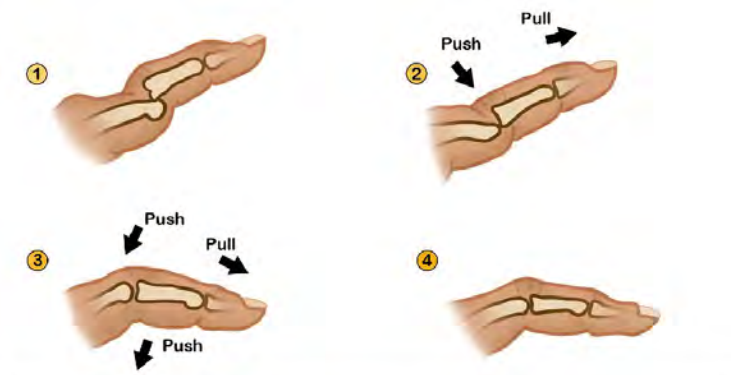
- Deformities (fractures and/or dislocations) with distal neurovascular compromise should be reduced ASAP in an attempt to regain circulation.
- Drawing an "X" on a distal pulse site may aid in re-assessing perfusion.

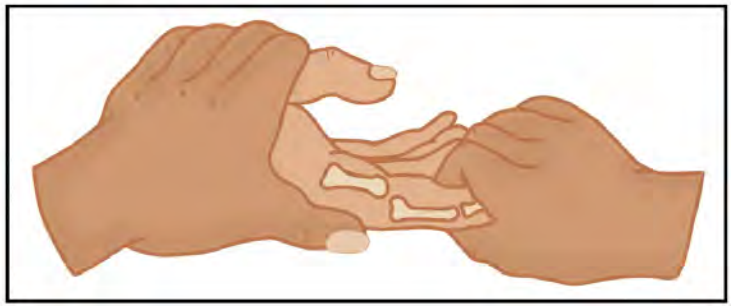
Fracture and Dislocation Management: Digit

NOTE: ALL Reductions MUST have MC approval prior to performing

Procedure: Reduction of Dislocated Digit (finger or toe)

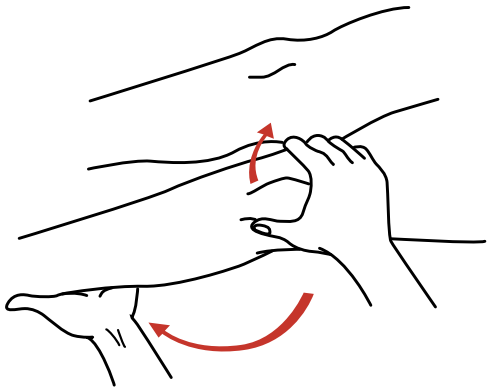
1. Assess other injuries, digits and distal circulation, sensation, and motor function.
2. If laceration or exposed bone irrigate thoroughly per PROCEDURE: *Wound Care.*
3. Confirm indications (ALL must be present):
   A. Greater than two hours transport time to hospital or clinic
   B. History of "jamming" finger
   C. Clear deformity to proximal or distal interphalangeal joint
   D. Patient with limited ability to bend finger because of pain
   E. Procedure does not delay care or transportation of life-threatening injuries.
4. If all indications are present, contact Medical Control for authorization to reduce.
5. Grasp distal portion of finger securely with gauze.
6. Stabilize the proximal portion of finger and hand per included diagram.
7. Apply gentle, firm, steady, longitudinal traction while gently pushing distal bone back into place.
8. Reduction is confirmed by "clunk," resolution of deformity and pain, and return of motion.
9. If successful, digit should be buddy taped and padded.
10. If unsuccessful or not attempted, finger should be splinted in the position it was found.
11. Reassess distal circulation, sensation, and motor function.
12. Document the procedure.
13. Recommend that the patient proceed to a medical evaluation for an X-Ray due to the high incidence of small fractures present with this injury.





Fraction and Dislocation Management: Patella

NOTE: ALL Reductions MUST have MC approval prior to performing



REDUCTION OF DISLOCATED PATELLA (KNEECAP)

(Only Laterally Dislocated Patella)

1. Assess other injuries, knee and distal circulation, sensation, and motor function.

2. Confirm indications (ALL must be present):
   A. Greater than two hours transport time to hospital or clinic
   B. History of indirect "lever-type" trauma to knee rather than direct blow
   C. Obvious lateral displacement of kneecap to outside
   D. Knee held flexed (bent) and patient with limited ability to straighten knee voluntarily because of pain
   E. No physical findings of direct knee trauma (e.g., knee lacerations/contusions/abrasions)
   F. Procedure does not delay the care and transportation of life-threatening injuries.

3. If all indications are present, **contact Medical Control for authorization to reduce.**

4. Apply steady, gentle pressure from lateral (outside) to medial patella and simultaneously straighten leg.

5. If successful, knee should be immobilized in extension (straight).

6. If there are no other extremity injuries that prevent walking, patient may ambulate with immobilization (e.g., ensolite pad wrapped and secured around leg).

   Minimize walking unless necessary to facilitate evacuation and patient states there is no significant pain.

7. If unsuccessful, time/injuries do not permit reduction, or all indications have not been met, knee should be immobilized in the position it was found.

8. Reassess distal circulation, sensation, and motor function.

9. Document procedure.

Fraction and Dislocation Management: Shoulder

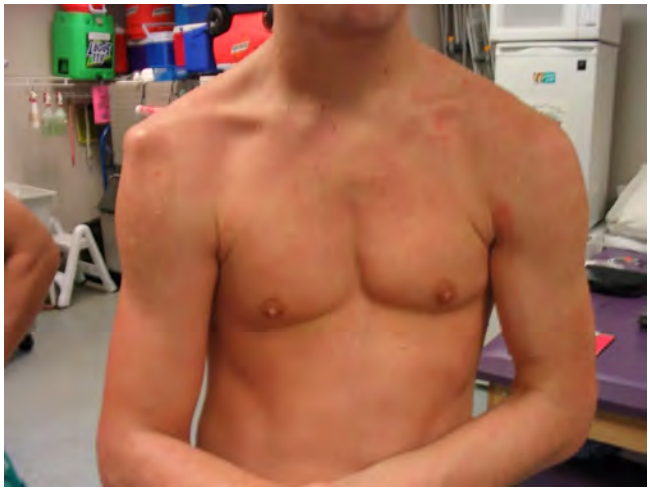
NOTE: ALL Reductions MUST have MC approval prior to performing

REDUCTION OF DISLOCATED SHOULDER

(Only ANTERIOR Shoulder Dislocations)

1. Assess other injuries, shoulder and distal circulation, sensation, and motor function.
2. Confirm indications (ALL must be present):
   - A. Is there is greater than two hours transport time to hospital or clinic?
   - B. Is there is a history of indirect "lever-type" trauma to arm rather than blow directly to shoulder?
   - C. Is there is a clear deformity to shoulder (loss of rounded appearance of lateral shoulder)? There should be no physical findings of direct shoulder trauma (e.g., shoulder contusions/abrasions).
   - D. Are there no other suspected fractures to same arm?
   - E. Does the patient have limited ability to move shoulder because of pain?
   - F. Does the procedure not delay the care or transportation of life-threatening injuries?
3. If all indications are affirmative, **contact Medical Control for authorization to reduce.**
4. Coach the patient to relax the shoulder muscles by maintaining a calm, reassuring demeanor. If this is unsuccessful, proceed with analgesia PROTOCOL: *Pain Management*.

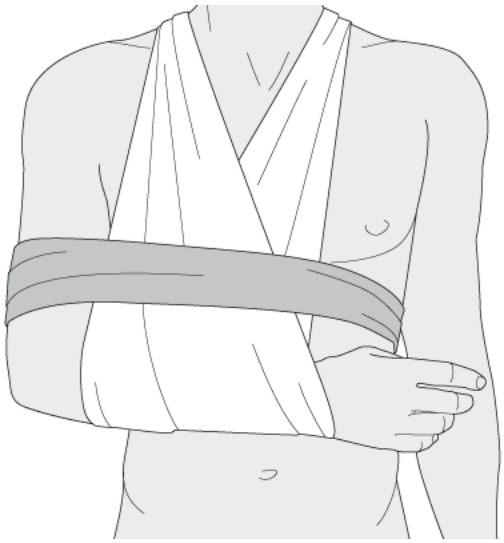
NOTE: Muscle spasms are common. Move slowly and allow spasms to pass before continuing reduction.



POSTREDUCTION:

1. If reduction is accomplished, the arm should be easily moveable into position against body. Apply sling and swath per attached diagram.
2. If reduction is not accomplished, the arm should be slowly moved into its original position, padding applied in the space between arm and body, then secured in position for transport.
3. Reassess distal circulation, sensation, and motor function, then document procedure.

NOTE: Most shoulder dislocations are recurrent injuries and involve very minimal (to no) trauma. All patients should be transported to appropriate definitive care for further evaluation.



PROVIDER: Chose between one of the following reduction techniques: Additional techniques exist, follow the director of your local medical control.

EXTERNAL ROTATION METHOD:

1. Place patient supine.
2. EMS provider should stand on the side of the affected extremity facing the patient.
3. Flex the elbow to 90 degrees and stabilize it against the torso (Fig 1:a).
4. Place the shoulder in 20 degrees of forward flexion by use of lower hand at inside of elbow (Fig 1:b) or cupping elbow (Fig 2).
5. Using the grasped wrist as a guide, gently rotate the shoulder until the forearm is in the coronal plane (Fig 1:c and Fig 2). The shoulder will likely reduce before the forearm reaches parallel.
6. If the shoulder does not reduce, lift the flexed arm forward, keeping it in line (i.e., sagittal plane) with the body.
7. Once reduction is achieved, gently rotate the arm internally until the forearm lies across the chest (Fig 1:d).

NOTE: Work slowly and gently!

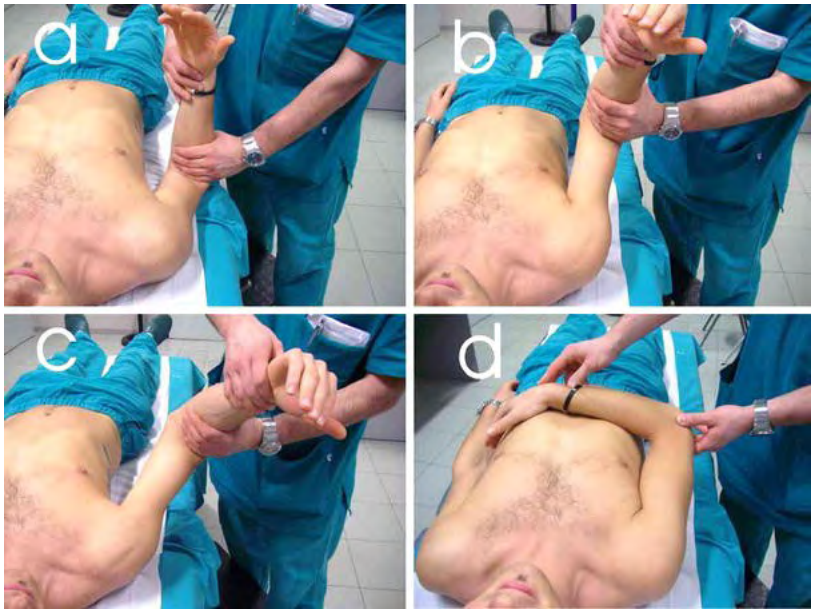


Fig 1. The external rotation method for the reduction of an acute anterior dislocation of the shoulder. a. The patient is in the supine position with the elbow in 90° flexion. b. The arm is adducted to the side of the chest and the shoulder is placed in 20° forward flexion. c. The shoulder is externally rotated until the forearm is in the coronal plane. d. The arm is internally rotated to bring the forearm into the abduction position

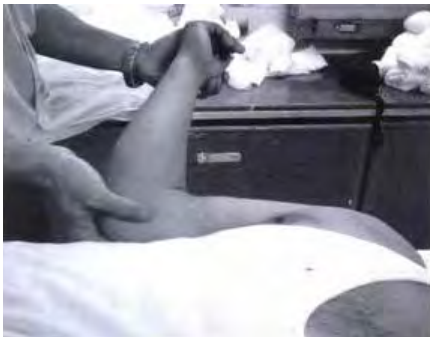


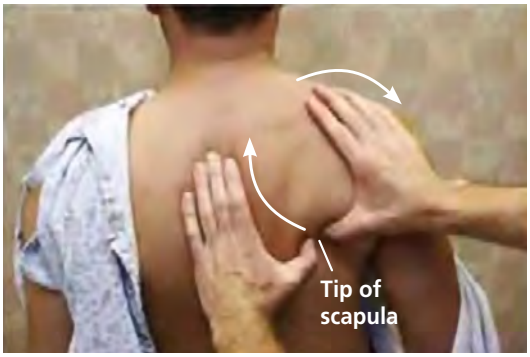
Fig 2. The external rotation method for the reduction of an acute anterior dislocation of the shoulder.

SCAPULAR MANIPULATION METHOD:

1. Have patient sit upright.
2. If a second provider is available to assist, have them stand or sit facing the patient.
3. Assist patient in flexing the injured arm forward to approximately 90 degrees.
4. The assistant will stabilize the injured arm and provide gentle traction forward by putting counter traction on the patient's clavicle.
5. Standing behind the patient, stabilize the superior border of the scapula, and use your thumbs to press medially on the lateral border of the scapula, rotating the scapula as shown.

(image obtained from *https://clinicalgate.com/management-of-common-dislocations/)*

Scapular Manipulation



Rotate the inferior tip of the scapula medially and dorsally toward the spine with the tips of your thumbs.

The procedure can take place with the patient prone (as in the Stimson technique) or with the patient seated. For the latter, have an assistant apply traction on the arm while applying countertraction on the ipsilateral clavicle.

Fracture and Dislocation Management: Traction splint

CLINICAL INDICATIONS

- Suspected mid-shaft femur fracture

CONTRAINDICATIONS:

- Pelvic fracture or instability
- Hip dislocation
- Unstable knee trauma
- Femur fracture near the knee
- Partial amputation or avulsion with bone separation
- Injury to the lower leg or ankle

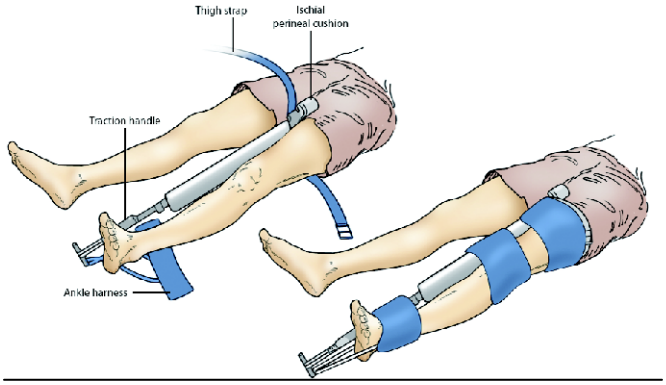
PROCEDURE KENDRICK TRACTION DEVICE:

1. Grasp the ankle of the affected leg and maintain manual traction. Apply traction until the patient reports pain relief.
2. Apply ankle hitch around the leg. Tighten the stirrup by pulling the green tab until it is snug under the heel. Manual traction can be held from the stirrup while the rest of the splint is applied.
3. Apply the ischial strap by feeding the male end of the buckle under the leg. Work the strap up the leg until it is firmly seated in the patient's groin. Ensure the patient's genitals are clear of the strap.
4. Buckle hip strap, then tighten so the traction pole receptacle is positioned at the belt line.
5. Assemble the splint and ensure each joint is seated.
6. Place the traction pole alongside the leg so that one section extends beyond the patient's foot. Collapse sections of the pole as appropriate to size the splint.
7. Insert the pole into the traction pole receptacle on the blue strap. Adjust the blue strap of the foot harness so the yellow tab is fully extended.

8. Place the yellow tab over the dart at the distal end of the splint.
9. Steadily tighten the blue ankle strap by pulling on the red tab. Continue to tighten until the provider holding manual traction reports that the splint is supporting the leg.
10. Use the colored Velcro straps to secure the splint to the leg.
11. Reassess distal circulation, sensory, and motor function.

PROCEDURE SAGER TRACTION DEVICE:

1. Position the splint between the patient's legs, resting the saddle against the ischial tuberosity.
2. Attach the strap to the thigh.
3. Secure the ankle strap tight.
4. Gently extend the inner shaft until the desired amount of traction; approximately 10% of the patient's body weight.
5. Adjust the thigh/leg/foot strap.
6. Reassess distal circulation, sensory, and motor function.



Applying the Sager splint

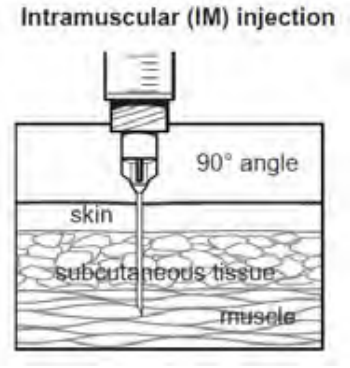
Injections (Intramuscular)

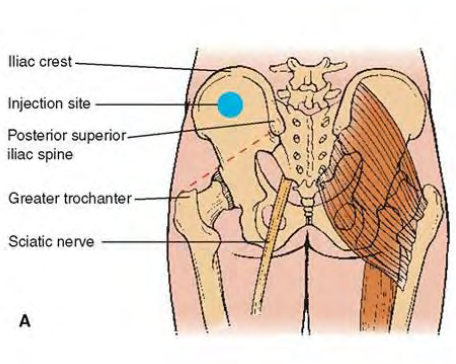
CLINICAL INDICATIONS

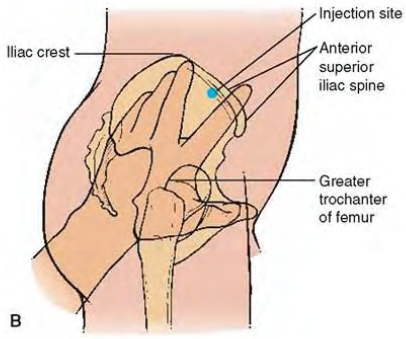
- When medication administration is necessary, and the medication must be given the intramuscular (IM) route or as an alternative route in selected medications.

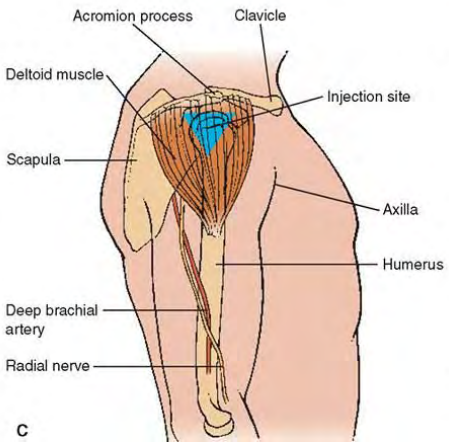
PROCEDURE

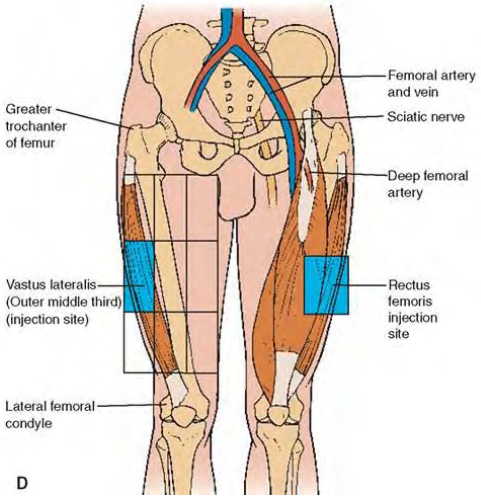
1. Receive and confirm medication order or perform according to standing orders.
2. Prepare equipment and medication expelling air from syringe.
3. Explain the procedure to the patient and reconfirm patient allergies.
4. Possible injection sites for intramuscular injections include the arm, buttock, and thigh sites (see below).
5. Injection volumes by site:
   A. Injection volume should not exceed 1 ml for the arm.
   B. Injection volume should not exceed 3 ml in the thigh or buttock.
   C. Pediatrics: the thigh should be used and injection volumes should not exceed 1ml.
6. Expose the selected area and cleanse the injection site with alcohol or chloraprep wipe.
7. Insert the needle into the skin with a smooth, steady motion (90 degree angle with the skin flattened).
8. Aspirate for blood (if blood pulls back into needle, withdraw the needle and re-stick using a fresh needle).
9. Inject the medication.
10. Withdraw the needle quickly and dispose of it into a sharps container.
11. Apply pressure to the site.
12. Monitor the patient for desired therapeutic effects as well as possible side effects.
13. Document the medication, dose, Route, and time in the Patient Care Report (PCR).











IO (Intraosseous) Access

CLINICAL INDICATIONS

- A patient where vascular access is appropriate (significant trauma or mechanism, emergent or potentially emergent medical condition).
- All Ages: IV and IO should be considered equal (see specific protocols).

CONTRAINDICATIONS, RELATIVE CONTRAINDICATIONS, COMPLICATIONS INTRAOSSEOUS (IO) ACCESS

Contraindications

- Fracture of the bone selected for IO insertion
  - » **NOTE:** a fracture of another bone proximal to the bone being considered for the insertion site is NOT a contraindication to use of the site if perfusion distal to the fracture site can be confirmed.
- Insertion site is grossly contaminated

Relative Contraindications

- The previous orthopedic surgery on the same appendage that is being considered for IO insertion.
- The areas that are burned.
- Same bone with previous IO insertion within past 24 hours.
- Inability to locate anatomical landmarks due to significant edema to site.
- Excessive tissue at insertion site (obese or excessive muscle tissue).
- Obvious signs of skin infection including erythema, warmth, or purulent discharge.
- Osteogenesis imperfecta (genetic abnormality resulting in extremely brittle bones).

IO Complications:

Fracture of bone or damage to growth plate, bleeding from insertion site, neurovascular injury, misplacement of IO through bone, compartment syndrome, especially if unrecognized fluid extravasation.

Proximal Tibia Site Identification

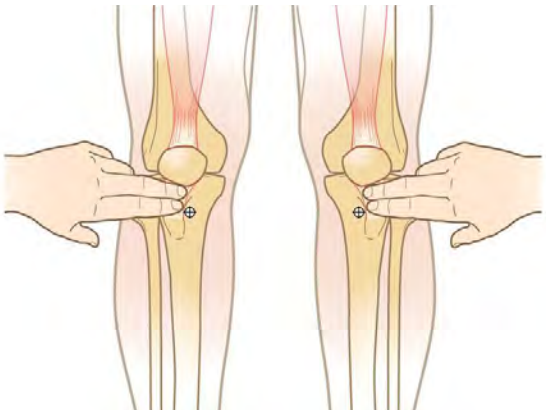
Extend leg and palpate the landmarks at the proximal tibia (patella and tibial tuberosity)

Adult:

Insertion site should be approximately 2 cm **medial** to the tibial tuberosity **OR** 3 cm (two finger widths) below the patella and approximately 2 cm **medial**, along the flat aspect of the tibia.

Pediatric (patients weighing 3-39 kg):

Insertion site should be approximately 1cm **medial** to the tibial tuberosity **OR** just below the patella (approximately 1cm or one finger width), along the flat aspect of the tibia. Pinch the tibia between your fingers to identify the center of the medial and lateral borders.



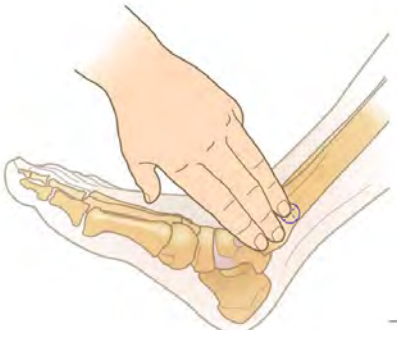
Distal Tibia Site Identification

Adult:

The insertion site is located approximately 3 cm (2 finger widths) proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.

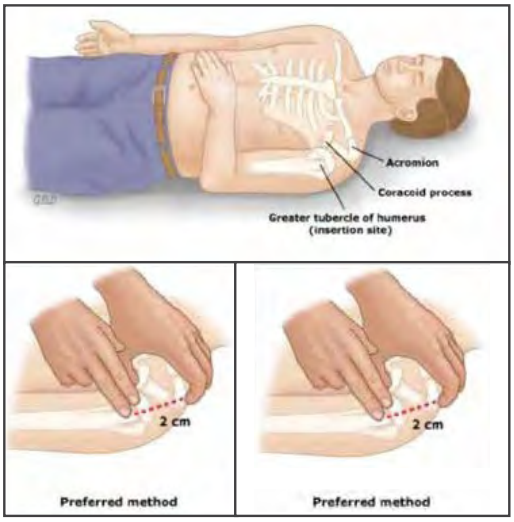
Pediatric:

Insertion site is located approximately one finger width proximal to the medial malleolus along the flat aspect of the medial distal tibia.



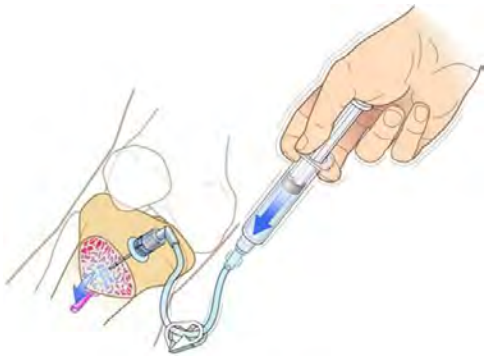
PROXIMAL HUMERUS SITE IDENTIFICATION (FOR ADULT AND PEDIATRIC)

1. Place patient's hand over abdomen (elbow adducted and humerus internally rotated).
2. Place your palm on the patient's shoulder anteriorly.
3. The area that feels like a "ball" under your palm is the general target area.
4. You should be able to feel this ball, even on obese patients, by pushing deeply.
5. Place the ulnar aspect of your hand vertically over the axilla.
6. Place the ulnar aspect of your other hand along the midline of the upper arm laterally.
7. Place your thumbs together over the arm. This identifies the vertical line of insertion on the proximal humerus.
8. Palpate deeply up the humerus to the surgical neck. This may feel like a golf ball on a tee—the spot where the "ball" meets the "tee" is the surgical neck.
9. The insertion site is 1 to 2cm above the surgical neck, on the most prominent aspect of the greater tubercle.



EZ-IO® ACCESS PROCEDURE

1. Assemble all necessary equipment. See PROCEDURE: *IV, IO Fluid Administration*
2. Determine the most appropriate insertion site.
3. Prep the surface with antiseptic solution.
4. Prepare EZ-IO and medications.
5. Prime EZ-Connect extension kit as follows:
   A. Adult/pediatric unresponsive to pain: prime EZ-Connect extension kit with a normal saline flush.
   B. Adult responsive to pain: prime EZ-Connect extension kit with 40 mg of lidocaine (priming volume is approximately 1 ml). See lidocaine medication page for contraindications.
   C. Pediatric response to pain: prime EZ-Connect extension kit with 0.5 mg/kg of lidocaine (max dose 40 mg).
6. Needle Insertion and Drilling:
   A. Stabilize patient's extremity and begin insertion from a 90 degree angle to the plane of the center of the bone (if using the proximal humerus, this will result in the needle pointing toward the patient's tailbone). Gently advance the needle set tip through the skin until the tip rests against the bone. The 5 mm mark must be visible above the skin for confirmation of adequate needle set length.
   B. Adults: Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin.
   C. Pediatrics: Gently drill, then immediately release the trigger when you feel the "pop" or "give" as the needle set enters the medullary space.
7. Once the needle is in proper position, hold the hub and pull the driver straight off. While continuing to hold the hub, twist the stylet off the hub with counterclockwise rotations. The catheter should feel firmly seated in the bone.
8. Connect extension tubing, primed with fluid, to IO hub. Firmly secure by twisting clockwise.
9. Infuse lidocaine (if responsive to pain), flush with normal saline, infuse fluids and/or medication.
10. Assess for free flow of fluid, with no evidence of extravasation under the skin. If proper insertion cannot be confirmed or catheter appears to be locked and cannot flush, repeat procedure at another site; do not remove existing EZ-IO until successful IV/IO has been established.
11. Secure the hub with a dressing/bandage so it does not become dislodged
12. Continually reassess for extravasation. This will present as obvious fluid around the catheter or swelling and rigidity in the patient's limb (check the calf muscle or biceps/triceps if using the tibial site or humeral site, respectively).



NOTE: Medication and Fluid delivery: passive gravity infusions will not work with IO lines. Use a 60ml syringe or pressure bag to give fluid/boluses. All IV medications can be administered through the IO line. Flush all medications with 10ml NS. Continued attempts at IV Access. If IV established, use it primarily, but keep IO backup.

IV (Intravenous) Access: Peripheral

CLINICAL INDICATIONS

- A patient where vascular access is appropriate (significant trauma or mechanism, emergent or potentially emergent medical condition).
- All Ages: IV and IO should be considered equal (see specific protocols).

CONTRAINDICATIONS, RELATIVE CONTRAINDICATIONS, COMPLICATIONS

Vascular (IV) Access Contraindications: No absolute contraindications

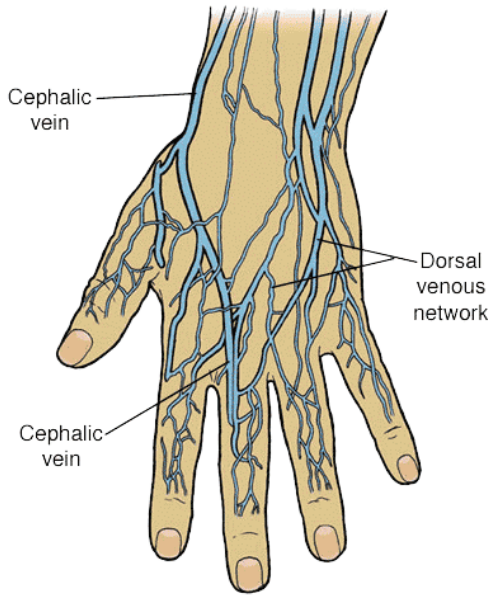
- Relative IV Contraindications—IV placement in an extremity with a suspected fracture, presence of an AV fistula.
- IV Complications—Bleeding, infection, vein, or tissue damage from extravasation.

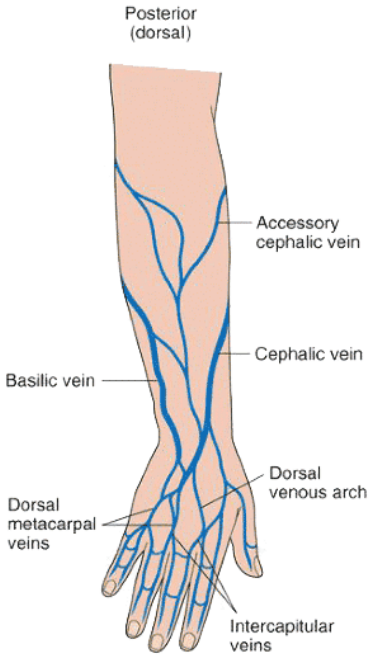
IV ACCESS PROCEDURE

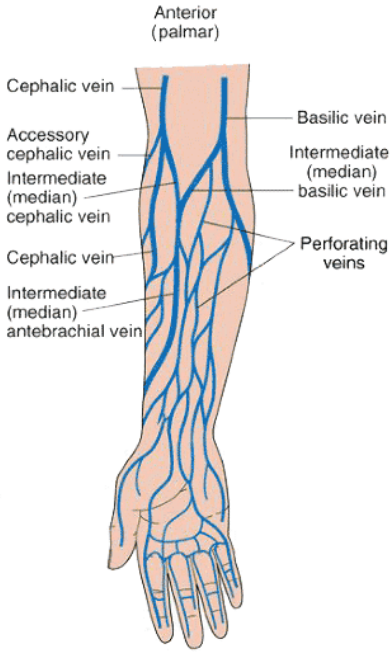
Venous Access: Peripheral (Extremity) Vein

1. Use the largest catheter bore necessary based upon the patient's condition and size of veins.
2. Place a tourniquet around the patient's extremity to restrict venous flow only.
3. Select a vein and an appropriate gauge catheter for the vein and patient's condition. Prep the skin with an antiseptic solution.
4. Place inline and lateral traction on skin to stabilize the vein.

   NOTE: Do not alter your body position between placing tension on vein and inserting needle.
5. Insert the needle, with the bevel up, into the skin in a steady, deliberate motion until blood flashback is visualized in the catheter.
6. Advance the catheter into the vein. NEVER reinsert the needle through the catheter.
7. Dispose of the needle into the sharps container.
8. Remove the tourniquet and connect the IV tubing or saline lock.
9. For fluid administration, go to PROCEDURE: *IV, IO Fluid Administration.*
10. Cover the site with a sterile dressing and secure the IV tubing.
11. Label or document the IV date, time, catheter gauge, and name of the person starting the IV.
12. Document the above information as well as the results and fluid administration in the PCR.







IV (Intravenous) Access: External Jugular

CLINICAL INDICATIONS

- Age > 12 years who require intravenous access for fluid or medication administration and extremity vein was not attainable.
- Vascular access attempt in life-threatening events after no obvious peripheral site is noted.

CONTRAINDICATIONS:

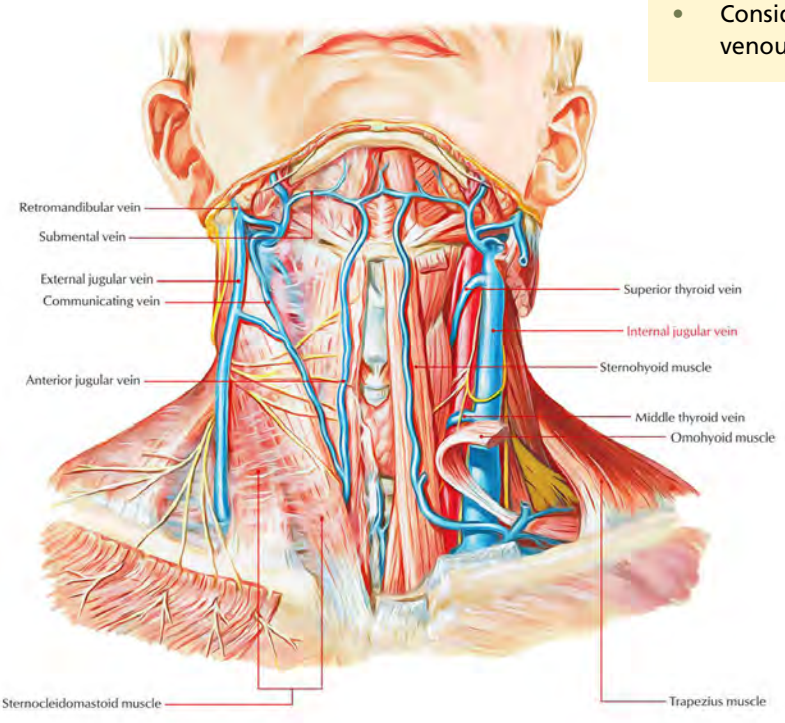
- Patient cannot tolerate supine position
- Active vomiting
- Agitation (unable to keep head still)
- Presence of a neck mass or VP shunt
- Circumferential burns to the neck
- Inability to identify anatomical landmarks

EQUIPMENT:

- Appropriate size IV catheter, extension set, 10 ml saline flush, alcohol prep, tegaderm, tape

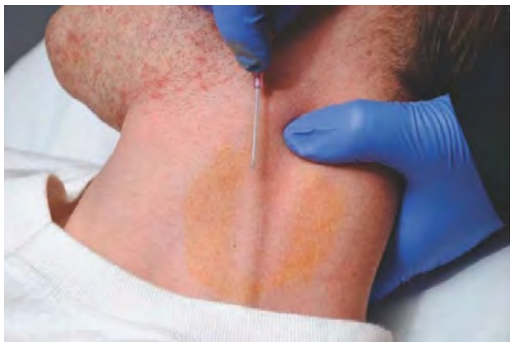
PROCEDURE

1. Don appropriate PPE and prepare equipment. Lay the patient supine.
   A. Identify the external jugular vein on the lateral aspect of the neck:
   B. Turn the patient's head slightly to the side opposite the insertion site.
   C. A slight Trendelenburg position may help accentuate the vein.
   D. Apply light pressure above the clavicle to engorge the external jugular vein.
   E. If unable to visualize the external jugular vein, do not attempt access.
2. Clean the skin with antiseptic solution.
3. Select a site for puncture, away from the clavicle to avoid accidental lung puncture.
4. Puncture the vein midway between the angle of the jaw and the clavicle in a shallow and superficial manner.
5. Once a flash is obtained, advance the catheter over the needle and remove the needle while occluding the proximal tip of the catheter to minimize blood loss.
6. Connect saline lock or tubing to the catheter and flush with normal saline.
7. Secure the catheter hub with a sterile dressing and the extension set with tape.
8. Monitor for signs of extravasation.
9. Document the IV-time, catheter gauge, site, and name of provider who started the IV in the PCR.



NOTES & PRECAUTIONS

- Consider IO access for patients with difficult venous access.



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IV and IO Fluid Administration

CLINICAL INDICATIONS

- A patient where fluid administration or medications are indicated
- Saline lock may be substituted for an IV line if needed. To ensure continued IV patency, TKO is preferred.

EQUIPMENT IV:

- Adults: TKO or maintenance fluids: one 18-20-gauge IV catheter
- If there are signs, symptoms, or at high risk for shock: two 16-18-gauge IV catheters
- Pediatrics: Medications: One IV catheter appropriate size for vein
- Volume resuscitation: two largest age appropriate IV catheters.

IO:

- EZ-IO Power Driver
- Appropriate size IO Needle Set based on patient's size and weight:
  - » EZ-IO 15mm 3-39 kg
  - » EZ-IO 25mm 40 kg and greater
  - » EZ-IO 45mm 40 kg and greater with excessive tissue.
- One EZ-Connect® extension set
- Two 10 ml NS syringes
- 2% lidocaine without preservatives or epinephrine (cardiac lidocaine) for patients responding to pain
- Nonsterile, nonlatex gloves
- Iodine or alcohol prep pads
- 500 ml or 1000 ml NS
- Fluid administration set
- Pressure bag
- Bulky dressing for IO stabilization, or premade IO stabilizer kit
- EZ-IO wrist band.

SPECIFICS—FOLLOW PROCEDURE: *IO ACCESS, IV ACCESS*

Fluid delivery

- Adult:
  - » All IVs: macro drip set (10-15 drops/ml) or micro-drip set (60 drops/ml)
  - » All IOs: Use a 60 ml syringe or pressure bag to give fluid/boluses.
- Pediatric:
  - » All IVs: measured-volume solution administration, 60 ml syringe
  - » All IOs: Use a 60 ml syringe to give fluid/boluses.

IV FLUID

- Saline lock or TKO: may generally use interchangeably if fluid or medication is not currently required but may be needed in the future.
- Maintenance fluids: stable patients with no contraindications to fluid:
  - » Adults: 120 ml/hr (macro-drip 1 drop every 2-3 seconds)
  - » Pediatrics: See chart or reference Broselow Tape.
- Fluid Challenge:
  - » Adult: 500 ml fluid boluses repeated while lungs are dry, and BP is 80-100 or HR>100.
  - » Pediatric: Same as bolus.
- Fluid Bolus:
  - » Adults: If SBP<80, 1-L bolus wide open under pressure.
    Repeat SBP<80, Repeat bolus once, then contact medical control.
  - » Pediatrics: Shock, indicated by protocol:
    20 ml/kg bolus.
  - » If no improvement: Repeat bolus once, then contact medical control.
  - » Pediatric shock: SBP< (70+2x age in years)—consider exam findings of lethargy, poor skin turgor, dry mucus membranes and prolonged capillary refill—cuff pressure may not be accurate.
    APPENDICES: *Pediatric Parameters.*

In the case of a fluid challenge or bolus, contact Medical Control as soon as possible. If communication failure, continue per guidelines to a maximum of 3L in adults and 60 ml/kg in pediatrics (up to 3L).

	TKO: (Stable)	Maintenace: (Stable)	Challenge: (At Risk)	Bolus: (Shock)	Maximum: (Shock)
Adult	TKO	120 ml/hr	**SBP 80-100 or HR >100:** 500 ml bolus	**SBP <80:** 1 L bolus	3L
0-14 years	TKO	**<10 kg:** 4ml/kg/hr **10-20 kg:** 40ml/hr for first 10kg of body weight + 2ml/kg/hr for any increment of body weight over 10kg **>20 kg:** 60ml/hr for first 20kg of body weight + 1 ml/kg/hr for any increment of body weight over 20 kg (Max 100m/hr)	**SBP <70 + 2x age in yrs):** 20 ml/kg (same as bolus)	**SBP <70 + 2x age in yrs):** 20 ml/kg	60 ml/kg

FLUID BOLUS/CHALLENGE PROCEDURE:

- Check vitals and lung exam after each fluid bolus/challenge.
- As vitals change, refer to the table above for fluid guidelines.
- If signs of pulmonary edema develop during IV fluid admin, decrease to TKO and contact Medical Control.
- If IV orders differ than this procedure, it will be indicated in the specific protocol.

NOTES & PRECAUTIONS

- Normal Saline should be used with caution in patients with cardiac and respiratory disorders or extremes of age.
- If the patient is not likely to be transported, contact Medical Control before IV administration.

IV and IO Infusions

CLINICAL INDICATIONS:

- Administration of IV medications or fluids at a prescribed rate

PROCEDURE:

1. Select appropriate IV tubing/setting.
2. Determine the weight of patient, concentration of medication, appropriate dose of medication, and the time over which the medication will be delivered.
3. Use the following equation to determine the number of drops per minute with a medication that doesn't factor in the patient's weight.

INFUSION CALCULATION (NOT BASED ON PT WEIGHT):

$$\frac{\text{Volume in ml}}{\text{Time in min}} \text{ x drip set } \left(\frac{\text{gtt}}{\text{ml}}\right) = \text{IV flow rate in } \frac{\text{gtt}}{\text{min}}$$

EXAMPLE:

Amiodarone – Dose in ROSC is 150mg in 100ml NS over 10 minutes.

$$\frac{100\text{ml}}{10\text{ min}} \text{ x } \left(\frac{10\text{gtt}}{\text{ml}}\right) = \text{IV flow rate in } \frac{\text{gtt}}{\text{min}}$$

$$\frac{100\cancel{\text{ml}}}{10\text{ min}} \text{ x } \left(\frac{10\text{gtt}}{\cancel{\text{ml}}}\right) = \frac{1000\text{gtt}}{10\text{ min}} = \frac{1.67\text{gtt}}{1\text{ sec}} \sim \frac{3\text{gtt}}{2\text{ sec}}$$

EXAMPLE:

Magnesium Sulfate – Dose in Eclampsia/Pre-eclampsia is 5g in 500ml NS over 20 minutes.

$$\frac{500\text{ml}}{20\text{ min}} \text{ x } \left(\frac{10\text{gtt}}{\text{ml}}\right) = \text{IV flow rate in } \frac{\text{gtt}}{\text{min}}$$

4. Use the following equation to determine a drip rate for a medication dependent on the patient's weight:

WEIGHT-BASED INFUSION CALCULATION (TYPICALLY FOR DOPAMINE, EPI DRIP, ETC.):

$$\frac{\text{Dose (mcg per kg per min) x pt weight in kg x drip set } \left(\frac{\text{gtt}}{\text{ml}}\right)}{\text{Solution in concentration (mcg per ml)}} = \text{IV flow rate in } \frac{\text{gtt}}{\text{min}}$$

Mucosal Atomizer Device

Medication can quickly be absorbed directly from the olfactory mucosa (the area that allows smelling to occur) and enter the brain cerebrospinal fluid skipping the blood stream/blood brain barrier. This is called the nose-brain pathway.

CLINICAL INDICATIONS

Patients who require rapid medication administration when an IV is not readily accessible. Some medications that can be administered Intranasally (IN) include:

- 3180 Naloxone (Narcan)
- 3107 Fentanyl
- 3120 Glucagon
- 3148 Ketamine
- 3160 Midazolam (Versed).

See specific medications for administrations for specific protocols.

PROCEDURE

1. Draw the medication up into a syringe.
2. Expel all air from the syringe.
3. Connect the atomizer to the syringe.
4. Insert atomizer into nostril and quickly compress the syringe plunger to atomize the medication.

NOTES AND PRECAUTIONS

- The Mucosal Atomizer Device (MAD) device has a dead space (priming volume) of 0.1 ml. Take this into account when drawing up medication.
- Significant amounts of blood and/or mucosal discharge or nasal obstruction will limit medication absorption.
- Always use the most concentrated form of the medication available, diluted forms are less effective.
- Deliver half the dose to each nostril if possible
- Do not use more than ½ to 1 ml of medication per nostril. If more volume is required, separate doses allow a few minutes for the previous dose to absorb.
- Can be used in all body positions.

1350

Mass-casualty Incidents (MCI)

INDICATION

The number of patients cannot be managed adequately by personnel on scene. Typically, 5+ patients.

DEFINITIONS

A mass casualty incident (MCI) is defined as "an event that overwhelms the local EMS or healthcare system, where the number of casualties vastly exceeds the local resources and capabilities in a short period of time."

NOTE: All EMS providers should take Incident Command System (ICS) and National Incident Management Systems (NIMS) training. This is available through DOI Talent or FEMA.gov.

Triage is the separation of many patients into smaller groups based on severity of illness/injury. In an MCI, providers should prioritize care for the sickest patients, or those most likely to benefit from immediate intervention.

START Triage—A specific triage system (Simple Triage and Rapid Treatment [START]) designed for very large-scale disasters. Patients are each given a triage tag (see below) and a designation to a color group (green, yellow, red, or black) representing acuity based on a 30 second or less assessment of airway, respiratory rate, capillary refill/ radial pulse and mental status only. See START Triage diagram.

Jump START—A complimentary triage system designed to be used with children (defined as shorter than the Broselow tape, generally about age 8 years old). See diagram.

Triage tag—cards designed to be used with the START/ Jump START system but may be used with a triage system. One tag is placed on each patient. Each tag has patient identifying number and removable colored strips that correspond to the following categories:

- **RED/IMMEDIATE** Critically ill patients who may survive and are highest priority for transport. Patients with RR>30, airway maneuvers required, altered mental status, no radial pulse or capillary refill >2 seconds.
- **YELLOW/DELAYED** Patients with significant injury that require care, but not immediately life-threatening. Includes patients with significant bleeding that is controlled with basic interventions, open fractures, or any concerning injuries with normal vital signs at time of evaluation.
- **GREEN/MINOR** Patients who are ambulatory with minor injuries and no signs of life or limb-threatening conditions.
- **BLACK/DECEASED** Patient determined to be dead, or with no reasonable chance of survival with currently available resources.

PROCEDURE

The first responder on scene is Incident Commander (IC) and Triage Officer until someone else assumes one of the roles.

1. **SCENE SAFETY/SCENE SIZE-UP**
2. **START Triage**
   A. The first rescuer shall decide of whether they are "overwhelmed" by the number and acuity of patients, considering the E.T.A. of back-up.
   B. Begin triage based on START/JUMP-START criteria, simultaneously communicating information to command.
3. **Communicate**
   A. IC keeps Comm Center informed of scene and needs.
   B. Supervisor/CRO contact should be made as soon as possible and before patients are transported off scene. This will help distribute patients to the appropriate treatment facilities and to avoid relocating the disaster.
4. **Scene SET-UP**
   A. When practical patients shall be separated into distinct treatment areas according to color designation based on number of patients/rescuers and geography.
5. Continue triage, initiate treatment, and transport.

MCI CALL IN FORMAT

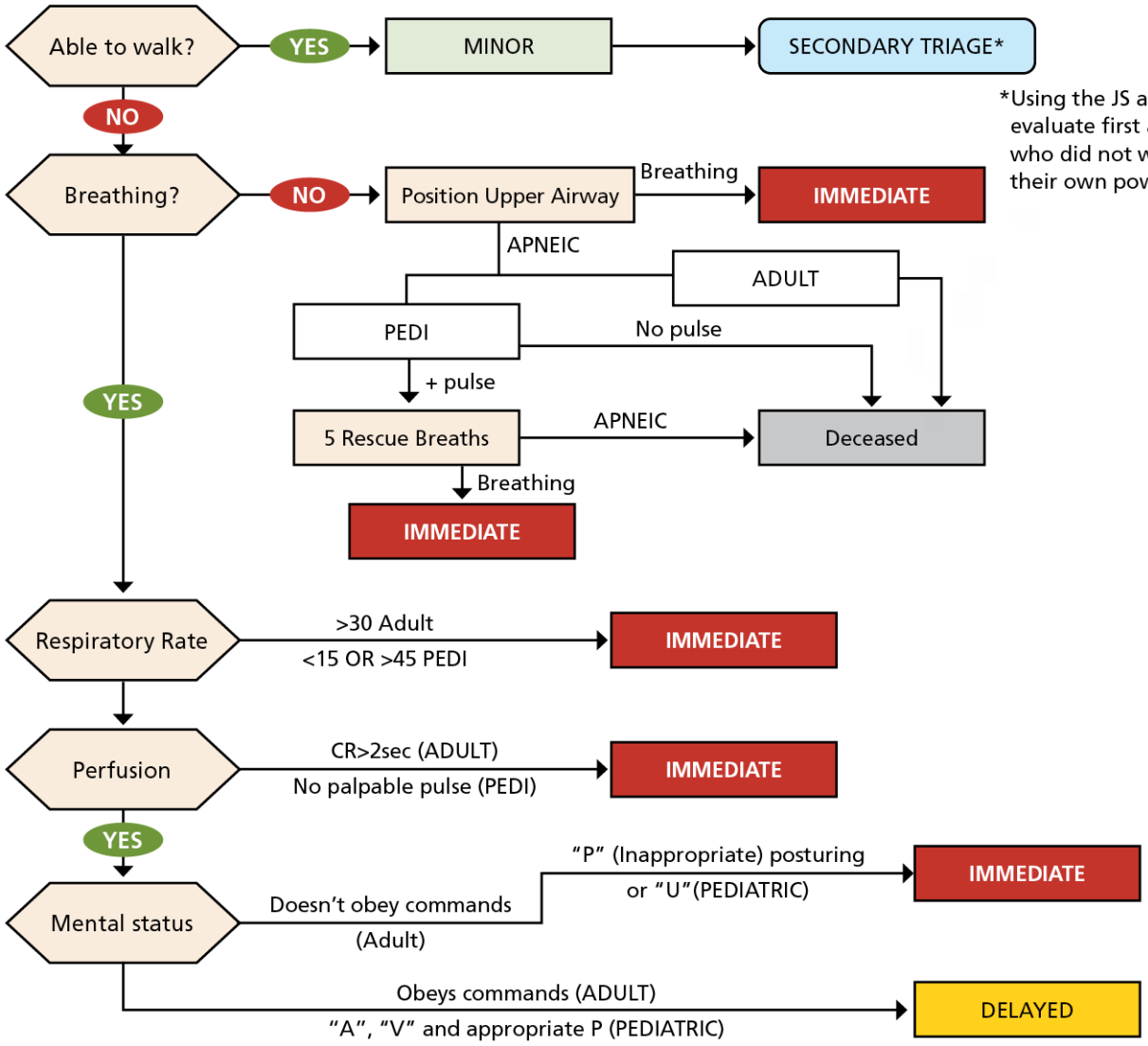
Initial Multi-Casualty Call-In: 8-line standard report:

1. **Establish Communications and clear channel:**
    A. "Dispatch, stand by for Emergency Traffic—break—please keep channel clear"
2. **Incident Summary and Command Structure:**
    A. e.g., "incident is helicopter crash; R. Ranger acting command, X Ranger providing medical care"
3. **Initial Patient Assessments:**
    A. e.g., "I have multiple burn patients, multiple trauma patients, multiple airway patients"
4. **Injury severity/transport priority/triage category:**
    A. e.g., "I have three red, 5 yellow, and 10 green patients"
5. **Transport plan**
    A. request transport method—helicopter, ground transport, ATV, ambulatory
6. **Additional Resources and Equipment needed**
7. **Communication**
    A. identify communication methods, channel for incident
8. **Evacuation location:**
    A. e.g., "patients will be transported to (location of LZ, closest road, GPS coordinates)."

Multi-Casualty Patient Report: note that PHI is not part of this report

1. Mobile unit name (first responder, EMT, Medic identification)
2. Triage tag number
3. Color Code/Triage designation (may include general class of injury or illness)
4. Destination (if known)
5. Transporting unit (if known)
    A. e.g., "Medic R Ranger reporting; triage tag 12345, Yellow orthopedic injury, recommend emergency department, transport via ground.

START TRIAGE AND RAPID TREATMENT



*Using the JS algorithm, evaluate first all children who did not walk under their own power.

Nebulizer Inhalation Therapy

CLINICAL INDICATIONS PATIENTS

experiencing bronchospasm

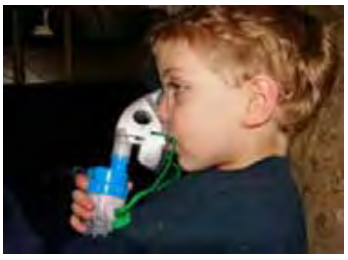
PROCEDURE

1. Gather the necessary equipment
2. Assemble the nebulizer kit

3. Pour the premixed drug (albuterol or another approved drug) into the reservoir of the nebulizer.
4. Connect the nebulizer device to oxygen at 6-8 liters per minute or adequate flow to produce a steady, visible mist.
5. Instruct the patient to inhale normally through the mouthpiece of the nebulizer. The patient needs to have a good lip seal around the mouthpiece.
6. The treatment should last until the solution is depleted. Tapping the reservoir well near the end of the treatment will assist in utilizing all the solution.
7. Monitor the patient for medication effects. This should include the patient's assessment of his/her response to the treatment and reassessment of vital signs, ECG (if appropriate) and breath sounds.
8. Document the treatment, dose, and route in the Patient Care Report (PCR).

SPECIAL CONSIDERATIONS

- A nebulizer treatment may be administered via a nonrebreather mask if the patient cannot hold onto the Handheld Nebulizer (HHN) device themselves. The reservoir well will fit into the connection on the mask where the bag attaches to the mask.
- A Bag Valve Mask (BVM) may also be used to administer a nebulizer treatment to a patient who needs ventilator assistance. Use of an inline nebulizer adapter is needed for this process, in addition another oxygen source is required.

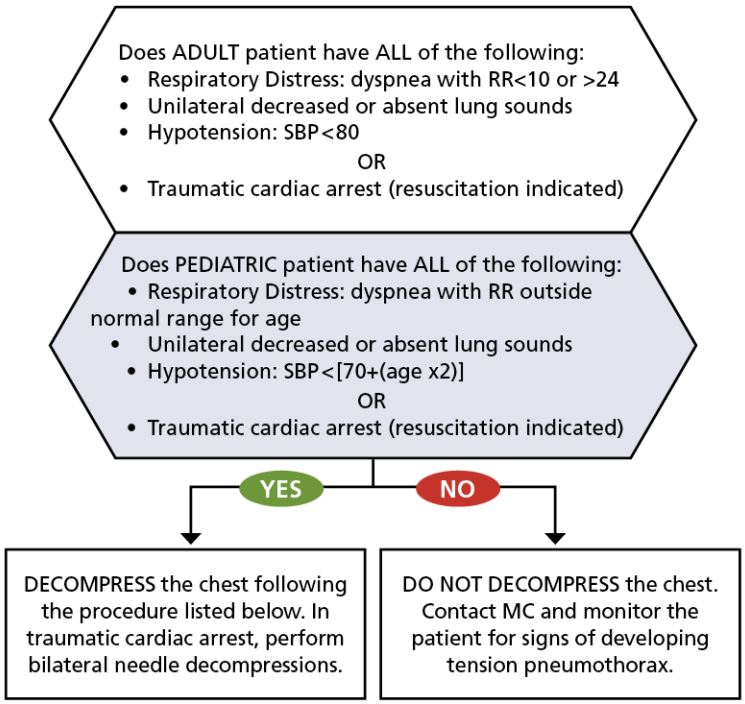


1365

Needle Decompression/Thoracostomy

CLINICAL INDICATIONS

- Tension pneumothorax OR Traumatic cardiac arrest (when resuscitation is indicated)



Tension pneumothorax is often difficult to assess clinically. Contact MC early if tension pneumothorax is suspected and the patient does not meet all the above criteria. Maintain a high level of suspicion in patients with chest trauma and respiratory distress.

Other signs of tension pneumothorax may include:

- Jugular vein distention
- Tracheal deviation (late sign)
- Hyper-resonance to percussion on the affected side (rare finding)
- Increased resistance during ventilations

EQUIPMENT

ADULT:

10-14-gauge IV catheter ≥ 3.25 inches long,

PEDIATRICS < 8 years:

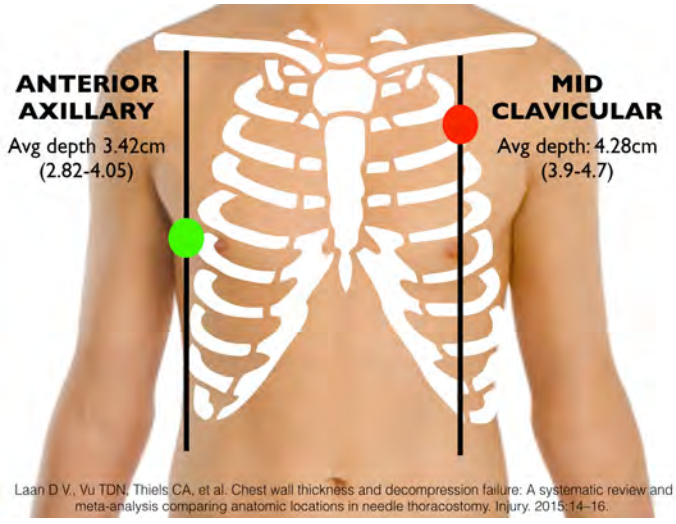
14-16-gauge IV catheter 2 inches

PROCEDURE

1. Don personal protective equipment (gloves, eye protection, etc.).
2. Administer high flow oxygen.
3. Identify and prep the site:
   A. Locate the fourth intercostal space in the anterior axillary line on the same side as the pneumothorax. Approximate landmarks: for the 5th intercostal space are the nipple line in males, and inframammary crease in females. (It is important that the catheter is not placed below the patient's 5th intercostal space laterally as this may go into the abdomen and cause intra-abdominal injury without decompressing the thorax.)
   B. Prepare the site with Iodine or Alcohol
4. Consider placing a finger cut from an exam glove over the catheter hub for a one-way valve. (**Note:** do not waste much time preparing the flutter valve; if necessary, control the air flow through the catheter hub with your gloved thumb.)
5. Insert the catheter into the skin over the fifth rib and direct it just over the top of the rib into the intercostal space
6. Advance the catheter through the parietal pleura until a "pop" is felt and air or blood exits under pressure through the catheter, then advance catheter only to chest wall.
7. Remove the needle, leaving the plastic catheter in place up to hub even if an air rush is not felt. One more attempt can be made with manual displacement of chest wall tissue (may occur with obese or extremely muscular patients). The site of second attempt should be within 1 cm of original site.
8. Secure the catheter hub perpendicular to the chest wall with dressings and tape.
9. Reassess patient including respiratory distress, breath sounds, and vital signs.

NOTES AND PRECAUTIONS

- If the patient's anterior axillary line cannot be accessed due to positioning, you may perform the above procedure in the second intercostal space along the mid-clavicular line. This location has a higher failure rate however, and if there is no rush of air, the procedure should be repeated as above in the anterior axillary line.
- Catheters placed in the second intercostal space must not be placed more medial than the mid-clavicular line. There are arteries running parallel to the sternum in this area that may cause bleeding into the thorax if damaged.
- Use caution when placing the catheter through the intercostal space. The nerve, artery and vein run just below the edge of each rib. Catheters should be placed over the upper edge of the rib to avoid damaging the structures.



Laan D V., Vu TDN, Thiels CA, et al. Chest wall thickness and decompression failure: A systematic review and meta-analysis comparing anatomic locations in needle thoracostomy. Injury. 2015:14–16.

1370

Orogastric Tube Insertion

CLINICAL INDICATIONS

For use with supraglottic airway

RELATIVE CONTRAINDICATIONS

- Severe facial trauma.
- Anterior neck surgery, tumors, injuries, etc.
- Known caustic or hydrocarbon ingestion
- Known esophageal pathology.

PROCEDURE

1. Determine correct size:
   This is based on the Supraglottic Airway used.

   A. *1085 KING LTS-D SUPRAGLOTTIC AIRWAY*—see chart
   B. i-Gel gastric access lumen allows insertion of up to a 12 Fr orogastric tube

2. Measure length of OG tube from the nose to the earlobe and then to a point midway between xyphoid process and umbilicus. Note or mark the length of tube.

3. Lubricate tip of tube with water soluble lubricant.

4. Continue advancing tube until measured length is at the lip. If tube meets resistance or the patient has respiratory distress, remove the tube. Fogging of the tube accompanied by cough or respiratory distress indicates tracheal intubation.

5. If a patient begins to vomit, suction around tube and leave in place as long as confirmation of correct placement has been made. If the patient airway is compromised remove OG tube immediately and maintain airway.

6. Confirm placement of tube by injecting 5 to 20 ml of air while auscultating over the stomach for a “swoosh” indicating gastric placement.

7. Auscultate lung sounds. If the tube is not placed properly, remove immediately. Reinsert following the same procedure. Do not attempt insertion more than three (3) times.

8. If the tube is properly placed: Tape in place or apply a tube holder securing supraglottic airway.

9. For stomach decompression: Allow tube to drain by gravity into an emesis bag.

10. Aspirate stomach contents with syringe.

NOTES AND PRECAUTIONS

- Under no circumstances is the orogastric tube to be connected to continuous, high suction.

Pain Assessment and Documentation

CLINICAL INDICATIONS

Patient in pain.

DEFINITIONS

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Pain is subjective (whatever the patient says it is)

PROCEDURE

1. Initial and ongoing assessment of pain intensity and character is accomplished through the patient's self-report.
2. Pain should be assessed and documented in the PCR during initial assessment, before starting pain control treatment and with each set of vitals.
3. Pain should be assessed using the appropriate scale.
4. Three pain scales are available:

   A. **0-10 Scale:** the most familiar scale used by EMS for rating pain with patients. It is primarily used for adults and is based on the patient being able to express their perception of the pain as related to numbers. Avoid coaching the patient; simply ask them to rate their pain on a scale from 0-10, where 0 is no pain and 10 is the worst pain ever.

   B. **Wong-Baker "FACES" scale:** this scale is primarily used for use with pediatrics but may also be used with geriatrics or a patient with a language barrier. The faces correspond to numeric values from 0-10. This scale can be documented with the numeric value.

   C. **FLACC scale:** this scale has been validated for measuring pain in children with mild to severe cognitive impairment and in preverbal children (including infants).

CATEGORIES	0	1	2
FACE	No expression or smile	Occasional grimace or frown, with-drawn disinterested	Frequent to constant frown, clenched jaw, quivering chin
LEGS	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
ACTIVITY	Lying quietly, normal position or moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
CRY	No cry (awake or asleep)	Moans or whimpers, occasional complaints	Crying steadily, screams or sobs, frequent complaints
CONSOLABILITY	Content, relaxed	Reassured by occasional touching, hugging or talking to, distractible	Difficult to console or comfort

1385

Pelvic Stabilization

CLINICAL INDICATIONS

- For pelvic instability in the presence of trauma
- Shock in trauma with suspected pelvic injury—have a low threshold for application of the device in trauma
- For pelvic pain without instability as a comfort measure

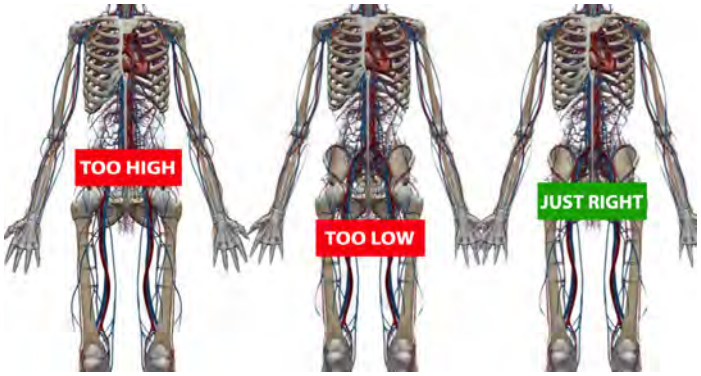
GENERAL PROCEDURE FOR PELVIC STABILIZATION: SHEET METHOD:

There are numerous commercial devices available—be familiar with what your unit has available. The principles and placement of the commercial devices' mirrors that of the sheet.

1. Maintain spinal precautions if indicated
2. Fold the sheet smoothly lengthwise to about 9 inches wide (avoid rolling patient unless necessary) and apply underneath the pelvis, centered on the greater trochanters. Assure the patient's pockets are empty of bulky or sharp objects (if applicable). If objects are removed from the patient's pockets be sure to document the objects removed and where they are left (i.e., at receiving facility with patient or with patient's family per patient's request).
3. Tighten the sheet around the pelvis and adjust the tension to try to return the pelvis to normal anatomical position.
4. Secure using a knot or clamps if available
5. Document time and date applied

NOTES AND PRECAUTIONS:

1. Blood loss from a pelvic fracture can be significant. Monitor closely and treat per protocol SHOCK (xxx)
2. Consider placing a device prior to vehicle extrication if feasible
3. Unless necessary—do not remove once in place
4. If stabilization device is in place for greater than 24 hours, assess skin integrity every 12 hours
5. For male patients: ensure genitalia elevated out of the groin area and not compressed by the stabilizing device.



Restraint of Patients

CLINICAL INDICATIONS

A patient who may harm himself, herself, or others may be restrained to prevent injury to the patient or crew. This restraint must be used humanely and only after other means to prevent injury to the patient or crew have failed. The efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

Refer to *Behavioral and Psychiatric Emergency* Protocol

PROCEDURE

- Attempt less restrictive means of managing the patient.
- Ensure that there are sufficient personnel available to physically restrain the patient safely.

PHYSICAL RESTRAINT GUIDELINES:

1. Use the minimum number of physical restraints required to accomplish necessary patient care and ensure safe transportation (soft restraints may be sufficient). If law enforcement or additional manpower is needed, call for it prior to attempting restraint procedures. Do not endanger yourself or your crew.
2. Avoid placing restraints in such a way as to preclude evaluation of the patient's medical status.

PHYSICAL RESTRAINT PROCEDURE:

1. Place patient face up on long back board or on the stretcher (backboard recommended for ease of patient transfer)
2. Secure ALL extremities to back board. Try to restrain the lower extremities first using soft restraints around ankles. Next restrain the patient's arms (either both arms at the patient's sides or one arm at their side and the other above their head).
3. If necessary, utilize cervical spine precautions (tape, foam bags, etc.) to control violent head or body movements.
4. Secure backboard onto stretcher for transport using additional straps as necessary.
5. Evaluate the patient's respiratory and cardiac status every few minutes to ensure that no respiratory compromise exists. Monitor SpO2 if possible.
6. DO NOT tighten chest straps to the point that they restrict breathing.

CHEMICAL RESTRAINT GUIDELINES:

Sedative agents may be used to provide a safe method of restraining the violently combative patient. The patients may include alcohol and/or drug-intoxicated patients and restless, combative head injury patients. Patients who are violently fighting the restraints may require chemical restraint: CONTACT MC

NOTES AND PRECAUTIONS

- Patients who are restrained particularly in a prone position are at risk for asphyxia and sudden death. Constant evaluation of the patient's respiratory status is necessary.
- Only the minimum amount of restraint is to be used on the patient's chest area.
- Hypoxia and/or hypoglycemia may be a cause of combativeness.

1400

Spinal Examination and Clearance

CLINICAL INDICATIONS:

- Suspicion of spinal/neurological injury
- Provider decision to utilize the Spinal Motion Restriction Flow Chart

PROCEDURE

Equipment: Vacuum splint, Scoop Stretcher, Backboard and straps, KED, rigid cervical collar, tape, head supports. Before and after placing a patient in spinal precautions, check circulatory, sensory, and motor functions.

NOTE: This procedure details the spinal examination process and must be used in conjunction with the Spinal Immobilization Clearance Flow Chart (next page).

1. Explain to the patient the action that you are going to take. Ask the patient to immediately report pain and to answer questions with a "yes" or "no" rather than nodding his or her head.

2. With the patient's spine supported to limit movement, begin palpation at the base of the skull at the midline of the spine.

3. Palpate the vertebrae individually from the base of the skull to the bottom of the sacrum.

4. On palpation of each vertebral body, look for evidence of pain and ask the patient if they are experiencing pain. If evidence of pain along the spinal column is encountered, the patient should be immobilized. **(Do not procede to step 5 if there is midline tenderness)**

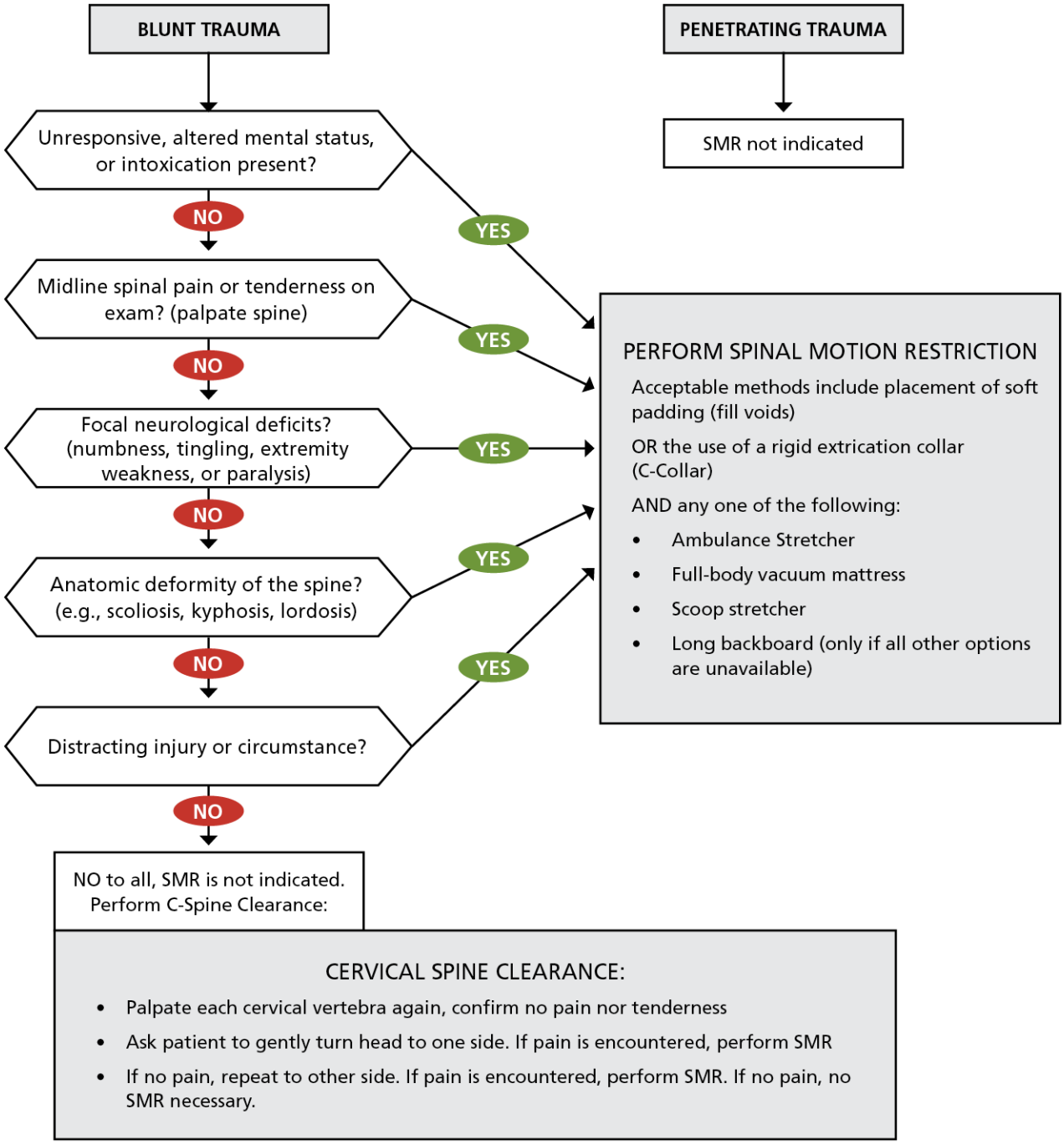
5. If the capable patient is found to be pain free, ask the patient to turn his or her headfirst to one side (so that the chin is pointing toward the shoulder on the same side as the head is rotating) then, if pain free, to the other. If there is evidence of pain the patient should be immobilized.

NOTE: Do not proceed to step 5 (range of motion) if the patient has midline spinal tenderness.

SPECIAL CONSIDERATIONS:

- **If any doubt exists regarding whether or not the patient has a spinal injury, immobilize. Contact MC for final clearance.**
- In the very old and very young, a normal exam may not be sufficient to rule out a spinal injury.
- Significant mechanisms of injury include high-energy events such as long falls, ejection from a vehicle, rollover MVAs, head-on MVAs, and MVAs involving abrupt deceleration.
- Maintain a higher index of suspicion for spinal injury in any patient with arthritis, cancer, dialysis, or other underlying spinal or bone diseases.

SPINAL MOTION RESTRICTION (SMR) ASSESSMENT



1410

Spinal Motion Restriction

CLINICAL INDICATIONS:

Spinal motion restriction (also referred to as immobilization) is indicated in patients with a mechanism of injury having the potential to cause spinal injury and who have ANY of the following criteria:

- Unresponsive
- Altered mental status
- Evidence of intoxication
- Distracting pain/injury (e.g., severe burns, fractures)
- Distracting situation (e.g., communication barrier, emotional distress)
- Neurological deficit (numbness, tingling, paralysis)
- Spinal tenderness/pain

FULL BODY VACUUM SPLINT:

Preferred to a long backboard if available

1. Temporarily immobilize the cervical spine with rigid extrication collar and continuous manual inline support.

2. Log roll the patient onto the center of the vacuum body splint while maintaining manual spinal immobilization. Make sure there are no sharp objects on the patient—these objects could puncture the splint and render it useless.

3. Replace the rigid cervical collar with headblocks or towel rolls placed around the patient's head. Use soft materials that will maintain cervical spine immobilization as the splint tightens around the patient.

   Fasten the straps along the vacuum splint.

4. Ask other providers to help conform the splint to the patient's torso and low back. Attach the pump and evacuate the air from the splint. As the splint conforms to the patient, tighten the straps.

5. Helmet chin straps, which could compromise the airway, should be removed as the patient is immobilized. If KED leg straps were used in the initial extrication, loosen, or remove them so that the patient can lie flat.

6. Continually reassess the vacuum splint during transport and evacuate additional air as needed. During patient transfer, ensure that the receiving ambulance/facility is familiar with how to use the splint.

LONG BACKBOARD:

For use when a full body vacuum splint OR scoop stretcher are unavailable or impractical.

1. Temporarily immobilize the cervical spine with a rigid extrication collar and continuous manual inline support. In severely traumatized patients requiring rapid transport, use a rigid C-collar with continuous manual inline stabilization during rapid extrication onto a long spine board.
2. Immobilize thoracic and lumbosacral spine to the backboard, when possible, and/or other appropriate device as patient condition allows (e.g., KED). Secure straps diagonally across the shoulders/chest and straight across the hips and thighs. During this procedure, the patient should be moved as little as possible and always as a unit.
3. After immobilizing the patient's body from the neck down, secure head and cervical spine to long backboard using dense, soft support material on both sides of the head and tape.
4. Helmet chin straps, which could compromise the airway, should be removed as the patient is immobilized to the backboard. If KED leg straps were used in the initial extrication, loosen, or remove them so that the patient can lie flat.
5. Patients should be strapped securely enough to the long backboard to enable turning the board in the event of vomiting. Additional help may be necessary to turn the patient and manage the airway while maintaining spinal immobilization.

NOTES AND PRECAUTIONS:

- **When in doubt, or if a communication barrier exists, err on the side of spinal motion restriction. This is especially true in the elderly, mentally disabled, and patients with whom you have a language barrier.**
- Patients with penetrating injuries to the head, neck, or torso who do not have evidence of spinal injury should NOT be immobilized. Routine immobilization of patients with penetrating trauma has been associated with poor outcomes

PEDIATRIC CONSIDERATIONS:

- **Children injured in motor vehicle collisions should be transported in their car seats if possible (booster seats, which are designed for children 40-80 pounds, are NOT adequate for spinal motion restriction).**
- **Children require extra padding behind the shoulders and are best immobilized in a device made specifically for their size.**
- **Since the pediatric patient is at risk of sliding from side to side on a backboard, it is recommended that responders place rolled up blankets or other dense, soft support material on both sides of the patient prior to securing the chest and hip straps.**
- **The location of the straps on the backboard may have to be adjusted to securely hold the pediatric patient in place and to avoid compressing the abdomen.**

1420

Suctioning

CLINICAL INDICATIONS

Respiratory difficulty secondary to secretions or the potential for aspiration exists.

PROCEDURE ORAL SUCTIONING

1. Preoxygenate patient with 100% oxygen.
2. Assemble equipment: Suction unit with tonsil tip, personal protective equipment (gloves, goggles, gown).
3. Turn suction unit on and confirm mechanical suction is present.
4. Insert tip without suction, then cover thumbhole to begin suction.
5. Apply suction for less than 15 seconds.
6. Monitor the patient's oxygenation saturation.
7. Re-oxygenate patient for at least 2-3 minutes between suction attempts.

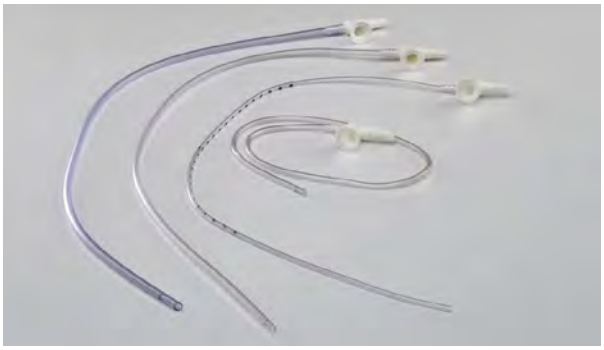
NASAL SUCTIONING (PEDIATRIC):

1. Squeeze air out of the bulb syringe to create a vacuum.
2. Maintain vacuum and gently insert tip of the bulb into one nostril.
3. Gently release the bulb to suction and remove from the nostril.
4. Squeeze secretions out of bulb and repeat procedure for second nostril.
5. Monitor the patient's respiratory status.

TRACHEAL SUCTIONING:

(Parkmedic, Paramedic)

1. Preoxygenate patient with 100% oxygen if possible. However, never delay suctioning if the potential for aspiration/airway compromise exists due to large volumes of emesis or blood.
2. Assemble equipment: suction unit with whistle tip suction catheter, personal protective equipment (gloves, goggles, gown).
3. Remove the BVM from the tracheostomy tube, insert the catheter as far as possible, then use intermittent suction and slowly withdraw and rotate the catheter.
4. Do not suction more than 15 seconds UNLESS large volume regurgitation exists.
5. Monitor patient's respiratory status (SpO2, EtCO2, lung sounds).
6. If possible, re-oxygenate patient for at least 2-3 minutes between suction attempts but do not delay if the airway is completely obstructed.



NOTES AND PRECAUTIONS

- Traditional suctioning time limitations do not apply in situations with large-volume regurgitation. Do everything in your power to clear the airway and prevent severe aspiration: roll the patient onto his or her side (maintain spinal immobilization if necessary) and suction oropharynx until it is clear.
- Current Neonatal Resuscitation Program (NRP) guidelines do not recommend routine suctioning of neonates with clear amniotic fluid UNLESS the neonate has an obvious obstruction to spontaneous breathing or requires positive pressure ventilation (BVM ventilations). Neonatal suctioning is associated with bradycardia and should be used only when necessary.
- Current NRP guidelines do not recommend routine tracheal suctioning of infants with meconium staining.
- Infants prefer to breathe from their nose, but they are not in fact "obligate nose-breathers" and can breathe from their mouths if a nasal obstruction exists.

Temperature Measurement

CLINICAL INDICATIONS

Monitoring body temperature in a patient with suspected infection, hypothermia, or hyperthermia

PROCEDURE

- For adult patients that are conscious, cooperative and in no respiratory distress, an oral temperature is preferred. For infants or adults who do not meet the criteria above, a rectal temperature may be performed. Tympanic temperature measurement is also acceptable. Refer to the manufacturer's instructions for these devices as necessary.

ORAL TEMPERATURE

- To obtain an oral temperature, ensure the patient has no significant oral trauma and place the thermometer under the patient's tongue with appropriate clean covering.
- Have the patient seal his or her mouth closed around the thermometer.
- If using an electric thermometer, leave the device in place until there is an indication an accurate temperature has been recorded (per the "beep" or other indicator specific to the device). If using a traditional thermometer, leave it in place until there is no change in the reading for at least 30 seconds (usually 2 to 3 minutes).

RECTAL TEMPERATURE

- Prior to obtaining a rectal temperature, assess whether the patient has suffered rectal trauma by history and/or brief examination as appropriate for patient's complaint.
- To obtain a rectal temperature, cover the thermometer with an appropriate clean cover, apply lubricant and insert into rectum no more than 1 to 2 cm beyond the anal sphincter.
- Follow guidelines above to obtain temperature.

NOTES AND CONSIDERATIONS

Record time, temperature, method (oral, rectal, tympanic, etc.) and scale (C or F) in the PCR. Many thermometers do not record below 34.5° C (94° F)—an extended range thermometer is necessary for hypothermic patients.

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Tourniquet Application

CLINICAL INDICATIONS

- Life-threatening hemorrhage from an extremity that cannot be controlled by direct pressure
- In a MCI, Tactical or Technical situation where extremity bleeding is occurring and there are limited resources or ability to apply direct pressure for initial bleeding control.

GUIDELINES

- The tourniquet should be at least 2 inches wide, applied directly to exposed skin if possible, as high as possible on the extremity with the wound. Do not place over a joint.
- A blood pressure cuff may be used as a tourniquet, inflated 20 mmHg above systolic blood pressure. Recheck frequently to ensure cuff has not lost pressure.
- An appropriately applied tourniquet is tightened until bleeding stops, and you cannot feel a distal pulse. It is painful. If bleeding continues, a second tourniquet may need to be applied.
- **NOTE:** Once placed, tourniquets should be left in place and rapid transport should be initiated/arranged. Medical Control should be made early if tourniquet applied (see NOTES AND PRECAUTIONS for prolonged care/tourniquet removal).

CAT TOURNIQUET PROCEDURE

CAT type tourniquets are commonly used—be sure to know how to use the tourniquet that you carry.

1. Wrap band around the extremity and pass the free (running) end through the inside slit of the buckle—or—insert the wounded extremity through the loop of the self-adhering band.
2. Pass band through the outside slit of the buckle.
3. Pull the band tight and securely fasten the band back on itself.
4. Twist the windlass rod until bleeding has stopped and no distal pulse is present.
5. Lock the rod into the clip and secure with the strap.
6. Document time of application on the tourniquet so that the hospital knows the exact time of application.

NOTES AND PRECAUTIONS

- Contact medical control before attempting removal of a tourniquet.
- Removal should be considered in the following situations:
  - » The tourniquet was placed in an MCI, technical, or tactical environment where a limited assessment was performed. Once the scene is stabilized and assessment/treatment can continue, the tourniquet may be loosened, and bleeding assessed and managed as above.
  - » Prolonged care (>2 hours). Loosen tourniquet and if bleeding does not recur, leave it loose around the extremity. If bleeding resumes, tighten tourniquet again.
- Tourniquets left in place for more than 6 hours should be left in place until definitive care is reached.
- After placing a tourniquet that successfully controls bleeding, wound irrigation can be considered, (Procedure: *WOUND CARE*), if transport is prolonged.

Transcutaneous Pacing

CLINICAL INDICATIONS

- Symptomatic bradycardia
- HR <50 AND one of the following:
  - » Unstable Patient (e.g., hypotension, AMS/ALOC, shock, chest pain, severe SOB, heart block)
  - » Unresponsive to atropine (atropine administration should not delay implementation of external pacing for patients with poor perfusion.)

CONTRAINDICATIONS

- Patients without a pulse
- Patients meeting Death in the Field criteria. See GENERAL GUIDELINES AND POLICIES: Determination of Death in the Field.
- Patients in traumatic cardiac arrest
- Patients in asystole
- In patients with an effectively firing pacemaker, look for other causes of hypotension.

1. Consider premedication per MEDS: midazolam or fentanyl and ketamine hydrochloride.

   A. This is a consideration for a conscious patient—do not delay treatment to administer medications.

2. Consider contacting MC (If MC contact is not possible at the initiation of the procedure due to the severity of the patient condition—contact when the patient is more stable or more personnel arrive).

3. Ensure ECG limb lead electrodes are attached, and monitor displays a rhythm.

4. Attach pacing pads to anterior and posterior chest. The anterior pad should be placed midway between the xyphoid process and the left nipple at the apex of the heart. The posterior pad should be beneath the left scapula and lateral to the spine at heart level. (There are multiple placement options—follow the recommendations of the device being used)

   A. ensure the pads are adherent—most units will not operate it pads are not properly adherent.

5. Print rhythm strips.

6. Set device to "Pacing" mode

7. Set the rate between 60-90 bpm.

8. Set the electrical current (or output) to the lowest setting:

   A. Gradually increase the current until a pacer spike is seen on the monitor
   B. Continue increasing until a QRS complex is seen—this indicates electrical capture

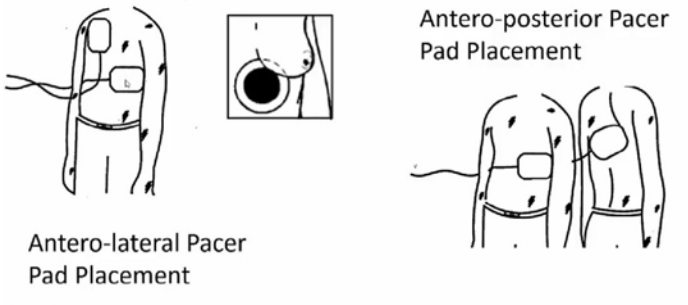
9. Confirm mechanical capture (patient pulse)

10. A paced rhythm will have a spike with each QRS—the T wave will (generally) be broad and tall.

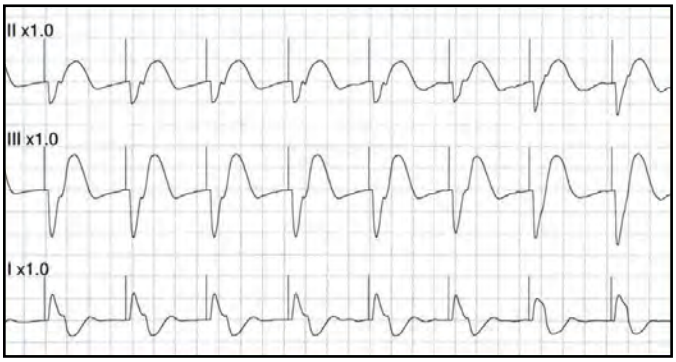
11. Reassess patient

    - V-fib rare—monitor closely
    - Burns: (rare) patients being paced for a long time (>4 hours) may develop skin burns. Ensure the skin is clean prior to placing the pads and that the pads are intact
    - Failure to recognize an underlying treatable ventricular fibrillation due to obscuration of ECG by pacer spikes
      - » Troubleshoot by canceling the TCP—this will pause the spikes to allow for identification of an underlying rhythm.

Examples of proper pad placement:



Example of TCP spike with QRS capture:



1445

Vagal Maneuvers

CLINICAL INDICATIONS

- Supraventricular tachycardia
- Tachycardia of unknown etiology

VALSALVA MANEUVER:

1. Print a baseline rhythm strip before initiating treatment.
2. For a patient with a dysrhythmia, apply defibrillation pads before initiating treatment to prepare for deterioration.
3. Explain the procedure to the patient.
4. Instruct the patient to inhale, hold his or her breath, and do one of the following:
    A. Bear down, as if to have a bowel movement, and attempt to hold this position for 20-30 seconds.
    B. Blow forcefully through a straw, syringe, or IV catheter for as long as possible (at least 20 seconds)
5. Monitor the patient's cardiac rhythm continuously and print a rhythm strip if conversion occurs.
6. Stop the maneuver immediately if:
    A. The patient develops an altered mental status or
    B. Heart rate drops below 100 bpm.

DIVE REFLEX:

1. Print a baseline rhythm strip before initiating treatment.
2. For a patient with a dysrhythmia, apply defibrillation pads before initiating treatment to prepare for deterioration.
3. Explain the procedure to the patient.
4. Prepare a cold pack wrapped in a damp wash cloth.
5. Apply the cold pack to the forehead and nose for 15-30 seconds.
6. Monitor the patient's cardiac rhythm continuously and print a rhythm strip if conversion occurs.
7. Stop the maneuver immediately if:
    A. the patient's mental status deteriorates
    B. the heart rate drops below 100

NOTES AND PRECAUTIONS

- Vagal maneuvers may be attempted while a provider prepares medications or cardioversion equipment, but they should not delay more definitive treatment for patients with unstable tachycardia.
- The dive reflex may be more effective in pediatric patients than adults.
- Reference *Cardiac—Adult Tachycardia* Protocol or *Cardiac—Pediatric Tachycardia* Protocol for more information regarding treatment of patients with tachycardia.

Vital Signs

CLINICAL INDICATIONS

- Transported patients: minimum of two full sets of vital signs regardless of transport time (see *Who Is A Patient?* Policy)
- Patients refusing treatment/transport (AMA): minimum of one full set of vital signs (see *Who Is A Patient?* Policy)
- Preintervention (however, do not withhold interventions if patient condition requires immediate treatment)
- After medication administration or procedure
- Every 15 minutes (minimum) for stable patients during transport
- Every 5 minutes for unstable patients during transport

PROCEDURE:

1. Obtain an initial set of vital signs, including:

    A. Pulse rate, regularity, and quality
    B. Respiratory rate, effort, and breath sounds
    C. Systolic and diastolic blood pressure (capillary refill may be substituted in patients under 5 years old)
    D. Pain severity (if pain is a complaint)
    E. GCS (patients with trauma or altered mental status)
    F. Pulse oximetry (SpO2)

2. As soon as feasible, obtain a complete set of vital signs including lung sounds and temperature. If indicated by specific procedures or protocols, obtain EtC02, ECG, or blood glucose measurements.

3. If equipment is unavailable (such as in a backcountry setting), providers must rely on basic findings, such as skin condition, mental status, and quality of the patient's pulse instead of blood pressures or SPO2 readings.

4. Be sure to document why traditional vital signs were not taken in the patient care report.

NOTES AND PRECAUTIONS

- In trauma patients, use a manual blood pressure cuff to establish a baseline blood pressure. Manual blood pressure readings are more accurate than automated cuffs, especially in hypotensive patients.
- Do not rely on pulse oximetry alone for a full picture of a patient's respiratory status. Include lung sounds, capnography, skin condition, respiratory rate/volume/effort, and a physical exam of the patient's chest (to evaluate for retractions, chest excursion, signs of trauma, etc.) in the assessment of anyone with a possible respiratory complaint.
- Patients with reactive airway disease (e.g., asthma, COPD) can present with respiratory failure despite normal or near-normal pulse oximetry readings.
- In the setting of carbon monoxide poisoning, pulse oximetry will be within normal range despite profound hypoxia. Carbon monoxide readings should be taken on suspect patients.

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Wound Care

CLINICAL INDICATIONS

Protection and care for open wounds prior to and during transport (including blisters, burns, abrasions, lacerations, punctures, open fractures, avulsions, and amputations).

PROCEDURE

1. Use personal protective equipment, including gloves, gown, and mask as indicated.
2. If the patient is exsanguinating from arterial bleeding (large volume of bright red blood, often spurting and difficult to control), do not hesitate to apply a tourniquet. Irreversible blood loss can occur within minutes. See Tourniquet Application Procedure. If arterial bleeding occurs from a location where a tourniquet cannot be applied (e.g., trunk, axilla), pack the wound with sterile roller gauze and hold firm direct pressure.
3. For all other bleeding control situations: apply well-aimed direct pressure with a gloved hand and sterile dressing. If bleeding continues, temporarily remove dressing to ensure that direct pressure is being appropriately applied to the source of bleeding. Pack the wound if needed for additional bleeding control. Bandage the wound to keep dressings in place.
4. Once bleeding control has been achieved continue with wound care. Frequently reassess wounds to ensure bleeding hasn't returned.
5. Document the wound, assessment, and care in the prehospital patient care report.

GENERAL WOUND CARE

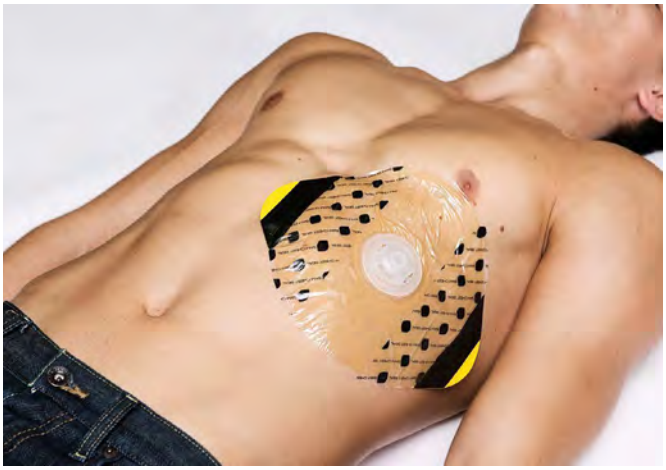
1. Assess whether the patient is stable or unstable. Never delay transport or treatment of other life-threatening injuries (e.g., exsanguination, airway compromise, tension pneumothorax, shock) to perform general wound care.
2. Keep wound as clean as possible: gently remove foreign material (except impaled objects) and remove constricting items as soon as possible, such as rings or watches.
3. Irrigate open wounds with approximately 100 ml per centimeter of wound length using normal saline, sterile water, or potable water as available. See step 5 for list of wounds not to irrigate. Do not use iodine, hydrogen peroxide, alcohol, or other antiseptics for irrigation. Pressure irrigation is preferred. If bleeding was severe or difficult to control, do not disturb the clotting process to irrigate. Cessation of severe bleeding takes priority over irrigation.
4. Burns < 15% total body surface area (TBSA) can be gently rinsed. Do not use high pressure lavage. Be aware of the patient's body temperature and take measures to maintain warmth.
5. Wounds that should NOT be irrigated include:
   A. Wounds that are actively bleeding or wounds with bleeding that was severe and difficult to control
   B. Punctures below the skin surface (inside a body cavity)
   C. Burns > 15% TBSA
6. Apply antibiotic ointment (bacitracin) to abrasions and burns < 5% TBSA and if transport time > 1 hour. DO NOT apply to eyes, large burns, deep wounds, puncture wounds, or impaled objects.
7. Apply sterile, nonadherent dressings and bandage wounds. Use pressure dressings for bleeding control if necessary and consider immobilization, if indicated.

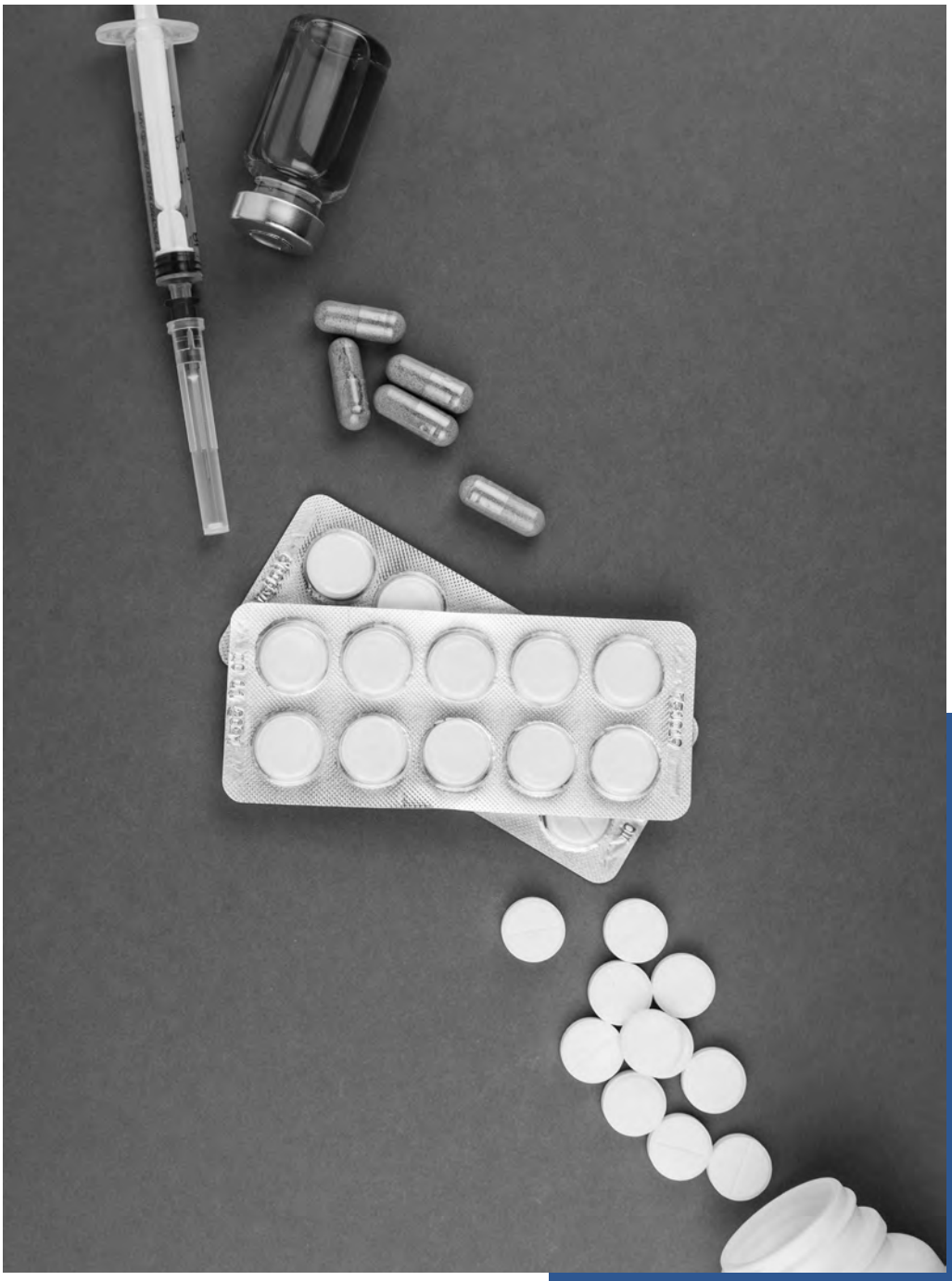
SPECIAL SITUATIONS IN WOUND CARE:

- **AMPUTATIONS:** Gently rinse the amputated part and wrap in moist, clean cloth or gauze. Place into a dry, water tight plastic bag. DO NOT IMMERSE SEVERED PART DIRECTLY IN WATER OR ICE. Place the bag in ice water or a cool water bath and transport with the patient. Do not delay transport to look for amputated tissue. Consider air ambulance transport: replantation success is highly time dependent.
- **BURNS > 15% TBSA:** Cover with sterile dry burn sheet or dressing. Keep the patient warm. Reference Burns Protocol for detailed treatment instructions.
- **EYE INJURIES:** Reference Eye Emergencies Protocol for detailed treatment instructions.
- **EVISCERATION:** Maintain as sterile an environment as possible. Control major bleeding. Do not push protruding bowel back into the abdomen. Cover with a moist sterile nonadherent multi-trauma dressing. Secure with a dry sterile dressing (occlusive dressing may be used) and ensure limited movement of the affected area.
- **FISHHOOK REMOVAL:** Barbless hooks are relatively easy to remove. Barbed hooks can be removed with MC contact; however all patients need tetanus status verified. Deeply imbedded hooks, or hooks in sensitive body parts should be referred to a Clinic or Hospital for removal.
- **IMPALED OBJECTS:** Stabilize in place unless the object interferes with ventilation or transport. If shortening or removal of the object is required for either reason, contact MC
- **NOSE BLEEDS:** See Epistaxis Protocol
- **LARGE, DEEP, OR GAPING WOUNDS:** Splint if near a joint or if necessary for bleeding control. See *Fracture/ Dislocation Management* Procedure.
- **SEVERE WOUNDS (DEEP; CRUSHED; EXPOSED TENDON; OPEN FRACTURE; HEAVY CONTAMINATION),** especially with time from injury to definitive care > 1 hours: Administer *cefazolin sodium.* Do not give cefazolin for burns, shallow wounds, or when the expected time from injury to definitive care is < 2 hours.
- **SUCKING CHEST WOUNDS:** Place an occlusive dressing over the wound. Vent dressing or perform chest decompression if signs of a tension pneumothorax develop. See Needle Thoracostomy Procedure.
- **TOOTH INJURIES:** If teeth are avulsed (broken), loosely wrap teeth in moist gauze and place in plastic bag for transport with patient. Handle teeth only by crown (not the root). Best results for reimplantation are using a commercial solution such as "Save a Tooth"

NOTES AND PRECAUTIONS

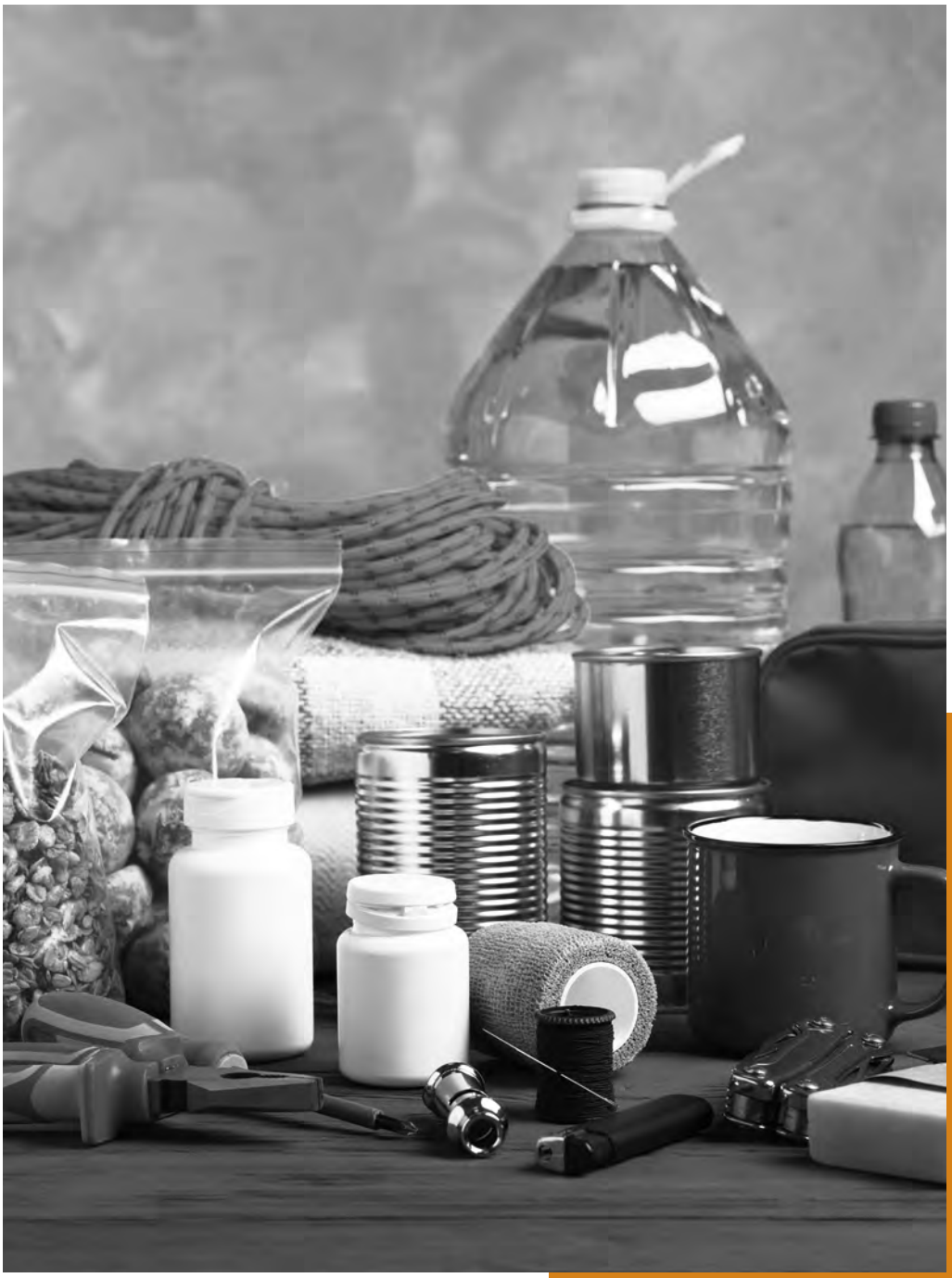
- Medical Control is advised for questions/unusual circumstances
- Reassess distal circulation, sensory and motor function every 30 minutes during transport.
- Reassess bandages that may have become constricting and compromising distal CSM.
- Refusal of Transport with a puncture wound—advise patient regarding tetanus.





Treatment

SECTION 2000



ABCs: Universal Patient Care

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Ask for Past Medical History • Ask follow-up questions as indicated, to ensure a clear medical history • Determine history of present illness and similar episodes in the past • Ask about family members (mother/father—heart disease, diabetes, other hereditary disorders)	• Look for clues as to what is going on with the patient • Assess the scene for additional clues (e.g., medical equipment, drug paraphernalia, pill bottles)	• When forming a differential diagnosis, work backward from the most urgent/life-threatening disease processes to the most benign, even if the most benign diseases are more common

SPECIAL CONSIDERATIONS

- Request additional resources as soon as possible.
- BLS should always request ALS when life threatening conditions are identified.
- For any patient contact that does not result in an EMS transport see Policy: *Informed Decision (Refusal of Treatment or Transport)*.
- Required vital signs on every patient include blood pressure, pulse, respirations, and pain/severity. Refer to Procedure: *Vital Signs.*
- The need for pulse oximetry, glucose measurement, and temperature documentation is dependent on the specific complaint.
- Scene times should be based on the patient's clinical condition and transport policy. Do not delay transport of critically ill patients to perform interventions unless they address immediate life-threats
- Do not give oral fluids unless directed by specific protocols.

OPQRST (PAIN/DISCOMFORT ASSESSMENT)

Onset

Palliative/Provocative factors

Quality (Feels like?)

Radiates/Refers

Severity (0-10)

Time (is this the first time?)

SAMPLE HISTORY

Signs/Symptoms

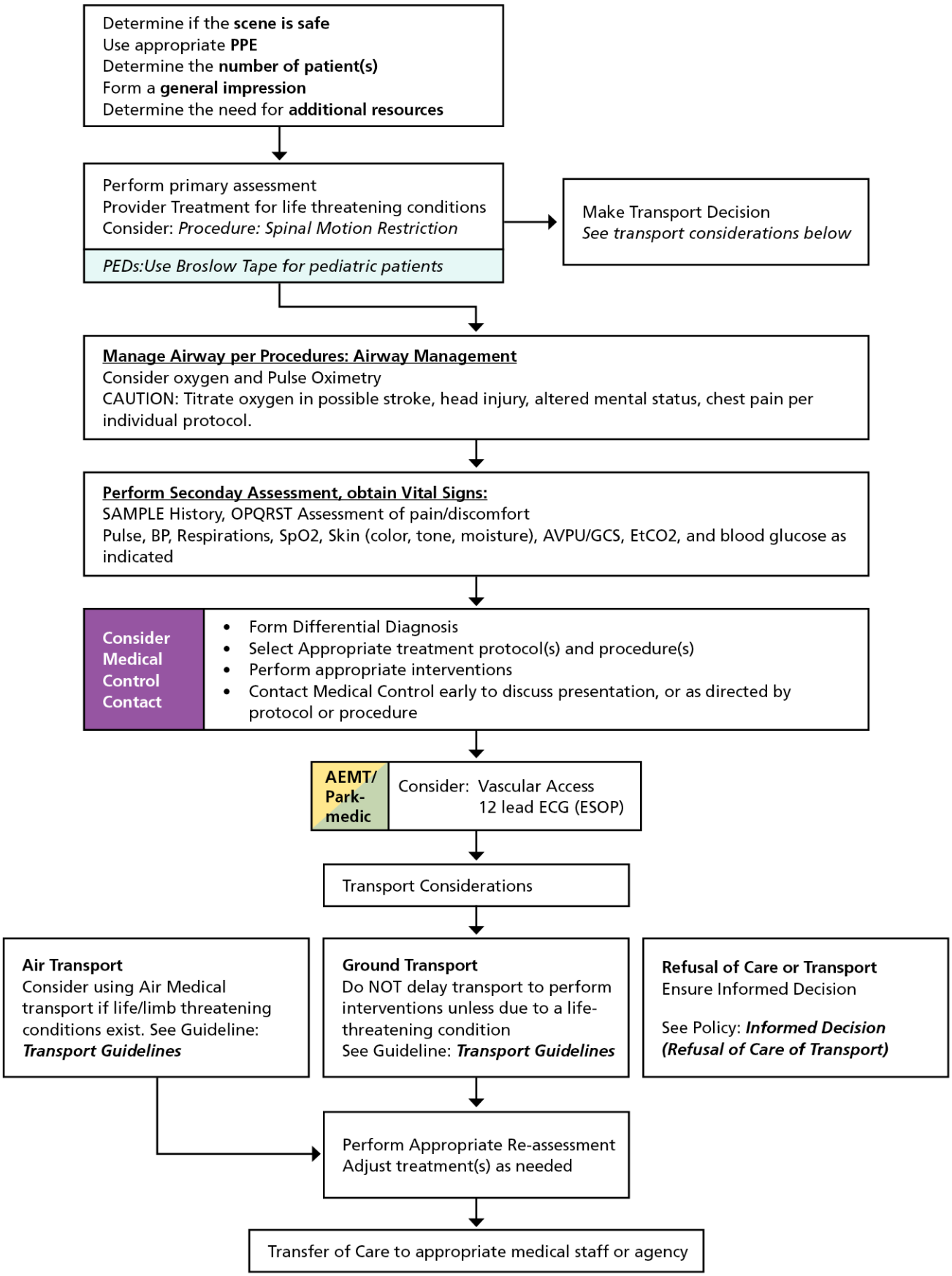
Allergies Medications

Past medical history

Last oral intake/output

Events leading up to present illness/injury

ABCs: UNIVERSAL PATIENT CARE



Abdominal Pain

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Age • Emesis/vomiting • Fever • Past Menstrual history (consider pregnancy) • Past abdominal surgery	• Constipation • Diarrhea • Dysuria • Guarding/rigidity • Nausea • Pain (locations, radiation) • Pulses (equal and strong) • Pregnancy • Tenderness • Vaginal bleeding/discharge • Vomiting/emesis	• Abdominal aortic aneurysm (AAA) • Appendicitis • Bowel obstruction • Diabetic Ketoacidosis • Gallbladder • Kidney stone • Myocardial infarction • Pelvic (PID, ectopic pregnancy, ovarian cyst) • Pneumonia or pulmonary embolus • Trauma

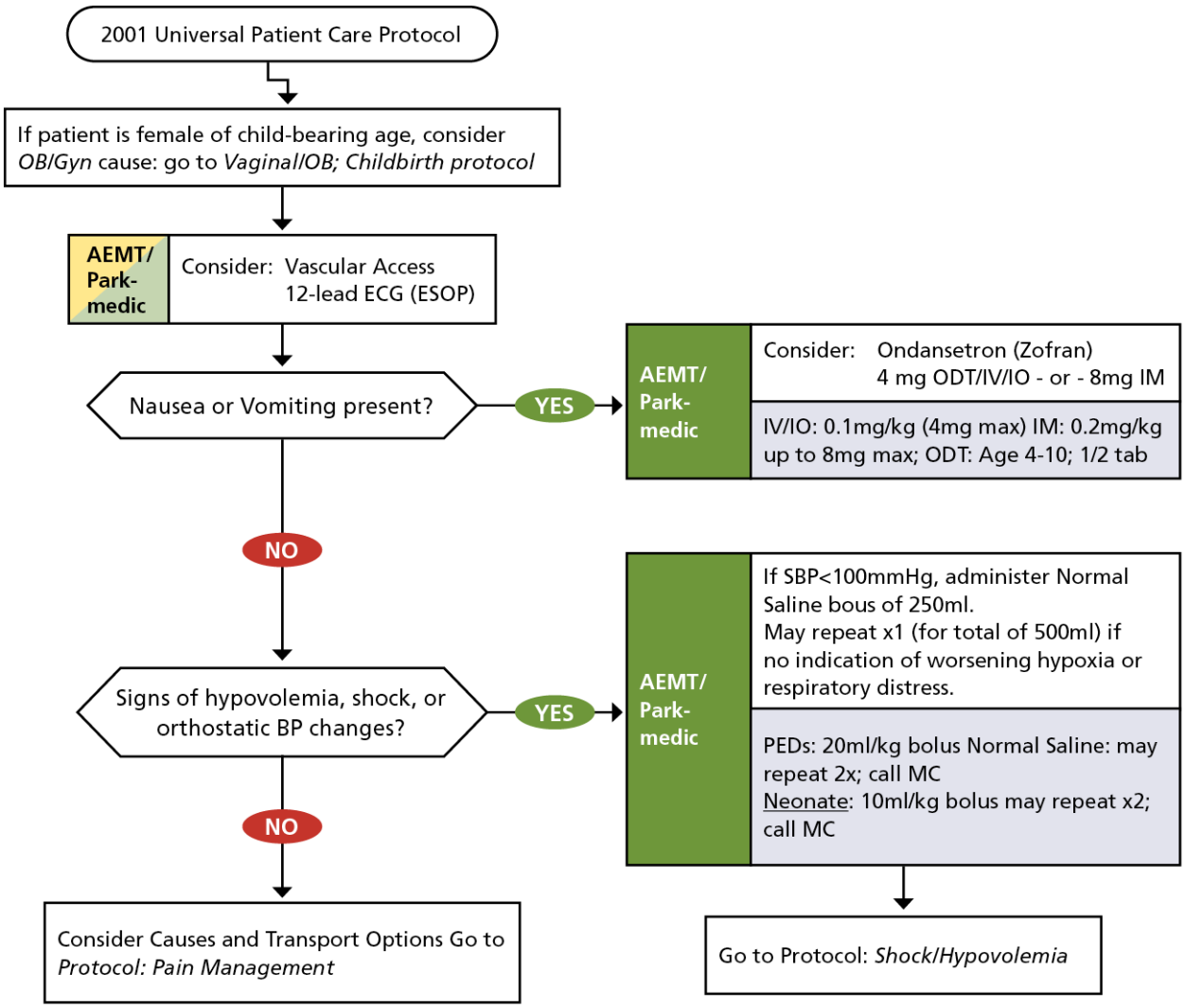
PEDIATRIC CONSIDERATIONS

- Consider nonaccidental trauma (abuse)
- Closely monitor vital signs as the blood pressure may drop quickly

SPECIAL CONSIDERATIONS

- Abdominal pain may be the first signs of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscera, etc.) Monitor for signs of shock.
- The diagnosis of abdominal aortic aneurysm should be considered with abdominal pain if patient is over 40.
- Appendicitis classically begins with vague, periumbilical pain, which migrates to the RLQ over time.
- Remember pneumonia or cardiac episodes can present as abdominal pain.
- The cause of abdominal pain is difficult to determine in the field. Transport and urgency should be guided by vital signs, level of pain, and history of prior conditions. Utilize medical control early.

ABDOMINAL PAIN



Accidental Exposures to Wildlife Capture Medications

INDICATIONS:

Human exposure to wildlife immobilization agents, euthanasia medications, or reversal agents

ROUTES:

Exposure may occur via injection (IV or IM), or contact with skin, eyes or mucous membranes (mouth or nose). For skin or eye exposure, wash the area with saline or clean water for at least 15 minutes.

PROTOCOL:

- In case of human exposure,
- Contact Poison Control at 1-800-222-1222.
- Contact Online Medical Control as soon as possible for further directions and possible orders to administer specific antidotes.
- Have Wildlife Biologist contact supervisor and NPS Attending Veterinarian.
- Determine if wildlife staff have administered reversal agent, and record time, dose and name of reversal agent.
- Obtain and review appropriate MSDS sheet for drug/ wildlife agent, but do not delay transport for patients exhibiting symptoms.
- For patients with signs or symptoms of opioid overdose, or known exposure to opioids, administer naloxone.
- See table for common signs, symptoms, and treatment considerations for each agent.

Wildlife Control personnel should have the reversal agents upon their person. Look for a reversal kit on the patient. Follow Universal Patient Care Protocol and address ABCs.

Animal Sedation Agent	Antagonist	Wildlife Drug Dose Administered (mg)	Conversion Calculation (mg of antagonist x sedation agent dose = maximum dose)	Maximum dose of Antagonist (mg)	Initial dose (ml)	Repeat does of Antagonist up to maximum dose	Comments
		Dose Calculation			Dose Administration		
Carfentanil	naloxone (Narcan) one puffer = 4mg	NA	4mg IN	Continue to Naltrexone dose	Support respirations with BVM; contact base for repeat dosing		
	Naltrexone (50mg/ml) (Trexonil)	—	x 100mg =	—	Calculated max dose _____ (ml)(IM)	NA	Support respirations with BVM
Thiafentanil (Thianil)	naloxone (Narcan one puffer = 4mg)	NA	4mg IN	Continue Naltrexone dose	Support respirations with BVM; contact base for repeat dosing		
	Naltrexone (50mg/ml) (Trexonil)	—	x 20mg =	—	Calculated max dose _____ (ml)(IM)	NA	Support respirations with BVM
Etorphine	naloxone (Narcan)	NA	4mg IN	Continue Naltrexone dose	Support respirations with BVM; contact base for repeat dosing		
	Naltrexone (50mg/ml) (Trexonil)				Calculated max dose _____ (ml)(IM)	NA	Support respirations with BVM
Butorphanol or Nalbuphine	naloxone (Narcan one puffer = 4mg)	NA			4mg (IN)	4mg (IN)	Support respirations with BVM and administer repeat doses every 2 minutes until BVM no longer needed
Medetomidine	Atipamezole (25mg/ml) or (5mg/ml as Antisedan)	—	x 5mg =	—	25mg (IM) 1ml (of 25 mg/ml) OR 5ml (of 5mg/ml)	25mg (IM)	Support respirations with BVM. Administer repeat doses every 2 minutes until max dose or BVM no longer needed

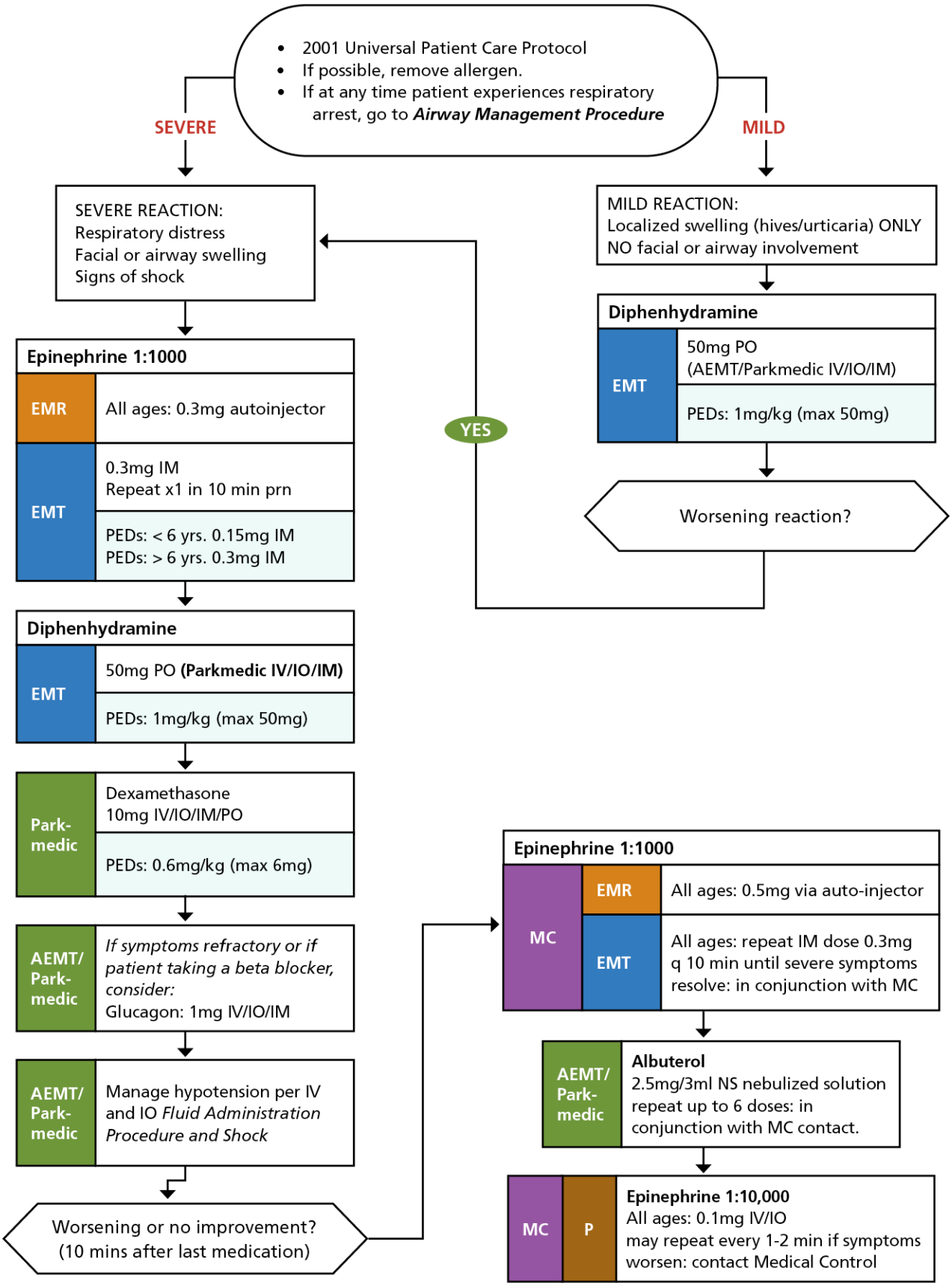
Allergic Reaction/Anaphylaxis

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Onset and location • Insect sting or bite • Food allergy/exposure • Medication allergy/exposure • New clothing, soap, detergent • Past history of reactions	• Itching or hives • Coughing/wheezing/stridor or respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotension or shock • Edema/angioedema • Abdominal pain, N/V	• Urticaria (rash only) • Anaphylaxis (systemic effect) • Shock • Aspiration/Airway obstruction • Asthma or COPD • Croup (upper airway obstructive illness) • Organophosphate poisoning

SPECIAL CONSIDERATIONS

- The shorter the onset from contact to symptoms, the more severe the reaction.
- When giving IV epinephrine for allergic reactions ALWAYS use the 1:10,000 concentration and push slowly (over 20-30 seconds) to minimize risks.
- Past history special considerations include allergic reactions, heart disease, stroke, and hypertension.
- Medication special considerations include beta blockers, epinephrine use before a responder comes on scene.
- Consider PROTOCOL *Shock/Hypotension* for anaphylactic shock.
- Use epinephrine with caution with patients over the age of 70.

ALLERGIC REACTION AND ANAPHYLAXIS



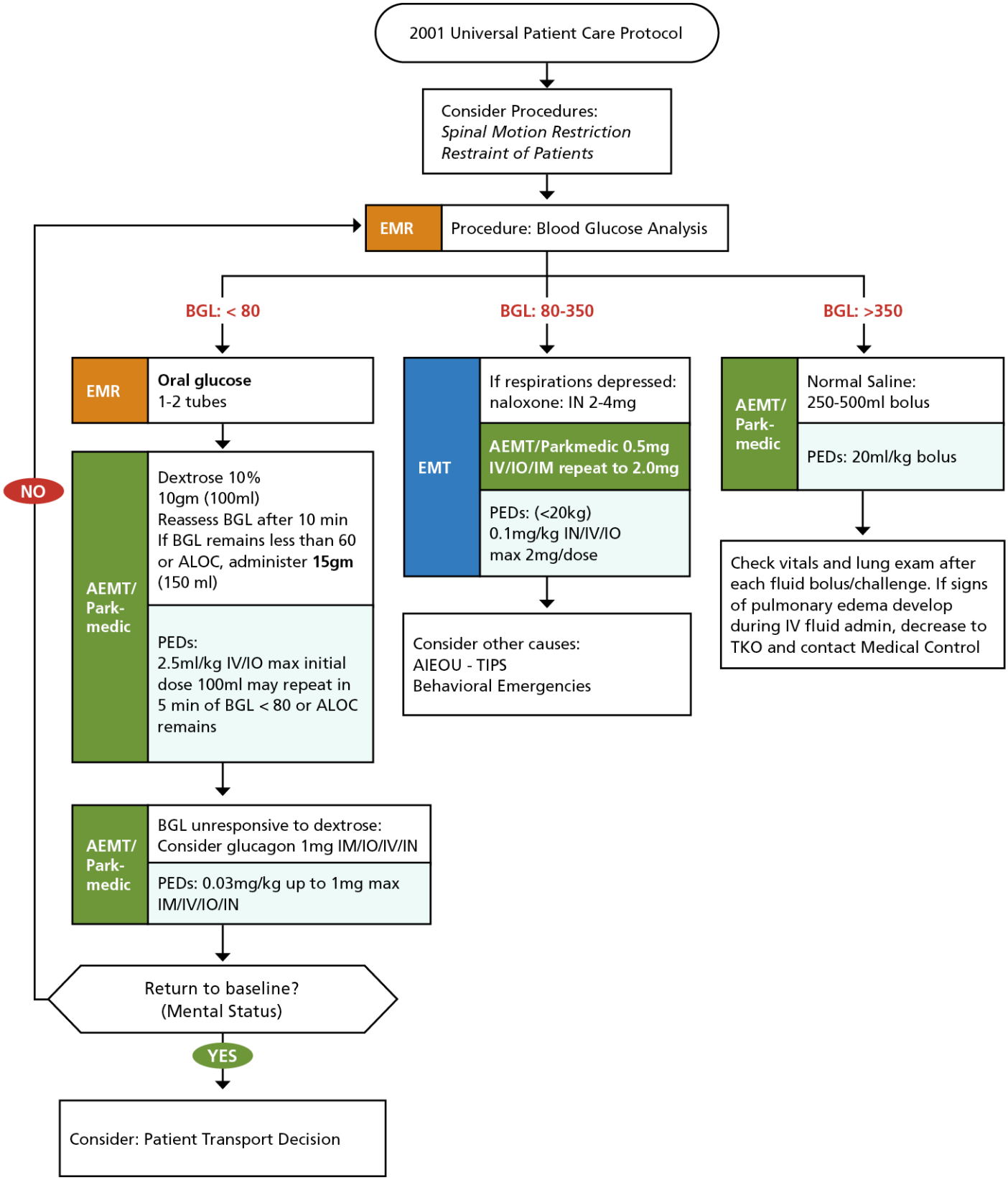
Altered Mental Status

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Baseline mental status • Time last seen normal • Past medical history (e.g., diabetes, epilepsy, dysrhythmias, psychiatric disorders, suicidal ideation/ attempts) • Illicit drug use • Toxic ingestion • Alcohol ingestion • Recent trauma • Medications (compliance, over/ under medication)	• AVPU, GCS • Baseline vital signs + SpO2, • EtCO2, ECG, temperature, blood glucose, pupils • Abnormal/bizarre behavior • Hypoglycemia: shakiness, irritability, fatigue, sweating, seizures, combativeness • Diabetic ketoacidosis: fruity breath (ketotic), dry skin/ mucosa, ill appearing, dehydration, abdominal pain, Kussmaul respirations	• Alcohol, Altitude, Age • Epilepsy, Electrolytes, Electrocution, Eclampsia, Encephalopathy • Insulin (hypo/hyperglycemia) • Overdose, oxygen (hypoxia) • Uremia (kidney failure) • Trauma, Tumor, Thyroid, Temperature (hypo/hyperthermia) • Infection, Infarction • Psychosis Poisons • Stroke, Syncope, Shock (septic, hemorrhagic, neurogenic, anaphylactic, cardiogenic, obstructive)

SPECIAL CONSIDERATIONS

- If patient is disoriented, think of medical causes (AEIOUTIPS, in differential above).
- Do not allow alcohol to confuse the clinical picture. Alcoholics frequently develop hypoglycemia.
- Patients who are "found down" with an altered mental status can be very difficult to assess: search for clues on the scene (pill bottles, medical alert tags, drug paraphernalia, etc.) and perform a complete and thorough physical exam.
- Different causes of altered mental status often present similarly (e.g., stroke/hypoglycemia, stroke/sepsis, hypoglycemia/alcohol intoxication, hypothermia/head injury). Stroke, in particular, has many mimics. Often a single vital sign, such as blood glucose or temperature, can be critical in determining the best working diagnosis.
- If unable to establish IV access, consider the use of Intranasal naloxone for suspected overdose, see PROCEDURE: *Mucosal Atomizer Device.*
- If patient is suicidal, do not leave alone.
- If patient is combative, consider the use of restraints. See PROTOCOLS: *Behavioral Emergency* and GENERAL GUIDELINES AND POLICIES: *Restraint of Patients.*

ALTERED MENTAL STATUS



Altitude Illness

HISTORY	ASSESSMENT	DIFFERENTIAL
• Ascent Profile (rate of ascent, nights at elevation, maximum altitude) • Duration of high-altitude exposure • Altitude at which signs and symptoms first began. • Prior history of altitude illness • Prophylactic medications taken? • Fluid intake • Past medical history • Overexertion	• AMS: headache, fatigue, nausea/ vomiting, decreased appetite, insomnia, periodic breathing • HACE: severe headache, ataxia, persistent vomiting, altered mental status • HAPE: shortness of breath at rest, tachypnea, cough, cyanosis, crackles, orthopnea (worsening respiratory distress when lying flat)	• AMS (Acute Mountain Sickness) • HACE (High Altitude Cerebral Edema) • HAPE (High Altitude Pulmonary Edema) • Hypoglycemia • Carbon Monoxide Poisoning • CHF, COPD, Asthma • Pneumonia, Pulmonary Embolism • Hypothermia • Hyperthermia • Infection • Intoxication (drug or alcohol) • Trauma • Stroke

SPECIAL CONSIDERATIONS

- High altitude illness usually occurs above 8000’ (2438m), and/or when an individual has ascended to a significantly higher elevation (for example: Sea level to 5000’). There is no set altitude for when symptoms may develop.
- Rapid ascent increases the risk of illness. Above ~9800’ (3000m), it is recommended to increase the sleeping altitude by no more than ~1600’ (500m) per day.
- All types of altitude illness: Descent is the preferred treatment. If descent is possible, DO NOT wait for a higher level of care
- Oxygen administration is essential for the treatment of altitude illness. If possible, administer oxygen during evacuation. (If the patient can descend, initiate slow descent while oxygen is coming to the patient.)
- HAPE often presents after the 2nd night after ascent to high altitude
- Patient’s with HAPE must have physical exertion limited. The patient should have no load (e.g., backpack) if self-extricating.
- AMS may progress to HACE. The differentiating factor is altered mental status, including ataxia.
- HAPE may present in isolation or with AMS/HACE

High Altitude Illness Prophylaxis (common medications taken by mountaineers)

- Acetazolamide (Diamox) 125mg po BID—many will take half the dose or only once daily
- Dexamethasone (Decadron) 2mg po q QID (generally for those with a true allergy to acetazolamide)

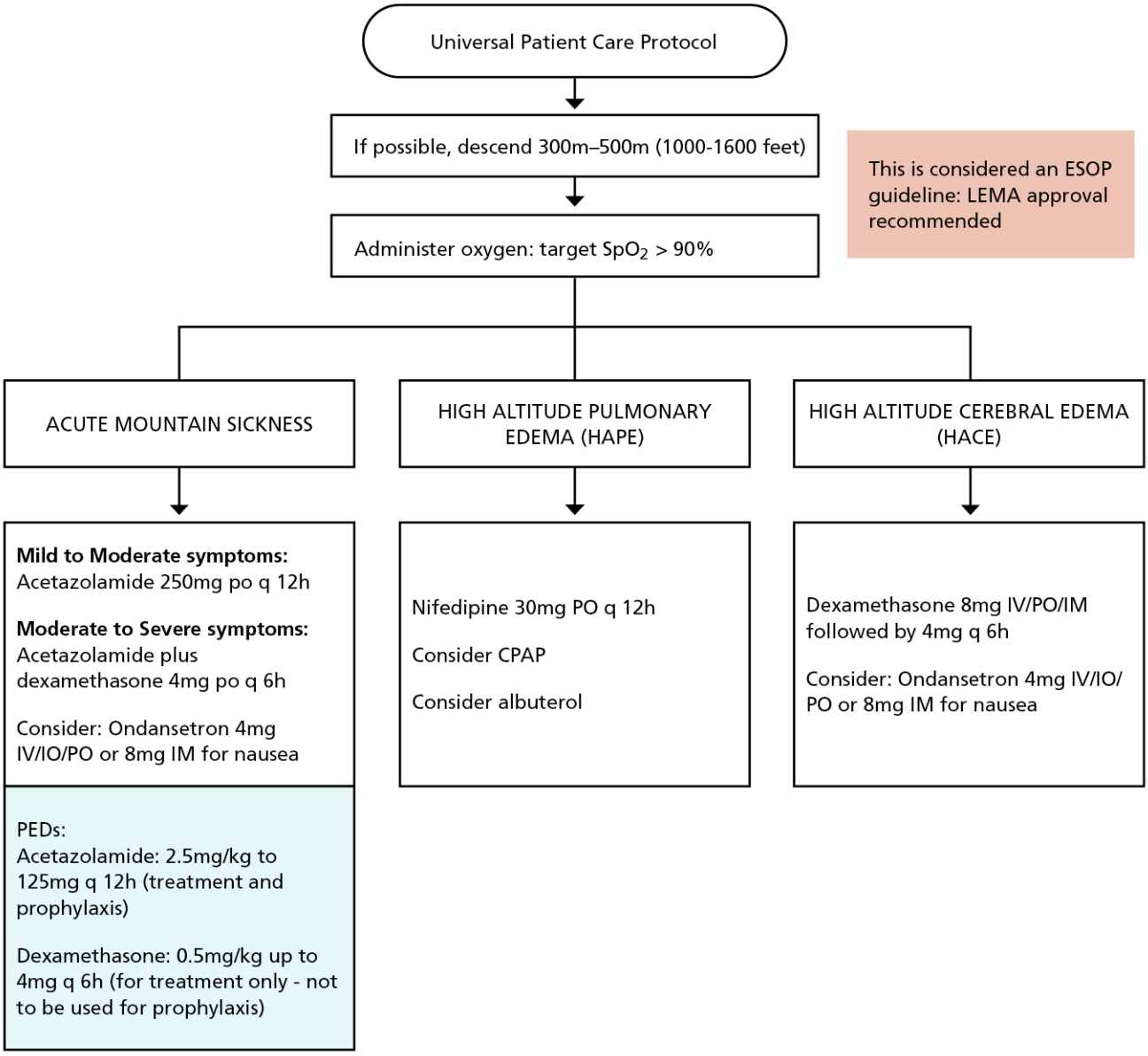
HACE treatment:

- Descent, either mechanically or by using a portable altitude chamber
- Oxygen administration
- Dexamethasone 8mg initially followed by 4mg (IV/IM/PO)
- Acetazolamide 250mg po q 12’ (dexamethasone is the key for treatment, this may potentiate it)

HAPE treatment

- Descent, either mechanically or by using a portable altitude chamber
- Oxygen administration
- Nifedipine 30mg q 12’
- CPAP and albuterol are considerations but not proven to improve symptoms
- May need to treat concurrently for AMS or HACE

ALTITUDE ILLNESS



PORTABLE ALTITUDE CHAMBER

If unable to descend consider use of a portable altitude chamber (e.g., Gamow Bag®). These devices are pressurized by a hand or foot pump. They are NOT to be used for mild to moderate AMS. The chamber creates a relative hyperbaric environment, simulating descent of 1500m-2000m. If the patient's status improves to the point they can assist with descent—initiate descent—but take the bag with you.

Contraindications:

- Comatose patient, patient not protecting their airway
- Severe claustrophobia

Considerations:

- The patient may experience ear pain—slow down the descent
- It can become quite warm within the bag.
- Be sure to insulate from cold (from the ground) and to shade from the sun.
- Most patients will require several hours in the bag.
- If the patient is confused, ensure that the rescuer is able to talk to them - offering reassurance.
- Rapid exit is possible—unzip the bag and trigger the release valve

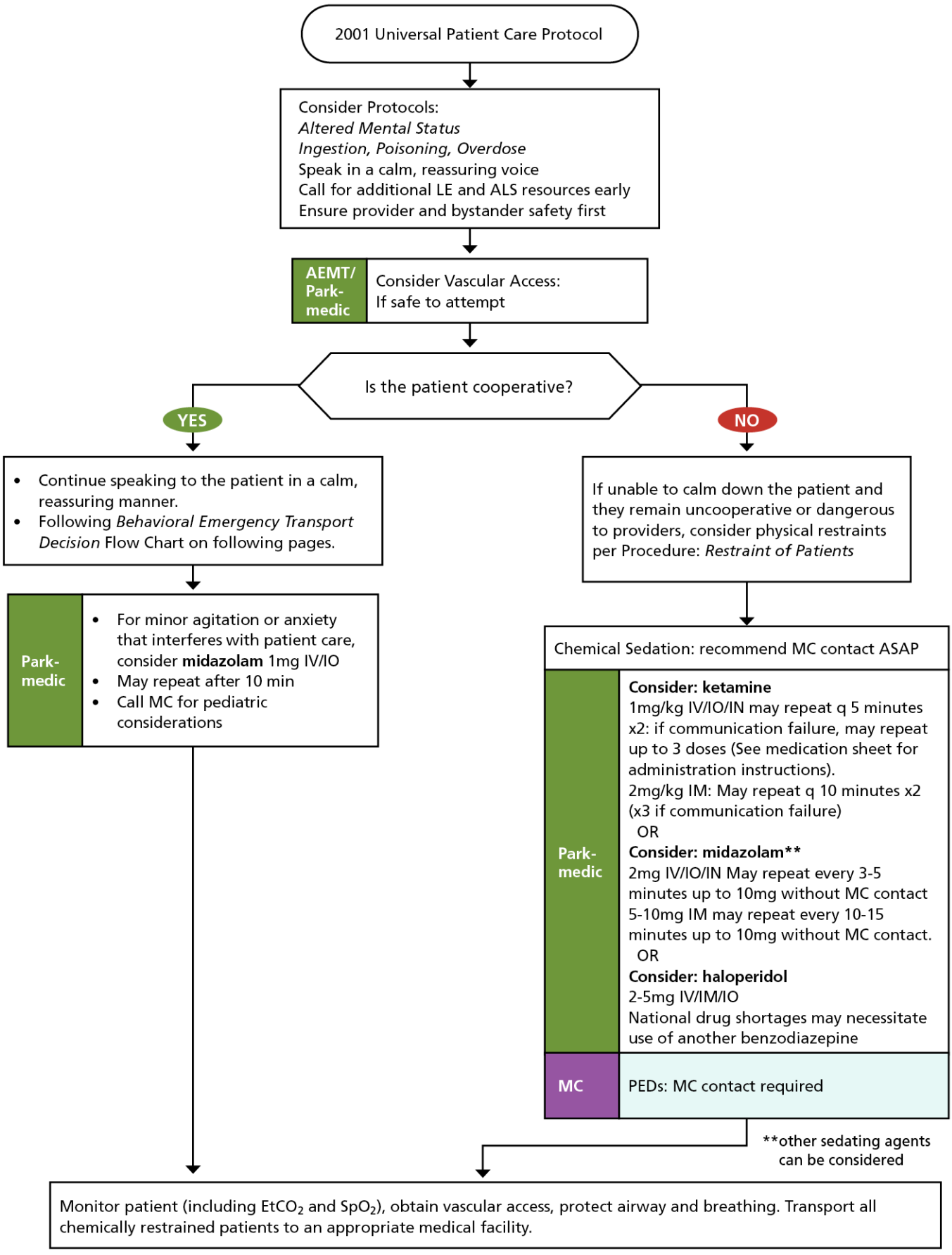
Behavioral and Psychiatric Emergencies

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Drug use • Alcohol intake • Psychiatric illness • Seizure disorder • Diabetes • Traumatic Brain Injury	• Aggressive behavior/combative • Shouting • Paranoia • Hyperthermia • Trauma	• Drug and/or alcohol intoxication • Psychiatric episode, Excited Delirium • Developmental delay • Trauma • Postictal • Diabetic episode • Hypoxia

SPECIAL CONSIDERATIONS

- See *Altered Mental Status* Protocol for a more extensive list of conditions associated with altered mental status.
- Speak to the patient in a calm, nonthreatening manner. Do not argue with the patient.
- **Excited delirium** is an extreme manifestation of behavioral emergencies that can lead to death. The pathogenesis of excited delirium is not well understood, but is likely multifactorial including positional asphyxia, hyperthermia, drug toxicity, and/or catecholamine-induced arrhythmias. Treatment should focus on reduction of stress (minimize noise/light/patient stimulation), pharmacological therapy and rapid monitored transport. If the patient has an elevated temperature or feels hot to the touch, institute cooling measures.
- Consider the possibility of **Excited Delirium** in patients exhibiting a combination of symptoms including:
  - » Bizarre and/or aggressive behavior
  - » Shouting
  - » Paranoia/panic
  - » Violence toward others
  - » Unexpected physical strength
  - » Hyperdynamic vital signs (hyperthermia, tachycardia, hypertension, tachypnea).
- Do NOT use prone, hobbled, or 'hog-tied' restraints. Consider securing one arm up and the opposite arm down. See *Restraint of Patients* Procedure.
- Any patient that may be a danger to self or others including impaired judgment must be transported. Consider legal psychiatric hold.
- If due only to psychiatric illness patients are usually alert and oriented.
- Closely monitor the cardiorespiratory status of any patient being restrained.
- Any patient that is chemically restrained must be transported to an ER.
- If an LE has applied another form of restraints such as handcuffs, they must accompany the patient in the back of the ambulance during transport
- Separation of Law Enforcement and EMS Provider responsibilities should ideally be defined to ensure patient safety.
- **Any patient who continues to struggle while in physical restraints should be chemically restrained if possible.**

BEHAVIORAL AND PSYCHIATRIC EMERGENCIES

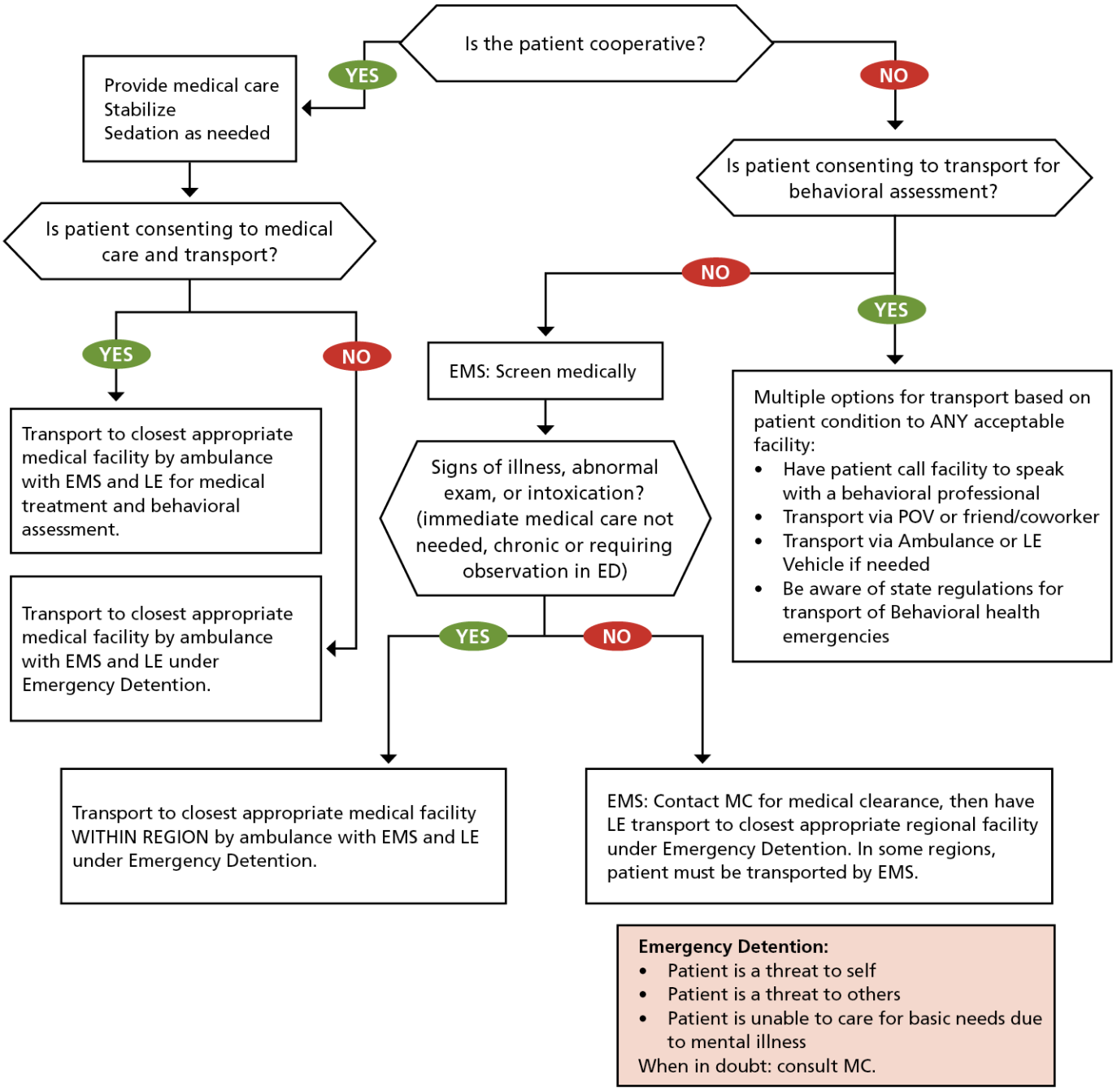


BEHAVIORAL AND PSYCHIATRIC EMERGENCIES

EMS Providers:
Call LE on ALL Behavioral Emergencies

LE Rangers:
Supervisor contact required

Behavioral Emergency Transport Decision



Emergency Detention:
- Patient is a threat to self
- Patient is a threat to others
- Patient is unable to care for basic needs due to mental illness

When in doubt: consult MC.

PSYCHIATRIC EMERGENCY DETENTION

What is an Emergency Detention?

An emergency detention is the legal process for the temporary detainment of a person who is dangerous to self or others as a result of a psychiatric emergency.

Each state has different statutes regarding emergency detention. Be aware if your area requires that the declaration be made by Law Enforcement or if it may be made by a medical provider.

PROCEDURE:

1. Make sure the scene and providers are safe!
2. If the patient poses a threat to themselves or others, attempt to gain consent for transport to a medical facility.
    A. If the patient is not violent and consents to medical treatment, treat as a medical incident.
    B. If consent will not be given and the patient is a danger to themselves or others, they may be placed under an emergency detention order.
3. Request a Law Enforcement Officer when considering an emergent detention.
4. Contact Medical Control.
5. Only an EMT or higher level of care provider can respond to a psychiatric emergency along with the assistance of a Law Enforcement officer. Law Enforcement should ride in the back of the ambulance with the patient and primary care provider.
    A. Restrain patient in such a way as to allow rapid and adequate maintenance of airway and preservation of peripheral circulation and neurological function. (Consider applying soft restraints)
    B. If patient is acting irrationally, is combative, or is unable to cooperate AND physical restraint is required, consider administration of sedatives for chemical restraint and monitor patient.
6. Treat any medical problems, traumatic injuries and/or possible causes as indicated in specific protocols. Specifically refer to altered mental status protocol as appropriate.
7. When possible, one EMS provider should remain as the primary care provider until the patient is transferred to the emergency department—where they will be cleared for admission to a mental health facility. If the patient is placed under emergency detention, the Law Enforcement officer must remain with the patient until care is transferred.
8. If the patient is being transported by law enforcement to the hospital in a patrol vehicle, the patient must be medically assessed prior to transport. A PCR must be completed and medical control approval for transport in a patrol vehicle documented.
9. Complete any federal and/or state required emergency detention forms.

    Local facility information can be included below:

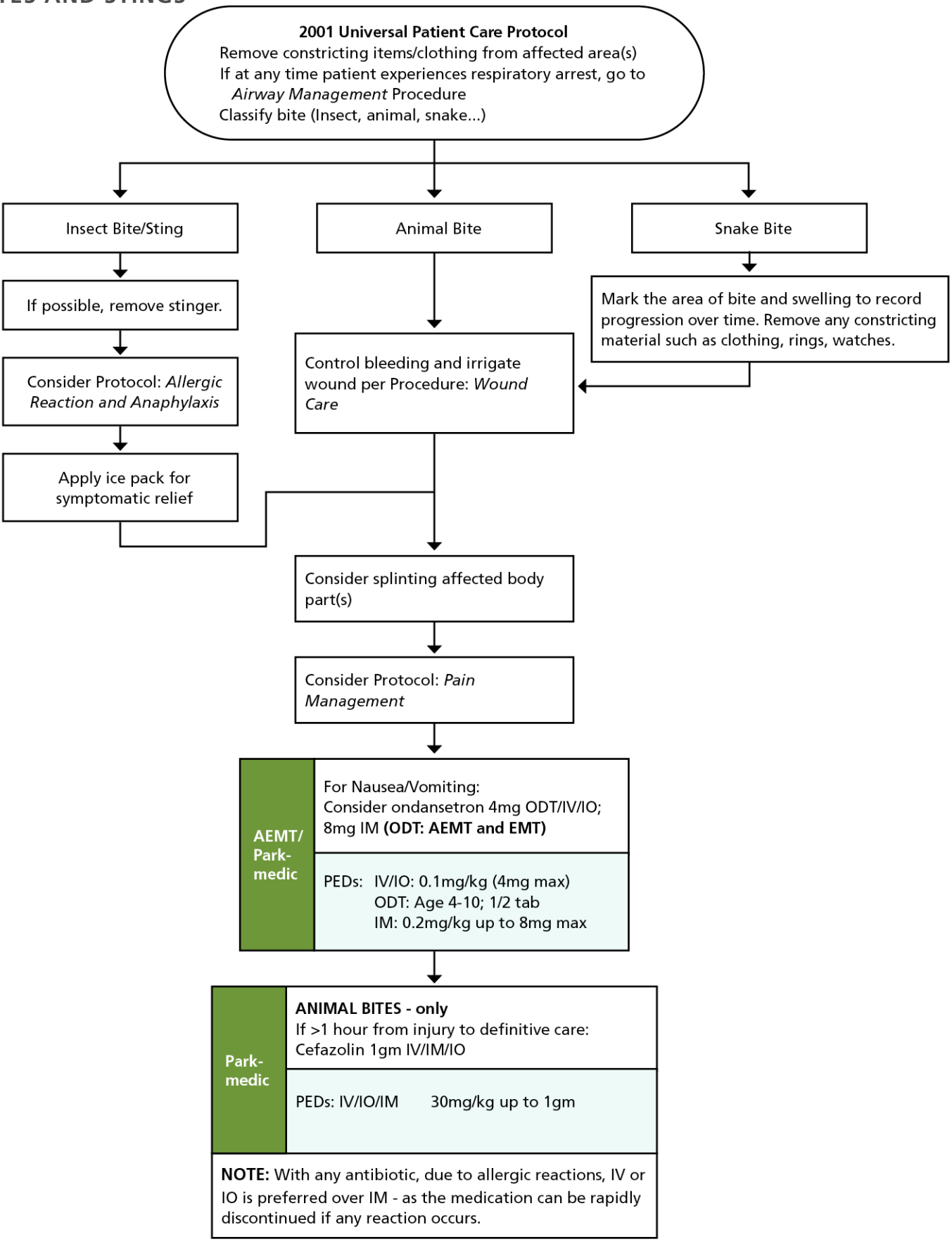
Bites and Stings

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Type of bite/sting, circumstances • Description/photo with patient for identification of animal involved (animal behavior) • Time, location, size, progression of bite/sting • Previous reaction to bite/sting • Domestic vs. wild • Tetanus and Rabies risk • Immunocompromised patient	• Rash, skin break, wound • Pain, soft tissue swelling, redness • Blood oozing from the bite wound • Evidence of infection • Shortness of breath, wheezing • Allergic reaction, hives, itching • Prepare for anaphylaxis • Hypotension or shock • Stinger or barb still in skin	• Animal bite • Human bite • Snake bite (poisonous) • Spider bite (poisonous) • Insect sting/bite (bee, wasp, ant, tick) • Infection risk • Rabies risk • Tetanus risk • Penetration of abdomen, thorax, or fractures • Neurovascular/tendon damage

SPECIAL CONSIDERATIONS

- **Poison Control: 1-800-222-1222.** In venomous snake bite, contact MC re: possible anti-venom
- **Human bite**s pose a serious infection risk due to the variety and number of bacteria that flourish in the human mouth. Human bite injuries include clenched-fist injuries, which occur when someone strikes another person's teeth with his or her fist and breaks through the skin on the hand.
- **Bats:** Bats have a high risk of rabies exposure even with simple contact, does not require an actual bite.
- Carnivore bites (e.g., raccoons, foxes, skunks, coyotes) are extremely likely to become infected and all have risk of rabies exposure. Scrub wound if rabies is suspected.
- **Cat bites** may progress to infection rapidly due to specific bacteria *(Pasteurella multocida)*.
- Try to preserve the animal for analysis. Call LE or Wildlife Management to capture/dispatch the animal.
- Most Snake bites are "dry" meaning no venom is injected. If envenomed, some of the following should occur in 5-30 minutes: Severe burning pain, edema around bite, small, nonblanching purple spots/bruising or continued oozing from site, numbness or tingling in mouth/extremities or bite site, metallic taste in mouth, involuntary mouth twitching, weakness. Treat all snake bites as if venom was injected.
  - » DO NOT apply ice to snake bite sites. DO NOT elevate extremity. If possible keep the site of the bite at the same level as the patient's heart. DO NOT "suck" venom out or incise wound. Take care around the snake, it may appear dead but may bite again.
  - » **Exotic snake bites** (Cobra, Krait, etc. as pets) may cause neurologic and respiratory depression prior to a local reaction. Observe for mental status change, respiratory depression, convulsions, or paralysis and treat accordingly.
- **Black Widow** (black spider with red hourglass on belly) **spider bites** tend to be minimally painful to painless. Little reaction is noted initially but over a few hours, muscular pain, and severe abdominal pain may develop.
- **Brown Recluse** (brown spider with fiddle shape on back) **spider bites** are minimally painful to painless. Little reaction is noted initially but tissue necrosis at the site of the bite may develop over the next few days.
- **Ticks** can transmit Lyme disease, Rocky Mountain spotted fever, or tularemia. Contact MC for risk stratification based on the type of tick, length of time attached, and geographic area the bite occurred.
- Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplant patient.

BITES AND STINGS



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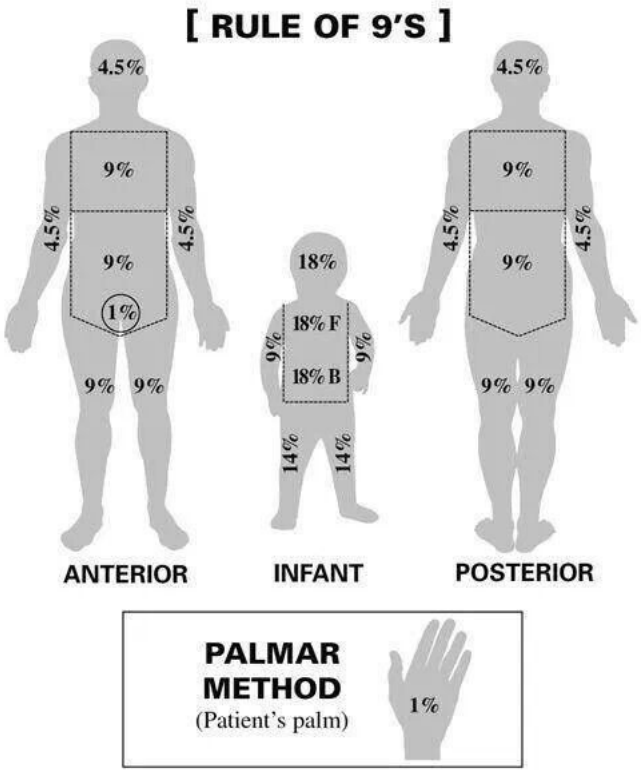
Burns

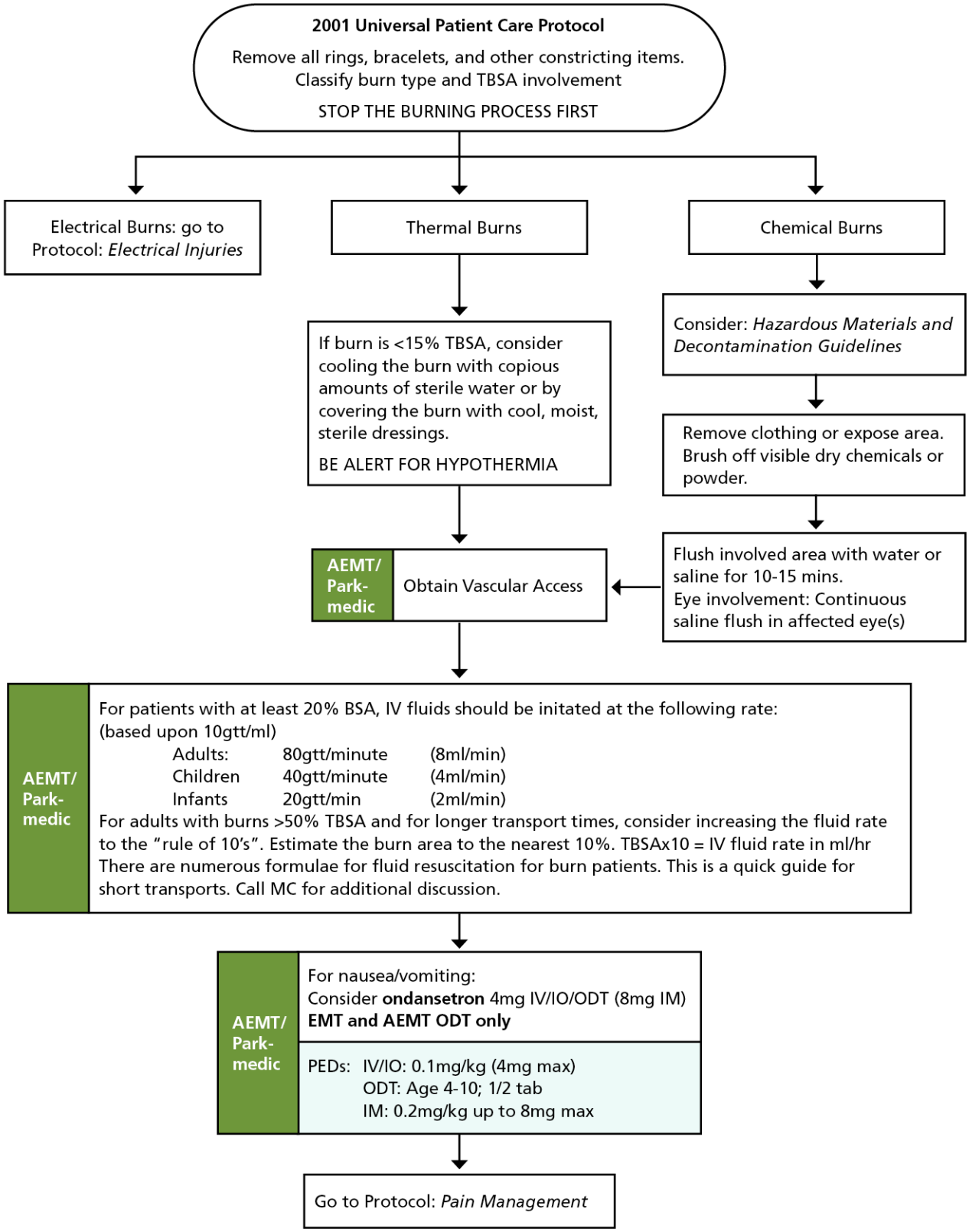
PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Type and length of exposure (chemical, thermal, electrical, radiation) • Inhalation injury • Time of injury • Other trauma • Loss of consciousness • Tetanus status • Drug/alcohol intoxication • Past medical history: patients with chronic disease at greater risk	• Stop the burning process • Estimate TBSA of burns and initial severity • Exam: blistering, redness, swelling, charring • Airway involvement: stridor, hoarseness, wheezing, tachypnea, dyspnea, singed facial/nasal hair, black-tinged sputum • Hypotension/shock • Carbon monoxide exposure • Cyanide poisoning	• Superficial (1st) red and painful—like sunburn • Partial thickness (2nd) blistering • Full thickness (3rd) are generally painless with charred or leathery skin • **Note:** initial burn extent is difficult to assess particularly with burns from hydrothermal features and electrical burns. Estimate to the best ability of the provider. • Coexisting major trauma

SPECIAL CONSIDERATIONS

- Critical Burns requiring rapid transport to a burn center:
  - » > 10% Partial Thickness
  - » > 5% Full Thickness
  - » Involvement of hands, feet, face, or genitalia
  - » Circumferential burns
  - » Airway burns
  - » Deep chemical burns
  - » Electrical/lightning burns
  - » Burns with extremes of age or chronic disease
  - » Burns with associated major traumatic injury
  - » Burn involving major joints
- Early airway management (cricothyrotomy) may be required in significant inhalation injuries
- Circumferential burns to extremities are dangerous due to potential vascular compromise to soft tissue swelling (compartment syndrome).
- Burn patients are prone to hypothermia. Never ice/cool burns that involve more than 5%TBSA.
- Do not overlook the possibility of multiple system trauma.
- Do not overlook the possibility of child abuse with children and burn injuries.
- Attempt to locate MSDS sheets for chemicals that may have caused a burn.
- Serious burns from hydrothermal features occur in parks almost every year. Most have circumferential involvement. If possible, identify the thermal feature involved in the incident.



BURNS


2001 Universal Patient Care Protocol
Remove all rings, bracelets, and other constricting items.
Classify burn type and TBSA involvement
STOP THE BURNING PROCESS FIRST
Electrical Burns: go to Protocol: Electrical Injuries
Thermal Burns
Chemical Burns
If burn is <15% TBSA, consider cooling the burn with copious amounts of sterile water or by covering the burn with cool, moist, sterile dressings.
BE ALERT FOR HYPOTHERMIA
Consider: Hazardous Materials and Decontamination Guidelines
Remove clothing or expose area. Brush off visible dry chemicals or powder.
Flush involved area with water or saline for 10-15 mins.
Eye involvement: Continuous saline flush in affected eye(s)
AEMT/ Park-medic
Obtain Vascular Access
AEMT/ Park-medic
For patients with at least 20% BSA, IV fluids should be initated at the following rate:
(based upon 10gtt/ml)
Adults: 80gtt/minute (8ml/min)
Children 40gtt/minute (4ml/min)
Infants 20gtt/min (2ml/min)
For adults with burns >50% TBSA and for longer transport times, consider increasing the fluid rate to the "rule of 10's". Estimate the burn area to the nearest 10%. TBSAx10 = IV fluid rate in ml/hr
There are numerous formulae for fluid resuscitation for burn patients. This is a quick guide for short transports. Call MC for additional discussion.
AEMT/ Park-medic
For nausea/vomiting:
Consider ondansetron 4mg IV/IO/ODT (8mg IM)
EMT and AEMT ODT only
PEDs: IV/IO: 0.1mg/kg (4mg max)
ODT: Age 4-10; 1/2 tab
IM: 0.2mg/kg up to 8mg max
Go to Protocol: Pain Management

2100

Cardiac Arrest: AED/BLS

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Medications • Event leading to arrest • End-stage renal disease • Estimated downtime • Suspected hypothermia • Suspected overdose • DNR	• Pulseless • Apneic • No auscultated heart tones	• Hypoxia • Hypothermia • Hypovolemia • Hydrogen ion (acidosis) • Hypo-/hyperkalemia • Trauma/Medical • Toxins • Tension Pneumothorax • Tamponade (Cardiac) • Thrombosis - coronary or pulmonary • Device error • Death

SPECIAL CONSIDERATIONS

- Single-rescuer resuscitation may be initiated with compression-only CPR depending upon available assistance and necessary airway equipment.
- The critical characteristics of high-quality CPR include:
  - » Starting compressions within 10 seconds of recognition of cardiac arrest
  - » Push hard, push fast: compress at a rate of 100-120/minute with a depth of at least 2 inches for adults, approximately 2 inches for children and approximately 1½ inches for infants.
  - » Allow complete chest recoil after each compression
  - » Minimize interruptions in compressions (try to limit interruptions to LESS than 10 seconds).
  - » Give effective breaths that make the chest rise.
  - » Avoid excessive ventilations
- Do not start CPR if: unsafe for rescuers to approach, obviously dead (decapitation, decomposition), rigor mortis, avalanche burial >60 min, patient has a pulse
- If the patient has a valid DNR/POLST/MOST form on their person, review the form and follow the directive, either not starting CPR or terminating efforts.

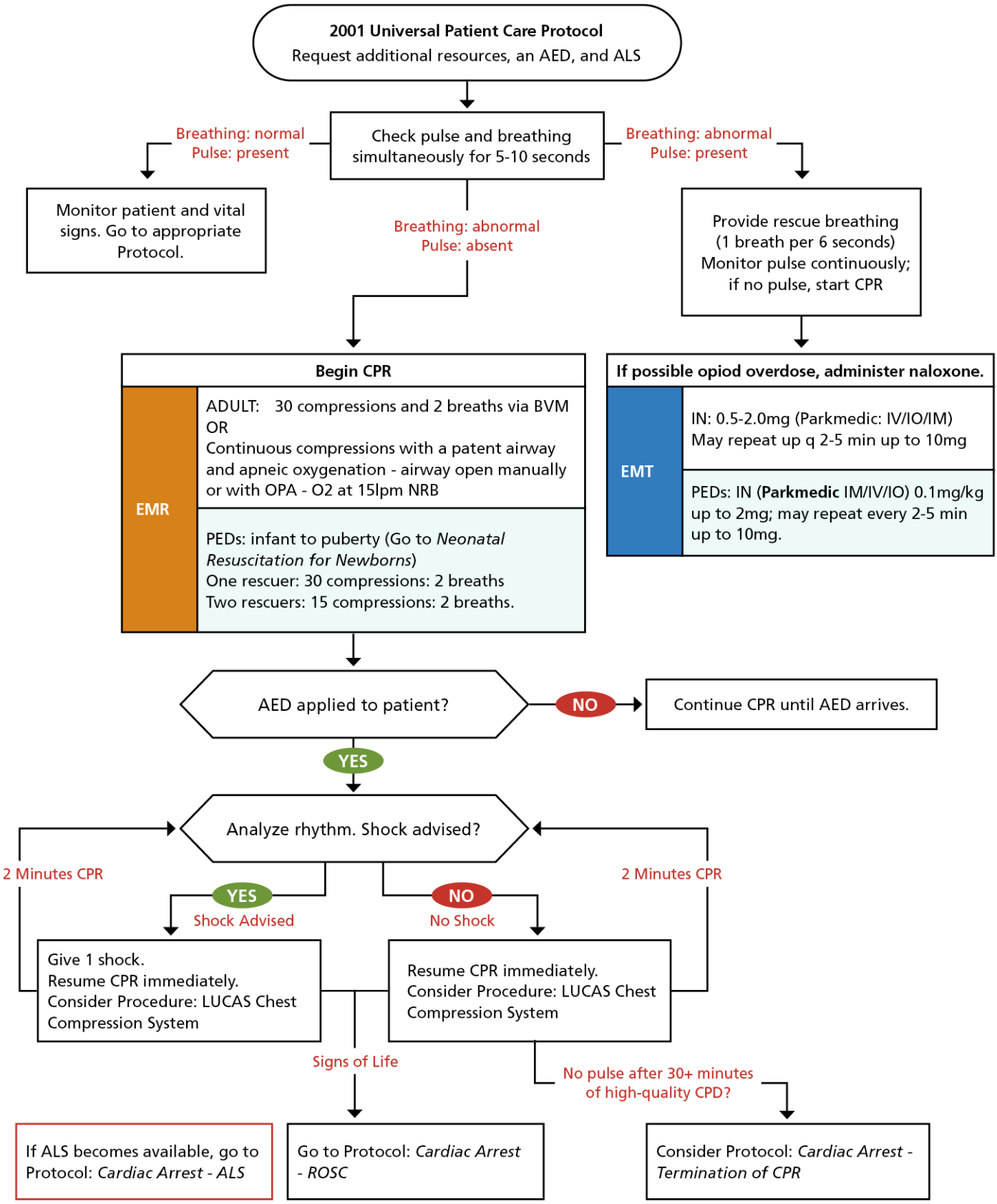
MATERNAL CARDIAC ARREST

- Perform high-quality CPR with attention to ventilation and oxygenation
- If uterus is at or above the umbilicus, perform continuous left lateral uterine displacement to relieve pressure on major vessels in the abdomen.
- For best blood flow, wedge patient into left lateral position.

PEDIATRIC CONSIDERATIONS

- START CPR if the PULSE is < 60 bpm and poor perfusion is noted (altered level of consciousness, respiratory distress/arrest, etc.)

CARDIAC ARREST - AED/BLS



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Cardiac Arrest: ALS

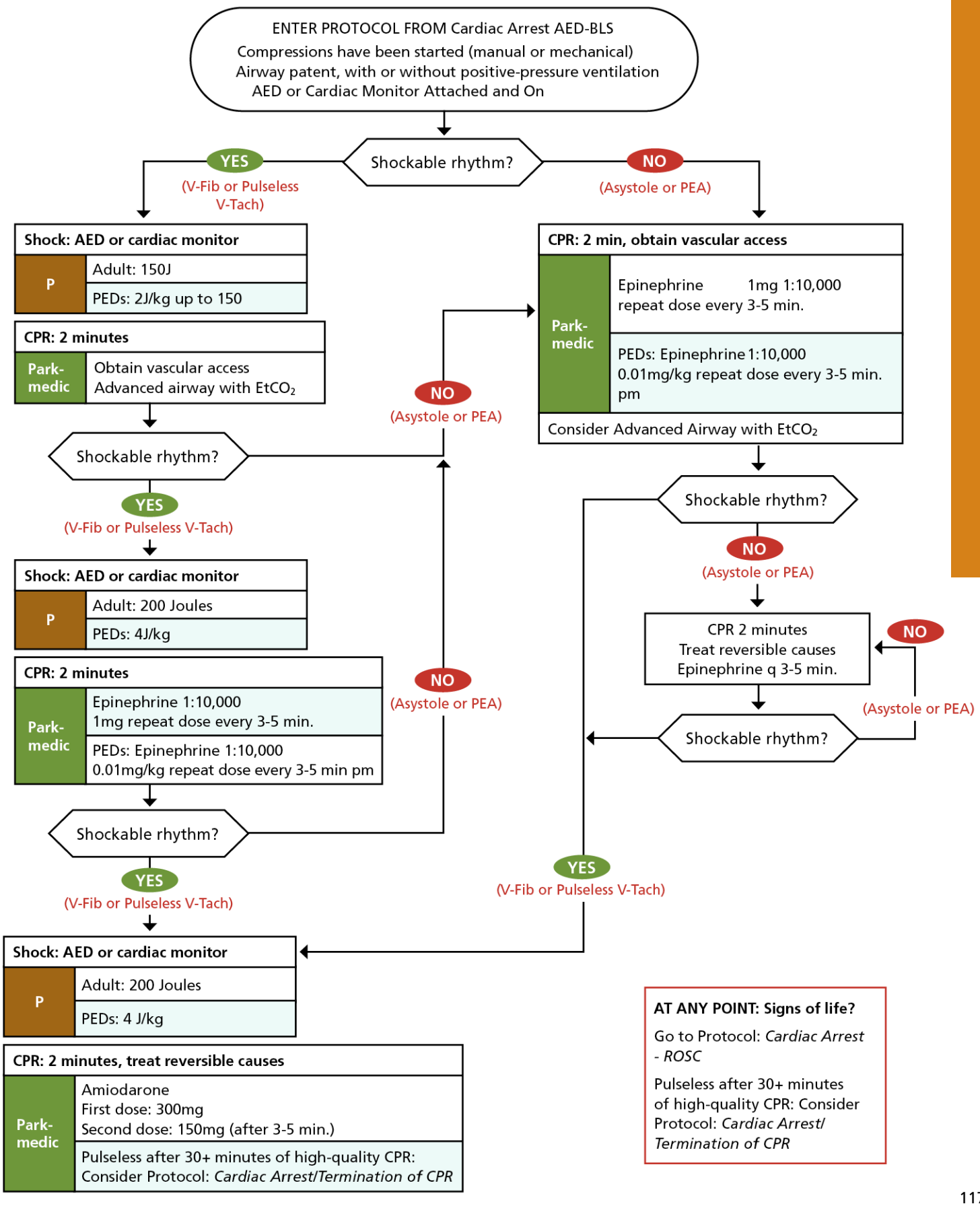
PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Events leading to arrest • Estimated downtime • Time last known normal (asymptomatic) • Any signs of extended down time: dependent lividity, rigor mortis, decomposition • Medications • End-stage renal disease • Suspected overdose • DNR or Advanced Directives	• Pulseless • Apneic or agonal (gasping) respirations • No electrical activity on ECG • No auscultated heart tones	• Hypoxia • Hypothermia • Hypovolemia • Hydrogen ion (acidosis) • Hypo-/hyperkalemia • Trauma/Medical • Toxins • Tension Pneumothorax • Tamponade (Cardiac), • Thrombosis - coronary or pulmonary • Device (lead) error • Death

SPECIAL CONSIDERATIONS

- Always confirm asystole in more than 1 lead
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.
- Correctable causes must be addressed; survival is based on identifying and correcting the cause
- If the patient has a valid DNR/POLST/MOST form on their person, review the form and follow the directive, either not starting CPR or terminating efforts.

REVERSIBLE CAUSES OF CARDIAC ARREST (H's and T's)	
Hypoxia	Airway Management Procedures, oxygen
Hypothermia	Active Rewarming
Trauma	Protocol: *Cardiac Arrest: Trauma*
Toxins	Protocol: *Ingestions, poisoning, overdose*
Hypoxia	Airway Management, oxygen
Hypothermia	Active Rewarming
Hypovolemia	Normal Saline Bolus
Hydrogen ion (acidosis)	Sodium bicarbonate (MC contact required
Tension Pneumothorax	Protocol: *Thoracostomy/Needle Decompression*
Toxins	Protocol: *Ingestions, poisoning, overdose*
Trauma	Protocol: *Cardiac Arrest - Trauma*
Hyperkalemia	Sodium bicarbonate (MC contact Advised)
Torsades de Pointes	Magnesium sulfate
NOT TREATABLE BY EMS	
Hypokalemia	
Tamponade (cardiac)	
Thrombosis (cardiac)	
Thrombosis (pulmonary)	

Cardiac Arrest: ALS



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Cardiac Arrest—ROSC

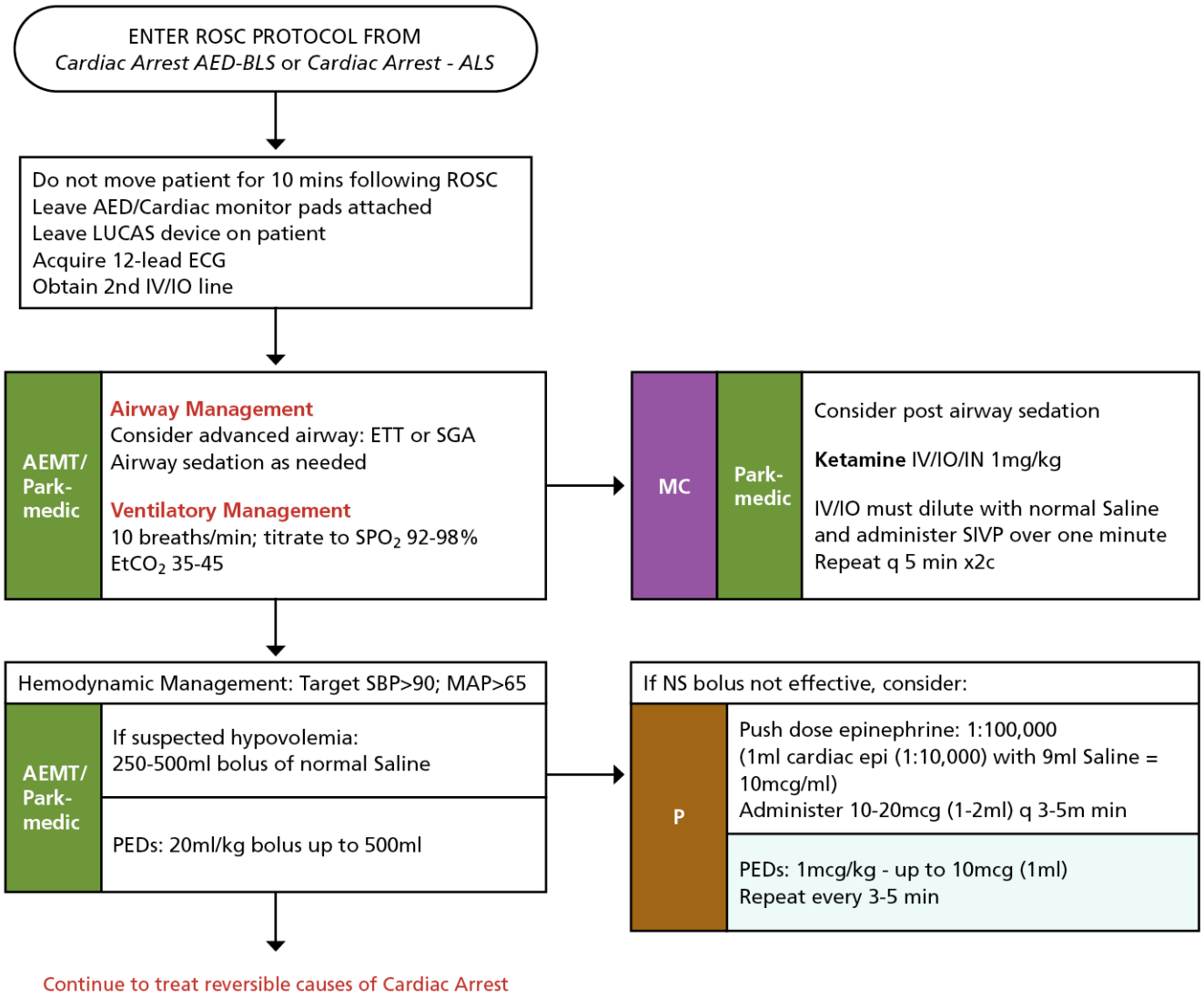
PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Respiratory arrest • Cardiac arrest	• Return of pulse (adequate for perfusion) • Vital signs • 12-Lead ECG	• Continue to address specific differentials • Hypoxia • Hypothermia • Hypovolemia • Hydrogen ion (acidosis) • Hypo/hyperkalemia • Trauma/Medical • Toxins • Tension Pneumothorax • Tamponade (Cardiac), • Thrombosis - coronary or pulmonary • Device (lead) error • Death

SPECIAL CONSIDERATIONS

If return of spontaneous circulation, contact Medical Control for further management as soon as possible without compromising patient care.

- **Hyper**ventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided.
- Most patients immediately post resuscitation will require ventilatory assistance.
- The condition of post resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post resuscitation management may be planned in consultation with medical control.
- Keep AED pads on patient in case of reoccurring arrest. Turn off AED.
- Common causes of post resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax and medication reaction to ALS drugs.
- Amiodarone may cause bradycardia.
- Titrate pressors to maintain systolic BP of 90 mmHg. Ensure adequate fluid resuscitation is ongoing.

CARDIAC ARREST—ROSC



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Cardiac Arrest: Termination of CPR

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Medications • DNR or Advanced Directive • Event leading to arrest • Estimated downtime • Special considerations? • Cold water drowning • Hypothermia • Barbiturate ingestion • Electrical Injuries • Patient < 14 yo	• Pulseless • Apneic • No electrical activity on ECG • No auscultated heart tones	

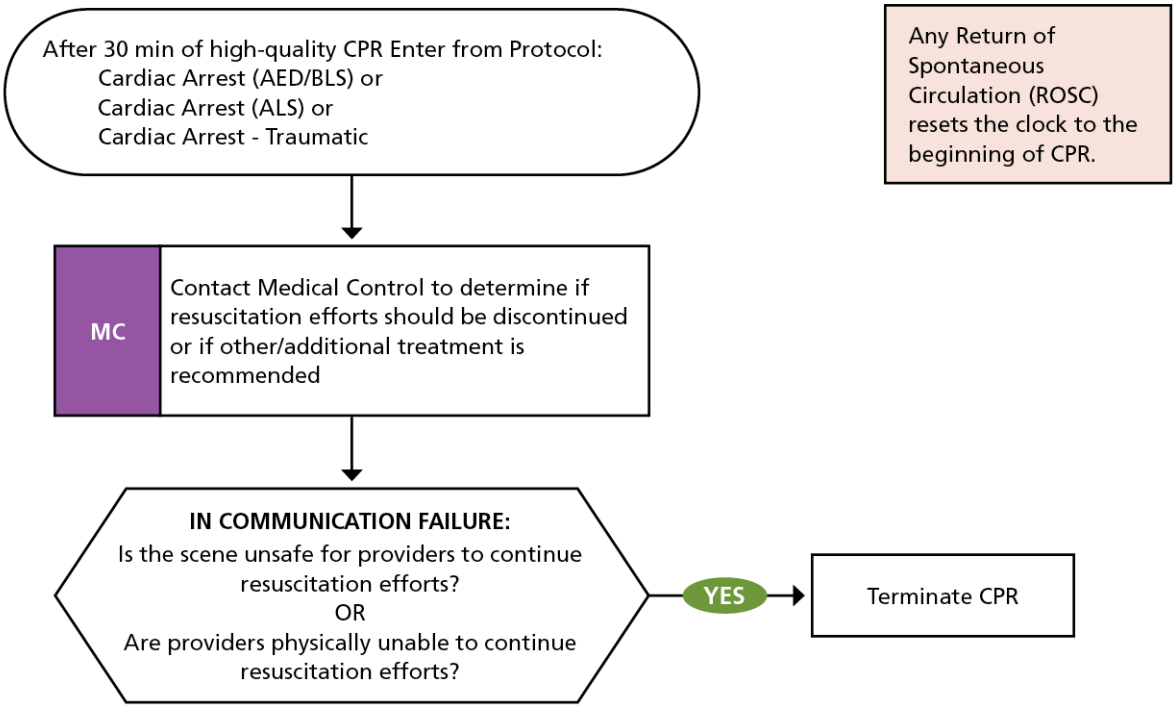
NOTES

MEDICAL CONTROL MUST BE CONTACTED WHEN CPR IS TERMINATED: CONSIDER CALLING MEDICAL CONTROL PRIOR TO TERMINATION (adhere to local protocols).

SPECIAL CONSIDERATIONS:

- Special Cases: Cold water drowning, hypothermia, barbiturate or nitrite ingestion, electrical injury, or pediatric patients (< 14 years of age)
- Any return of spontaneous circulation restarts the clock (for CPR termination) should the patient subsequently re-arrest.

CARDIAC ARREST: TERMINATION OF CPR



Information to include in MC call for CPR Termination:

- Estimated total down time?
- Arrest witnessed or unwitnessed?
- Duration of resuscitation efforts performed by EMS?
- ALS care provided? Advanced airway in place?
- Number of rounds of epinephrine and other medications given?
- Number of shocks given? No shock advised?
- Asystole in two or more leads? Other rhythms?
- Other treatment provided?
- Request further orders from MC
- Special circumstances?
  - Cold water drowning
  - Hypothermia
  - Barbiturate ingestion
  - Electrical Injuries
  - Patient < 14 yo
- Request to discontinue resuscitation efforts

2120

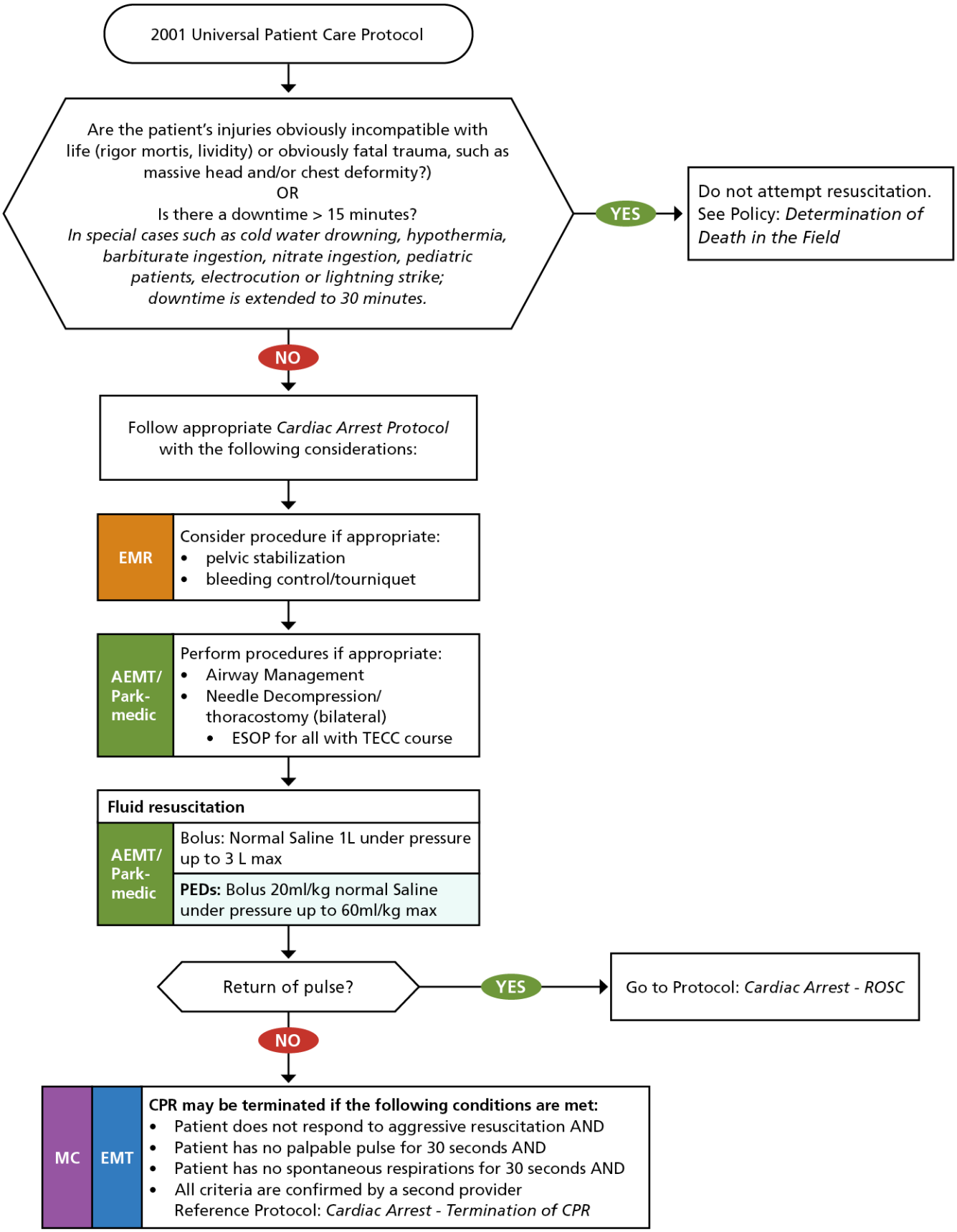
Cardiac Arrest: Traumatic

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Indication: Patient who has suffered traumatic injury and is now pulseless • Mechanism of injury • Estimated down time or time of arrest, if known • Complaints prior to arrest, if known by bystanders (e.g., chest pain, difficulty breathing)	• Evidence of blunt or penetrating trauma • Chest trauma (possible tension pneumothorax or cardiac tamponade) • Evidence of blood loss • Injuries incompatible with life: decapitation, massively deformed head/ chest injuries, etc.	• Medical conditioning preceding traumatic event as cause of arrest • Tension Pneumothorax • Hypovolemic shock • External hemorrhage • Unstable pelvic fracture • Displaced long bone fracture(s) • Hemothorax • Intra-abdominal hemorrhage • Retroperitoneal hemorrhage • Traumatic Brain Injury

SPECIAL CONSIDERATIONS:

- Injuries obviously incompatible with life include decapitation, massively deformed head or chest injuries or other features of a particular patient encounter that would make resuscitation futile. If in doubt, place patient on the monitor or AED and initiate resuscitation.
- Consider using medical cardiac arrest protocols if uncertainty exists regarding medical or traumatic cause of death.
- Regardless of age, victims of traumatic arrest rarely survive unless they are within minutes of a hospital.
- In the field, it may be difficult to know that the heart has arrested or is no longer viable because of trauma.
- Fixed and dilated pupils are not always a reliable sign of death (e.g., sympathomimetic over-dose).
- Hypothermic patients have a higher likelihood of survival and may be viable while appearing to be dead.

CARDIAC ARREST: TRAUMATIC



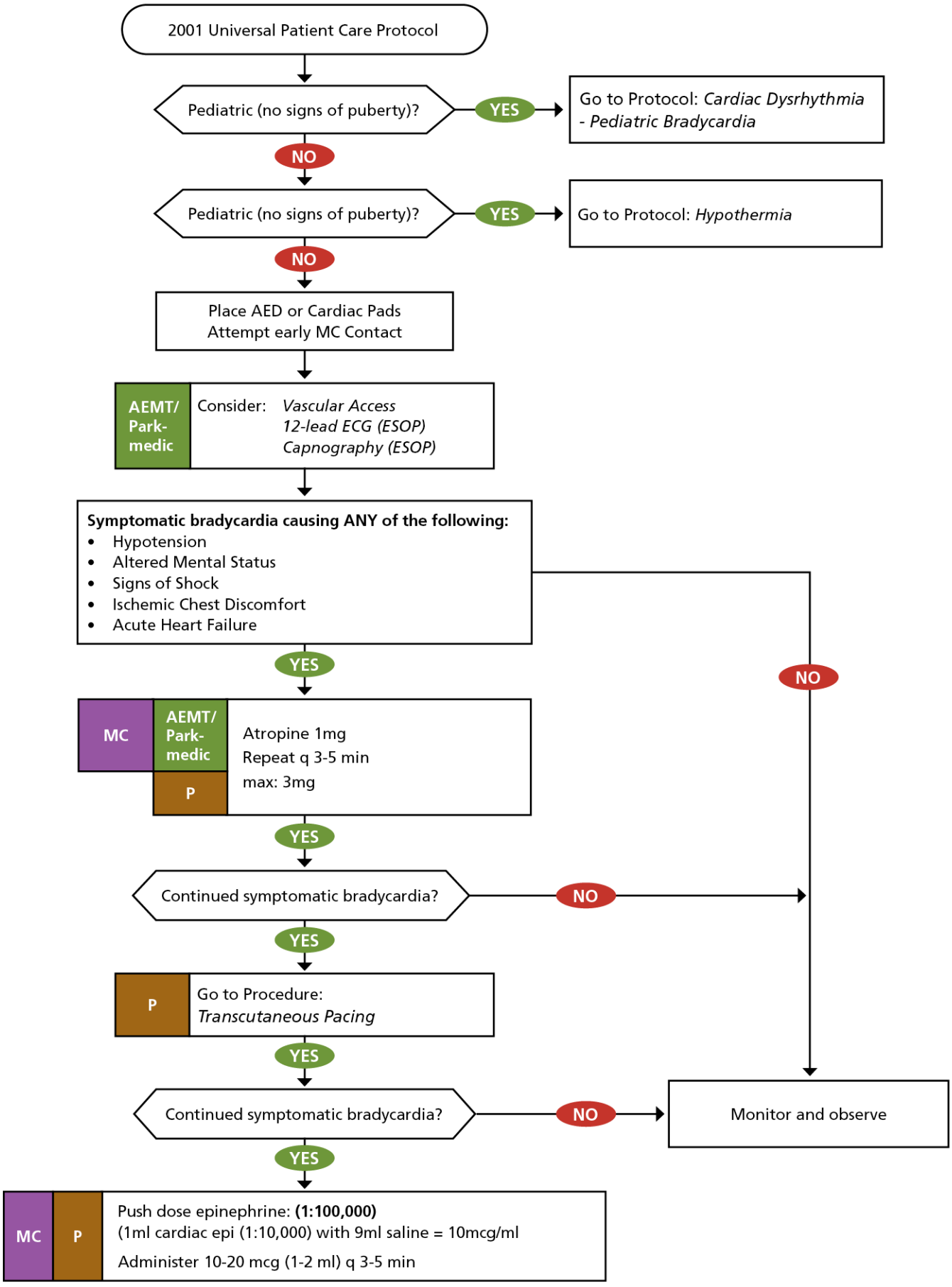
Cardiac Dysrhythmia: Adult Bradycardia

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Medications » Beta Blockers (Metoprolol, Atenolol, Propranolol, Esmolol, Labetalol, Carvedilol) » Calcium Channel Blockers (Amlodipine, diltiazem, Verapamil, nifedipine) » Clonidine » Digitalis » Other antidysrhythmic • Pacemaker/AICD • History of renal failure, hypertension, cardiovascular disease • Recent head trauma or falls	• HR <50/min • Chest Pain • Respiratory distress • Hypotension or Shock • Altered mental status • Syncope • Core Temperature • Toxins • Glucometry	P: Physiologic (young, athlete, sleeping). A: AV Block (Mobitz type II second degree AV Block, third degree block). D: Drugs (Beta-blockers, Calcium Channel Blockers, Digoxin, Clonidine, amiodarone, Opioids, nerve agent/ organophosphate exposure.) H: Hypothermia, Hypothyroidism, Hyperkalemia (renal failure), Hypoxemia. I: Increased Intracranial Pressure (head trauma, head tumor, subarachnoid hemorrhage, stroke, spinal cord lesion). M: Myocardial infarction/ischemia. S: Sick sinus syndrome

SPECIAL CONSIDERATIONS

- Bradycardia may be a normal variant in an asymptomatic patient, especially in young athletes.
- At any time, a patient with Bradycardia can decompensate into V-Fib/V-Tach or PEA.
- Pharmacological treatment of Bradycardia is based upon the presence or absence of symptoms
- **If symptomatic, treat. If asymptomatic, monitor only.**
- Atropine administration should not delay transcutaneous pacing in patients with poor perfusion.
- Doses of atropine < 0.5 mg (or dose pushed too slow) may paradoxically result in further slowing of the heart rate.
- Oxygenate the patient and support respiratory effort.
- Analyze rhythm and prepare for transcutaneous pacing without delay in patients who are unstable. Consider atropine while awaiting pacer, if atropine is ineffective begin pacing. If pacing is ineffective consider pressors (Push-dose epinephrine).
- Hyperkalemia can cause bradycardia and present with a variety of ECG changes, including flattened/absent P-waves, widened QRS, and peaked T-waves.
- **Consider nerve agent/organophosphate exposure if multiple victims and/or "ABSLUDGEM" Present:** ALOC, Bronchorrhea, Bradycardia, Bronchospasm, Salivation, Sweating, Seizures, Lacrimation (tearing), Urination, Defecation, Diarrhea, GI upset (abdominal cramps), Emesis (vomiting), Miosis/Muscle activity (twitching).

CARDIAC DYSRHYTHMIA: ADULT BRADYCARDIA



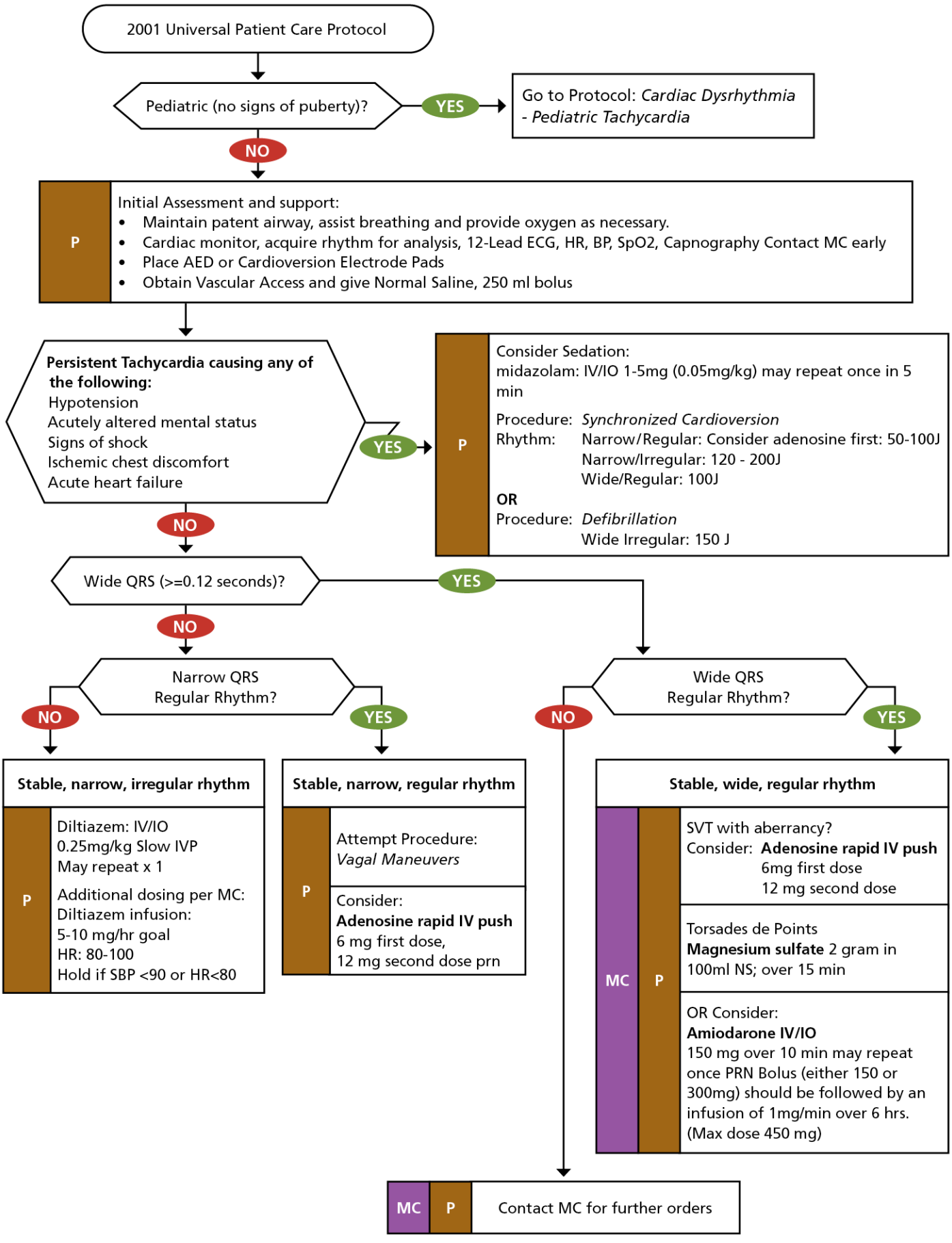
Cardiac Dysrhythmia: Adult Tachycardia

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• History of palpitations/heart racing • Medications: e.g., Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin. • Diet (caffeine, chocolate) • Drugs (energy drinks, nicotine, cocaine, methamphetamine) • Anxiety, mental health issues • History of bundle-branch blocks	• HR usually >150/min • Patient stable or unstable? • Palpitations, weakness, syncope/ near-syncope, dyspnea • ECG Assessment: rate, QRS (wide or narrow), P waves • Potential presenting rhythms: Sinus tachycardia; Atrial fibrillation/ flutter; Multifocal atrial tachycardia, supraventricular tachycardia	• Shock • Heart disease (WPW, LGL, Valvular) • Sick sinus syndrome • Myocardial infarction • Electrolyte imbalance • Exertion, pain, emotional stress • Fever • Hypoxia • Hypovolemia or anemia • Drug effect/overdose (see history) • Hyperthyroidism • Pulmonary embolism

SPECIAL CONSIDERATIONS

- Tachycardia is defined as a heart rate over 100 in adults. However, heart rates less than 150 bpm are unlikely to be the cause of serious symptoms and usually are the result of a normal physiologic response to a disease, medication, drug, or other stressor.
- **If Patients HR > (220 - age) = consider pathologic rhythm.**
- **This protocol is intended to address pathologic tachyarrhythmias (usually heart rates > 150), not physiologic tachycardia. Common causes of physiologic tachycardia include fever, hypoxia, hypovolemia/shock, stimulant use, or other diseases that cause an increase in heart rate.**
- Adenosine may not be effective in atrial flutter or fibrillation and may precipitate cardiac arrest. Adenosine should be used with caution and with MC consultation. Adenosine has a very short half-life of less than 10 seconds. For this reason adenosine has to be given as a very fast bolus followed immediately by a 20 ml saline flush.
- Monitor for hypotension after diltiazem administration.
- Patients with paroxysmal atrial fibrillation are at an increased risk for stroke and may present with stroke symptoms.
- **Sinus Tachycardia** > 100 beats/min and is usually a normal physiologic response to underlying pathology (A healthy heart responding to a sick body). Patients with signs and symptoms of the following often present with sinus tach: systemic inflammatory response syndromes (SIRS); sepsis; or undifferentiated shock (cardiogenic, hypovolemic, obstructive, distributive, etc.) The patients will not respond well to treatments directed at their sinus tachycardia and may worsen with such treatments. This protocol is not intended for the patients. Often, they respond to volume replacement and treatment of the underlying condition(s).
- **Supraventricular Tachycardias (SVT)** are pathologically significant tachydysrhythmias where rates are typically ≥ 150 beats/ minute.
- **Narrow-complex SVT (QRS duration < 0.12 seconds)** include: atrial fibrillation; atrial flutter; AV nodal reentrant tachycardia (AVNRT); atrioventricular reentrant tachycardia (AVRT); atrial tachycardia; multifocal atrial tachycardia (MAT); and junctional tachycardia (rare in adults).
- **Wide-complex (QRS duration ≥ 0.12 second) tachycardias** consist of: Ventricular tachycardia (VT); ventricular fibrillation (VF); SVT with aberrancy; Preexcitation tachycardias (WPW, LGL, Mahaim); and Ventricular paced rhythms. Wide-complex tachycardias are often unstable, or progress to instability quickly if not addressed.
- **Vagal maneuvers** may be useful for the conversion of Paroxysmal SVT (PSVT). See Procedure: *Vagal Maneuvers* for approved methods.

CARDIAC DYSRHYTHMIA: ADULT TACHYCARDIA



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Cardiac Dysrhythmia: Pediatric Bradycardia

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Medications » Beta Blockers (Metoprolol, Atenolol, Propranolol, Esmolol, Labetalol, Carvedilol) » Calcium Channel Blockers (Amlodipine, diltiazem, Verapamil, nifedipine) » Clonidine » Digitalis » Other antidysrhythmic • Pacemaker/AICD • History of renal failure, hypertension, cardiovascular disease, congenital heart defect • Recent head trauma or falls	• HR <50/min • Chest Pain • Respiratory distress • Hypotension or Shock • Altered mental status • Syncope • Core Temperature • Toxins • Glucometry	P: Physiologic (young athlete, sleeping). A: AV Block (Mobitz type II second degree AV Block, third degree block). D: Drugs (Beta-blockers, Calcium Channel Blockers, Digoxin, Clonidine, amiodarone, Opioids, nerve agent/ organophosphate exposure.) H: Hypothermia, Hypothyroidism, Hyperkalemia (renal failure), Hypoxemia. I: Increased Intracranial Pressure (head trauma, head tumor, subarachnoid hemorrhage, stroke, spinal cord lesion). M: Myocardial infarction/ischemia. S: Sick sinus syndrome, Spinal cord lesion

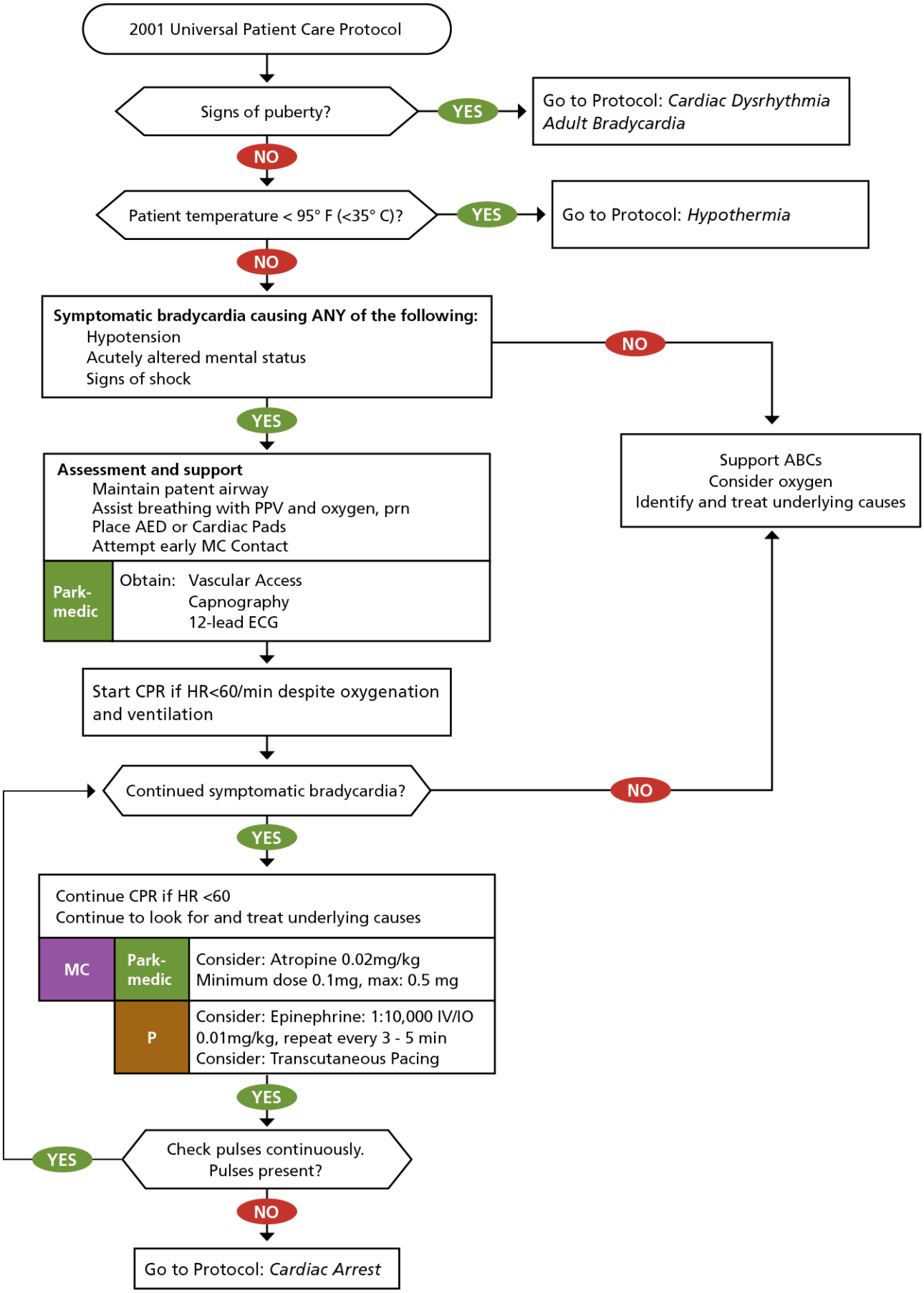
SPECIAL CONSIDERATIONS

- Pediatric dysrhythmias occur most commonly after hypoxic events. Be sure to aggressively oxygenate the patient and support respiratory effort.
- Use **Pediatric Parameters** in Appendix for normal heart rates in pediatric patients.
- Doses of atropine < 0.1 mg (or dose pushed too slow) may paradoxically result in further slowing of the heart rate.
- Pharmacological treatment of Bradycardia is based upon the presence or absence of symptoms. **If symptomatic, treat. If asymptomatic, monitor only.**
- Consider treatable causes of bradycardia (Beta blocker or Calcium channel blocker OD, etc.)
- **Cardiovascular Compromise** is Hypotension, acutely altered mental status,signs of shock
- Consider nerve agent/organophosphate exposure if multiple victims and/or "ABSLUDGEM": ALOC, Bronchorrhea, Bradycardia, Bronchospasm, Salivation, Sweating, Seizures, Lacrimation (tearing), Urination, Defecation, Diarrhea, GI upset (abdominal cramps), Emesis (vomiting), Miosis/Muscle activity (twitching).

PEDIATRIC HYPOTENSION (SBP<)

- <60 mm Hg in term neonates (0-28 days)
- <70 mm Hg in infants (1-12 months)
- <70mmHg + (2 x age in yrs.) in 1-10 yrs.
- <90 mm Hg in >10 yrs.

CARDIAC DYSRHYTHMIA: PEDIATRIC BRADYCARDIA



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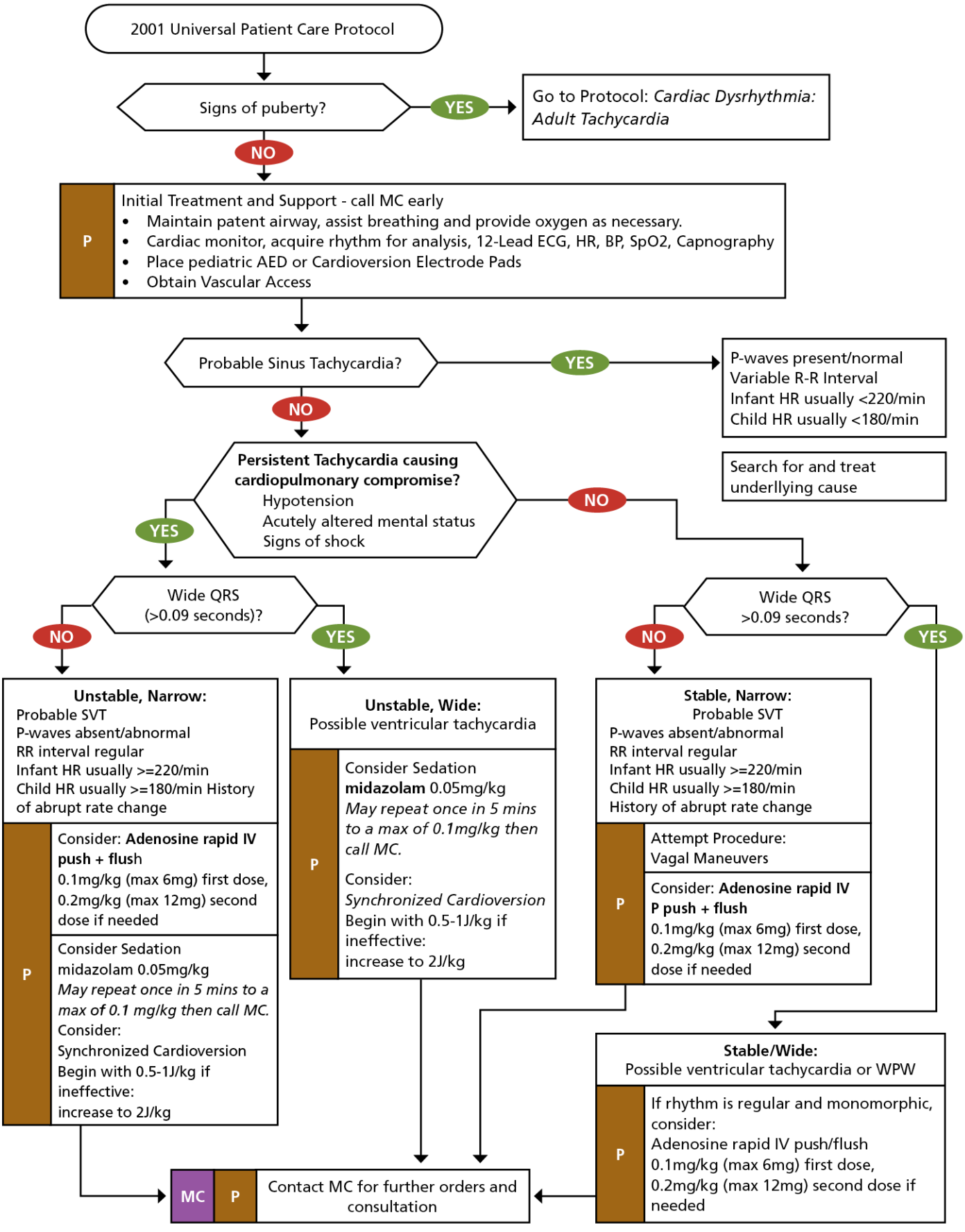
Cardiac Dysrhythmia: Pediatric Tachycardia

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Medications • (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin) • Diet (caffeine, chocolate) • Drugs (nicotine, cocaine, methamphetamine) • History of palpitations/heart racing • Syncope/near syncope	• HR >180/min • Dizziness, CP, SOB • Potential presenting rhythm • Sinus tachycardia • Atrial fibrillation/flutter • Multifocal atrial tachycardia	• Heart disease (WPW, LGL, Valvular) • Sick sinus syndrome • Myocardial infarction • Electrolyte imbalance • Exertion, pain, emotional stress • Fever • Hypoxia • Hypovolemia or anemia • Drug effect/overdose (see history) • Hyperthyroidism • Pulmonary embolus

SPECIAL CONSIDERATIONS

- Use **Pediatric Parameters** in Appendix for normal heart rates in pediatric patients.
- The most common cause of tachycardia in children is fever.
- Sinus Tachycardia in children is generally <180 and <220 in infants.
- Adenosine may not be effective in identifiable atrial flutter or fibrillation and in some cases may precipitate cardiac arrest.
- Monitor for hypotension after diltiazem.
- Monitor for respiratory depression and hypotension associated with midazolam.
- Continuous pulse oximetry is required for all SVT patients.
- Contact MC for medication options in irregular narrow complex tachycardia and in cases of polymorphic ventricular tachycardia.
- **Vagal maneuvers** may be useful for the conversion of Paroxysmal SVT (PSVT). There are multiple vagal maneuvers, however, the only maneuvers endorsed in this manual are Valsalva maneuvers. For Valsalva maneuvers, instruct the patient to "bear down" or hum loudly for approximately 10 seconds. Do not perform carotid body massage
- **Cardiovascular Compromise** is:
  - » Hypotension
  - » Acutely altered mental status
  - » Signs of shock

CARDIAC DYSRHYTHMIA: PEDIATRIC TACHYCARDIA



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Chest Pain

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Age • Risk Factors: previous MI, angina, diabetes, hypertension, hyperlipidemia, smoking history, postmenopausal • Allergies (morphine, lidocaine) • Recent physical exertion—exertion at onset of symptoms? • Recent use of erectile dysfunction meds (e.g., Viagra, Levitra, Cialis)	• Assess ABCs. Be prepared to provide CPR and defibrillation. • CP (pain, pressure, aching, vice-like tightness) • Location (substernal, epigastric, arm, jaw, neck, shoulder) • Radiation of pain • Pale, diaphoresis • Shortness of breath • Nausea, vomiting, dizziness	• Trauma vs. medical • Angina vs. myocardial infarction • Pericarditis • Pulmonary embolism • Asthma/COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux of hiatal hernia • Esophageal spasm • Chest wall injury or pain • Pleural pain • Overdose (cocaine)

SPECIAL CONSIDERATIONS:

- Avoid nitroglycerin in any patient who has used Erectile Dysfunction medication (e.g., sildenafil (Viagra), vardenafil (Levitra), tadalafil (Cialis) in the past 24 hours due to potential severe hypotension.
- Monitor for hypotension after administration of nitroglycerin.
- Caution when administering nitroglycerin in inferior MIs (suspected right ventricular infarction). Patients with right ventricular involvement are preload dependent and prone to hypotension. Establish IV access and consider 250 ml NS bolus prior to nitroglycerin. Contact MC for consultation.
- If ACS is expected, establish a second IV line while en route to the hospital.
- If initial 12-lead ECG negative but clinical suspicion remains high for ACS, repeat 12-lead ECG every 10-15 minutes and continue with Chest Pain Protocol. Many MIs present with completely normal 12 lead ECGs.
- Diabetics and geriatric patients often have atypical pain or only generalized complaints.
- Notify receiving agency as soon as possible if ST elevation is noted or suspected.
- **Aspirin** dose is 324 mg PO. Providers can administer 4 (81 mg) baby aspirin or 1 (325 mg) adult aspirin. Either way, the medication is to be chewed before swallowing.
- **Nitroglycerin**—if a patient has their own prescription, an EMT may assist in the administration of the Nitro according to the dosing schedule on the **Chest Pain Algorithm.**
- **Morphine and fentanyl**—note that dosing regimen in this protocol is more aggressive and different than all other protocols using this drug. This is due to the fact that in addition to alleviating pain, the medications also help treat the underlying disease process.
- Do not delay transport. Coronary revascularization is the ultimate treatment for patients experiencing an MI.

CHEST PAIN

If patient is experiencing cardiac chest pain titrate SpO2 to 90%. If 90% or greater, do NOT administer oxygen, but never withhold oxygen from dyspneic patients.

2001 Universal Patient Care Protocol
Provide reassurance, calm, and prevent exertion

Chest pain due to trauma? — YES → Go to Protocol: *Major Trauma*

NO

EMT | EMR | Aspirin 324mg

Consider rapid transport or air ambulance to Cath Lab facility for suspected ACS/STEMI/NSTEMI

12-lead ECG

MC | Park-medic | P | **Obtain 12-lead ECG within first 10 minutes of encounter. Transmit to MC and discuss treatment options.**

Associated/alternate Protocols:

If HR < 50, go to: *Cardiac Dysrhythmia: Adult or Pediatric bradycardia*

If HR rate >120, go to: *Cardiac Dysrhythmia - Adult OR Pediatric Tachycardia*

If suspected CHF/Pulmonary Edema go to: *Respiratory Distress Cardiogenic Pulmonary Edema/CHF*

AEMT/Park-medic | Obtain vascular access apply Capnography (ESOP)

Confirmed inferior wall MI? — YES → P | Consider right sided 12-lead, Normal saline bolus - 250ml, Contact MC

No/Unknown

Nitroglycerin

MC | EMT | AEMT/Park-medic | **EMT may only assist with patient's own nitroglycerin**
NTG: 0.4mg SL q 5 min x3
IF SBP>100

Nausea/vomiting? — YES → Park-medic | Ondansetron: 4mg ODT/IV/IO 8mg IM **EMT/AEMT ESOP for ODT**
PEDs:
IV/IO: 0.1mg/kg up to 4 mg
ODT: Age <4: 1/2 tab - 2mg >4; 4mg
IM: 0.2mg/kg up to 8mg

NO

Chest pain caused by sympathomimetic drug use? (e.g., cocaine, methamphetamine) — YES → MC | Park-medic | **Consider midazolam** IV/IO 1-5mg (est. 0.05mg/kg) May repeat once in 5 min

NO

Chest Pain resolved with nitroglycerin? — NO → Park-medic | **Consider fentanyl** 25-50mcg IV/IM/IO Repeat in 10min x1prn pain. Subsequent dosing q 20 min

YES

MC | AEMT/Park-medic | Continue nitroglycerin - up to 3 doses prior to MC contact and if SBP > 100
If not effective: contact MC and consider fentanyl

Repeat vital signs q 5 mins. Repeat 12-Lead q 10 mins.

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Childbirth

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Due date • Prenatal care • Time contractions started/how often • Rupture of membranes/"water breaks"/ mucus • Time/amount of any vaginal bleeding • Sensation of fetal activity • Past pregnancy/delivery history (Gravida/ Para/Abortus) status • High Risk pregnancy	• Vaginal discharge or bleeding • Crowning or urge to push • Meconium	• Abnormal presentation » buttock, foot, hand • Prolapsed cord • Placenta previa • Placental abruption (abruptio placenta)

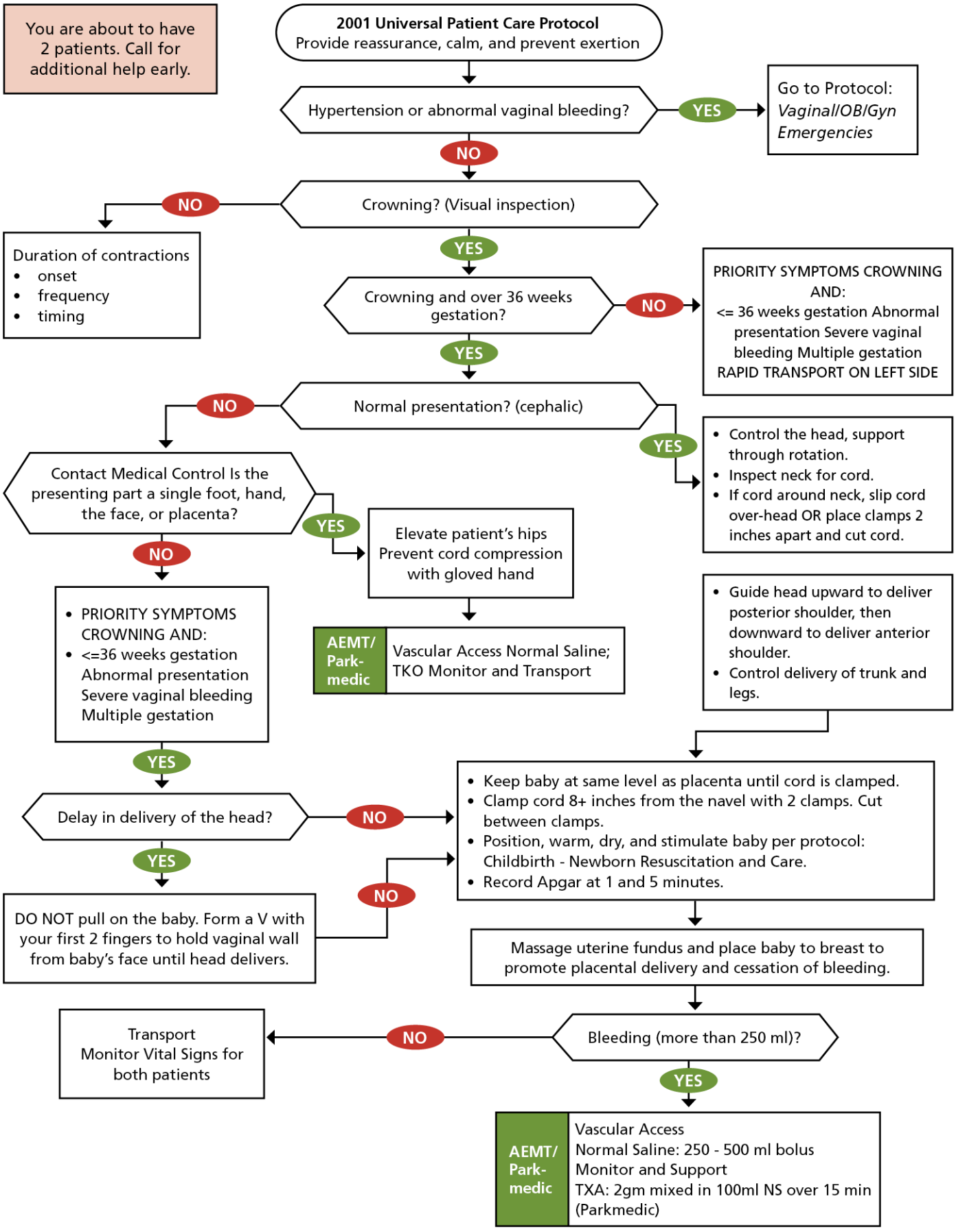
SPECIAL CONSIDERATIONS

- Document all times (contraction frequency and length, delivery time)
- If maternal seizures occur, refer to the PROTOCOL: *Vaginal/Obstetric/GYN Emergencies*
- After delivery, aggressively massaging the uterus (lower abdomen) will promote uterine contraction and help to control postpartum bleeding. Bring placenta to the hospital with patient.
- Some perineal bleeding is normal with any childbirth; large quantities of blood or free flowing blood is abnormal and should be treated with Vascular Access, TXA, and Normal Saline administration
- Record APGAR at 1 minute and 5 minutes after birth
- Be aware of local Air Medical Transport guidelines for patients in labor.
- Be aware of local NICU and neonatal resources

APGAR SCALE

	0	1	2
Appearance	Blue/Pale	Body pink, blue extremities	Completely pink
Pulse	Absent	Slow (<100)	≥100
Grimace	No response	Grimace	Cough or sneeze
Activity	Limp	Some flexion	Active motion
Respirations	Absent	Slow, irregular	Good, crying

CHILDBIRTH


You are about to have 2 patients. Call for additional help early.
2001 Universal Patient Care Protocol
Provide reassurance, calm, and prevent exertion
Hypertension or abnormal vaginal bleeding?
YES
Go to Protocol: Vaginal/OB/Gyn Emergencies
NO
Crowning? (Visual inspection)
NO
Duration of contractions
• onset
• frequency
• timing
YES
Crowning and over 36 weeks gestation?
NO
PRIORITY SYMPTOMS CROWNING AND:
<= 36 weeks gestation Abnormal presentation Severe vaginal bleeding Multiple gestation
RAPID TRANSPORT ON LEFT SIDE
YES
Normal presentation? (cephalic)
NO
YES
• Control the head, support through rotation.
• Inspect neck for cord.
• If cord around neck, slip cord over-head OR place clamps 2 inches apart and cut cord.
Contact Medical Control Is the presenting part a single foot, hand, the face, or placenta?
YES
Elevate patient's hips
Prevent cord compression with gloved hand
NO
AEMT/ Park-medic
Vascular Access Normal Saline; TKO Monitor and Transport
• PRIORITY SYMPTOMS CROWNING AND:
• <=36 weeks gestation Abnormal presentation Severe vaginal bleeding Multiple gestation
YES
• Guide head upward to deliver posterior shoulder, then downward to deliver anterior shoulder.
• Control delivery of trunk and legs.
Delay in delivery of the head?
NO
YES
• Keep baby at same level as placenta until cord is clamped.
• Clamp cord 8+ inches from the navel with 2 clamps. Cut between clamps.
• Position, warm, dry, and stimulate baby per protocol: Childbirth - Newborn Resuscitation and Care.
• Record Apgar at 1 and 5 minutes.
NO
DO NOT pull on the baby. Form a V with your first 2 fingers to hold vaginal wall from baby's face until head delivers.
Massage uterine fundus and place baby to breast to promote placental delivery and cessation of bleeding.
Bleeding (more than 250 ml)?
NO
Transport
Monitor Vital Signs for both patients
YES
AEMT/ Park-medic
Vascular Access
Normal Saline: 250 - 500 ml bolus
Monitor and Support
TXA: 2gm mixed in 100ml NS over 15 min (Parkmedic)

Childbirth: Newborn Resuscitation and Care

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Gestation (full term, complications, etc.) • Mother's previous pregnancies and current health. • Prenatal care • Maternal drug use	• Amniotic fluid clear? • Breathing or crying? • Good muscle tone? • APGAR at 1 and 5 minutes	• Premature delivery • Narcotic overdose • Neonatal hypoglycemia

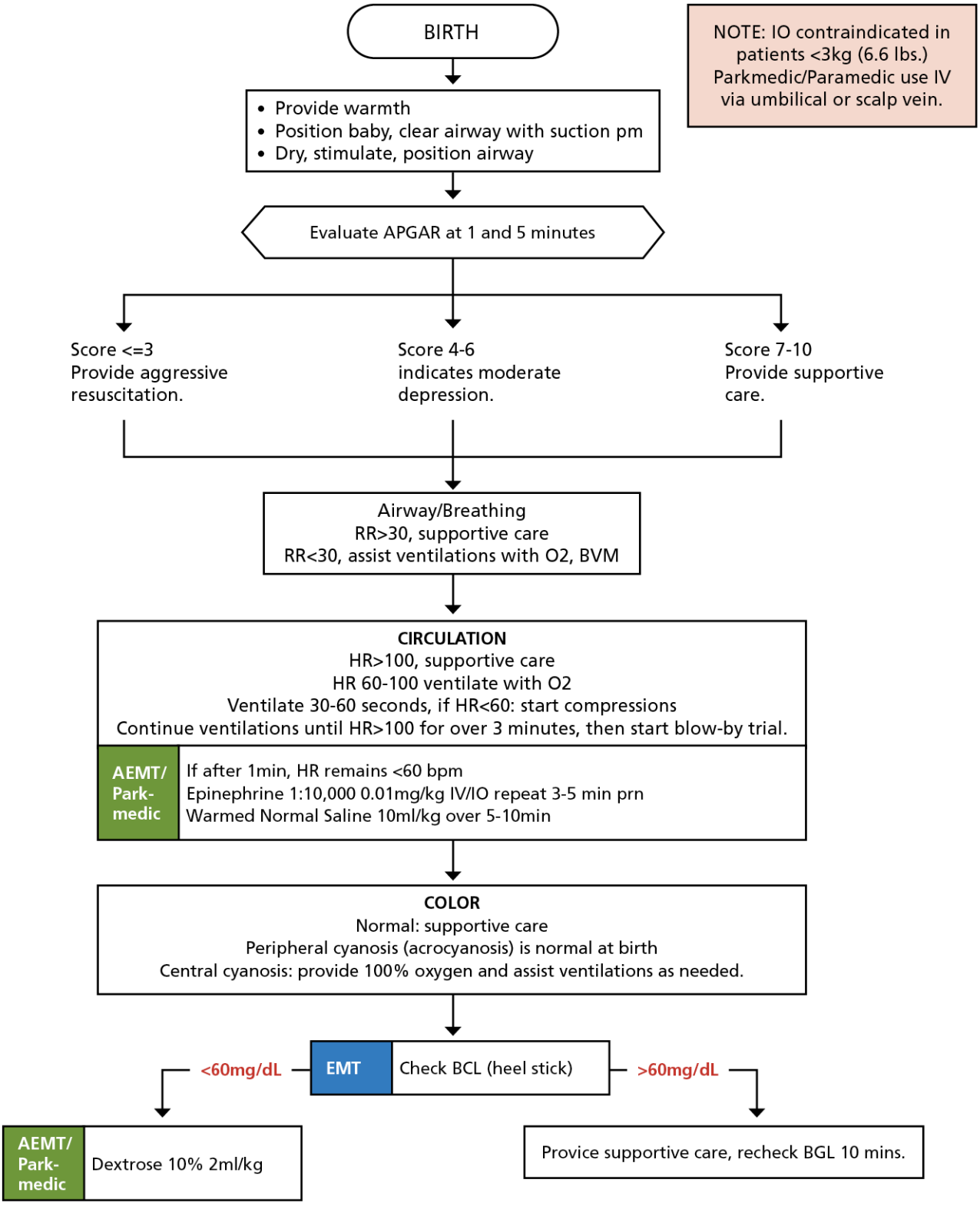
SPECIAL CONSIDERATIONS

- Contact MC prior to ANY Narcan administration to a neonate.
- Try and avoid pressure on the newborn's eyes during BVM ventilation
- It is important to get a detailed maternal history including drug, tobacco and alcohol use, hypertension, maternal medications, history of previous pregnancies and complications with past and current pregnancies.
- Newborns <500 grams (about the size of a 12 oz. soda can) or <24 weeks gestation may not survive regardless of resuscitation.
- Respiratory distress is indicated by nasal flaring, chest retractions, belly breathing, and head bobbing
- Reassess HR, respiratory rate, and color every 3 minutes.
- Once blow-by ventilation is initiated, continue regardless of HR.
- Be mindful of how much pressure is applied during ventilations. Excessive pressure may cause damage to lungs
- Measure pulse oximetry on right hand
- For IV access, use the umbilical cord while keeping distal cord clamped.
- Be aware of local NICU and Neonatal resources

Drug	Dose (dose/kg)	Weight (kg)	Volume IV ET	Method	Indication
Epinephrine 1:10,000 0.1mg/ml	IV 0.01~0.03mg/kg (0.1~0.3ml/kg ET 0.03~0.1mg/kg (0.3~1ml/kg)	1kg 2kg 3kg 4kg	0.2ml 0.5ml 0.4ml 1ml 0.6ml 1.5ml 0.8ml 2ml	Give IV push or IT push.The current IT doeses do not require dilution of flushing with saline. Do not give into an artery; do not mix with bicarbonate; repeat in 5 min PRN	Asystole or severe bradycardia
Sodium bicarbonate 0.5mEq/ml	2mEq/kg	1kg 2kg 3kg 4kg	4ml 8ml 12ml 16ml	Give IV over 2 min; do not mix with epinephrine, calcium, or phosphate; assure adequate ventilation; repeat 5~10 min PRN	Metabolic acidosis, rarely needed in delivery room. Better to wait for proved acidosis
Volume expanders Normal saline Ringer's lactate O-negative blood	10ml/kg	1kg 2kg 3kg 4kg	10ml 20ml 30ml 40ml	Give IV over 5~10 min. Slower in premature infants	Hypotension because of intravascular volume loss
naloxone (Narcan) 0.4mg/ml	0.1~0.2mg/kg	1kg 2kg 3kg 4kg	0.25ml 0.5ml 0.75ml 1.0ml	Give IV push, IM, SQ, or IT; repeat PRN 3 times if no response, if material narcotic addiction is suspected do not give; do not mix with bicarbonate	Narcotic depression
Dopamine*	Begin at 5µg/kg/min IV (may increase up to 20 µg/kg/min	1kg 2kg 3kg 4kg	5~20µg/min 10~40µg/min 15~60µg/min 20~80µg/min	Give as continuous infusion	Hypotension because of poor cardiac output
Cardioversion/ Defibrillation	1 to 4J/kg increase 50% each time				

Do not use of atropine, calcium
*Dopamine IV infusion rate = 6 x wt (kg) x desire dose (µg/kg/min)/mg drug per 100ml IV fluid

CHILDBIRTH: NEWBORN RESUSCITATION AND CARE



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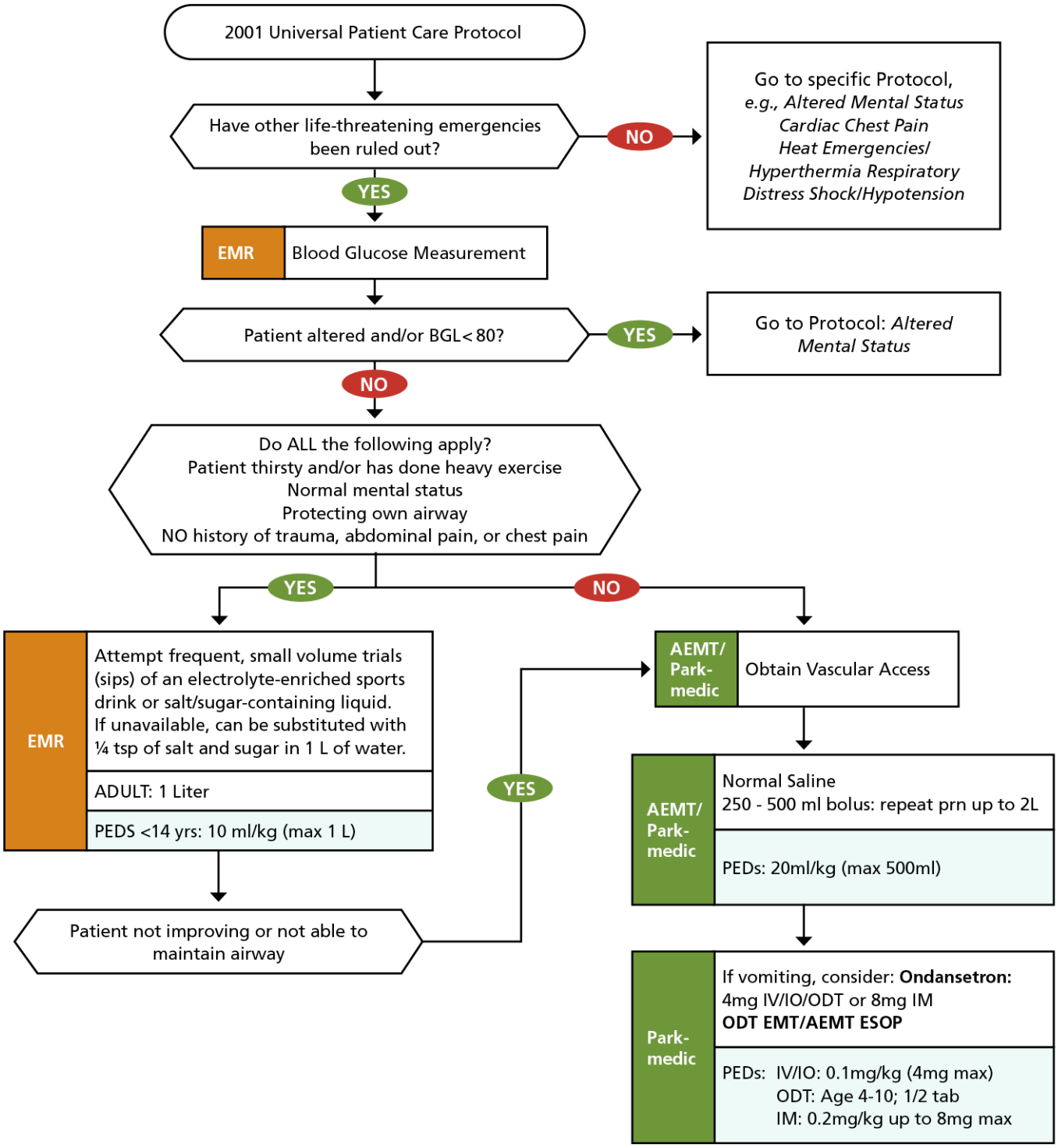
Dehydration

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Most recent fluid intake • Total fluid intake (volume, frequency, type) • Alcohol intake • Food intake • Time of last urination, amount, color • Environmental exposure (heat, cold, altitude) • Recent physical exertion • Recent illness (diarrhea, vomiting, and/or fever) • Past medical history (e.g., diabetes) • Medications (e.g., diuretics)	• Fatigue • Dizziness, weakness, light-headedness • Syncope, near-syncope • Mental status changes • Muscle cramps • Dry mucous membranes • Oliguria (reduced urine output) • Polyuria (in hyperglycemia) • Abdominal pain • Headache	• Heat illness • Hyponatremia • Diabetes insipidus • Diabetic ketoacidosis (DKA) • Hyperosmolar hyperglycemic state (HHS) • Sepsis • Head injury • Medication or drug reaction

SPECIAL CONSIDERATIONS:

- **Dehydration should be a diagnosis of exclusion: ensure that a life-threatening disease process (cardiac dysrhythmia, stroke) is not likely the cause of the patient's symptoms.** Obtain a thorough history and perform a complete physical exam with vital signs to include temperature and blood glucose.
- Dehydration can cause underlying disease processes to worsen.
- Common causes of dehydration include vomiting, diarrhea, physical exertion with poor fluid intake, and fever.
- Visitors to public lands may not be acclimatized to the heat, humidity, or altitude. Most are also increasing their activity level from "normal" levels at home. Baseline water intake for low activity should be 2 liters per day, minimum.
- Time of last urine output is an important indicator of dehydration.
- People who take diuretics (e.g., "water pills") may be more susceptible to dehydration.
- Dehydration can lead to electrolyte imbalances. Hyponatremia is possible consequence of exertion (sodium loss), excessive water intake, and poor food intake (poor sodium intake). However, rapid overcorrection of hyponatremia is only harmful if the patient has had > 48 hours to adapt to the electrolyte imbalance.
- Orthostatic vitals do not need to be positive to prove the existence of dehydration.
- Blood pressure is not a reliable marker for dehydration until it is severe. Rely on history (urine output, fluid/food intake, exertion, thirst) to develop a full clinical picture of the patient's hydration status.

DEHYDRATION



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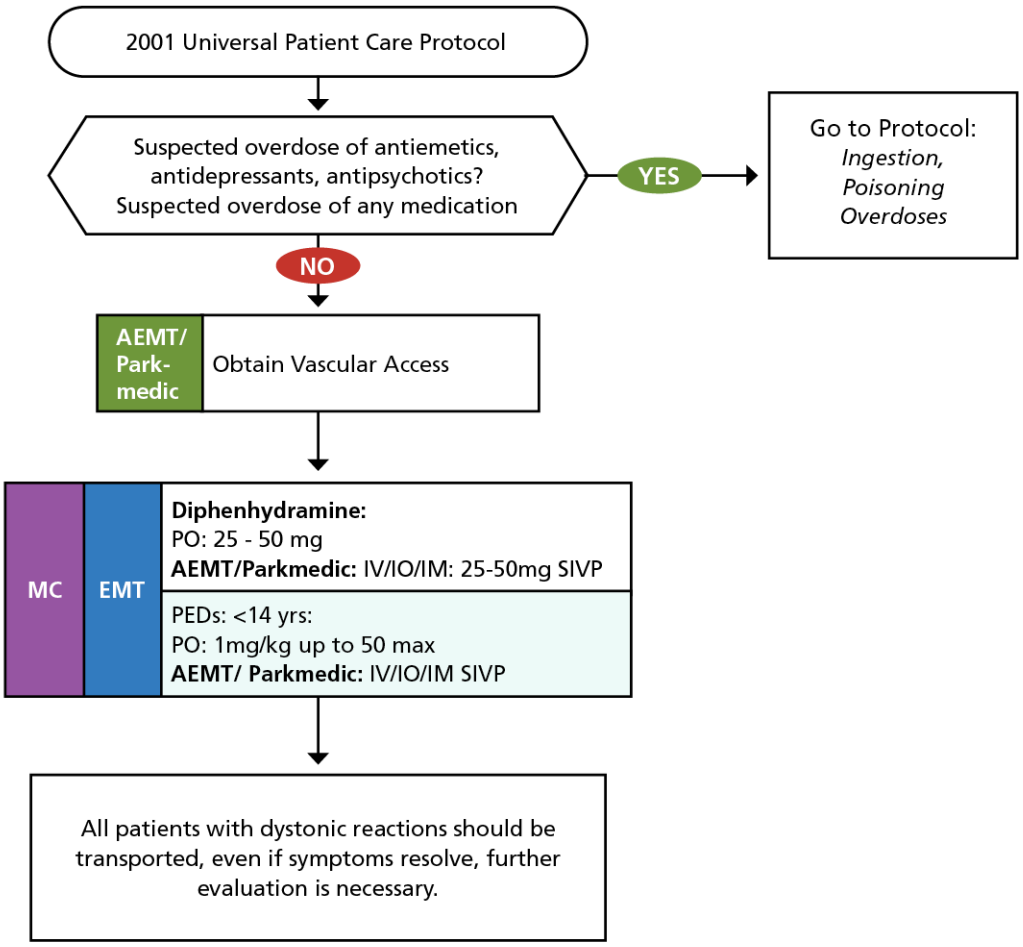
Dystonic Reaction

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Allergic reaction to anti-psychotic medications • Behavioral medical history • Currently taking (neuroleptic) medications such as: » Haldol (haloperidol) » Thorazine (chlorpromazine) » Prolixin (fluphenazine) » Stelazine (trifluoperazine) • Currently taking anti-emetic medications such as: » Phenergan (promethazine) » Reglan (metoclopramide) » Compazine (prochlorperazine) • Currently taking antidepressant medications (esp. tricyclic)	• Muscle spasms • Seizure-like activity • Torticollis (neck twisted) • Arm rotation • Protrusion of tongue • Oculogyric condition (unable to move eyes in vertical plane and/or blurred or double vision) • Full body spasm • Extreme restlessness (cannot sit still)	• Seizures • Muscular abnormality • Rheumatoid arthritis • Hypocalcemia • Anticholinergic toxicity (overdoses of Benadryl, meclizine, promethazine, quetiapine, etc.) • Previous medical/physical condition causing muscle spasms or muscle constriction • Overdose • Stroke

SPECIAL CONSIDERATIONS:

- Attempt to contact MC to discuss the diagnosis of a dystonic reaction before administering diphenhydramine.
- Dystonic reactions are usually caused by antipsychotics, antiemetics, and antidepressants.
- Dystonic reactions may occur immediately after beginning a new medication regimen (or after an increase in dose), or they may be delayed for days. Alcohol and/or cocaine use can increase the risk of a dystonic reaction.
- Dystonic reactions are characterized by involuntary intermittent or sustained muscle contractions. The contractions can cause parts of the body to spasm and twist and can sometimes be painful. Any part of the body can be affected including the arms, legs, trunk, neck, eyelids, and vocal cords.
- Patients with dystonia may not be able to verbally communicate, but they are typically alert, aware, and usually have normal vital signs (unless another condition is present).
- Diphenhydramine is indicated in acute dystonic reactions, but it is not indicated in overdoses of anti-psychotics, antiemetics, or antidepressants. Overdoses can be life-threatening and may require rapid transport.
- Overdoses of medications with anticholinergic properties (extensive number of medications) can be confused with dystonic reactions: always be suspicious of overdose and thoroughly interview the patient and family/bystanders.
- All patients with dystonic reactions should be transported for further evaluation.

DYSTONIC REACTION



2180

Electrical Injuries

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Lightning or electrical exposure • Single or multiple victims • Trauma secondary to fall from high wire or MVC into line • Duration of exposure • Voltage and current (AC/DC)	• Cardiac arrest • Respiratory arrest • Burns (fernlike) • Pain including eardrums • Entry and exit wounds • Hypotension or shock • Compartment Syndrome • Transient paralysis of legs • Loss of consciousness	• Cardiac arrest, arrhythmias • Respiratory arrest • Altered mental status • Seizure • Burns (see Burn protocol) • Multi-system trauma • Environmental emergencies (hypo/hyperthermia)

SPECIAL CONSIDERATIONS

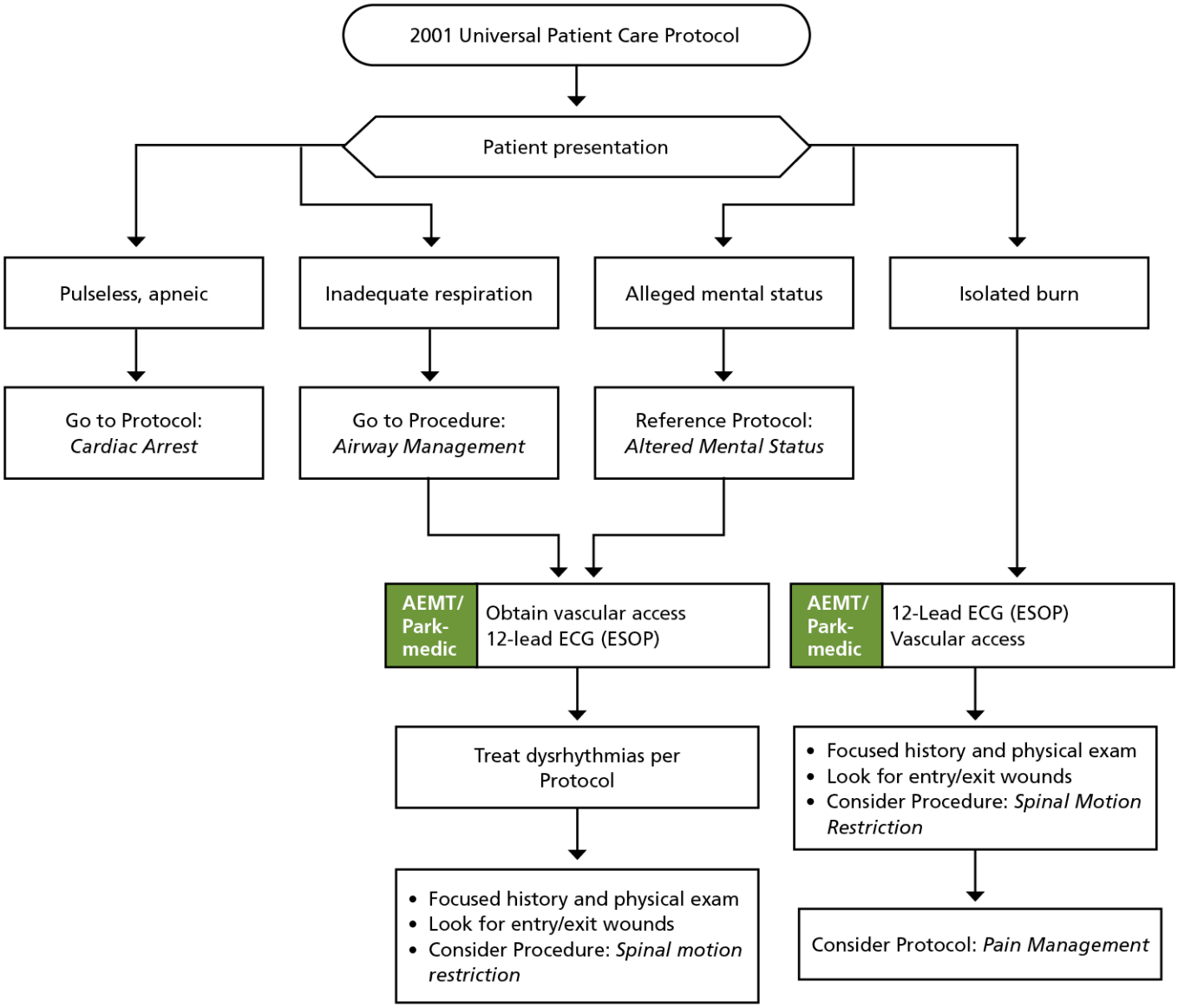
- Ventricular fibrillation and asystole are the common life-threatening dysrhythmias.
- Damage is often hidden; the most severe damage will occur in muscle, vessels and nerves.
- High voltage > 1000 volts: industrial, high-tension, lightning
- Low voltage < 1000 volts: household voltage
- AC can cause greater internal injuries; DC throws the victim causing more trauma.
- Respiratory arrest may last longer than cardiac arrest. Rescue breaths may be needed after pulse returns.

SPECIAL CONSIDERATIONS: LIGHTNING

In a mass casualty lightening incident, attend to victims in full arrest first. ("Reverse Triage") If the victim did not arrest initially, it is likely they will survive. Attend to ventilation first—administer rescue breaths, and then proceed with routine CPR.

- Do not overlook other trauma (i.e., falls)
- Lightning is a massive DC shock most often leading to asystole.
- In lightning injuries, most of the current will travel over the body surface producing flash burns.

ELECTRICAL INJURIES



Victims of high voltage electrical discharge, including lightning, are often in primary respiratory arrest and will need ventilatory support.

2190

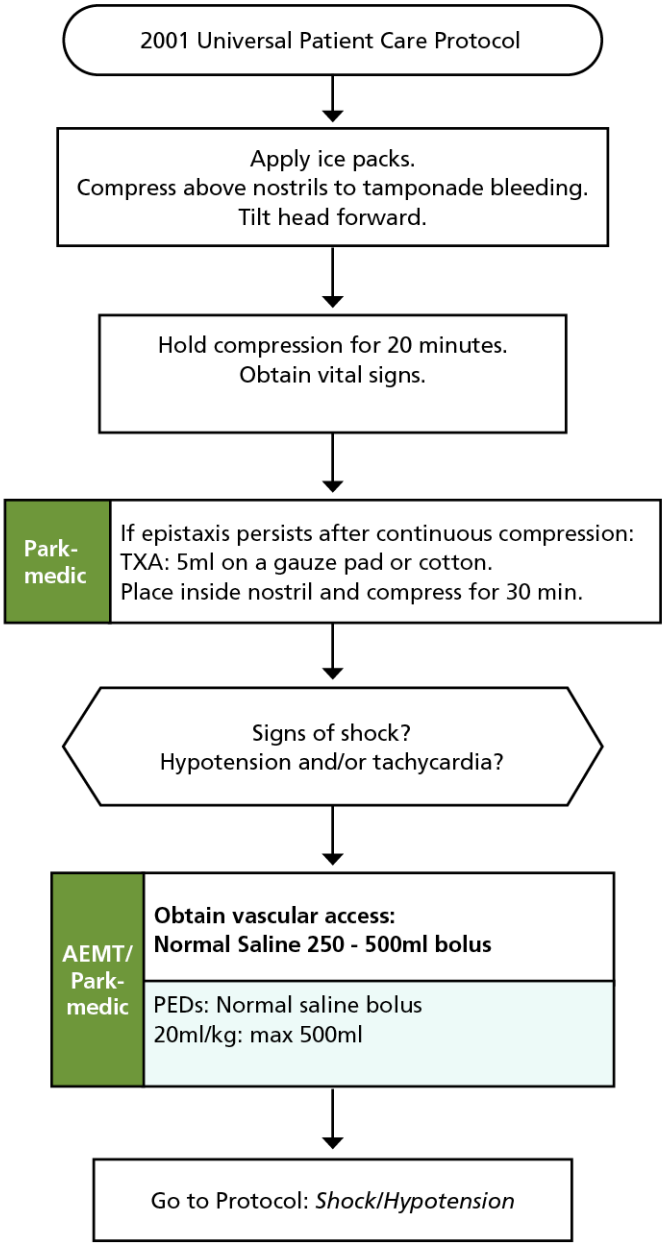
Epistaxis

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Duration and estimated quantity of bleeding • Traumatic vs. atraumatic • Past medical history (e.g., hypertension, blood clotting disorders) • Medications and compliance (anticoagulants, antihypertensives) • Previous episodes of epistaxis	• Bleeding from nasal passage • Pain • Nausea/vomiting • Signs of hypertensive emergency: chest pain, dizziness, blurred vision, altered mental status • Signs of hemorrhagic shock: altered mental status, anxiety, pallor, poorly perfused extremities, tachycardia, hypotension, tachypnea, air hunger	• Hypertensive emergency • Head trauma • Medication or drug toxicity (anticoagulants, cocaine) • Hemophilia (blood clotting disorder) • Thrombocytopenia (low platelet count): leukemia, chemotherapy, liver disease, alcoholism, drug induced • Barotrauma (diving emergencies) • Nasal foreign body • Infection • Allergic rhinitis • Lesions (polyps, ulcers, tumors)

SPECIAL CONSIDERATIONS

- It is very difficult to quantify the amount of blood loss with epistaxis.
- Anticoagulants include aspirin, warfarin (Coumadin), Xarelto (rivaroxaban), Eliquis (apixaban), Pradaxa (dabigatran), and NSAIDS (such as ibuprofen or naproxen sodium).
- Patients with hemophilia (e.g., "factor VIII" deficiency) are at increased risk for extensive blood loss. Contact MC.
- Make sure to protect airway and breathing in patients with active epistaxis.
- To tamponade a nosebleed, the patient should:
  1. Blow nose to remove blood.
  2. Bend forward over a basin to minimize risk of aspiration or swallowing.
  3. Pinch above the nostrils and below the bony nasal bridge firmly against septum, applying continuous pressure for 20 minutes.

EPISTAXIS


2001 Universal Patient Care Protocol
Apply ice packs.
Compress above nostrils to tamponade bleeding.
Tilt head forward.
Hold compression for 20 minutes.
Obtain vital signs.
Park-medic
If epistaxis persists after continuous compression:
TXA: 5ml on a gauze pad or cotton.
Place inside nostril and compress for 30 min.
Signs of shock?
Hypotension and/or tachycardia?
AEMT/ Park-medic
Obtain vascular access:
Normal Saline 250 - 500ml bolus
PEDs: Normal saline bolus
20ml/kg: max 500ml
Go to Protocol: Shock/Hypotension

2195

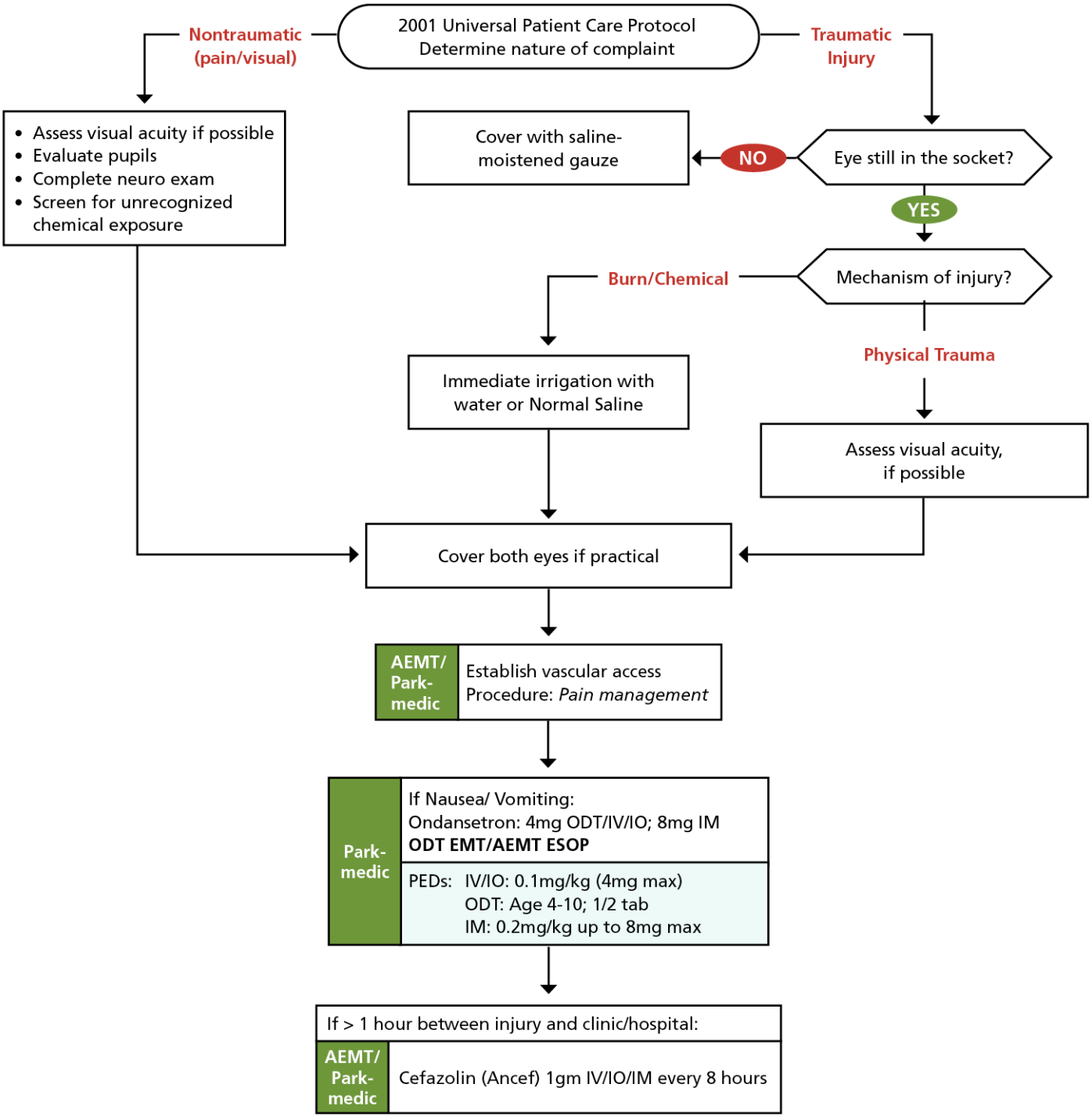
Eye Emergencies/Complaints

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Time of injury • Blunt/penetrating/chemical • Open vs. closed injury • Involved chemicals/MSDS • Wound contamination • Tetanus status • Normal visual acuity • Sun exposure	• Pain, swelling, blood • Deformity, contusion • Visual deficit • Leaking aqueous/vitreous humor • Upwardly fixed eye • "shooting" or "streaking" light • Visible contaminants • Rust ring • Lacrimation	• Abrasion/Laceration • Globe rupture • Retinal damage/detachment • Chemical/thermal burn/chemical weapon • Orbital fracture • Neurological event • Acute glaucoma • Retinal artery occlusion

SPECIAL CONSIDERATIONS

- Normal visual acuity can be present even with severe eye injuries.
- Remove contact lens whenever possible.
- Any chemical or thermal burn to the face/eyes should raise suspicion of respiratory insult
- Orbital fractures raise concern of globe or nerve injury and need repeated assessments of visual status
- Use shields, not pads, for physical trauma to eyes. Pads OK for unaffected eye.
- Do not remove impaled objects: pad around object and keep in place.
- Suspected globe rupture requires emergent transport.
- With suspected globe rupture, no irrigation or ointment application. Protect the eye from the environment.
- Avoid NSAIDS in patients with eye injuries.
- Cover both eyes if practical to prevent the patient from moving the injured eye unnecessarily
- Transport keeping the patient's face upward and head of the bed at > 30 degrees to minimize postural/positional increases in intra-ocular pressure.
- In suspected severe eye trauma or open globe, treat nausea aggressively to avoid increased ocular pressure.

EYE EMERGENCIES/COMPLAINTS



2200

Frostbite

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Diabetes • Circulatory problems • Exposure length • Tetanus status • Previous frostbite injury	• Color of skin • Condition of skin • Condition of clothing, gloves, etc (wet, dry) • CSMs • Core body temperature	• Trauma • Infection • Hypothermia

SPECIAL CONSIDERATIONS

- Prevent further heat loss and injury.
- Consider location of patient, length of extrication, extent of freezing, ambient temperature and if the area can stay warmed throughout contact. DO NOT rewarm if the area has the potential to refreeze. This could cause further tissue damage and death.
- The patient should not walk on thawed feet.
- Rewarming is rarely done in the field—but spontaneous rewarming can occur: Protect the injured area from refreeze or injury.

REWARMING CONSIDERATIONS:

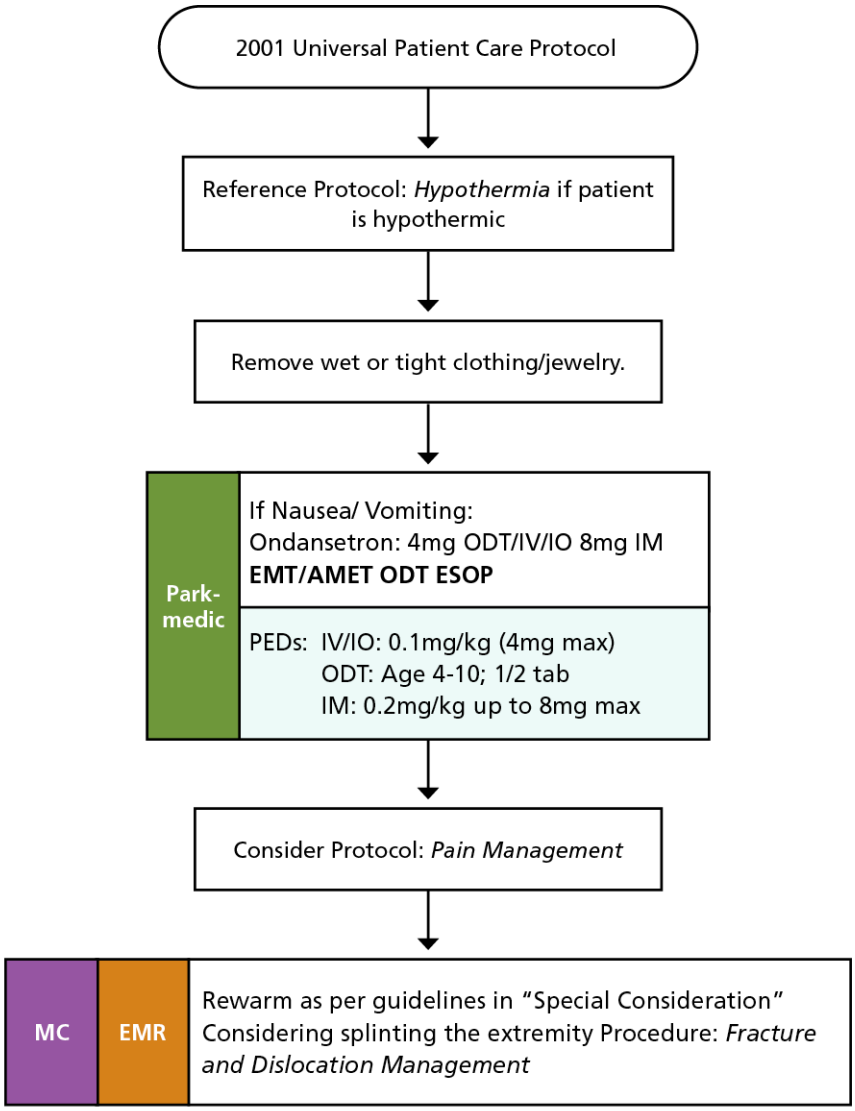
Consider backup transport if rewarming is being attempted. Rewarm if ALL the following apply: consult MC

- Evacuation not possible in <12 hour
- Patient is not hypothermic (hypothermic patients require core rewarming first)
- Sufficient supply of warm water with a thermometer
- There is NO risk of refreezing

REWARMING PROCEDURE:

1. Water temperature 102F
2. Immerse until skin is soft, pink, and pliable. Expect pain
3. DO NOT RUB
4. Protect from injury and re-freezing
5. Place gauze between fingers and toes
6. Do not rupture blebs

FROSTBITE


2001 Universal Patient Care Protocol
Reference Protocol: *Hypothermia* if patient is hypothermic
Remove wet or tight clothing/jewelry.
Park-medic
If Nausea/ Vomiting:
Ondansetron: 4mg ODT/IV/IO 8mg IM
EMT/AMET ODT ESOP
PEDs: IV/IO: 0.1mg/kg (4mg max)
ODT: Age 4-10; 1/2 tab
IM: 0.2mg/kg up to 8mg max
Consider Protocol: *Pain Management*
MC
EMR
Rewarm as per guidelines in "Special Consideration"
Considering splinting the extremity Procedure: *Fracture and Dislocation Management*

2205

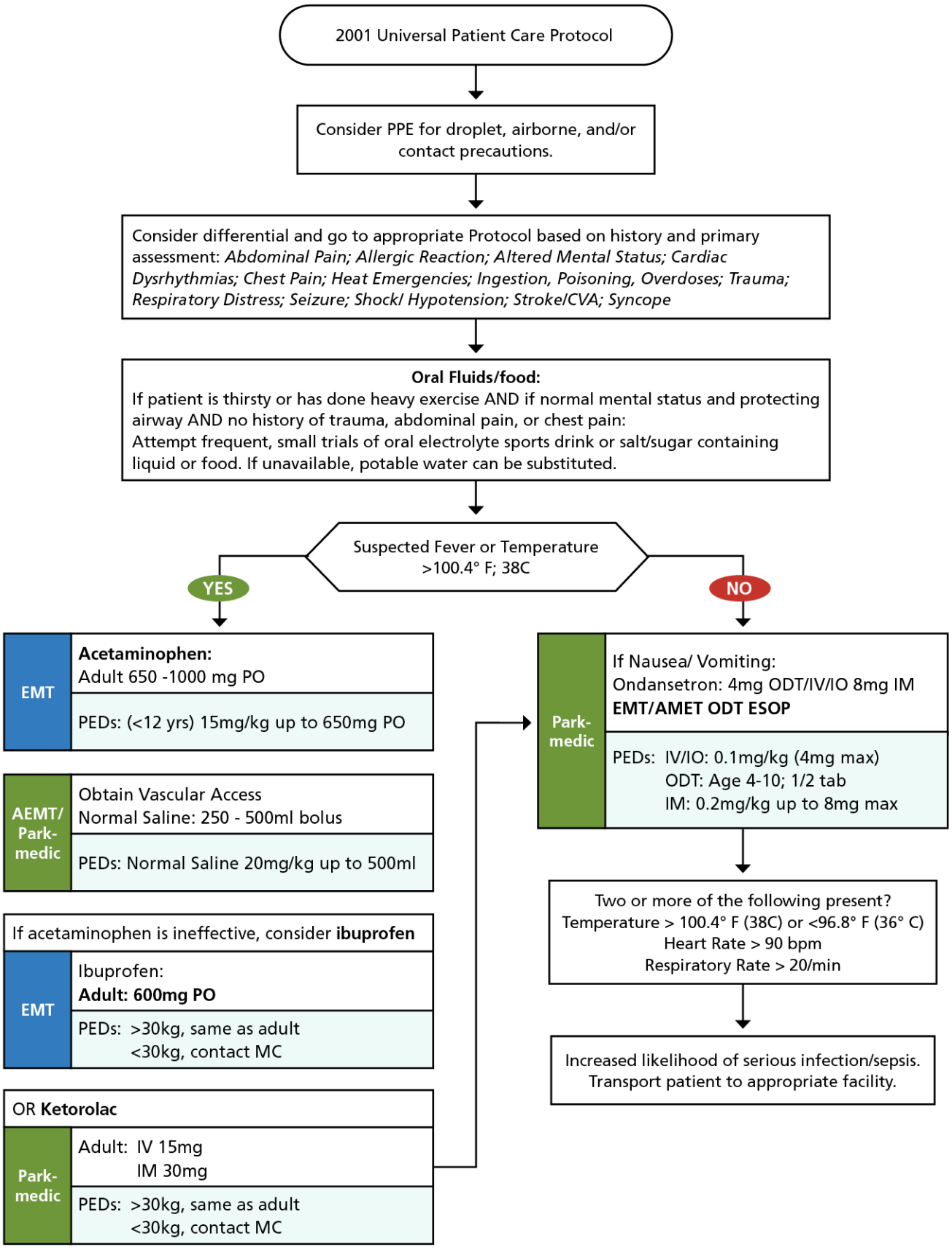
General Illness/Fever

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Age • Duration of fever • Severity of fever • Immunocompromised (transplant, HIV, diabetes, cancer) • Environmental exposure • Last acetaminophen or ibuprofen • Vaccine History • Hyper/hypoglycemia	• Blood glucose • Warm/flushed • Nausea/vomiting • Sweaty • Chills/rigors • Myalgia, cough, runny nose, headache, dysuria, rash, stiff neck. • Weakness • Dizziness • Diarrhea • Altered Mental Status • Chest pain	• Cardiac (MI, Angina, CHF, Dysrhythmia) • Sepsis • Infection/UTI/pneumonia/viral illnesses • Cancer/tumors/lymphomas • Medication or drug reaction • Hyperthyroidism • Heat stroke • Meningitis • Croup/epiglottitis • Hepatitis/gastroenteritis/renal failure • Sugar or electrolyte issues • Motion sickness

SPECIAL CONSIDERATIONS

- Febrile Seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.
- Fever in the chemotherapy patient is a serious emergency.
- **Droplet precautions** include standard PPE plus a surgical mask or a nonrebreather oxygen mask for the patient. This level of precaution should be used when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses are spread via large particle droplets are suspected.
- **Airborne precautions** include standard PPE plus an N-95 mask or PAPR unit for providers who accompany patients in the back of the ambulance and a surgical mask or nonrebreather oxygen mask for the patient. This level of precaution should be utilized when COVID and COVID-like infections, tuberculosis, measles, varicella, or other infections that are spread by droplet nuclei are suspected.
- **Contact precautions** include standard PPE plus utilization of a gown, change of gloves after every patient contact and strict hand washing precautions. This level of precaution is utilized when multi-drug resistant organisms (MRSA), scabies or zoster (shingles) or other illnesses spread by contact are suspected.
- **All hazard precautions** include standard PPE plus airborne precautions plus contact precautions. This level of precaution is used during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g., SARS-CoV).
- If patient is > 50 years old or > 40 years with a history of diabetes, consider applying a 12-lead ECG.

GENERAL ILLNESS/FEVER



2210

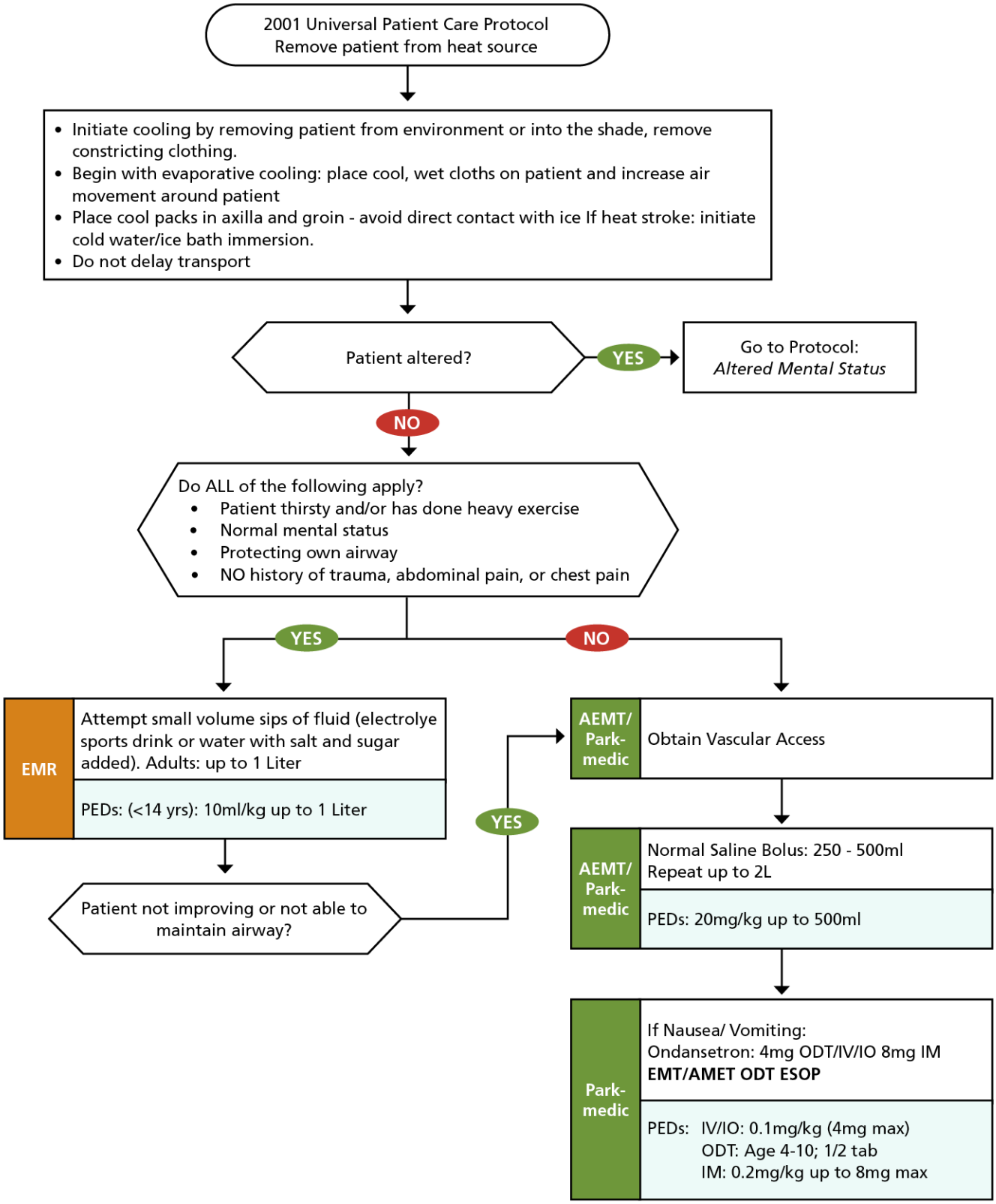
Heat Emergencies/Hyperthermia

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Age • Exposure to increased temperatures and/or humidity • Medications (e.g., antihypertensives, diuretics) • Illicit drugs, alcohol use • Extreme exertion • Time and length of exposure • Poor PO intake • Fatigue and/or muscle cramping	• Altered mental status or unconsciousness • Hot, dry, or sweaty skin • Hypotension or shock • Seizure • Nausea, vomiting • Fatigue • Muscle cramps • Combativeness	• Fever (infection), meningitis • Dehydration • Hyperthyroidism (Thyroid Storm) • Status epilepticus • Heat cramps • Heat exhaustion • Heat stroke • CNS lesions or tumors • Diabetic complications • Drug overdose, alcohol withdrawal, Delirium tremens (DTs) • Cerebral hemorrhage • Serotonin Syndrome

SPECIAL CONSIDERATIONS

- Extremes of age are more prone to heat emergencies (i.e., young and old). They are also more sensitive to overzealous fluid replacement.
- Cocaine, amphetamines, and salicylates may elevate body temperatures.
- Sweating generally disappears as body temperature rises above 104° F (40° C) and nears heat stroke. **DO not use the presence or absence of sweating alone to differentiate between heat stroke and heat exhaustion.**
- Intense shivering may occur as a patient is cooled; therefore, active cooling should stop at 102° F (39° C).
- **Heat cramps** consists of dehydration, salt depletion, cramping. Vital signs may include tachycardia and elevated temp.
- **Heat exhaustion** consists of cool, moist skin while in the heat, heavy sweating, faintness, dizziness, fatigue, muscle cramps, nausea, and headache. Vital signs may include weak, thready pulse and low BP when standing.
- **Heat stroke c**onsists of dehydration, tachycardia, hypotension, core temperature greater than 104° F (40° C) and an altered mental status.
- The following alter body's ability to regulate temperature: diuretics, beta-blockers, antihistamines, antipsychotics, alcohol, acclimatization, humidity, amount/type of fluid replacement.
- An oral temperature should only be taken with normal mental status, otherwise rectal should be taken.

HEAT EMERGENCIES/HYPERTHERMIA



HEAT EMERGENCIES/HYPERTHERMIA

	Who/Why	Symptoms	Treatment
Heat Edema	Elderly, or those not acclimated to hot environment. History of rigorous activity then sitting/ standing for long periods.	Redness, swelling of hands, ankles and feet.	Resolves with elevation of extremity and acclimatization.
Heat Rash (prickly heat)	Anyone, usually in tropical/humid environments.	Blockage of sweat glands causing red, painful, itchy rash in areas where clothing rubs.	None in field. Loose clothing, antihistamines.
Heat Syncope	Elderly most common. Relative volume depletion. Must rule out other serious causes of syncope.	Dizziness and syncope with postural changes in hot environment.	Oral or IV fluids.
Heat Tetany	Anyone doing vigorous activity in a hot environment.	Hyperventilation, hand/foot spasm and tingling/numbness.	Shade and normal breathing.
Heat Cramps	Unconditioned people starting vigorous activity in the heat. Fluid replacement with water and lack of adequate salt and potassium replacement.	Involuntary, spasmodic, painful cramps in calves, thighs, or shoulders during or after exercise.	Rest and rehydration with sport drink or salted water. (Not salt pills)
Heat Exhaustion Normal mental status Body temp usually < 40° C (104° F)	Anyone active in hot environment without adequate fluid replacement. Caused by water and/or salt depletion.	Dizziness, weakness, fatigue, body aches, headache, nausea, sweating, vomiting, syncope, positional hypotension, tachycardia, elevated body temperature but NORMAL MENTAL STATUS!	Rest, cooling, aggressive fluid/ electrolyte replacement.
Heat Stroke Altered mental status Body temp usually > 40° C (104° F) MEDICAL EMERGENCY	Anyone active in hot environment without adequate fluid replacement. Water and/or salt depletion. *Classic:* elderly in heat wave—poor ability to regulate heat because of age/meds. *Exertional:* young, healthy athletes after strenuous exercise in hot environment.	Same as heat exhaustion but no longer able to regulate heat: ALTERED MENTAL STATUS incoordination, combative, hallucinations, seizures. Severe vasodilation=hypotension, tachycardia Dry skin=loss of sweating mechanism, i.e., temp control.	Rapid cooling, airway protection, IV fluids, seizure treatment if present.

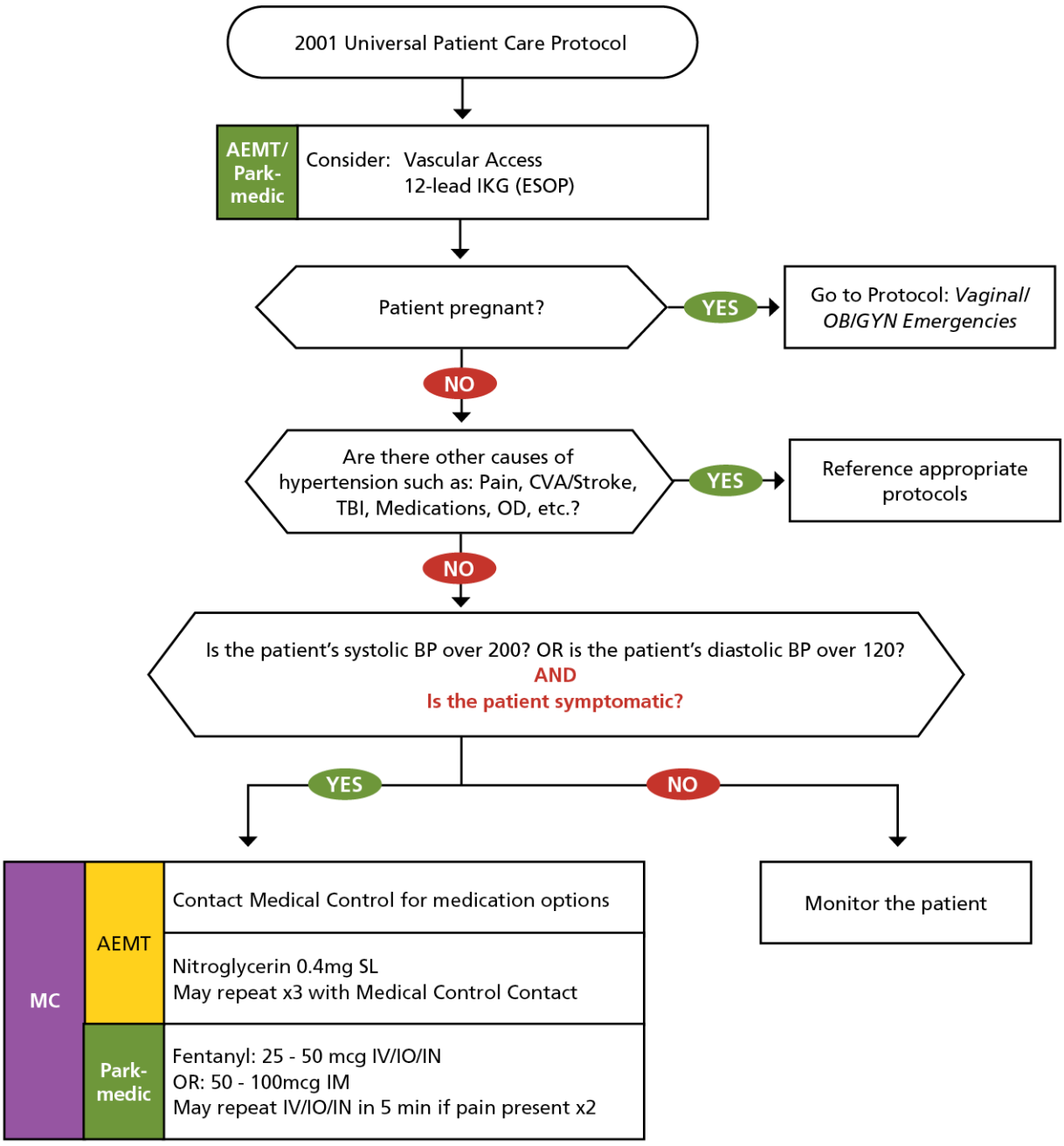
Hypertension

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Past medical history: hypertension, heart failure, stroke, aortic aneurysm, renal failure • Pregnancy (≥ 20 weeks) or postpartum • Medications and medication compliance (e.g., MAOIs, beta blockers, antihypertensives, diuretics) • Use of Erectile Dysfunction medications: e.g., Viagra, Levitra, or Cialis • Alcohol/drug use	• Systolic BP 200 or greater AND/OR Diastolic BP 120 or greater • AND at least one of the following: • Headache • Altered mental status • Dizziness • Nosebleed • Blurred vision • Pulmonary edema • Chest pain	• Hypertensive encephalopathy • Primary CNS injury (Cushing's triad: bradycardia, hypertension, irregular respirations) • Myocardial infarction • Acute heart failure • Aortic dissection (aneurysm) • Preeclampsia/eclampsia • Illicit drug use/overdose (esp. stimulants: cocaine, methamphetamine) • Medication or drug withdrawal (e.g., alcohol, beta-blockers, clonidine)

SPECIAL CONSIDERATIONS

- Hypertensive emergency is defined by the presence of end-organ dysfunction in the presence of severe, uncontrolled hypertension. End-organ dysfunction may be primarily neurologic (altered mental status, dizziness, severe headache, seizures) or cardiovascular (acute heart failure/pulmonary edema, chest pain). Other indications of hypertensive emergency include vision changes and nosebleeds.
- Never treat hypertension based on a single set of vital signs.
- Symptomatic patients should be transported with the head of the stretcher elevated.
- Pregnant (usually > 26 weeks) or postpartum women with a systolic blood pressure over 140 or a diastolic pressure over 90 meet criteria for hypertension in pregnancy (preeclampsia). See Protocol: *VAGINAL/ OB/GYN EMERGENCIES.*
- Hypertension associated with alcohol withdrawal and stimulant use is best treated with benzodiazepines.

HYPERTENSION



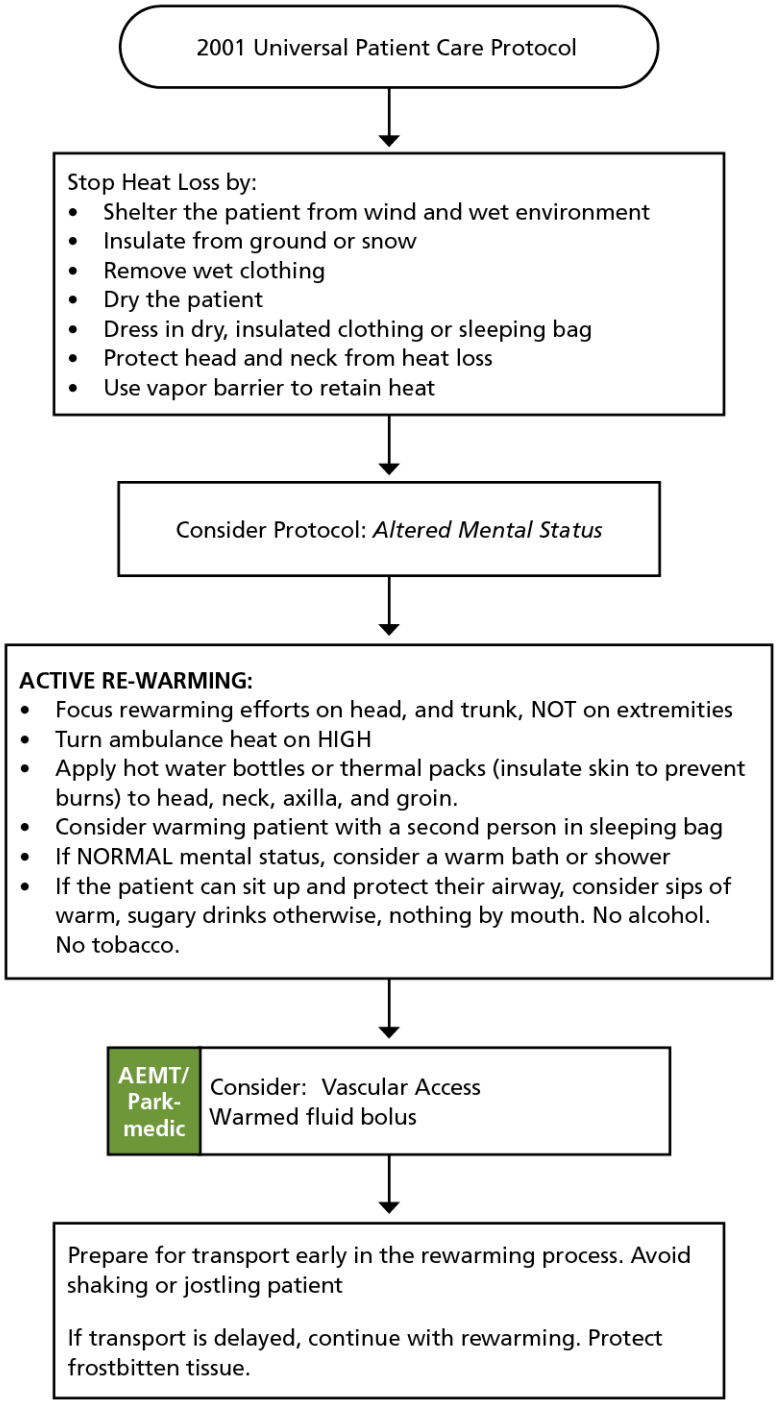
Hypothermia

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Exposure to environment even in normal temperatures • Exposure to extreme cold • Extremes of age • Drug use: Alcohol, barbiturates • Infections/Sepsis • Length of exposure/wetness	• Mild hypothermia: tachycardia, tachypnea, shivering, ataxia, cold diuresis • Severe hypothermia: altered mental status/unresponsive, bradycardia, hypotension, hypoventilation, pulmonary edema, loss of shivering, paradoxical undressing • ECG changes in severe hypothermia: slow atrial fibrillation, junctional bradycardia, Osborn/J waves, prolonged intervals, VF, asystole	• Altered mental status of any cause • Overdose (e.g., beta-blocker, calcium channel blocker) • Sepsis • Hypoglycemia • CNS dysfunction (stroke, head injury, spinal cord injury) • High altitude cerebral edema (HACE) • Hypothyroidism (myxedema coma) • Adrenal insufficiency

SPECIAL CONSIDERATIONS

- Core temps are the most accurate measurement of hypo/hyperthermia. As this is difficult in the field, clinical signs may be used to assess the degree of hypothermia.
- In the appropriate settings, patients should be resuscitated and warmed—**[NEARLY] NO PATIENT IS DEAD UNTIL WARM AND DEAD.**
- Hypothermia is defined as core temperature less than 95° F (35° C).
- **MILD hypothermia** (core temp of 90-95° F/32-35° C) the body can still maintain temperature if heat loss is stopped. Signs may include tachycardia, hypertension, or shivering; with normal mental status.
- **SEVERE hypothermia** (core temp < 90° F/32° C)—the body is unable to maintain temperature and signs may include bradycardia, hypotension, loss of shivering, slowing of functions or cardiac arrest. Vital signs become depressed. Mental Status declines—confusion leading to coma.
- Extremes of age are more susceptible (i.e., young and old).
- With core temperature less than 86° F (30° C) ventricular fibrillation is a common cause of death, Handling patients gently may prevent this (rarely responds to defibrillation)
- Fatal dysrhythmias can occur during rewarming. Carefully monitor the patient and be sure to warm the patient's core first. Simultaneous rewarming of the core and extremities can cause further drop in core temperature as cold acidotic blood from the extremities returns to the core with peripheral vasodilation.
- If the temperature cannot be measured, treat the patient based on their suspected temperature.
- Prepare for transport early in the rewarming process. Avoid shaking or jostling patient. If transport is delayed, continue with rewarming.
- Do not attempt to increase heat production through exercise in moderate/severe hypothermia.

HYPOTHERMIA



Infectious Pathogens (COVID/SARS/MERS/EBOLA others)

Past Medical History	ASSESSMENT	Differential
• Patient with known exposure	• Fevers, Tachycardia, Tachypnea	• Febrile Illness

AIRBORNE PRECAUTIONS:

Standard PPE with fit-tested N95 mask (or PAPR respirator) and utilization of a gown or coveralls, change of gloves after every patient contact, and strict hand washing precautions. This level is utilized with Aspergillus, SARS/MERS/COVID-19, Tuberculosis, Measles (rubeola) Chickenpox (varicella-zoster), Smallpox, Influenza, disseminated herpes zoster, or Adenovirus/Rhinovirus.

CONTACT PRECAUTIONS:

Standard PPE with utilization of a gown or coveralls, change of gloves after every patient contact, and strict hand washing precautions.

This level is utilized with GI complaints, blood or body fluids, C diff, scabies, wound and skin infections, MRSA.
NOTE: Clostridium difficile (C diff) is not inactivated by alcohol-based cleaners and washing with soap and water is indicated.

DROPLET PRECAUTIONS:

Standard PPE plus a standard surgical mask for providers who accompany patients in the treatment compartment and a surgical mask or NRB O2 mask for the patient. This level is utilized when Influenza, Meningitis, Mumps, Streptococcal pharyngitis, Pertussis, Adenovirus, Rhinovirus, and undiagnosed rashes.

ALL-HAZARDS PRECAUTIONS:

Standard PPE plus airborne precautions plus contact precautions.

This level is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g., SARS, MERS-CoV, COVID-19).

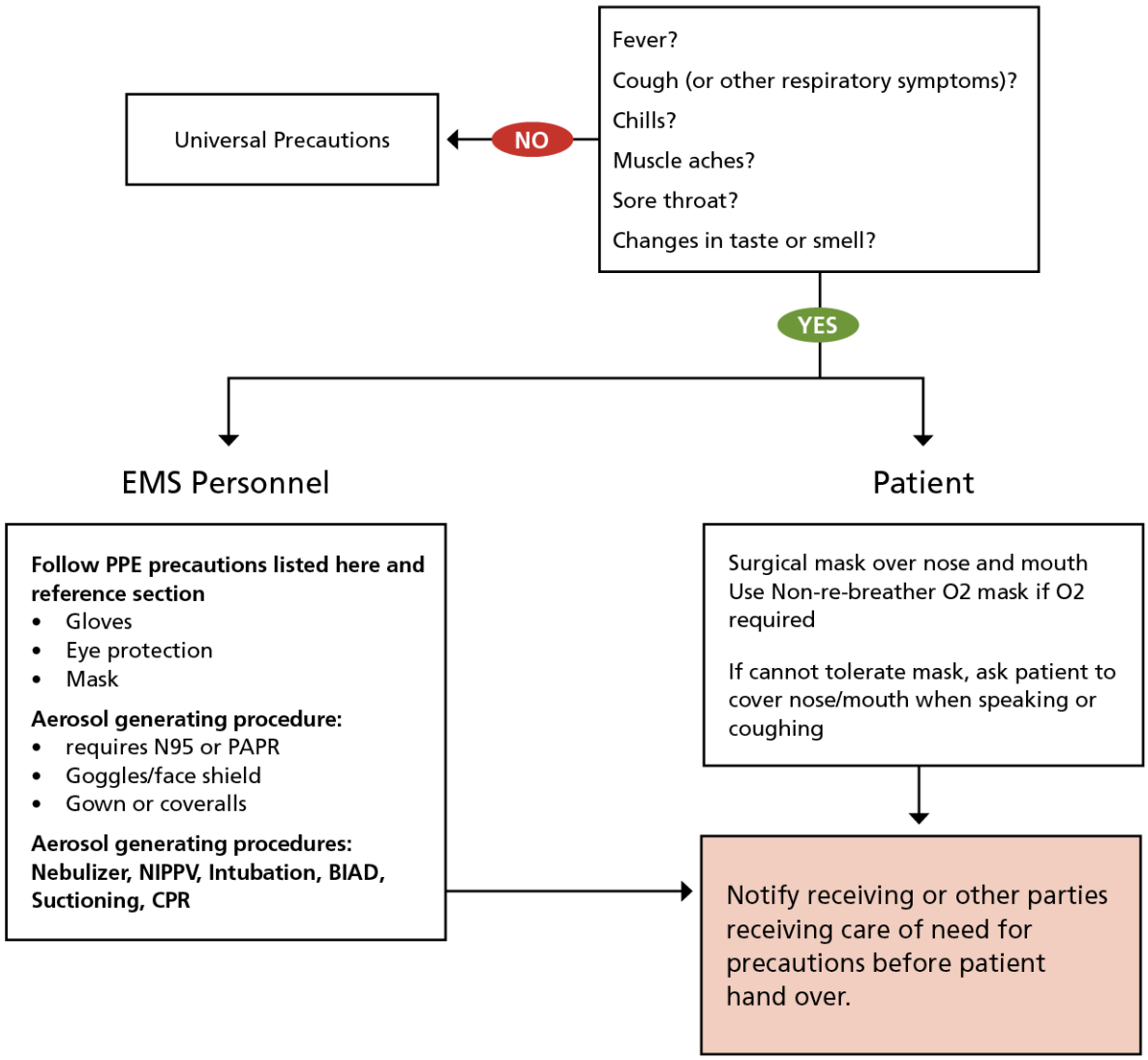
COVID-19 (NOVEL CORONAVIRUS):

For most current criteria to guide evaluations of patients under investigation:
https://www.cdc.gov/coronavirus/2019-ncov

INFECTIOUS PATHOGENS (COVID/SARS/MERS/EBOLA, OTHERS)

If nature of call/patient condition allows:

Send only one provider into scene to complete quick screen.
Stand at distance of > 6 feet and perform screening questions.



Exit to appropriate Treatment Protocol

PPE Supply chain disruptions:

- Prioritize respirators/N95 for aerosol generating procedures
- Prioritize gowns/coveralls for aerosol generating procedures
- Consider using one mask per shift if not grossly soiled or damaged

Ingestion, Poisonings, Overdoses

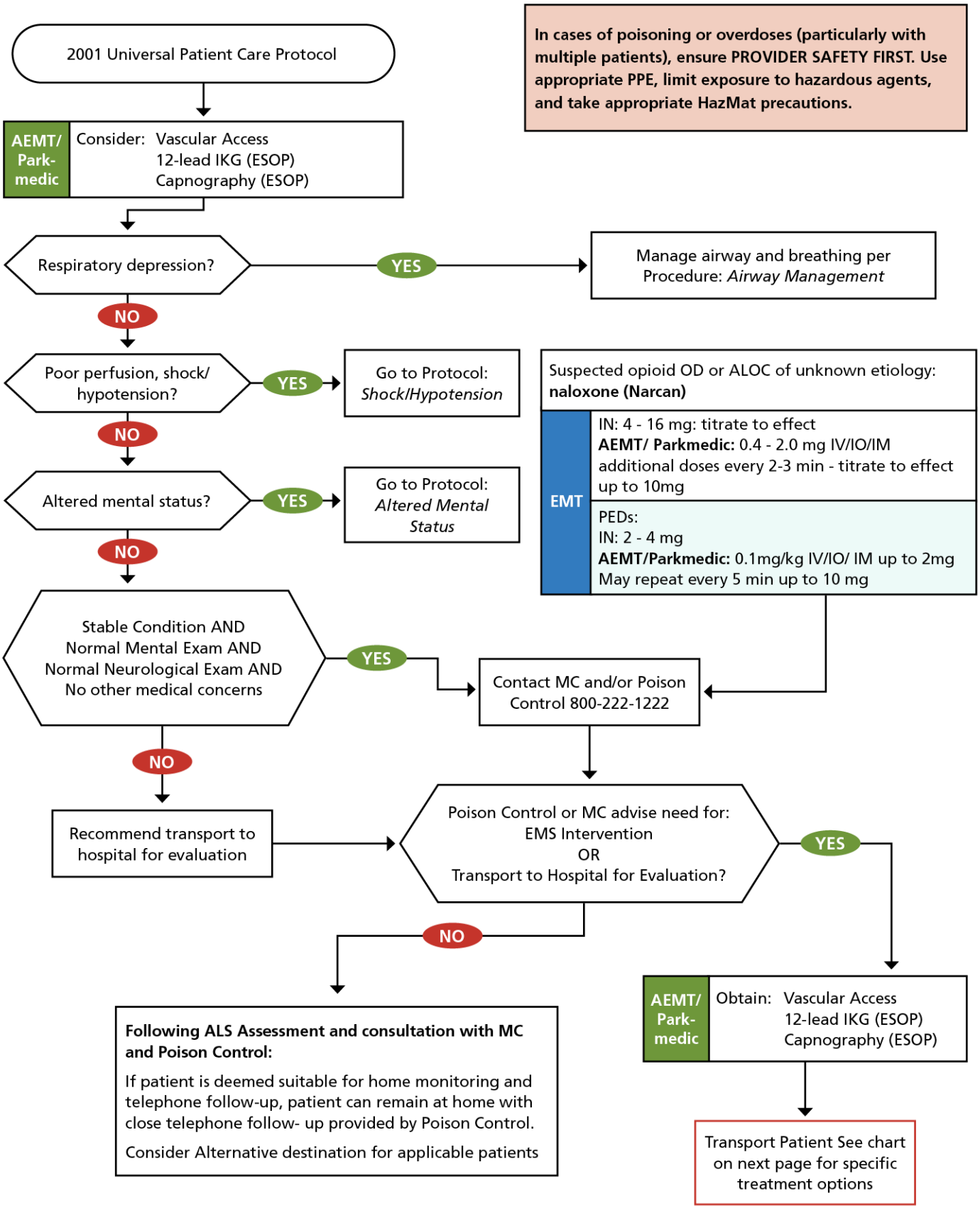
PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Ingestion or suspected ingestion of a potentially toxic substance • Substance ingested, route, quantity • Time of ingestion • Reason (suicidal note, accidental, criminal) • Available medications and/or toxins in home? • Patient given Ipecac/Vomiting?	• Airway, lung sounds • Mental status changes • Hypotension/hypertension • Decreased respiratory rate • Tachycardia, dysrhythmias • Seizures • Track Marks • Vomiting • Pupils PERRL? • Route of exposure: ingestion, inhalation, absorption, or injection.	• Tricyclic antidepressants (TCAs) such as Amitriptyline and Nortriptyline • Acetaminophen (Tylenol) • Acetylsalicylic acid (aspirin) • Depressants • Opiates • Anti-psychotics • Diphenhydramine • Stimulants • Anticholinergic • Cardiac medications (Beta blockers, calcium channel blockers, Digoxin/ Lanoxin) • Solvents, alcohols, cleaning agents • Insecticide/organophosphate poisoning • Caustic agents (agents with a high/basic pH) • etc.

SPECIAL CONSIDERATIONS

- **Be very cautious with any contamination/decontamination especially with organophosphate poisoning. Providers can rapidly become patients.**
- Consider contacting Medical Control early. Contact Poison Control if needed 800-222-1222
- Medication supplies needed for organophosphate poisoning (atropine) or beta blocker overdose (glucagon) will exceed the amount carried by a single ambulance. Arrange for additional medication ASAP.
- Do not rely on patient history of ingestion, especially in suicide attempts
- Beware of possible co-ingestions (polypharmacy). i.e., it is not uncommon for an overdose victim to mix drugs and alcohol.
- Bring patient's medications, possible intoxicants (including bottle or container) and emesis to ED with patient.
- Consider restraints if necessary for patient's and/or personnel protection. See PROCEDURE: *Restraint of Patients.*
- Organophosphates come in a liquid or powder form, are absorbed through the skin, and are found near farms or gardens. **ABSLUDGEM: A**ltered mental status, **B**reathing difficulty, bradycardia, **S**alivation, sweating, seizures, **L**acrimation, **U**rination, **D**efecation, diarrhea, **G**I upset/cramping, **E**mesis/vomiting, **M**iosis/muscle activity/twitching. Usually presents with more than one symptom. **DUMBBELS:** Diarrhea, Urination, Miosis, Bradycardia, Bronchospasm, Emesis, Lacrimation, Seizures

	Respirations	Heart Rate	BP	Temp.	Mental Status	Pupils	Other
Acetaminophen	Initially normal with possible nausea/vomiting. If not detected and treated may cause irreversible liver failure.						
Depressants	Decreased	Decreased	Decreased	Decreased		Nonspecific	
Stimulants	Decreased	Increased	Increased	Decreased		Dilated	
Anticholinergic		Increased		Increased	Altered	Dilated	
Cardiac Meds		Dysrhythmias			Altered		
Solvents					Altered		Nausea/Vomiting
Insecticides	Increased secretions	Increased or decreased				Pinpoint	Nausea/Vomiting Diarrhea

INGESTION, POISONINGS, OVERDOSES



REMEMBER: CONTACT MEDICAL CONTROL AND/OR POISON CONTROL!

Antidote/Reversal agent	Indication	Notes	Dosage
Atropine sulfate	Organophosphate/ carbamate insecticide poisoning and other cholinesterase inhibitors (e.g., warfare agents); bradycardia induced by a variety of toxins	May require large amounts in severe cholinesterase inhibitor poisoning.	ADULT: IV/IO 2 mg Repeat dose every 5 minutes prn secretions (no max dose) PEDs: IV/IO 0.04 mg/kg (Min dose 0.1 mg, Max single dose 2 mg) Repeat dose every 5 minutes prn secretions (no max dose)
Glucagon	Beta blocker/calcium channel blocker poisoning	Anticipate nausea and vomiting	ADULT: IM/IN/IV/IO 2 mg May repeat every 5 minutes for bradycardia/hypotension (shock) PEDs: IM/IN/IV/IO 0.06 mg/kg May repeat every 5 minutes for bradycardia/hypotension (shock)
naloxone/ Narcan	Opioid overdose	Use small initial dose to avoid abrupt awakening/ withdrawal	ADULT: IN 4-16 mg titrate to effect (**Parkmedic:** IM/IV/IO) 0.4-2mg Additional doses q 2-3 minutes prn ALOC (max 10mg) PEDs: IN 2-4 mg **Parkmedic:** IM/IV/IO) 0.1mg/kg Additional doses every 2-3 minutes prn ALOC (max 10mg)
Sodium bicarbonate	Sodium channel blocker (”membrane stabilizer”) toxicity & urinary alka-linization Consider in overdoses of: • Tricyclic Antidepressants • Salicylate (aspirin) • Seizures • Diphenhydramine • Any wide-complex tachycardia	IV bolus dosing for reversal of sodium channel blocker toxicity; monitor alkalemia	ADULT: IV/IO 1 mEq/kg (max 50 mEq) SIVP, consider serial ECGs to titrate to effect (narrowing of QRS) PEDs: Contact MC

2235

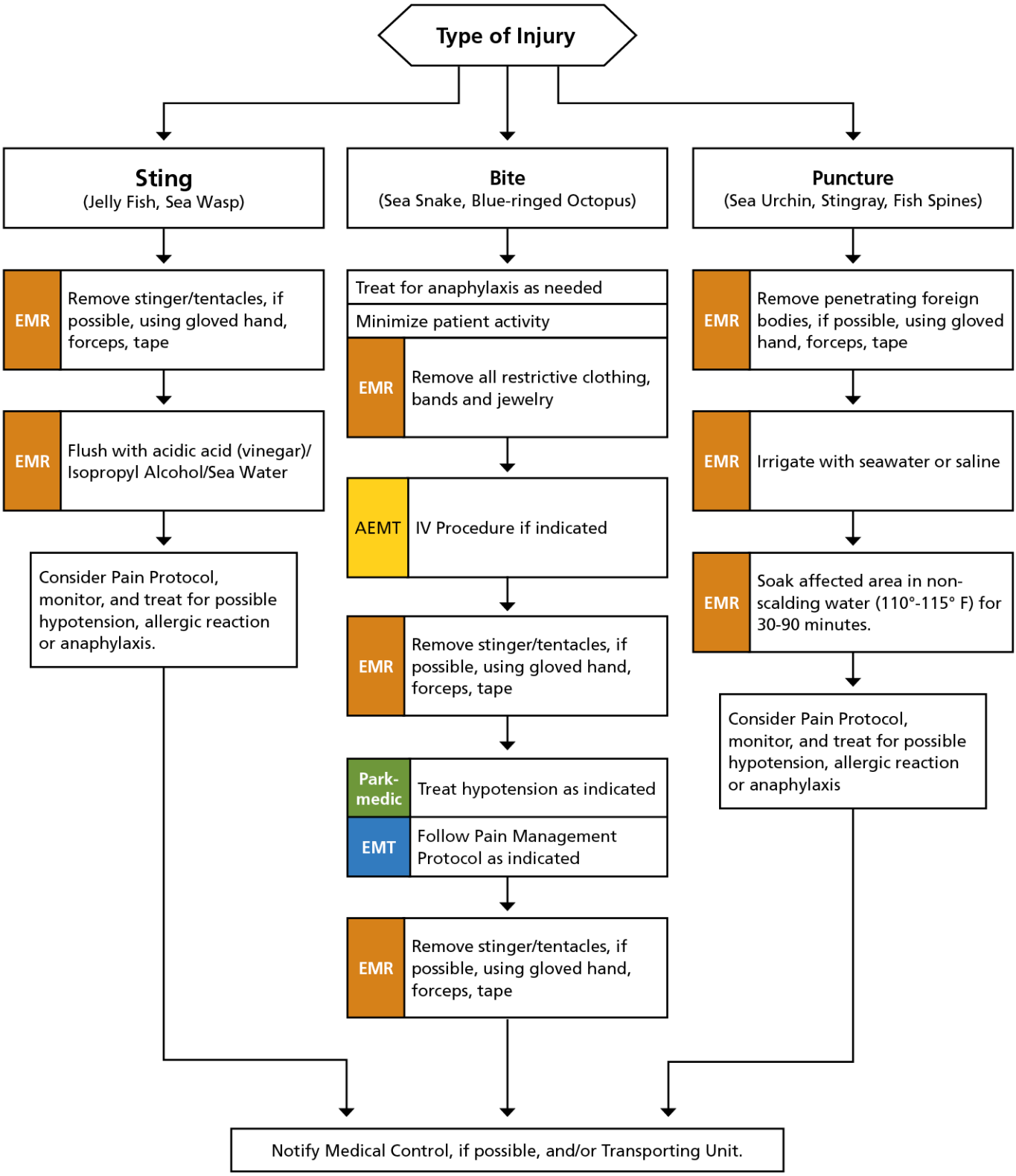
Marine Envenomations

Past Medical History	ASSESSMENT	Differential
• Patient is in marine environment or exposed to exotic aquarium animal • Respiratory distress or ventilatory failure	• Respiratory status, may have ventilatory failure • Nausea, vomiting • Progressive mental status changes including confusion • Paralysis • Ascending limb edema	• Anaphylaxis • Soft tissue infection • Nonmarine envenomation

SPECIAL CONSIDERATIONS:

- Urgent evacuation should be done if evidence of severe envenomation (cardiovascular collapse, anaphylaxis, paralysis, ascending edema of limb).
- Envenomation results from stings by jellyfish, fire corals, sting rays, sea urchins, bristle worms, fish spines, sea snakes, etc.
- Sea Snake venom is 2-10 times more potent than cobra venom, but only about 25% of those bitten develop symptoms due to snake's inefficient delivery system and small mouth
- Sea Snakes may have a latent period of 10 minutes to several hours between the bite and onset of symptoms. May initially present with mental status changes progressing to nausea, vomiting, paralysis—leading to respiratory distress/failure
- Blue Ringed octopus bites are painless and may go unnoticed. Patient may become paralyzed with respiratory distress.
- Symptoms are usually rapid in onset and extremely variable in severity.
- HOT, but tolerable seawater/saline (at least 110° F will deactivate the proteins) to wash the wounds out.
- Check on proper application of compression wrap
- Elevate to level of heart
- Application of tap water (hypotonic fluids) may trigger additional injection of toxins into skin stung by marine animals. Irrigation with ocean water or 3% saline is preferred, though 0.9% (Normal Saline) is acceptable.
- Venom (TTX) from the Blue-Ringed octopus often requires respiratory support due to diaphragmatic paralysis.

MARINE ENVENOMATIONS



2240

NAAK - MARK 1 Kit: Nerve Agent Exposure

Past Medical History	ASSESSMENT	Differential
• Exposure to Nerve Agent • Note that multiple patients with pinpoint pupils suggest nerve agent exposure	• Miosis (pinpoint pupils) • Copious secretions • Bronchospasm • Chest tightness • Respiratory failure • Muscle twitching • Flaccid paralysis • seizures • Confusion • Coma • Nausea, vomiting, cramps, diarrhea	• Minor exposure may mimic URI • Minor exposure may produce symptoms of "narrowing vision" • GI symptoms may be only symptoms, can by AGE • Opioid abuse or overdose

SPECIAL CONSIDERATIONS

- Nerve Agents are the most toxic of known chemical warfare agents. They are chemically similar to organophosphate pesticides.
- Nerve agents can cause loss of consciousness and convulsions within seconds and death from respiratory failure within minutes of exposure.
- Nerve Agent is a highly toxic systemic poison that is absorbed well by inhalation and through the skin. Victims exposed only to nerve agent vapor do not pose secondary contamination risks to rescuers, but do not attempt resuscitation without a barrier. Victims whose clothing or skin is contaminated with liquid nerve agent can secondarily contaminate response personnel by direct contact or through off-gassing vapor. Avoid dermal contact with nerve agent contaminated victims or with gastric contents of victims who may have ingested nerve agent-containing materials.

Volatile Nerve Agents (vapor)

- Vapor is readily absorbed by inhalation and ocular contact, producing rapid local and systemic effects.
- DO NOT attempt resuscitation without a barrier.

Low Volatility Agents (liquid)

- Liquid nerve agents are readily absorbed through the skin, effects may be delayed for several minutes

PPE Required: LEVEL A:
https://chemm.hhs.gov/na_prehospital_mmg.htm#top

TRIAGE FOR NERVE AGENT CASUALTIES

Immediate (1)	Effects: Unconscious, talking but not walking, moderate to severe effects in two or more systems (e.g., respiratory, GI, cardiac arrest, muscular, CNS)
	Clinical Signs: seizing or postictal, severe respiratory distress, recent cardiac arrest
Delayed (2)	Effects: recovering from agent exposure or antidote
	Clinical Signs: diminished secretions, improving respiration
Minimal (3)	Effects: walking and talking
	Clinical Signs: pinpoint pupils, runny nose, and mild to moderate difficulty breathing
Expectant (4) (limited resources)	Effects: Unconscious
	Clinical Signs: Cardiac/respiratory arrest of long duration

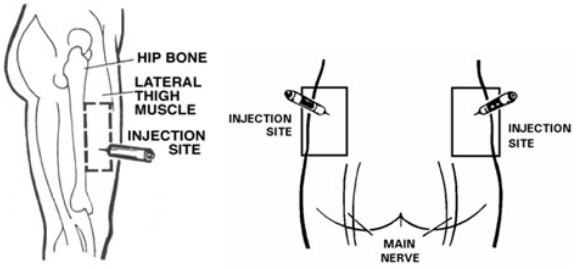
NAAK: nerve agent antidote kit

MARK 1 KIT CONTAINS:

Atropine Autoinjector; 2mg in 0.7ml and
Pralidoxime (2-PAM) Autoinjector 600mg in 2ml

INJECTION SITE SELECTION:

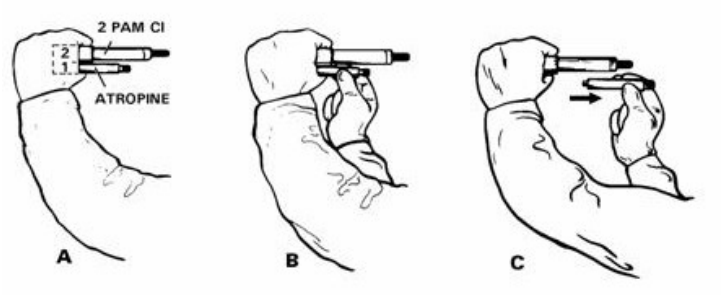
1. Injectors must be given in a large muscle, with the most common site being the lateral thigh.



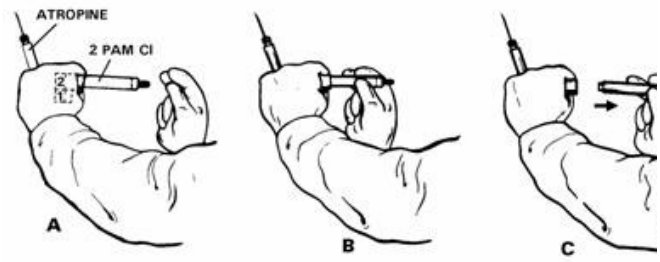
ANTIDOTE ADMINISTRATION:

Administer up to **3** Mark 1 kits as needed.

1. Remove the kit from protective pouch
2. Grasp the **atropine** autoinjector (smaller of the two) and remove from slot 1 of plastic clip
   A. The yellow safety cap remains in the clip and the injector is now **armed**.



3. Grasp the unit and position the green tip into the victim's injection site, apply firm even pressure to the injection site (DO NOT JAB), hold in place for 10 seconds. Carefully remove the device and dispose of properly (sharp is exposed)
4. Remove the **2-PAM** injector from slot 2 of the clip and administer the same way.



Pain Management

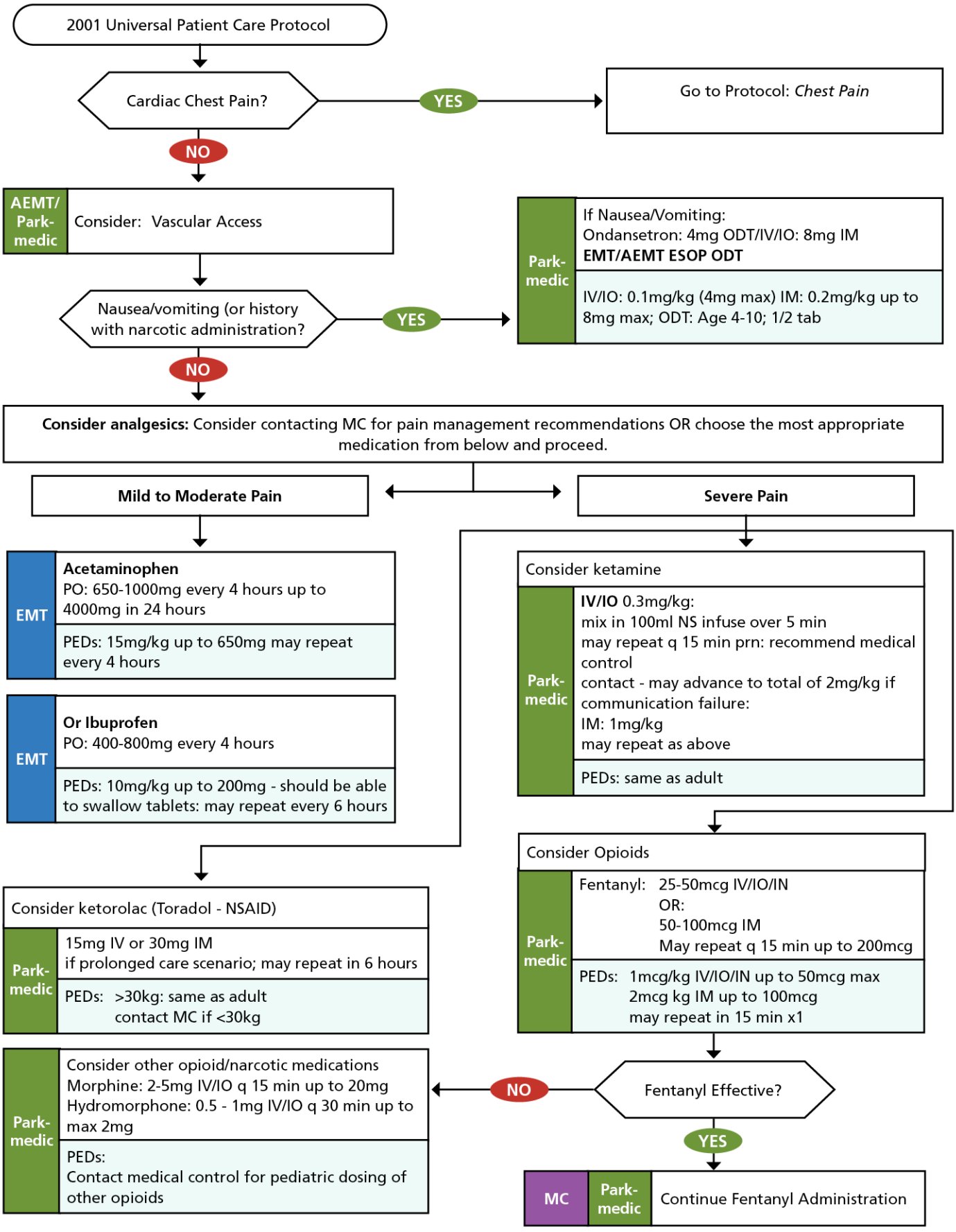
PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Age • Location • Duration • Severity (1-10) • Medications • Drug allergies	• Physical exam: Inspect, Palpate, Auscultate • Onset • Palliative/Provocative factors • Quality (Feels like?) • Radiates/Refers • Severity (0-10) • Time (is this the first time?)	• Reference specific protocol • Musculoskeletal • Visceral (abdominal) • Cardiac • Pleural/Respiratory • Neurogenic • Renal (colic)

SPECIAL CONSIDERATIONS

- Pain severity (0-10) should be recorded at initial contact as well as before and after medication administration.

- A full set of vital signs and mental status should be recorded 3-5 minutes before and after pain medication administration.
- To administer opioids, SBP > 100 or appropriate for age and normal mental status of patient.
- Fentanyl and morphine can cause respiratory depression that is reversible with naloxone. Respiratory depression is exacerbated by underlying lung diseases and use of other respiratory depressant drugs so it should be used with caution with patients with known asthma or COPD. Fentanyl and morphine should be used cautiously at altitudes >8,000 ft. due to possible respiratory depression.
- Fentanyl and morphine should be used with caution with patients who have multi-system trauma. Ketamine is preferred.
- If administered rapidly in very large doses, fentanyl can cause muscle spasm and chest wall rigidity. The only reliable treatment for this is neuromuscular blockade.
- The action of fentanyl is prolonged and its elimination slower in the elderly. Smaller maintenance doses are advisable.
- Fentanyl must be used cautiously in patients that have already received morphine.
- For IV administration, ketamine must be diluted with equal amount of sterile water or saline. Dilution in a 100ml bag and given over 5+ minutes is preferred administration route for pain management use of ketamine
- Ketamine provides strong analgesia with minimal risk for respiratory depression or hypotension. Ketamine may be co-administered with narcotics or midazolam in some patients (contact MC).
- Ketorolac is a potent NSAID and has been shown to be a safe and effective in patients with kidney stones (renal colic). Do not use ketorolac if you suspect internal bleeding, renal failure (CKD stage 4), or in patients with acute coronary syndrome (cardiac chest pain, MI). Be cautious in the elderly as many have comorbidities.
- See individual medication pages and protocols for specific pain control considerations.
- Individual units may have different opioid or pain medication options, such as hydromorphone.

PAIN MANAGEMENT



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Respiratory Distress Overview

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Asthma; COPD—chronic bronchitis, emphysema, congestive heart failure • Home treatment (oxygen, nebulizer, CPAP) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation • Pulmonary embolism risk factors: recent surgery, extended travel/ immobility, cigarette smoking + oral contraceptive use, prior history of DVT or PE	• Shortness of breath • Pursed lip breathing • Tripod positioning • Decreased ability to speak • Cyanosis • Increased respiratory rate and effort, diaphoresis • Wheezing, rhonchi, rales, stridor, silent chest • Use of accessory muscles • Fever, cough • Tachycardia • JVD, tracheal deviation • Drooling • Universal choke sign • Peripheral edema	• Anemia • Asthma • Anaphylaxis • Aspiration/FBAO • Cardiac (MI or CHF) • COPD • Croup • Cystic fibrosis • Early Shock • Emphysema, Bronchitis • Epiglottitis • Diabetic ketoacidosis • Hyperthyroidism • Hyperventilation/anxiety attack • Inhaled toxin (CO, etc.) • Noncardiogenic pulmonary edema (HAPE, ARDS) • Pericardial tamponade • Pleural effusion • Pneumonia • Pneumothorax • Pulmonary embolus

In every Respiratory Distress incident, the provider should always consider the following:

- Protect the airway and assist in ventilations if needed
- Administer high flow oxygen if moderate to severe distress or altered mental status
- Assess all vitals including temperature, lung sounds, mental status, pulse oximetry, capnography
- Contact MC prior to administering epinephrine in patients who are over 50 years of age, have a history of cardiac disease, or if the patient's heart rate is over 150 bpm. Epinephrine may precipitate cardiac ischemia.
- A 12-lead ECG should be obtained in high-risk patients if circumstances allow.
- Absence of lung sounds, or significantly decreased lung sounds may be a sign of impending respiratory arrest ("silent chest").
- Pulse oximetry readings can be inaccurate in cases of carbon monoxide poisoning or if extremities are poorly perfused.
- Consider nerve agent/organophosphate exposure
- Always place the patient in a position of comfort
- If at any time the patient goes into respiratory arrest, follow the PROTOCOL: *Airway Management.*
- If the patient deteriorates to cardiac arrest, follow the PROTOCAL: *Cardiac Arrest.*

Classify the Type of Respiratory Distress and go to appropriate Protocol				
Provisional Diagnosis	**Protocol**	**History**	**Sputum**	**Physical Exam**
FBAO (Foreign body airway obstruction such as food, toy)	*PROCEDURE: Foreign Body Airway Obstruction*	Onset during meal or play	None	Grabbing neck, unable to speak, drooling
Anaphylaxis Croup Epiglottitis	*Upper Airway Obstruction - Nonmechanical*	Known Allergy and exposure. Fever, drooling, sore throat.	None	Inspiratory stridor, anxious, leaning forward to breathe, drooling.
Asthma and/or COPD	*Bronchospasm*	PMH: asthma, emphysema, bronchitis, heavy smoking Meds: home oxygen, albuterol, prednisone	If present: Thick may be any color	Prolonged expiratory phase with wheezes, poor air movement, little to no pitting edema. Pursed lip breathing in emphysema.
CHF Cardiogenic Pulmonary Edema	*Cardiogenic Pulmonary Edema/CHF*	PMH: CHF, MI, Angina, Paroxysmal Nocturnal Dyspnea, Orthopnea. Meds: Digoxin, Nitro-glycerin, BP meds	May be watery/ foamy white or pink/blood-tinged	Wheezes or rales (crackles), pitting edema in legs, distended neck veins. Typically have very elevated BP
Pneumonia	*Consider Airway Management and General Illness, Fever*	Any age. Progressive SOB with cough, fever, chills, sputum. May be on antibiotics	Thick, any color	Asymmetric or localized rales (crackles), may have mild wheezing, no peripheral edema.
Pulmonary Embolus	*Consider Airway Management*	Sudden onset SOB	None to Bloody	Tachypneic, low SpO2 that does not improve with oxygen administration Tachycardia common

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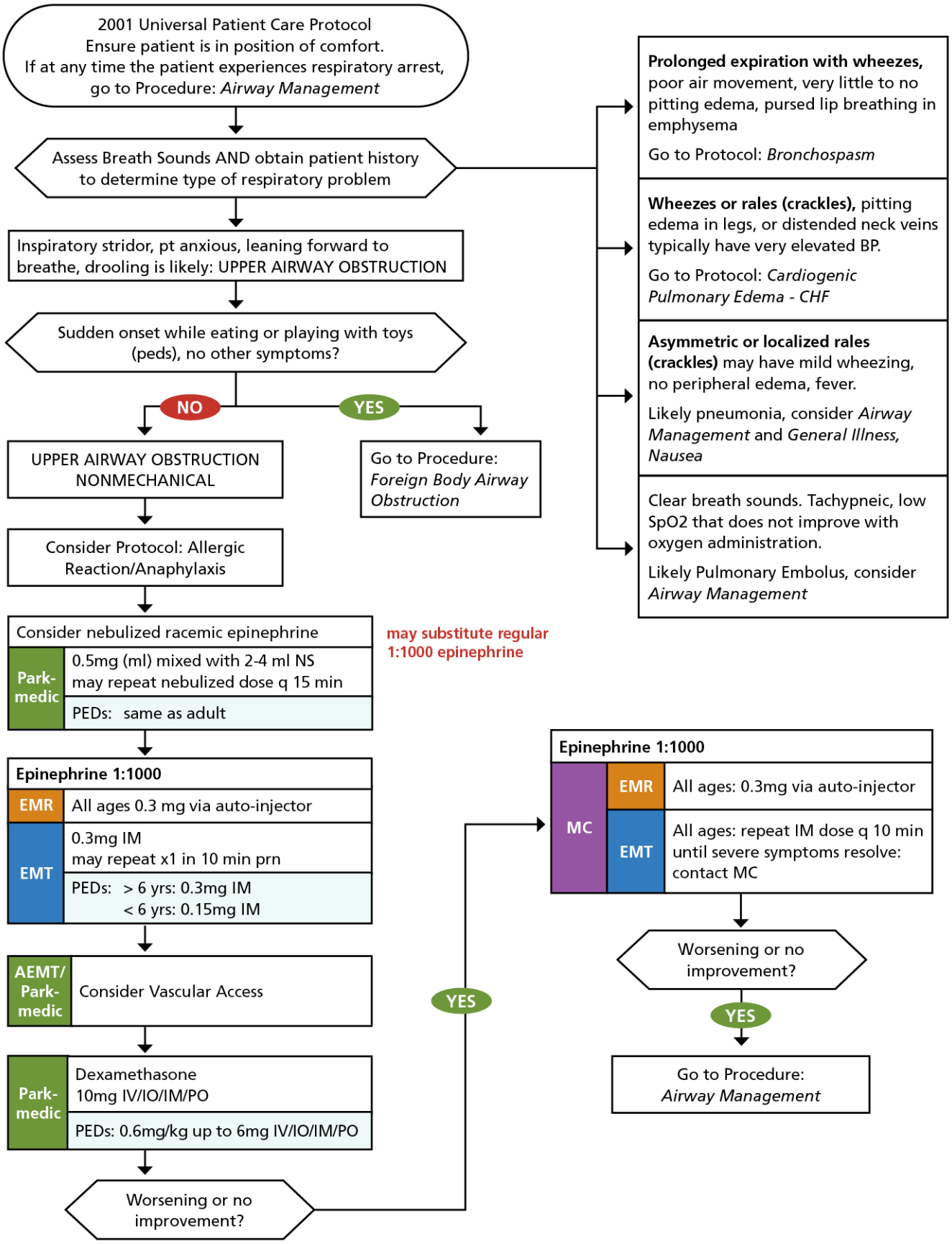
Respiratory Distress: Upper Airway Obstruction Non-mechanical

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Croup or Epiglottitis: Fever, drooling, sore throat • Anaphylaxis: Known allergy + exposure	• Ability to speak • Temperature • Mental status • Croup or Epiglottitis: Inspiratory stridor, anxious, leaning forward to breathe, drooling • Anaphylaxis: Airway edema, chest tightness, low BP. • Look for urticaria	• Asthma • Anaphylaxis • Diabetic ketoacidosis • Early Shock • Emphysema, Bronchitis, croup/epiglottitis • Pneumonia • Pulmonary embolus • Pneumothorax • Pericardial tamponade • Hyperventilation/anxiety attack • Inhaled toxin (CO, etc.), drug abuse • Hyperthyroidism • Anemia

SPECIAL CONSIDERATIONS

- Pulse oximetry should be monitored continuously if initial saturation is less than 96% or if there is a decline in patient's status despite normal pulse oximetry readings.
- Absence of lung sounds, or significantly decreased lung sounds may be a sign of impending respiratory arrest.
- Pulse oximetry readings can be inaccurate in cases of Carbon Monoxide poisoning.
- Interruptions to patient ventilations should not exceed 30 seconds in duration.
- Consider air transport if febrile child, severe distress, or unstable vitals.
- **Medical Control must be contacted before patient is released.**

RESPIRATORY DISTRESS: UPPER AIRWAY OBSTRUCTION NON-MECHANICAL



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Respiratory Distress: Bronchospasm/Asthma

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Asthma • COPD—chronic bronchitis, emphysema • Congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure • Smoke inhalation • history of Meth/Cocaine use • History of prior MI, longstanding hypertension	• Prolonged expiratory phase with wheezes, poor air movement • Rales (crackles) or rhonchi may be present • Pursed lip breathing (COPD) • Increased respiratory rate and effort • Diaphoresis • Use of accessory muscles, retractions • Tachycardia • JVD, tracheal deviation • Peripheral edema	• Asthma • Diabetic ketoacidosis • Early Shock • Emphysema, Bronchitis, croup/epiglottitis • Pneumothorax • Hyperventilation/anxiety attack • Inhaled toxin (CO, etc.), drug abuse • Hyperthyroidism • Anemia • Wildlife capture drugs

SPECIAL CONSIDERATIONS

- Pulse oximetry should be monitored continuously
- Contact MC prior to administering epinephrine in patients who have a history of angina or MI. Epinephrine may precipitate cardiac ischemia. A 12-lead ECG should be obtained on patients if circumstances allow.
- Absence of lung sounds, or significantly decreased lung sounds may be a sign of impending respiratory arrest.
- Pulse oximetry readings can be inaccurate in cases of carbon monoxide poisoning.
- Assume patients with SBP<90 with severe CHF in respiratory distress are in cardiogenic shock.
- If poisoned by organophosphates, see PROTOCOL: *Ingestion, Poisonings and Overdoses.*
- COPD patients are less likely to benefit from epinephrine compared to asthmatics.
- Albuterol is contraindicated in active heart disease. There is no maximum dose for young asthmatics.
- Use caution with oral medications in respiratory distress patients.
- **Medical Control must be contacted before patient is released.**

RESPIRATORY DISTRESS - BRONCHOSPASM

2001 Universal Patient Care Protocol
Ensure patient is in position of comfort.
If at any time the patient experiences respiratory arrest, go to Procedure: *Airway Management*

Assess Breath Sounds AND obtain patient history to determine type of respiratory problem

- Inspiratory stridor, grabbing neck, unable to speak, drooling (choking)
  Go to Protocol: *Foreign Body Airway Obstruction*
- Inspiratory stridor, anxious, leaning forward to breathe, drooling
  Go to Protocol: Upper *Airway Obstruction - Nonmechanical*
- **Wheezes or rales (crackles),** pitting edema in legs, distended neck veins, Typically have very elevated BP.
  Go to Protocol: *Cardiogenic Pulmonary Edema - CHF*
- **Asymmetric or localized rales (crackles),** may have mild wheezing, no peripheral edema, fever.
  Likely pneumonia, consider *Airway Management and General Illness,* Nausea
- Clear breath sounds. Tachypneic, low SpO2 that does not improve with oxygen administration.
  Likely Pulmonary Embolus, consider *Airway Management*

Prolonged expiratory phase with wheezes, poor air movement, little to no pitting edema OR pursed-lip breathing in emphysema (COPD) is likely: BRONCHOSPASM

AEMT/ Park-medic
Albuterol 2.5mg in 3ml NS nebulized
Consider:
Vascular Access
CPAP (Parkmedic) For severe COPD: may need to go to PROCEDURE: CPAP first

Patient improved?

NO

AEMT/ Park-medic
Consider: albuterol 2.5mg in 3ml NS WITH 3mg ipratropium bromide mixed and AEMT nebulized

Patient improved?

YES

AEMT/ Park-medic
Repeat albuterol 2.5 mg in 3ml NS nebulized as needed for recurrent symptoms
Consider dexamethasone (Parkmedic)

NO

Epinephrine 1:1000

EMR	All ages: 0.3 mg via auto-injector
EMT	Epinephrine 0.3mg IM repeat x1 in 10 min prn
EMT	PEDs: > 6 yrs: 0.3mg IM > 6 yrs: 0.15mg IM repeat x1 in 10 min prn

Park-medic
Dexamethasone 10mg IV/IO/IM/PO
PEDs: 0.6mg/kg up to 6mg IV/IO/IM/PO

Worsening or improvement?

YES

Consider racemic epinephrine or 1:1000 epinephrine

Park-medic
0.5mg mixed with 2-4ml NS nebulized
May repeat q 10 min x2
PEDs: same as adult Epinephrine 1:1000

Epinephrine 1:1000

MC / EMR	Consider magnesium sulfate 2gml IV
MC / EMT	All ages: repeat IM dose given prior until symptoms improve

MC / Park-medic	Consider magnesium sulfate 2gm IV over 20 minutes.
	For <14 years old, see Drug Page for reference.

Respiratory Distress: Cardiogenic Pulmonary Edema/CHF

PAST MEDICAL HISTORY	PHYSICAL FINDINGS	DIFFERENTIAL
• Asthma; COPD—chronic bronchitis, emphysema, congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation	• Breath sounds = Wheezes or rales (crackles) • Mental status • Cyanosis • Inspiratory/expiratory ratio • Increased respiratory rate and effort, diaphoresis • Use of accessory muscles, retractions • Chest Pain • JVD, tracheal deviation • Peripheral edema	• Diabetic ketoacidosis • Early Shock • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial tamponade • Inhaled toxin (CO, etc.), drug abuse • Hyperthyroidism • Anemia

SPECIAL CONSIDERATIONS

- Avoid nitroglycerin in any patient who has used sildenafil (Viagra), vardenafil (Levitra), or tadalafi (Cialis) in the past 24 hours due to possible severe hypotension.
- If patient has taken nitroglycerin without relief, consider the potency of the medication
- Consider myocardial infarction in all patients
- Diabetics and geriatric patients often have atypical pain or only generalized complaints
- Careful monitoring of level of consciousness, BP and respiratory status with above interventions is essential
- Allow patients to be in their position of comfort to maximize their breathing effort
- **Medical Control must be contacted before patient is released.**

RESPIRATORY DISTRESS: CARDIOGENIC PULMONARY EDEMA/CHF

2001 Universal Patient Care Protocol
Ensure patient is in position of comfort.
If at any time the patient experiences respiratory arrest, go to Procedure: *Airway Management*

Assess Breath Sounds AND obtain patient history to determine type of respiratory problem

- Inspiratory stridor, grabbing neck, unable to speak, drooling (choking),sudden onset
  Go to Protocol: *Foreign Body Airway Obstruction*
- Inspiratory stridor, anxious, leaning forward to breathe, drooling
  Go to Protocol: Upper *Airway Obstruction - Nonmechanical*
- **Prolonged expiration with wheezes,** poor air movement, very little to no pitting edema, pursed lip breathing in emphysema
  Go to Protocol: *Bronchospasm*
- **Asymmetric or localized rales (crackles),** may have mild wheezing, no peripheral edema, fever.
  Likely pneumonia, consider *Airway Management and General Illness,* Nausea
- Clear breath sounds. Tachypneic, low SpO2 that does not improve with oxygen administration.
  Likely Pulmonary Embolus, consider *Airway Management*

Wheezes or rales (crackles), pitting edema in legs, distended neck veins. Typically have very elevated BP is likely: CARDIOGENIC PULMONARY EDEMA /CHF

AEMT/Park-medic: Consider: Vascular Access
12-lead ECG (ESOP)
CPAP (ESOP) Admin. Nitro prior to placing

Nitroglycerin SL

MC	EMT	**May ONLY assist with patient's own NTG**
MC	AEMT/Park-medic	0.4mg SL if SBP >100 mmHg *recommend that tablets be administered at 5-minute intervals - not all at once.* *Assess blood pressure between each dose.*

Symptoms relieved by SL nitro?

YES → **Park-medic:** As long as SBP >100; Consider NTG paste 1-inch applied to chest wall

NO

Aspirin

MC	EMR / Park-medic	324mg PO - chewed

Park-medic:
If nausea and vomiting - Ondansetron 4mg IV/IO/ODT; 8mg IM
EMT/AEMT ESOP ODT
PEDs: IV/IO: 0.1mg/kg (4mg max)
ODT: Age 4-10; 1/2 tab
IM: 0.2mg/kg up to 8mg max
Remove CPAP if vomiting

If hypotensive: Fluid and BP management - if oxygen requirement is >6L use caution with fluids and consider push dose epi

MC	AEMT/Park-medic	*If SBP <100, NS bolus: 250ml* *May repeat x1 (total 500ml) if no signs of respiratory distress*
MC	P	If SBP <80, or <100 after 500ml Bolus, provide push dose epinephrine 1:100,000 10-20mcg or 1-2ml of 1:100,000 epinephrine q 3-5 min prn for SBP<90 or MAP<65

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Scuba/Dive Injuries and Drowning

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Submersion in water regardless of depth • Possible history of trauma i.e., diving board • Duration of immersion • Temperature of water • Fresh/Salt water	• Unresponsiveness • Mental status changes • Decreased or absent vital signs • Vomiting • Coughing • Bloody froth from airway • Convulsions	• Trauma • Preexisting medical problem • Pressure injury (diving) • Barotrauma • Decompression sickness • Arterial Gas Embolism

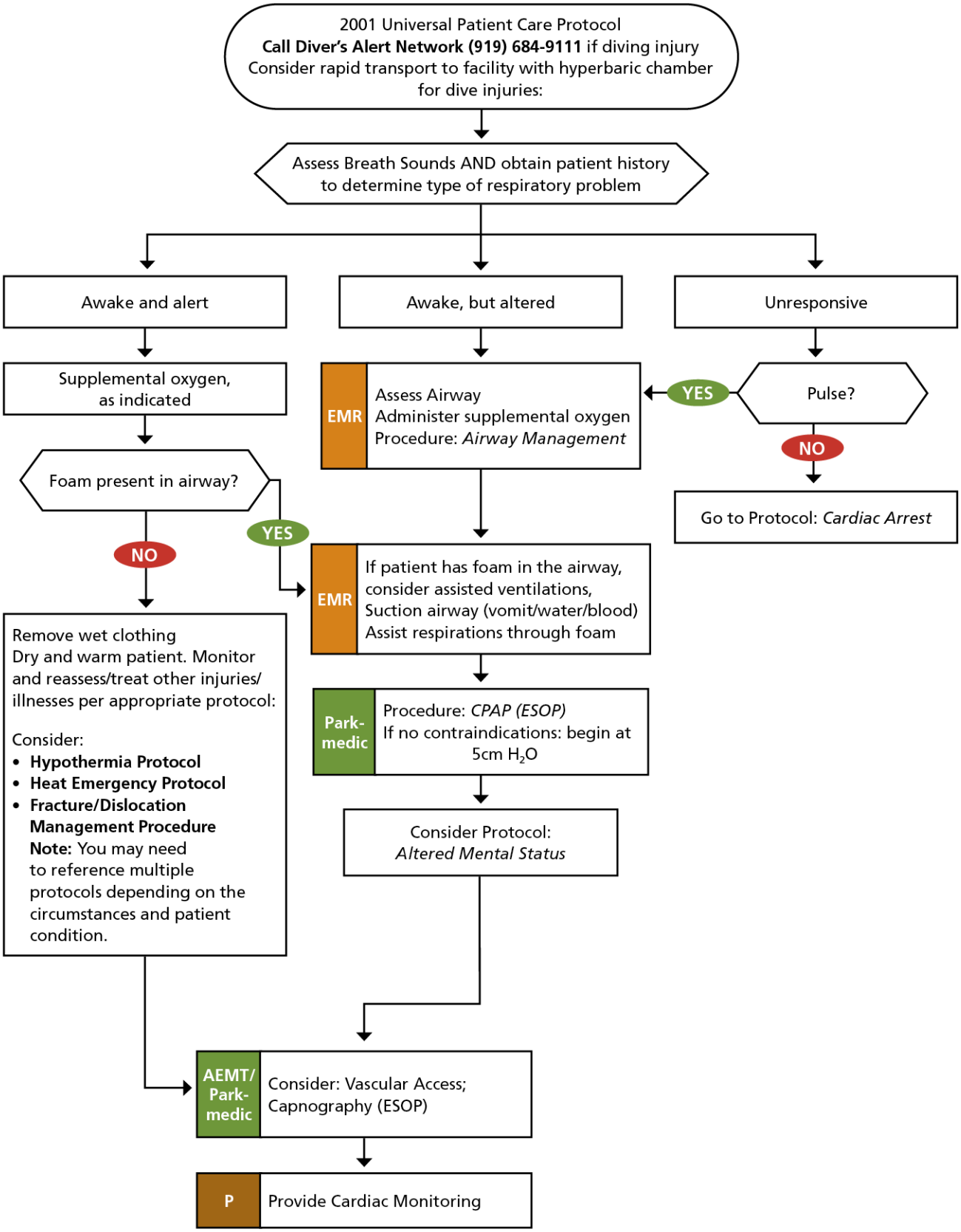
SPECIAL CONSIDERATIONS

- Due to potential worsening over the next few hours, all near-drowning, and dive injury patients should be transported to hospital for observation and evaluation. Life threatening pulmonary edema can develop hours after the initial incident.
- In the appropriate settings, patients should be resuscitated and warmed (chances of survival after a cardiac arrest are increased in cold water)—[NEARLY] NO PATIENT IS DEAD UNTIL WARM AND DEAD.
- Drowning is a leading cause of death among would be rescuers
- Allow appropriately trained and certified rescuers to remove patient from areas of danger
- Make note of possible pressure injuries (decompression/barotrauma)
- Other medical conditions may cause submersion such as cardiac arrest, seizures, hypothermia, hypoglycemia, intoxication, trauma.

SPECIAL CONSIDERATIONS FOR SCUBA AND DIVE RELATED INJURIES:

- CALL DIVERS ALERT NETWORK 24-HR EMERGENCY LINE (919) 684-9111 for consultation.
- Choose the closest ER if stabilization of life-threatening injuries is required before transport to hyperbaric chamber.
- Send all equipment, diving plan and medical history with diver if possible.
- A careful neurologic exam is key in identifying subtle findings caused by decompression sickness/illness. Check CSMs, vital signs including mental status, coordination, pain, urination, and nausea every 60 minutes.
- Transport SCUBA/dive patients in the left lateral recumbent position in case of an air embolism. Assess for delayed symptoms of decompression sickness: joint/muscle/extremity pain, numbness/tingling, dizziness, coughing spasms, fatigue, paralysis/weakness, collapse/unconsciousness, shortness of breath, or skin itch/rash

SCUBA/DIVE INJURIES AND DROWNING



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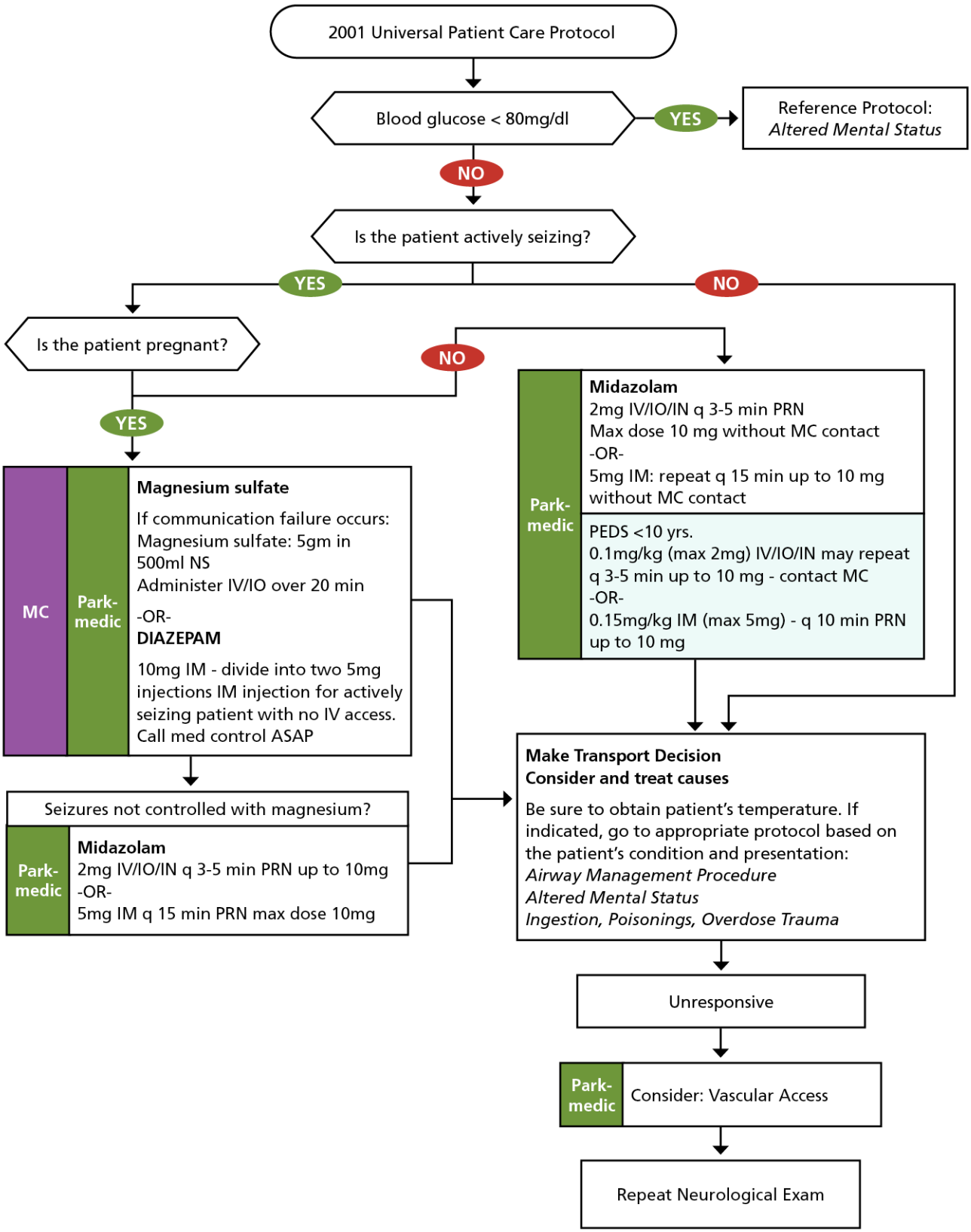
Seizure

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Reported/witnesses seizure activity • Duration and character of convulsions • Medical alert tag information • Seizure medications • History of trauma • History of diabetes • History of pregnancy • History of alcohol withdrawal	• Temperature • Decreased mental status • Sleepiness • Incontinence • Observed seizure activity • Evidence of trauma • Unconsciousness • Altered facial symmetry • Tonic/clonic activity	• CNS (Head) trauma • Hypoxia • Intracranial hemorrhage or stroke • Cardiac dysrhythmia • Electrolyte abnormality (Na, Ca, Mg) • Eclampsia • Metabolic, hepatic or renal failure • Drugs, medications, noncompliance • Infection/Fever • Alcohol withdrawal • Hyperthermia • Hypoglycemia • Tumor

SPECIAL CONSIDERATIONS

- **Status epilepticus is defined as a seizure lasting more than five minutes or two or more successive seizures without a period of consciousness or recovery.** This is a true emergency requiring rapid airway control, treatment and transport.
- **Generalized seizures** (grand mal) are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures** (petit mal) effect only a part of the body and are not usually associated with incontinence.
- Be prepared for airway problems and continued seizures. If patient is not placed on backboard/spinal immobilization, place in lateral decubitus position.
- For any seizure in a **pregnant** patient, follow the PROTOCOL: *Vaginal/Obstetric/GYN Emergencies*.
- If unable to gain IV access, consider the use of Intranasal midazolam. See PROCEDURE: *Mucosal Atomizer* for additional information.
- Patients who are not convulsing at the time of arrival should still receive a thorough assessment and evaluation. Some patients may refuse transport.
- First protect patient from complications of the seizure, then address the cause of seizure if cause is found.
- Patients without seizure history should be strongly encouraged to consent to ambulance transport for care.

SEIZURE


2001 Universal Patient Care Protocol
Blood glucose < 80mg/dl
YES
Reference Protocol:
Altered Mental Status
NO
Is the patient actively seizing?
YES
NO
Is the patient pregnant?
NO
YES
MC
Park-medic
Magnesium sulfate
If communication failure occurs:
Magnesium sulfate: 5gm in 500ml NS
Administer IV/IO over 20 min
-OR-
DIAZEPAM
10mg IM - divide into two 5mg injections IM injection for actively seizing patient with no IV access.
Call med control ASAP
Seizures not controlled with magnesium?
Park-medic
Midazolam
2mg IV/IO/IN q 3-5 min PRN up to 10mg
-OR-
5mg IM q 15 min PRN max dose 10mg
Park-medic
Midazolam
2mg IV/IO/IN q 3-5 min PRN
Max dose 10 mg without MC contact
-OR-
5mg IM: repeat q 15 min up to 10 mg without MC contact
PEDS <10 yrs.
0.1mg/kg (max 2mg) IV/IO/IN may repeat q 3-5 min up to 10 mg - contact MC
-OR-
0.15mg/kg IM (max 5mg) - q 10 min PRN up to 10 mg
Make Transport Decision
Consider and treat causes
Be sure to obtain patient's temperature. If indicated, go to appropriate protocol based on the patient's condition and presentation:
Airway Management Procedure
Altered Mental Status
Ingestion, Poisonings, Overdose Trauma
Unresponsive
Park-medic
Consider: Vascular Access
Repeat Neurological Exam

2285

Shock/Hypotension

PAST MEDICAL HISTORY	PHYSICAL FINDINGS	DIFFERENTIAL
• Blood loss—vaginal or gastrointestinal bleeding, AAA, ectopic pregnancy, trauma, internal bleeding • Fluid loss—vomiting, diarrhea, fever, burns • Infection • Cardiac ischemia (MI, CHF) • Allergic reaction • Pregnancy • History of dehydration	• Altered Mental Status • Restlessness, confusion • Anxiety • Weakness, dizziness • Weak, rapid pulse • Pale, cool, clammy skin • Delayed capillary refill • Hypotension • Coffee-ground emesis • Tarry stools • JVD • Edema • Tachypnea • Shortness of breath • Oliguria (low urine output)	• Shock • septic, neurogenic, anaphylactic • hypovolemic • ectopic pregnancy, trauma • Cardiogenic • MI, dysrhythmia • Obstructive • PE, cardiac tamponade, tension pneumothorax • Vasovagal response • Physiologic hypotension • Heat stroke • Overdose

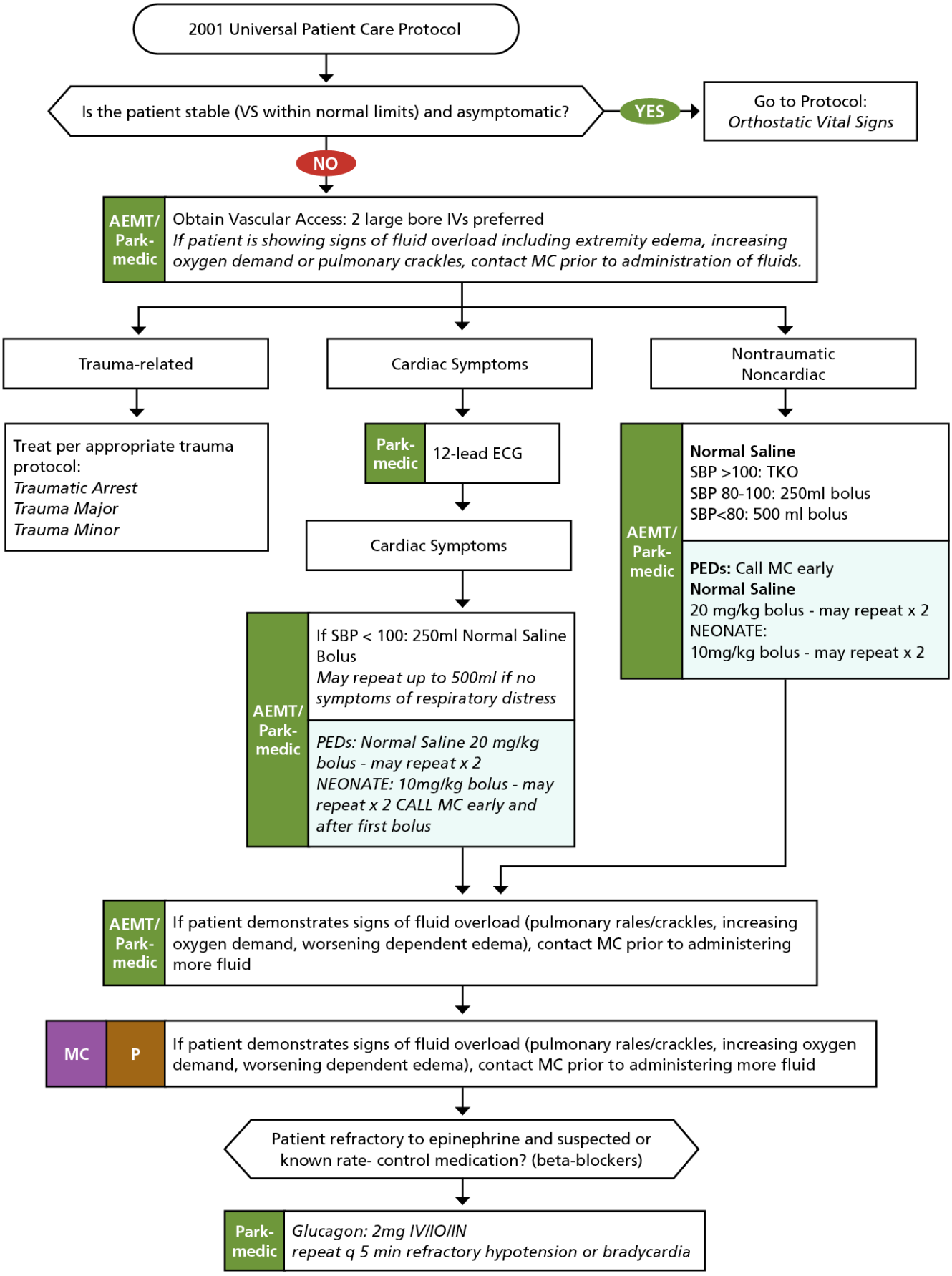
SPECIAL CONSIDERATIONS

- Hypotension can be defined as a systolic blood pressure of less than 100 mmHg in most adult patients. But, adults with preexisting hypertension may be symptomatic at SBP > 100 mmHg.
- In critical trauma or medical patients, use manual blood pressure to establish a true baseline. For heart rate, if a radial pulse is too weak or cannot be felt, use the brachial pulse and palpate while taking the blood pressure. Manual blood pressures are more accurate than auto cuffs, especially in SBP ≤ 90.
- Maintaining a high index of suspicion for shock is critical. Not recognizing or treating shock could compromise an otherwise treatable patient.
- Consider shock in any patient with persistent tachycardia and cool, poorly perfused extremities.
- Children compensate for shock better than adults: tachycardia is an early sign. **Decreased blood pressure is a sign of critical, decompensated shock.**
- Consider performing orthostatic vital signs on nontraumatic patients. However, negative orthostatics do not rule out hypovolemia.
- Consider all possible causes of shock and treat with the appropriate protocol.
- Signs of Shock: **Any person who is cool and tachycardic is in shock until proven otherwise.**

Adults: Skin signs may vary from cool/moist to hot/flushed
Altered Mental Status
Tachycardia (HR>100)
Hypotensive (SBP<100; late sign!)

Pediatric: Skin signs may vary from cool/moist to hot flushed
Altered mental status or lethargy
Tachycardia (Reference: *Pediatric Parameters*)
Delayed Capillary refill

SHOCK/HYPOTENSION



TYPE/CAUSE OF SHOCK	HISTORY	PHYSICAL EXAM	PATIENT MEDICATIONS	TREATMENT CONSIDERATIONS (WITHIN SCOPE)
Cardiogenic	Heart disease, chest pain, Orthopnea, SOB, PMH: MI, angina, CHF, dialysis	Pulmonary edema (wet lung sounds), cool, diaphoretic, peripheral edema	Lasix, Nitro, Digoxin, Beta-blocker, Calcium channel blocker, ACE inhibitors, aspirin	Difficult to treat in the field. Pressors (push-dose epinephrine)
Pericardial Tamponade	MI in last 2 weeks, chest trauma, Recent heart/ chest surgery, cancer, dialysis patients	Normal lung sounds, +/- Muffled heart sounds, JVD	Similar to cardiogenic meds	Fluids and pressors (push-dose epinephrine)
Pulmonary Embolism	Postpartum, Blood clot in leg, long car/plane ride, Immobilized (cast), cancer patients	Normal lung sounds, JVD, +/- Swollen leg, +/-Smoker	Birth control pills, Coumadin, Eliquis, Xarelto	Fluids and pressors (push-dose epinephrine)
Tension Pneumothorax	Chest pain, SOB, Recent procedure or prior pneumothorax, lung disease (COPD), HIV	Absent breath sounds on one side with hyper-resonance, Deviated trachea, JVD	Inhalers, Isoniazid	Needle thoracostomy. Consider fluids. Pressors not indicated
Hypovolemic	Vomiting, Diarrhea, Fever, GI/OB bleed, Decreased PO, Abdominal pain, trauma	Normal lung sounds, Flat neck veins, Signs of bleeding, Fever	Anti-diarrheal, antiemetic, proton pump inhibitor, blood thinners	Fluid boluses (up to 2-3 L) and pressors (push-dose epinephrine)
Neurogenic	PMH: spinal cord injury, Lower extremity weakness	Normal lung sounds, Flat neck veins, Warm skin, Lower extremity weakness, Bradycardia		Fluid boluses (up to 2-3 L) and pressors (push-dose epinephrine)
Septic	Recent fever or infection	Normal/wet lung sounds, Flat neck veins, Warm skin, Lethargic	Antibiotics	Fluid boluses (up to 2-3 L) and pressors (push-dose epinephrine)
Anaphylactic	Onset after food/drug/ sting exposure, Prior reactions	Normal lung sounds or wheezing/stridor, Flat neck veins, Rash, Red skin, Airway edema, +/- Med Alert Tag	Epinephrine autoinjector, Benadryl	Consider epinephrine, Benadryl, albuterol, and fluids. Pressors not indicated.
Heat Stroke	Hot weather and exertion, Dehydration	Normal lung sounds, Flat neck veins, High temperature		IV fluid boluses. Cooling measures.
Drugs or Toxins	IV drug abuse, chemical or fire exposure, Farm worker	Highly variable vitals, skin, lung, eye and mental status findings		Give naloxone before ALS airway if suspected narcotic overdose. Fluids, Pressors are potentially harmful.

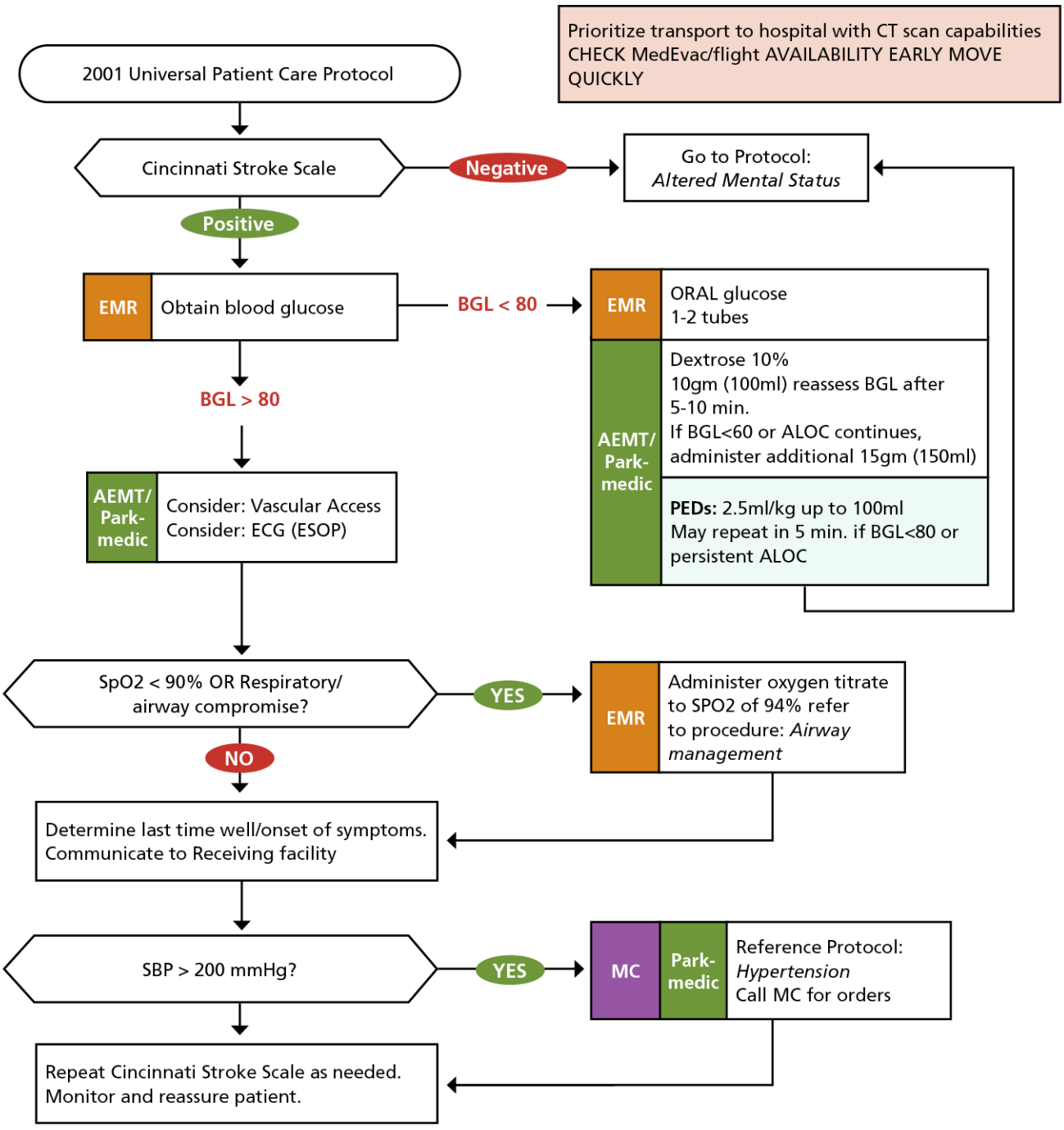
Stroke/CVA

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• TIME LAST SEEN WELL • Previous Stroke/Cerebral Vascular Accident (CVA), TIAs • Previous cardiac/vascular surgery • "Associated diseases" diabetes, hypertension, CAD, Atrial fibrillation • Medications (blood thinners) • History of trauma, falls • Drug/alcohol use	• Altered mental status • Weakness/paralysis • Blindness or other sensory loss • Aphasia/Dysarthria • Vertigo/Dizziness/Syncope • Vomiting • Headache • Seizures • Respiratory pattern change • Hypertension/hypotension	• See Differential under Protocol: Altered Mental Status • TIA (Transient ischemic attack) • Seizure • Sepsis • Hypoglycemia • Stroke • Thrombotic • Embolic • Hemorrhagic • Tumor • Trauma • Migraine

SPECIAL CONSIDERATIONS

- With duration of symptoms of less than 4.5 hours, scene times and transport times should be minimized. Consider delay of procedures such as IV initiation until transport is under way.
- The window for patients to receive thrombolytics or other early interventions can be extended to 4.5 hours or more (from symptom onset) depending on the situation. Contact MC and consider rapid transport
- Onset of symptoms is defined as the last witnessed time the patient was symptom free (i.e., awakening with stroke symptoms would be defined as an onset time of the previous night when patient was symptom free).
- Whenever possible, a family member should accompany patient to hospital/rendezvous to provide additional history and/or consent.
- The differential listed on the PROTOCOL: *Altered Mental Status* should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- Document the Cincinnati evaluation/or other prehospital stroke evaluation in the prehospital patient care report. Repeat as possible q 10 mins.
- Use restraints only if necessary to protect patient or personnel from injury. Restrain in swimmers' position (supine, head of bed elevated, one arm laterally up, one arm laterally down) for airway protection. Reassess mental status and distal neurovascular function every 10 minutes.

STROKE/CVA


Prioritize transport to hospital with CT scan capabilities
CHECK MedEvac/flight AVAILABILITY EARLY MOVE QUICKLY
2001 Universal Patient Care Protocol
Cincinnati Stroke Scale
Negative
Go to Protocol: Altered Mental Status
Positive
EMR
Obtain blood glucose
BGL < 80
EMR
ORAL glucose 1-2 tubes
AEMT/ Park-medic
Dextrose 10% 10gm (100ml) reassess BGL after 5-10 min. If BGL<60 or ALOC continues, administer additional 15gm (150ml)
PEDs: 2.5ml/kg up to 100ml May repeat in 5 min. if BGL<80 or persistent ALOC
BGL > 80
AEMT/ Park-medic
Consider: Vascular Access
Consider: ECG (ESOP)
SpO2 < 90% OR Respiratory/ airway compromise?
YES
EMR
Administer oxygen titrate to SPO2 of 94% refer to procedure: Airway management
NO
Determine last time well/onset of symptoms. Communicate to Receiving facility
SBP > 200 mmHg?
YES
MC
Park-medic
Reference Protocol: Hypertension
Call MC for orders
Repeat Cincinnati Stroke Scale as needed. Monitor and reassure patient.

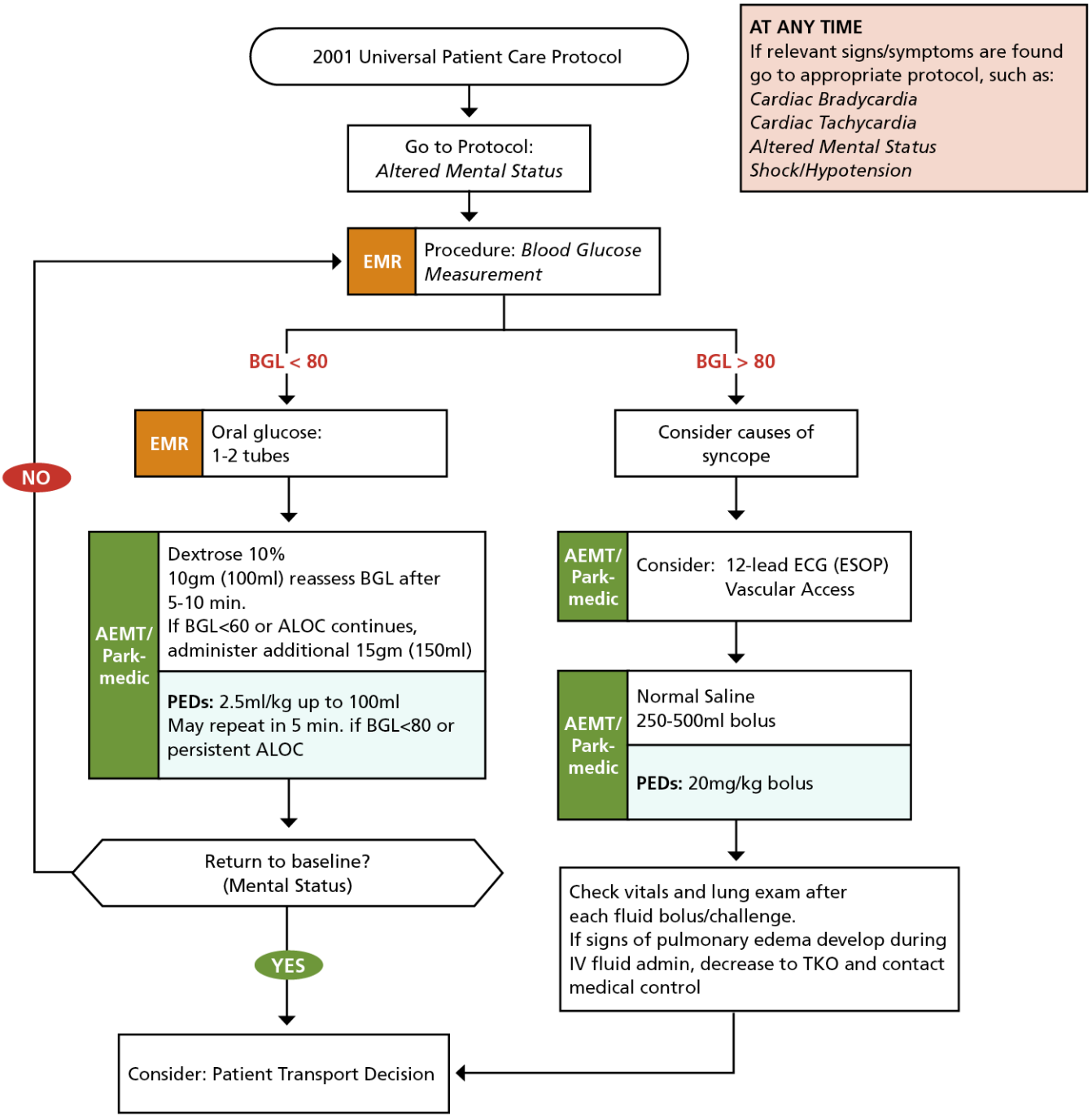
Syncope/Near Syncope

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Activities leading up to the syncope or near syncope • Any witnessed seizure activity • Cardiac history, stroke, seizure, diabetes • Females: LMP, vaginal bleeding • Fluid and food intake • Fluid loss: nausea, vomiting, diarrhea • Medications, alcohol, recreational Drug use • Occult blood loss (GI, ectopic pregnancy, AAA)	• Loss of consciousness with recovery • Lightheadedness, dizziness • Palpitations, slow or rapid pulse • Pulse irregularity • Decreased blood pressure	• See Differential under Protocol: *Altered Mental Status* • Vasovagal reaction • Orthostatic hypotension • Cardiac dysrhythmia • Micturition/Defecation syncope • Psychiatric condition • Stroke • Hypoglycemia • Metabolic dehydration • Seizure • Shock (see Hypotension/Shock Protocol) • Toxicological (Alcohol) • Medication effect (hypertension)

SPECIAL CONSIDERATIONS

- If a patient reports they are unsure if they lost consciousness or if they don't remember losing consciousness, assume a loss of consciousness occurred.
- Assess for signs and symptoms of trauma if associated or questionable fall with syncope.
- Consider dysrhythmias, GI bleed, ectopic pregnancy and seizure as possible causes of syncope. These patients should be transported
- More than 25% of geriatric syncope is cardiac dysrhythmia based. Consider cardiac dysrhythmias as a possible cause of syncope in patients of any age.
- Syncopal episodes associated with exercise should increase provider suspicion for a cardiac dysrhythmia or structural heart defect, even in young patients. Palpitations, dizziness, chest pain, and shortness of breath just prior to a syncopal episode are concerning for a dysrhythmia.
- Syncope patients should receive cardiac monitoring during assessment and transport, if available.

SYNCOPE/NEAR SYNCOPE



Trauma: Major/Multi-system

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Time and mechanism of injury • Damage to structure or vehicle • Location in structure or vehicle • Others injured or dead • Speed and details of MVC • Restraints/protective equipment	• Pain, swelling • Deformity, lesions, bleeding • Altered mental status or unconsciousness • Hypotension or shock • Cardiac Arrest • Tracheal Shift • Neck vein distention • Flail chest • Seat belt sign	• Chest: Tension Pneumothorax, Pericardial tamponade, Open chest wound, Hemothorax • Intra-abdominal bleeding, diaphragmatic rupture • Pelvis/femur fracture • Vertebral fracture/cord injury • Head injury, facial fractures • Extremity fracture/dislocation/ Amputation • Airway obstruction • Hypothermia

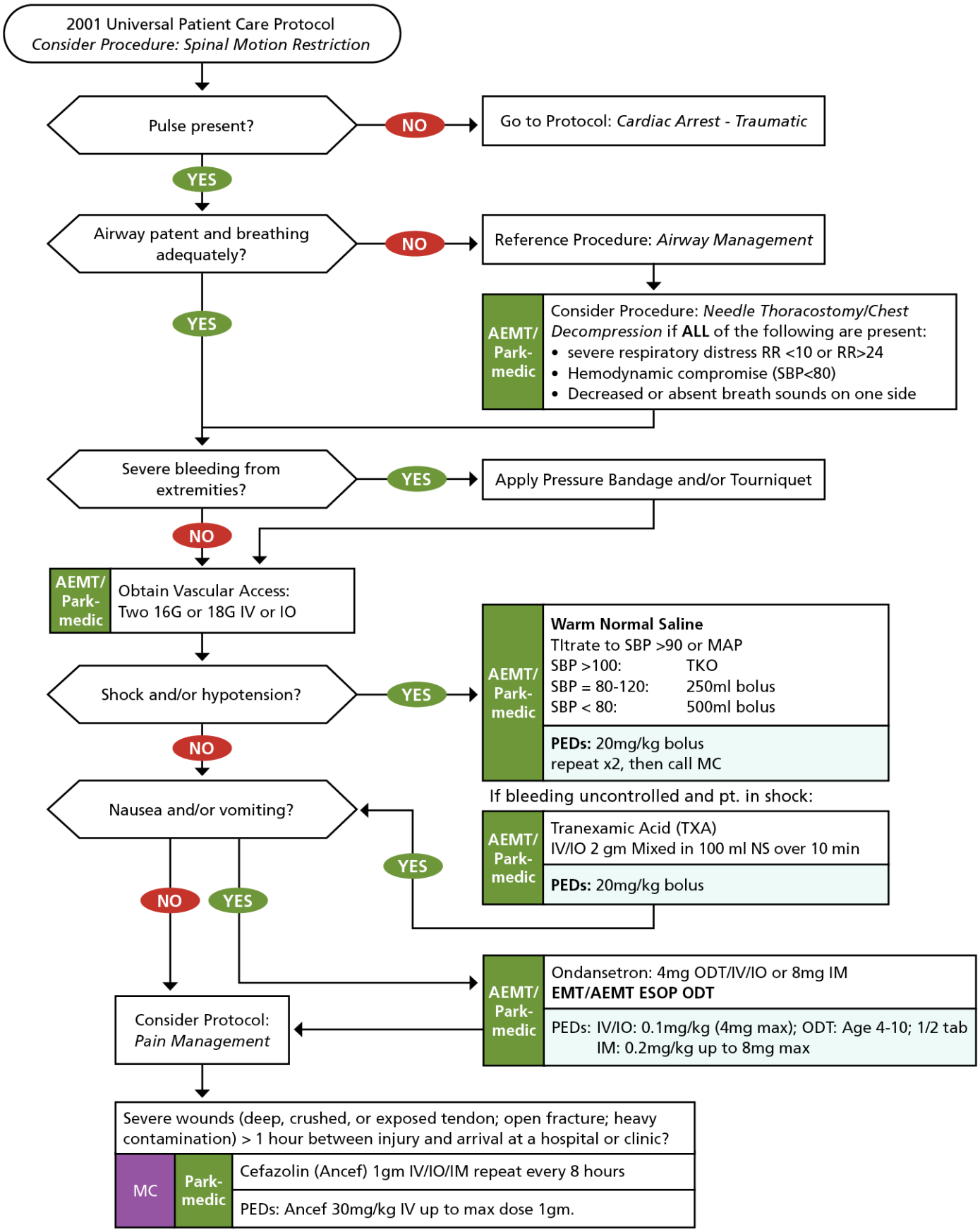
SPECIAL CONSIDERATIONS

- Continually reassess ABCs in major trauma patients. Treat life-threats as soon as they are recognized.
- In prolonged extrication and/or serious trauma consider air transport for transport speed.
- The receiving facility should be notified early of a major trauma patient.
- **Keep trauma patients warm. If hypotensive, administer warmed IV fluids.**
- Severe, uncontrolled bleeding from an extremity may require a tourniquet.
- Severe injuries can detract from more substantial and deadly injuries. Don't get tunnel vision.
- To administer narcotics, SBP > 100 or appropriate for age and normal mental status of patient.
- Avoid administration of NSAIDs for pain.
- Isolated closed head injuries do not cause hypotension in trauma patients unless the patient is peri-arrest. Uncontrolled scalp bleeding, however, that continues over time can lead to hemorrhagic shock.
- In trauma patients, use a manual blood pressure cuff to establish a true baseline. For heart rate, if a radial pulse is too weak or cannot be felt, go to the brachial pulse and palpate while taking the pressure. Manual BP is more accurate than an auto cuff, especially if SBP ≤ 90.
- For a penetrating trauma, secure impaled object in place and transport
- A tension pneumothorax is a rare, but life threatening condition and is often difficult to assess clinically. Tracheal deviation may not be observed but can be palpated at the sternal notch.
- Limit scene time to < 10 minutes when possible.
- For prolonged entrapment consider crush syndrome and treatment (acidosis, hyperkalemia). Contact MC for treatment options.
- If a head injury is suspected, titrate oxygen saturation to 94%.

PEDIATRICS

- Booster seats are not adequate spinal immobilization
- Often pediatric patients have no external signs of trauma.
- Hypotension is a very late sign for shock in the pediatric patient. The following are earlier indicators that a patient may be hypovolemic: altered mental status, pallor, peripheral pulses, capillary refill, tachypnea, and tachycardia.

TRAUMA: MAJOR



Trauma: Minor/Isolated Extremity

PAST MEDICAL HISTORY	ASSESSMENT	DIFFERENTIAL
• Mechanism: crush /penetrating/ amputation • Time of injury • Open vs. closed wound/fracture • Wound contamination • Assess risk of rabies (bite, etc.) • Tetanus history	• Pain, swelling • Altered sensation/motor function • Diminished pulse/capillary refill • Decreased extremity temperature • Crepitus • Open wounds and degree of contamination • Other injuries? May be masked by distracting injury	• Deformity • Contusion • Abrasion • Punctures/Penetrations • Laceration • Sprain • Dislocation • Fracture • Amputation • Compartment syndrome

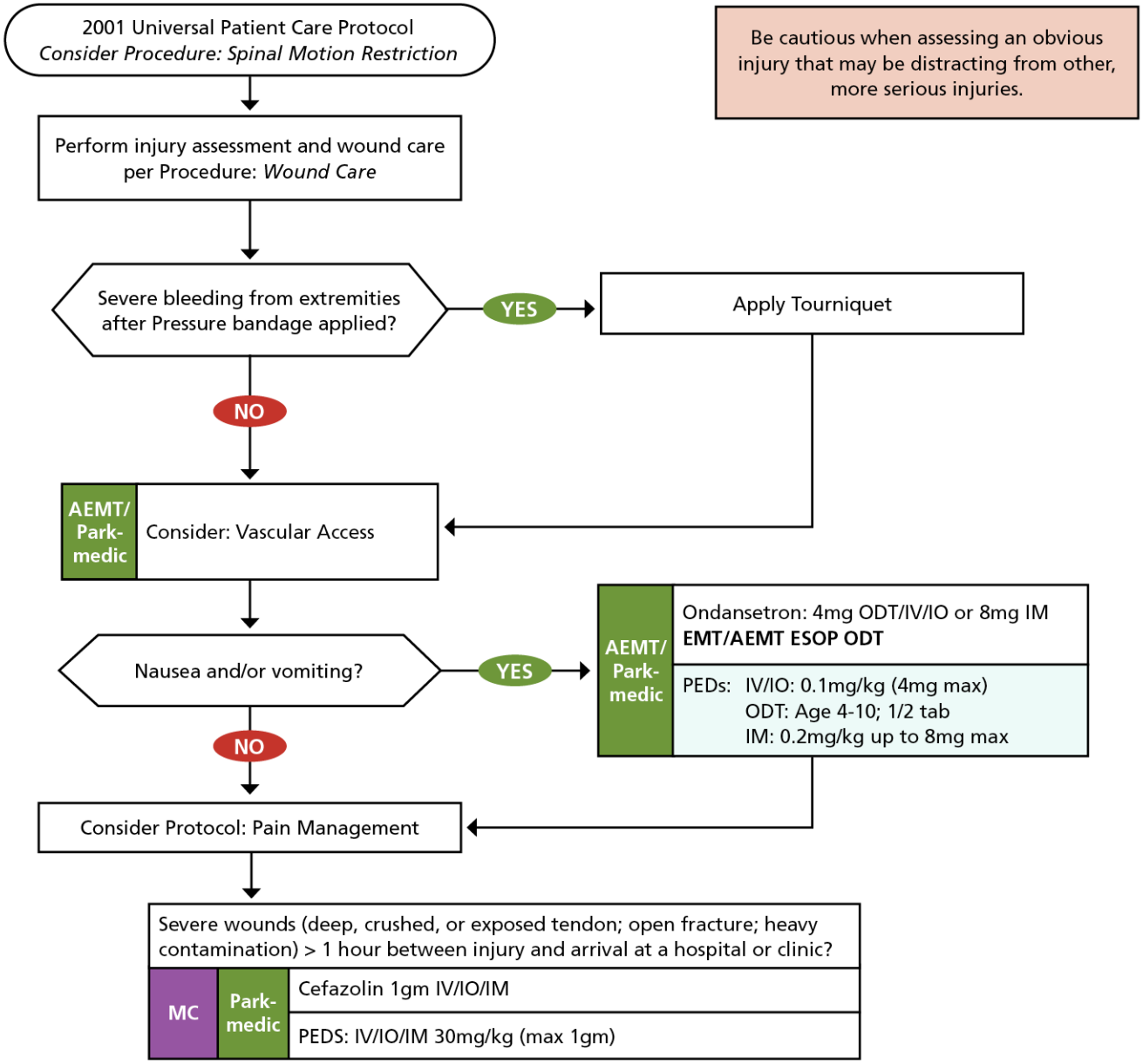
SPECIAL CONSIDERATIONS

- Maintain an increased index of suspicion for bleeding in patients taking anticoagulants or in patients with a history of hemophilia.
- Amputated parts should not be placed directly on ice
- In an amputation, time is critical
- Hip dislocations and knee and elbow fracture/ dislocations have a high incidence of vascular compromise. Frequently reassess distal CSMs.
- Urgently transport any injury with vascular compromise (consider helicopter evacuation)
- Blood loss may be concealed or not apparent with extremity injuries
- Severe bleeding not rapidly controlled may necessitate application of a tourniquet
- Always check the bones and or joints above and below injury and stabilize if necessary
- Document depth, length, width of wound and if bleeding is active or pulsatile
- Joint dislocation usually includes any joint injury symptoms with a deformity
- If there is no obvious fracture, test for pain-free range of motion and ability to bear weight
- Splinting should be applied with all possible fractures or joint injuries except for the knee or ankle if the injury does not limit function for self-evacuation.

DENTAL TRAUMA:

- If permanent teeth are avulsed (broken), loosely wrap teeth in moist gauze and place in plastic bag for transport with patient. Handle teeth only by crown. Best results for re-implantation are using a commercial solution such as “Save a Tooth” otherwise use saline.
- For dental bleeding, pack gauze in cavity and have patient bite down.
- For uncontrolled dental bleeding, Soak gauze with 5ml TXA, and apply to area of bleeding for 30min. (ALS only)

MINOR/ISOLATED EXTREMITY TRAUMA



Vaginal/OB/GYN Emergencies

SPECIAL CONSIDERATIONS

- Many women will not know or be in denial about being pregnant. Always ask LMP (last menstrual period) and if >1 month ago, assume pregnancy if in childbearing years (10-50 years old).
- In the setting of pregnancy, hypertension is defined as a BP > 140 systolic or > 90 diastolic, or a relative increase of 30 systolic and 20 diastolic from the patient's normal (prepregnancy) blood pressure.
- Maintain patient in the left lateral recumbent position to minimize risk of supine hypotensive syndrome.
- Ask patient to quantify bleeding—number of soaked pads used per hour/per day.
- Any pregnant patient involved in a potentially significant traumatic event should be transported for evaluation and fetal monitoring.
- Eclampsia/Preeclampsia: if patient > 5 months pregnant OR has delivered in past 2 weeks, AND is hypertensive or with a headache, ask about prior history of eclampsia or current symptoms (edema of face and hands, seizures, vision changes). Usually no vaginal bleeding. See PROTOCOL: *2240 Seizures.*

DEFINITIONS

- Gravida indicates the number of times the woman has been pregnant, regardless of whether the pregnancies were carried to term. A current pregnancy, if any, is included in this count.
- Parity, or "para" indicates the number of >20-week births (including viable and nonviable, i.e., still-births). Pregnancies consisting of multiples, such as twins or triplets, count as one birth for the purpose of this notation.
- Abortus is the number of pregnancies that were lost for any reason, including induced abortions or miscarriages. The abortus term is sometimes dropped when no pregnancies have been lost. Stillbirths are not included.

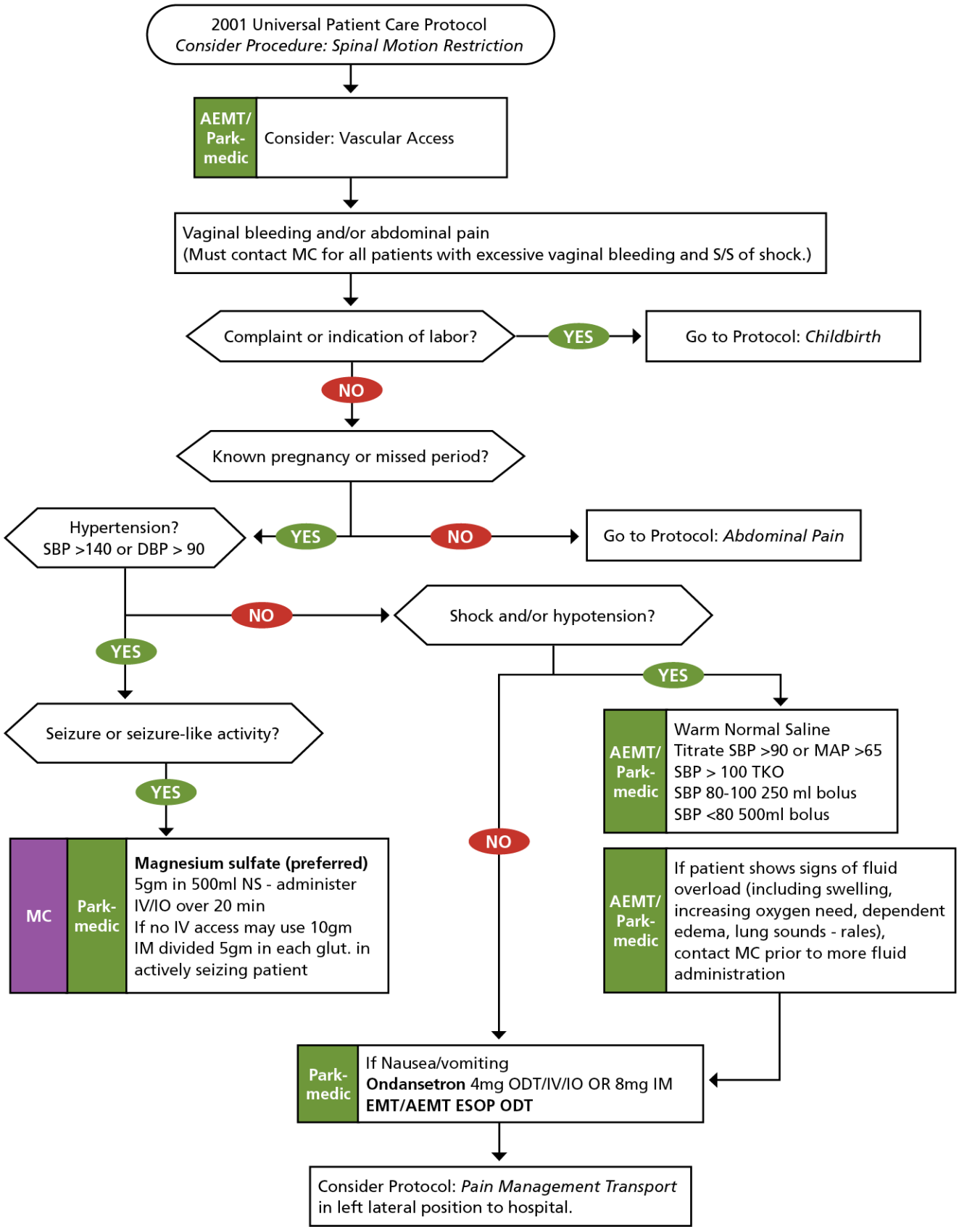
PAST MEDICAL HISTORY

- Hypertension medications
- Date of last menstrual period
- Prenatal care
- Passing tissue?
- Prior pregnancies/births
- History of trauma?
- Gravida/Para/Abortus (see definitions)
- Pelvic infections, STDs

DIFFERENTIAL DIAGNOSES FOR VAGINAL BLEEDING

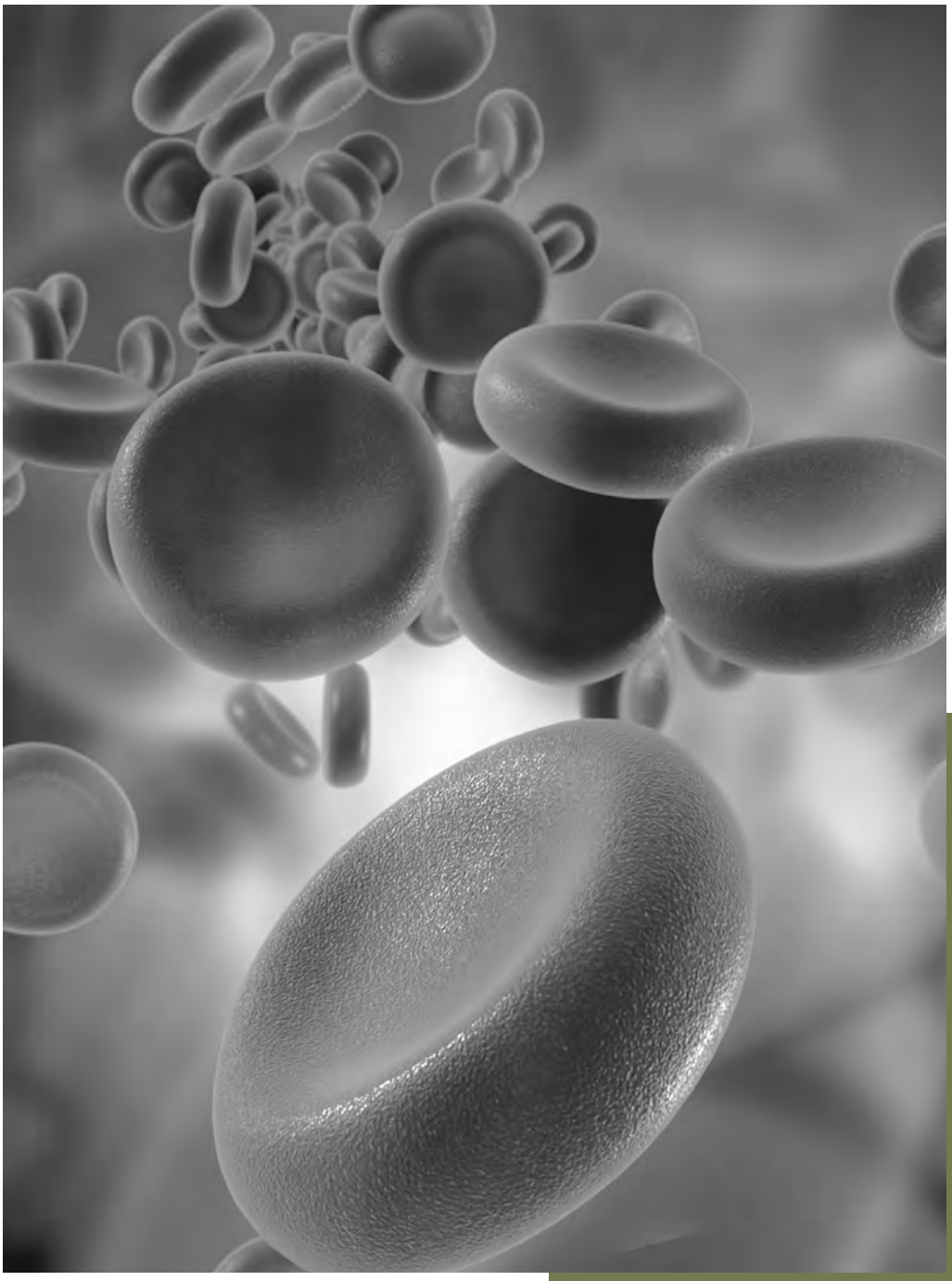
- Nonpregnancy related: STD complications, ovarian torsion, fibroids, etc.
  - » regular menses (pain, bleeding)
  - » Foreign body (IUD, rape): consider uterine perforation/rupture (rare).
  - » Hormonal imbalance: irregular menses (very common).
  - » Tumors: cervical and uterine, typically painless.
  - » Nonvaginal sources: rectal or urethral.
- First and Second Trimester bleeding (up to 20 wks):
  - » Ectopic pregnancy: a ruptured ectopic pregnancy is a life-threatening emergency. There may be little to no vaginal bleeding, but internal hemorrhage may be present. Patients typically complain primarily of abdominal pain as opposed to vaginal bleeding. Watch for shock.
  - » Threatened abortion (bleeding during pregnancy)
  - » Spontaneous abortion (miscarriage): if patient is passing tissue, save it and bring it to the hospital. It can be important to determine if all products of conception have passed.
  - » Delivery: be prepared for possible premature delivery if late term pregnancy
- Third Trimester bleeding (> 20 wks.):
  - » Abruptio placentae (placenta separates from uterus): can occur after blunt trauma. High risk of fetal death.
  - » Trauma: consider pelvic fracture, or placental bleeding if in third trimester.

VAGINAL/OB/GYN EMERGENCIES



Medications

SECTION 3000



Acetaminophen (Tylenol, APAP)

SCOPE:	EMT, AEMT, PM, PARAMEDIC
FORM:	500 mg tablet or Children's Liquid Solution 32mg/ml
CLASS:	Antipyretic, analgesic
PHARMACOLOGY AND ACTIONS:	Acetaminophen, also called N-acetyl para-aminophenol or paracetamol, is one of the most widely used over-the-counter analgesic and antipyretic agents. Although its exact mechanism of action remains unclear, it is historically categorized along with NSAIDs because it inhibits the cyclooxygenase (COX) pathways. Like NSAIDs, acetaminophen has analgesic and antipyretic properties. However, studies have shown that acetaminophen lacks peripheral anti-inflammatory properties. It may be that acetaminophen inhibits the COX pathway in the central nervous system but not peripheral tissues. Additionally, acetaminophen does not appear to bind to the active site of either the COX-1 or COX-2 enzyme, instead of reducing the activity of COX by a different mechanism.
ONSET:	20 minutes
DURATION:	4 hours
INDICATIONS:	Fever (acetaminophen is the first-line medication), Pain
CONTRAINDICATIONS:	• Known hypersensitivity • Severe liver disease/hepatic impairment

See specific protocols for medical control requirements

ADULT DOSING (older than 12 years)			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Fever or Pain	PO	650 - 1000 mg	May repeat every 6 hours Do not exceed 4000 mg in 24 hours

PEDIATRIC DOSING (less than 12 years)			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Fever or Pain	PO	15 mg/kg (Max 1000 mg)	May repeat every 4 - 6 hours Do not exceed 75 mg/kg in 24 hours

Liquid Acetaminophen Dosing Chart:

Less than 12 years old (15mg/kg)
Concentrate: 160/5ml

Weight (Lbs)	Weight (kg)	Dose in mg (32mg/1ml)	Total Volume to draw into syringe in ml
5	2	30	***0.9***
10	5	75	***2.3***
15	7	105	***3.3***
20	9	135	***4.2***
25	11	165	***5.2***
30	14	210	***6.6***
35	16	240	***7.5***
40	18	270	***8.4***
45	20	300	***9.4***
50	23	345	***10.8***
55	25	375	***11.7***
60	27	405	***12.7***
65	30	450	***14.1***
70	32	480	***15.0***
75	34	510	***15.9***
80	36	540	***16.9***
85	39	585	***18.3***
90	41	615	***19.2***
100	45	675	***21.1***

3010

Acetazolamide(Diamox®)

SCOPE:	Unit specific
FORM:	tablet; 125mg, 250mg
CLASS:	carbonic anhydrase inhibitor
PHARMACOLOGY AND ACTIONS:	Acetazolamide is a carbonic anhydrase inhibitor that inhibits H+ ion excretion in renal tubule, increasing sodium, potassium, bicarbonate, and water excretion, producing alkaline diuresis. Additionally decreases rate of aqueous humor formation for patients with glaucoma.
ONSET:	PO 1 - 1.5hr
DURATION:	8-12 hours
INDICATIONS:	Prophylaxis for acute mountain sickness, treatment of acute mountain sickness
CONTRAINDICATIONS:	• Hypersensitivity to acetazolamide or sulfa agents • Severe renal disease • Cirrhosis
PRECAUTIONS:	• May impair alertness and or physical coordination in higher doses • Severe adverse effects include tachypnea, tachycardia
SIDE EFFECTS AND NOTES:	• Commonly causes tingling in fingers and toes • May contribute to drowsiness • Carbonated beverages taste "flat"

ADULT DOSING			
INDICATION	**DOSE**	**ROUTE**	**NOTES**
Altitude illness prophylaxis and treatment	for prophylaxis; 125mg BID (may be as low as 62.5 mg daily for treatment: 250mg BID	PO	

PEDIATRIC DOSING (no signs of puberty)			
INDICATION	DOSE	ROUTE	NOTES
Treatment of AMS	2.5 mg/kg every 8-12 hr. **Call medical control**		

Adenosine (Adenocard®)

SCOPE:	PARAMEDIC
FORM:	3 mg/ml – 6mg & 12 mg prefilled syringe
CLASS:	Antidysrhythmic
PHARMACOLOGY AND ACTIONS:	Adenosine is a naturally occurring nucleoside that has the ability to slow conduction through the AV node. Since most cases of PSVT involve AV nodal reentry, adenosine is capable of interrupting the AV nodal circuit and stopping the tachycardia, restoring normal sinus rhythm.
ONSET:	IV: Immediate
DURATION:	less than 10 seconds
INDICATIONS:	Narrow complex tachycardia (QRS duration <0.12 second), to convert PSVT to a normal sinus rhythm, including PSVT that is associated with accessory bypass tracts. (WILL NOT CONVERT A-Fib, A-Flutter, or V-Tach)
CONTRAINDICATIONS:	• Second- or third-degree heart AV block • Sick Sinus Syndrome • Known hypersensitivity to adenosine • Known WPW (Wolff-Parkinson-White) Syndrome • Irregular tachycardia (relative) • Wide complex tachycardia (QRS >= 0.12 second) • Patient on Tegretol (carbamazepine), Persantine (Dipyridamol), heart transplant patients
PRECAUTIONS:	• A defibrillator should be attached to the patient prior to adenosine administration in case of deterioration. • Larger doses of adenosine may be required to overcome the effects of caffeine or methylxanthines (e.g., Theophylline). • Dipyridamole (Persantine) can enhance adverse effects of adenosine and result in prolonged asystole. • Carbamazepine (Tegretol) can enhance adverse effects of adenosine and result in high degree heart block. • When doses larger than 12 mg are given by injection there may be a decrease in blood pressure secondary to a decrease in vascular resistance. • Adenosine is not effective in converting atrial fibrillation, atrial flutter or ventricular tachycardia.
SIDE EFFECTS AND NOTES:	• May commonly cause facial flushing, shortness of breath, chest pressure, nausea, headache and lightheadedness, transient asystole. • Severe side effects: bradycardia, complete heart block, dysrhythmias. • Adenosine has a very short half-life of less than 10 seconds. For this reason, adenosine has to be given as a very fast bolus followed immediately by a 20 ml saline flush.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Narrow complex tachycardia (QRS<0.12 sec)	6 mg first dose, 12 mg second dose if needed Max total dose is 30mg.	Rapid IV	Use a large proximal IV site with fluid bolus flush.

PEDIATRIC DOSING (no signs of puberty)

INDICATION	DOSE	ROUTE	NOTES
Narrow complex tachycardia (QRS < 0.12 sec)	0.1 mg/kg (max 6 mg) first dose, 0.2 mg/kg (max 12 mg) second dose if needed Max total dose is 30mg.	Rapid IV	Use a large proximal IV site with fluid bolus flush.

3020

Albuterol

SCOPE:	
FORM:	2.5 mg/3 ml vial (HHN dose)
CLASS:	Sympathomemetic B2 agonist, bronchodilator
PHARMACOLOGY AND ACTIONS:	Albuterol is a potent, relatively selective Beta-2 adrenergic bronchodilator and is associated with relaxation of bronchial smooth muscle and inhibition of release of mediators of immediate sensitivity from cells, especially MAST cells. Albuterol has occasional Beta-1 overlap with clinically significant cardiac effects including tachycardia increased cardiac workload—use with caution in suspected cardiogenic shock.
ONSET:	Immediate
DURATION:	2-4 hours
INDICATIONS:	• Respiratory distress with Bronchial spasms (allergic reaction, asthma, COPD) • Suspected hyperkalemia
RELATIVE CONTRAINDICATIONS:	• Chest pain suspected to be of cardiac origin, known active heart disease • Severe hypertension • Acute MI within the past 6 weeks
PRECAUTIONS:	• The patient's rhythm should be observed for arrhythmias. Stop treatment if frequent PVCs develop or any tachyarrhythmias other than sinus tachycardia appear, or if heart rate increases by more than 20 beats/minute. • Paradoxical bronchospasm may occur with excessive administration
SIDE EFFECTS AND NOTES:	Clinically significant arrhythmias may occur, especially in patients with underlying cardiovascular disorders such as coronary insufficiency and hypertension. Palpitations, tremors, anxiety (uncommon when taken recommended doses)

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Respiratory Distress	Nebulized (HHN)	2.5 mg	Start oxygen at 6-8 L/min, increase to 10 L/min prn. May repeat as needed up to 6 doses. No maximum dose for young asthmatic. May add ipratropium to second dose.
Suspected hyperkalemia	Nebulized (HHN)	10 mg	

PEDIATRIC DOSING (less than 1 year old)

INDICATION	ROUTE	DOSE
Respiratory Distress	Nebulized (HHN)	SAME AS ADULT

Amiodarone (Cordarone)

SCOPE:	PM, PARAMEDIC
FORM:	150 mg/3 ml prefilled syringe or vial
CLASS:	Antidysrhythmic, class III
PHARMACOLOGY AND ACTIONS:	Amiodarone depresses automaticity of the SA node: slows conduction and increases refractory duration of the AV node; increases atrial and ventricular refractory period; prolongs the QT interval. In IV form is predominately an AV nodal blocker. Amiodarone is effective in preventing recurrent monomorphic VT and treating refractory ventricular arrhythmias.
ONSET:	IV/IO: Immediate
DURATION:	10-20 minutes
INDICATIONS:	• Ventricular fibrillation, pulseless Ventricular tachycardia—cardiac arrest • Patient has been shocked by AICD or has ROSC after AED shock • Ventricular tachycardia with pulses (Paramedic ONLY)
CONTRAINDICATIONS:	• HR less than 80 bpm • 2nd and 3rd degree AV block
PRECAUTIONS:	• In high concentrations (> 3 mg/ml) amiodarone can cause phlebitis. Infusion concentrations should not exceed 2 mg/ml • Amiodarone will precipitate if administered in the same IV line as sodium bicarbonate or heparin
SIDE EFFECTS AND NOTES:	In perfusing patients, amiodarone may cause hypotension, prolonged QT interval, proarrhythmic effects (Torsades and ventricular fibrillation), severe bradycardia and atrioventricular block. Also, may cause CHF, cardiac arrest, shock, respiratory depression, rash, anaphylaxis, vomiting.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Cardiac Arrest (Shockable: V-fib/V-tach)	IV/IO	300 mg	IVP. An additional dose of 150 mg 3-5 minutes after initial dose may be indicated
Re-Arrest (Shockable: V- fib/V-tach)	IV/IO	150 mg	IVP. ONLY IF patient did not receive 2nd dose above.
ROSC (Return of Spontaneous Circulation)	IV/IO	150 mg in 100 ml NS over 10 min	IF responsive to shock AND no amiodarone given during resuscitation. Parkmedic requires Medical Control order.
(Paramedic ONLY) Stable, Wide Complex Monomorphic V-Tach with pulse	IV/IO	150 mg over 10 min	May repeat once. Either bolus should be followed by an infusion of 1mg/ min over 6 hrs. (Max dose 450 mg)

PEDIATRIC DOSING (1 month-14 years)

INDICATION	ROUTE	DOSE	NOTES
Cardiac Arrest (Shockable: V-fib/V-tach)	IV/IO	5 mg/kg (Max 300 mg)	SIVP. An additional dose of 5 mg/kg 3-5 minutes after initial dose may be indicated x2 (Max total 3 doses, 450 mg)
Re-Arrest (Shockable: V-fib/V-tach)	IV/IO	2.5mg/kg (Max 150 mg)	SIVP. ONLY IF patient did not receive max 15mg/kg or 450 mg above.
Not indicated for patients less than 1 month in age			

3030

Aspirin (ASA)

SCOPE:	EMR, EMT, AEMT, PM, Paramedic
FORM:	81 mg chewable tablets
CLASS:	Nonsteroidal Anti-inflammatory agent (NSAID), platelet inhibitor ("Blood thinner"), Analgesic
PHARMACOLOGY AND ACTIONS:	Aspirin inhibits prostaglandins and disrupts platelet function for the life of the platelet. It inhibits aggregation and reduces the chances of complete coronary artery blockage in an AMI reducing heart muscle death. It is also a mild analgesic and anti-inflammatory agent. Also, an anti-pyretic although ibuprofen or acetaminophen should be used to reduce fever.
ONSET:	PO: 5-30 minutes
DURATION:	Anti-inflammatory: 1-4 hours Anti-platelet activity slowly decreases over 10 days
INDICATIONS:	In unstable angina and acute myocardial infarction, aspirin has been shown to lower mortality and is indicated in patients with suspected ischemic chest pain.
CONTRAINDICATIONS:	• Allergy to aspirin or other NSAID medications or aspirin induced asthma • **NOTE:** Many people are told not to take aspirin because it upsets their stomach or they have a history of GI bleeding (e.g., ulcers). In the setting of cardiac chest pain, this is NOT a contraindication—give them aspirin. • History of bleeding disorder (i.e., hemophilia) • Active, uncontrolled bleeding
SIDE EFFECTS AND NOTES:	• May cause heartburn, nausea, and vomiting • Aspirin is the MOST important drug to give during an acute myocardial infarction (MI). The sooner aspirin is given to a patient having an acute MI, the less potential for damage to the patient's heart. • If the patient takes aspirin daily and has already taken it within the past 12 hours, do not give aspirin. If there is any doubt, give aspirin. • If patient has a history of a bleeding disorder or is on anticoagulants (i.e., Coumadin, Warfarin, Lovenox, Pradaxa), contact MC before administering aspirin. If in communication failure, give aspirin. • An acute aspirin overdose is potentially lethal. Signs and symptoms may include tinnitus, vomiting, rapid respirations, high fever, seizure, hypoglycemia, or altered mental status.

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Cardiac chest pain (AMI)	PO	324 mg	Instruct the patient to chew the aspirin, then swallow

PEDIATRIC DOSING (Not indicated for pediatric patients)

Atropine Sulfate

SCOPE:	
FORM:	1 mg/10 ml prefilled syringe NERVE AGENT AUTOINJECTORS: EMR, EMT, AEMT
CLASS:	Anticholinergic (antimuscarinic)
PHARMACOLOGY AND ACTIONS:	Atropine is a muscarinic-cholinergic blocking agent. As such, it blocks the receptors of the parasympathetic nervous system (vagal) resulting in: • Increased heart rate causing increased cardiac output. • Decreased smooth muscle activity in stomach, intestine, and bladder causing decreased sweating, salivation, tears, urine, and mucus secretions.
ONSET:	IV/IO/IM Immediate
DURATION:	4 hours
INDICATIONS:	• Symptomatic bradycardia (HR < 50, SBP < 90 AND symptoms: active chest pain, shortness of breath, nausea/vomiting, or altered mental status) • Organophosphate poisoning
CONTRAINDICATIONS:	None for emergency use.
PRECAUTIONS:	Bradycardia in the setting of an acute myocardial infarction is common and likely beneficial. Do not treat unless there are signs of poor perfusion (low blood pressure, mental confusion). May increase myocardial demand causing angina or to worsen MI. Low dose or slow administration of atropine can cause paradoxical bradycardia. Organophosphate poisoning requires large amounts of atropine; there is no maximum dose. Call for more medications early and titrate until bronchial secretions are controlled.
SIDE EFFECTS AND NOTES:	Atropine blocks cholinergic (vagal) influences already present. If there is little cholinergic stimulation present, effects will be minimal. Enhanced anticholinergic effects may occur with antihistamines, Haldol, meperidine, procainamide, quinidine, and tricyclic antidepressants. Tachycardia, palpitations, hypertension, dry mouth, increased thirst, headache, nervousness, weakness, dilated pupils, blurred vision may occur.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Symptomatic Bradycardia	IV/IO	1 mg	Every 3-5 min prn (max of 3 mg)
Organophosphate Poisoning	IV/IO	2 mg	Repeat dose every 5 minutes prn secretions (no max dose)

PEDIATRIC DOSING (less than 14 years)

INDICATION	ROUTE	DOSE	NOTES
Symptomatic Bradycardia	IV/IO	0.02 mg/kg (Min dose 0.1 mg, Max dose 0.5 mg)	See *Cardiac Pediatric Bradycardia* Protocol
Organophosphates	IV/IO	0.04 mg/kg (Min dose 0.1 mg, Max dose 2 mg)	Repeat dose every 5 minutes prn secretions (no max dose)

3040

Bacitracin Ointment

SCOPE:	
FORM:	Small foil pouches
CLASS:	Topical (skin) antibiotic
PHARMACOLOGY AND ACTIONS:	Inhibits bacterial growth, thereby helping prevent infection
INDICATIONS:	Minor cuts and scrapes, partial thickness burns (<15% total body surface area)
CONTRAINDICATIONS:	• Known hypersensitivity • Large deep wounds (any wound that you think may require stitches) • Any full-thickness burn, partial thickness burns over 15%, puncture wounds, animal bites
SIDE EFFECTS AND NOTES:	• Local allergy—rash • Systemic allergy—wheeze, diffuse rash, anaphylaxis • May provide some pain relief

See specific protocols for medical control requirements

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Minor cuts and scrapes	Topical	After cleansing the area, apply a thin amount over the affected part and cover with a bandage. Apply only once.	

PEDIATRIC DOSING (SAME as adults)

Cefazolin Sodium (Ancef)

SCOPE:	PM, PARAMEDIC
FORM:	1 g powder in vial, reconstituted in 2 ml sterile water when needed
CLASS:	Cephalosporin antibiotic
PHARMACOLOGY AND ACTIONS:	Prevents and treats infection
ONSET:	IV/IO /IM: Immediate
DURATION:	8 hours
INDICATIONS:	Severe wounds (deep, crushed or exposed tendon; open fracture; heavy contamination) with more than 1 hour between injury and arrival at a hospital or clinic.
CONTRAINDICATIONS:	• Allergy to cephalosporin antibiotics • Prior anaphylactic reaction to penicillin (simple rash/itching is NOT a contraindication)
SIDE EFFECTS AND NOTES:	• Side effects are rare • To reconstitute dose, add 2 ml of sterile water to vial and shake well to mix. • IM: Inject into buttock or thigh muscle (no more than 2 ml per injection). • IV: Dilute the reconstituted dose in 100 ml normal saline and administer over 10 minutes. • Due to possible anaphylactic reaction to cephalosporin antibiotics, IV/IO route is preferred as medication can be discontinued if reaction occurs.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Severe wound	IV/IO/IM	1 gm mix in 100 ml NS, give over 10 min	May repeat every 8 hours

PEDIATRIC DOSING

INDICATION	ROUTE	DOSE	NOTES
Severe wound	IV/IO/IM	30 mg/kg (max 1 gm) mix in 100 ml NS, give over 10 min	May repeat every 8 hours

3050

Dexamethasone (Decadron)

SCOPE:	PM, PARAMEDIC
FORM:	Vial of 10mg in 1ml
CLASS:	Corticosteroid
PHARMACOLOGY AND ACTIONS:	Anti-inflammatory, decreases cerebral edema, decreases immune response
ONSET:	IV/IO/IM: 15-30 minutes
DURATION:	6 hours
INDICATIONS:	• Acute COPD • Severe asthma • Severe allergic reaction/anaphylaxis • Nonmechanical airway obstruction (croup, epiglottitis, other airway swelling) • HACE/HAPE
CONTRAINDICATIONS:	None in the emergency setting
PRECAUTIONS:	• Be prepared to treat anaphylaxis/manage airway: Because rare instances of anaphylactic reactions have occurred in patients receiving corticosteroid therapy, appropriate precautionary measures should be taken prior to administration, especially when the patient has a history of allergy to any drug. • Protect medication from heat and light.
SIDE EFFECTS AND NOTES:	Potential gastrointestinal bleeding, elevation of blood sugar.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
COPD, Asthma, Allergic reaction, nonmechanical airway obstruction, HACE/ HAPE	IV/IO/IM	8-10 mg	May repeat dose at 4-5 mg IV/ IO/IM every 6 hours.

PEDIATRIC DOSING (less than 12 years)

INDICATION	ROUTE	DOSE	NOTES
Suspected croup, COPD, Asthma, Allergic reaction, nonmechanical airway obstruction	IV/IO/IM	0.6 mg/kg (Max 6 mg)	May repeat every 6 hours at 0.3mg/kg (Not to exceed 16 mg in 24 hours)

Dextrose 10%

SCOPE:	AEMT, PM, PARAMEDIC
FORM:	Premixed bag (25g/250ml)
CLASS:	Carbohydrate (sugar)
PHARMACOLOGY AND ACTIONS:	Dextrose elevates blood glucose rapidly. Its use is regulated by insulin and glucagon: insulin allows glucose to move intracellularly, and glucagon mobilizes stored glucose from the liver into the bloodstream.
ONSET:	IV/IO: 1 minute
DURATION:	Variable
INDICATIONS:	• Hypoglycemia (less than 80) • Unconscious patient, BGL reading unobtainable • When directed by specific protocol
CONTRAINDICATIONS:	None in the acute setting
PRECAUTIONS:	• An IV should be placed in as large a vein as possible and well-secured. Free return of blood into the syringe or tubing should be checked 2-3 times during administration. If extravasation occurs, IMMEDIATELY stop administration. • Report any extravasation to receiving hospital personnel and document on the PCR Report. • Do not use in the same IV line as sodium bicarbonate.
SIDE EFFECTS AND NOTES:	• Hyperglycemia may complicate or worsen several medical conditions (e.g., myocardial infarction, stroke). • D10 should be given whenever hypoglycemia is documented by blood glucose meter. If the findings are not available, the provider should use judgment based on signs and history. If unable to determine blood glucose level and patient has altered mental status more severe than disorientation to time and date, glucose should be given. • IV/IO is preferred administration for altered mental status or seizures, second line PO glucose paste, third line IM glucagon. • Effects may be delayed in elderly patients or those with poor circulation

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Hypoglycemia (Altered Mental Status)	IV/IO	10g (100 ml) Reassess blood glucose after 5-10 min. If BGL < 60 or ALOC, give additional 15g (150ml)	

PEDIATRIC DOSING (less than 2 years)

INDICATION	ROUTE	DOSE	NOTES
Hypoglycemia (Altered Mental Status)	IV/IO	2.5 ml/kg IV/IO (max initial dose 100 ml) May repeat in 5 minutes if ALOC or BGL still < 80	

3060

Diltiazem (Cardizem)

SCOPE:	PARAMEDIC
FORM:	ADD-Vantage system, 100mg/100ml
CLASS:	Calcium Channel Blocker (antidysrhythmic)
PHARMACOLOGY AND ACTIONS:	Blocks calcium from moving into the heart muscle cell, which prolongs the conduction of electrical impulses through the AV node, decreasing myocardial contractility and oxygen demand. Can slow irregular narrow complex tachycardias. Also dilates coronary arteries and arterioles (weak vasodilator). If adenosine or vagal maneuvers fail to convert narrow-complex SVT, SVT recurs after such treatment, or the treatments disclose a different form of SVT (such as atrial fibrillation or flutter), it is reasonable to use longer-acting AV nodal blocking agents such as calcium channel blockers (diltiazem). Their alternate mechanism of action and longer duration may result in more sustained termination of SVT or afford more sustained rate control of atrial dysrhythmias (such as atrial fibrillation or flutter). For refractory SVT, further dosing should be administered under the direction of a MC physician.
ONSET:	IV/IO: 3 minutes
DURATION:	1-3 hours
INDICATIONS:	Narrow complex tachycardia
CONTRAINDICATIONS:	• Second- or third-degree AV blocks w/o pacemaker • Hypotension or cardiogenic shock • Wide complex tachycardia • Known sensitivity to diltiazem
PRECAUTIONS:	• Use with extreme caution in patients who are taking beta blockers, because the two drug classes potentiate each other's effects and toxicities. • Patients with a history of heart failure and heart block are at a higher risk for toxicity.
SIDE EFFECTS AND NOTES:	• May cause hypotension, headache, fatigue, dizziness, nervousness, confusion, nausea and vomiting, edema, Bradycardia, AV block • May worsen CHF

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Narrow Complex Tachycardia	IV/IO	0.25 mg/kg slow IV/ IO up to 25mg. May repeat x1 0.35mg/kg prn up to 35mg.	Additional dosing per MC: Diltiazem infusion: 5-10 mg/ hour for a goal HR of 80-100. Hold for SBP < 90 or HR < 80.

PEDIATRIC DOSING—Contact MC

Diphenhydramine (Benadryl)

SCOPE:	EMT, AEMT, PM, PARAMEDIC
FORM:	50 mg/1 ml vial; 25 mg/ tablet; 25 mg/10 ml liquid suspension
CLASS:	Antihistamine
PHARMACOLOGY AND ACTIONS:	Diphenhydramine blocks the action of histamines released from cells during an allergic reaction. It has direct CNS effects, which may act as either a stimulant, or more commonly as a depressant, depending on individual variation. Diphenhydramine also has an anticholinergic and antiparkinsonian effect that is used to treat acute dystonic reactions to antipsychotic drugs (e.g., Haldol, Thorazine, Compazine, Inapsine) and other some other drugs. It also has mild anti-nausea and sedative effects. Binds and blocks H1 histamine receptors.
ONSET:	IV/IO/IM/PO: Variable
DURATION:	4-6 hours
INDICATIONS:	• Anaphylaxis and severe allergic reactions • To counteract acute dystonic reactions • Mild allergic reactions • Motion sickness and nausea
CONTRAINDICATIONS:	• Known allergy or sensitivity • Patient taking MAO inhibitors (phenelzine [Nardil], tranylcypromine [Parnate]): these medications can increase the anticholinergic effects.
PRECAUTIONS:	• May potentiate effects of alcohol or other CNS depressants. Halve the dose if intoxicated or elderly • Although useful in acute dystonic reactions it is not antidote for antipsychotic toxicity or overdose. Dystonic reactions can occur up to 48 hours after patient has taken certain medications (commonly antipsychotic or antiemetic). The reaction often involves twisting of facial or neck muscles. • May cause hypotension if given too rapidly by IV. • Contact medical control prior to administration if patient is hyperthermic or in a hot environment
SIDE EFFECTS AND NOTES:	• Remember: epinephrine is the first-line drug for severe allergic reaction or anaphylaxis. • Diphenhydramine side effects can include tachycardia, thickening of bronchial secretions, sedation, dry mouth, and paradoxical agitation.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Anaphylaxis, Allergic Reaction	IV/IO/IM/PO	25-50 mg	IV: SIVP Over 1 minute May repeat every 6 hours

PEDIATRIC DOSING (less than 14 years)

INDICATION	ROUTE	DOSE	NOTES
Anaphylaxis, Allergic Reaction	IV/IO/IM/PO	1-2 mg/kg (Max 50 mg)	IV: SIVP Over 1 minute May repeat every 6 hours

Weight (LBS)	Weight (KG)	Dose (2.5mg/ml)	Volume in Syringe(ml)
10	5	5mg	2.0ml
20	9	9mg	3.5ml
30	14	14mg	5.5ml
40	18	18mg	7ml
50	23	23mg	9ml
60	27	27mg	11ml
70	32	32mg	13ml
80	36	36mg	14.5ml
90	41	41mg	16.5ml
100	45	45mg	18ml
110	50	Use max dose 50mg	Use max dose 20ml
115	50		

3070

Epinephrine (Adrenaline)

SCOPE:	EMR, EMT, AEMT, PM, PARAMEDIC
FORM and CONCENTRATIONS:	Autoinjector (0.3mg/0.3ml) 1:1,000—1 mg/ml ampule or vial 1:10,000—1 mg/10 ml prefilled syringe
CLASS:	Sympathetic Alpha-beta-receptor agonist (sympathomimetic), adrenergic catecholamine
PHARMACOLOGY AND ACTIONS:	Epinephrine is a catecholamine with both alpha and beta effects. Generally, the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased blood pressure, increased myocardial oxygen consumption, increased automaticity. Potent bronchodilator.
ONSET:	IV/IO Immediate IM 3-5 minutes
DURATION:	IV/IO 5-60 minutes IM 1-4 hours
INDICATIONS:	• Anaphylaxis (severe allergic reaction) • Severe respiratory distress; severe asthma • Cardiac arrest • Vasopressor after ROSC • Symptomatic bradycardia or hypotension refractory to other treatment (except hypovolemia)
CONTRAINDICATIONS:	• NONE if patient is hypoxic secondary to anaphylaxis or asthma, or in cardiac arrest • Relative contraindications: Cocaine Use, coronary artery disease
PRECAUTIONS:	• Double check the concentration IM=1:1000 (1mg/ml) vs. IV/IO=1:10,000 (0.1mg/ml) and route. • Epinephrine increases cardiac workload and can precipitate hypertension, angina, MI or major dysrhythmias in individuals with ischemic heart disease. IV epinephrine should be limited to near-death situations because of higher risk from cardiac side effects. • Consider pulmonary edema or a pulmonary embolus in an elderly person with wheezing. • Do not administer epinephrine concurrently with alkaline solution (e.g., sodium bicarbonate).
SIDE EFFECTS AND NOTES:	• May cause anxiety, tremor, and headache • Cardiac side effects include tachycardia, palpitations, PVC's, angina, and hypertension

BLS Dosing (Anaphylaxis/Allergic Reaction) **ALL AGES: 0.3 mg IM (EPI 1:1,000)** via Auto-Injector

EMT Dosing per Procedure **1044**

See specific protocols for medical control requirements

ALS ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Cardiac Arrest	IV/IO	1 mg 1:10,000	Repeat dose every 3-5 minutes per protocol
Respiratory Distress	IM	0.3 mg 1:1,000	May repeat every 5-10 minutes per protocol
SEVERE Respiratory Distress	IV/IO	0.1 mg 1:10,000	SIVP over 1-2 min. May repeat dose every 1-2 minutes until relief

ALS PEDIATRIC DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Cardiac Arrest	IV/IO	0.01 mg/kg 1:10,000 (max 1 mg)	Repeat dose every 3-5 minutes per protocol
Respiratory Distress	IM	0.2 mg 1:1,000 (4-10 yrs.) 0.1 mg 1:1,000 (<4yrs)	May repeat every 5-10 minutes per protocol
SEVERE Respiratory Distress	IV/IO	0.1 mg 1:10,000	SIVP over 1-2 min. May repeat dose every 1-2 minutes until relief

3072

Epinephrine - Push Dose

SCOPE:	PM, PARAMEDIC
OLMC REQUIREMENT:	Contact OLMC for push-dose epinephrine. Proceed in communication failure.
FORM:	Push Dose: Add 1 ml of 1:10,000 epinephrine (i.e., 0.1mg of epinephrine) to 10ml syringe with 9 ml of NS to make Epi 1:100,000 (10mcg/ml).
CLASS:	Sympathetic Alpha-beta-receptor agonist (sympathomimetic), adrenergic catecholamine
PHARMACOLOGY AND ACTIONS:	Epinephrine is a catecholamine with both alpha and beta effects. Generally, the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased blood pressure, increased myocardial oxygen consumption, increased automaticity. Potent bronchodilator
ONSET:	IV/IO Immediate
DURATION:	IV/IO 5-60 minutes
INDICATIONS:	Hypotension after ROSC; Hypotension refractory to other treatment (except hypovolemia).
CONTRAINDICATIONS:	NONE if patient is hypoxic secondary to anaphylaxis or asthma, or in cardiac arrest • Relative contraindications: Cocaine Use, coronary artery disease
PRECAUTIONS:	• Epinephrine increases cardiac workload and can precipitate hypertension, angina, MI or major dysrhythmias in individuals with ischemic heart disease. IV Epinephrine should be limited to near-death situations because of higher risk from cardiac side effects. • Do not administer epinephrine concurrently with alkaline solution (e.g., sodium bicarbonate).
SIDE EFFECTS AND NOTES:	May cause anxiety, tremor, and headache; Cardiac side effects include tachycardia, palpitations, PVC's, angina, and hypertension

ADULT DOSING (>14 years)			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Shock	IV/IO Push Dose	10-20 mcg (1-2 ml) of 1:100,000 IV/IO push every 3-5-minute prn (if SBP < 90 or MAP < 65)	Add 1 ml (0.1mg) of 1:10,000 epinephrine into a 10ml syringe with 9 ml of NS. This makes 10 ml of Epi 1:100,000 (10mcg/ml).

PEDIATRIC DOSING (0-14 years)			
INDICATION	ROUTE	DOSE	NOTES
Shock	IV/IO Push Dose	1 mcg/kg, Max dose 10 mcg (1 ml). Repeat q 3-5 min prn	Mix 1:100,000 epi as above.

Epinephrine - Racemic

SCOPE:	PM, PARAMEDIC
FORM:	2.25% Solution in 0.5 ml for nebulizer
CLASS:	Sympathetic Alpha-beta-receptor agonist (sympathomimetic), adrenergic catecholamine
PHARMACOLOGY AND ACTIONS:	Epinephrine is a catecholamine with both alpha and beta effects. Generally, the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased blood pressure, increased myocardial oxygen consumption, increased automaticity. Potent bronchodilator - smooth muscle relaxation in the airways.
ONSET:	Immediate
DURATION:	2 hours
INDICATIONS:	Stridor, upper airway swelling (laryngeal edema), bronchoconstriction (wheezing), croup.
CONTRAINDICATIONS:	• NONE if patient is hypoxic • Relative contraindications: Cocaine Use, coronary artery disease, seizures, dysrhythmias
PRECAUTIONS:	Epinephrine increases cardiac workload and can precipitate hypertension, angina, MI or major dysrhythmias in individuals with ischemic heart disease.
SIDE EFFECTS AND NOTES:	May cause anxiety, tremor, and headache; Cardiac side effects include tachycardia, palpitations, PVC's, angina, and hypertension

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Stridor, upper airway swelling, bronchocon- striction (wheezing)	Nebulized	0.5 ml nebulized solution mixed with 2-4 ml NS	May repeat nebulized dose x2 if no improvement.

PEDIATRIC DOSING: Same as Adult

3080

Fentanyl (Sublimaze)

SCOPE:	PM, PARAMEDIC
FORM:	Carpuject or vial, 100 mcg/2 ml
CLASS:	Synthetic opioid agonist, Narcotic analgesic
PHARMACOLOGY AND ACTIONS:	Binds to opiate receptors, producing analgesia and euphoria. Fentanyl is a potent, synthetic opioid analgesic that produces analgesia and sedation with a short duration of action. Fentanyl is about 50-100 times more potent than morphine on a weight basis. 100 micrograms (0.1 mg) is approximately equivalent in analgesic activity to 10 mg of morphine. Fentanyl produces remarkably few hemodynamic changes, minimal histamine release, minimal nausea/ vomiting.
ONSET:	IV/IO Immediate IM 7-8 minutes IN 1-2 minutes
PEAK EFFECT:	IV/IO 5 minutes IM 10-12 minutes IN 5 minutes
DURATION:	30 minutes-1 hour (all routes)
INDICATIONS:	• Severe pain in STABLE patients (SBP >100 mmHg) • Cardiac chest pain • Analgesia after ALS airway (see Supraglottic Airway procedures)
CONTRAINDICATIONS:	• Shock/hypotension (SBP < 100) Known allergy to fentanyl • Altered mental status (esp. head injury)
PRECAUTIONS:	• Fentanyl can cause respiratory depression that is reversible with naloxone. Respiratory depression is exacerbated by underlying lung diseases and use of other respiratory depressant drugs so it should be used with caution with patients with known asthma or COPD. • Should be used cautiously at altitudes >8,000 ft. due to possible respiratory depression. • If administered rapidly in very large doses, fentanyl can cause muscle spasm and chest wall rigidity. The only reliable treatment for this is neuromuscular blockade. • The action of fentanyl is prolonged and its elimination slower in the elderly. Smaller maintenance doses are advisable. • Fentanyl must be used cautiously in patients that have already received morphine for prehospital analgesia. • Should be given before joint reduction if possible and if patient meets indications. • Should be used with caution with patients who have multi-system trauma.
SIDE EFFECTS AND NOTES:	• If hypotension develops, it is usually responsive to naloxone administration and fluids. • Bradycardia, nausea /vomiting may also occur • Side effects are increased by alcohol or drugs that are CNS depressants and other narcotics. • If transport time is >2 hours, or if repeated doses of fentanyl are ineffective, consider switching to morphine 15-30 minutes after previous dose of fentanyl. Discuss with Medical Control per protocol. • Recheck vitals and mental status before and after each dose. Administer ONLY if SBP>100 and normal mental status.

FENTANYL (Sublimaze)

General note on fentanyl dosing:

All patients respond differently to pain medication administration. Use clinical judgment for dosing based on patient weight, age, and background medical history (e.g., hepatic/renal disease, multi-system trauma, drug/alcohol use). When in doubt, start low and titrate up to desired effect.

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Cardiac Chest Pain (If ongoing pain or unresponsive to nitro, SBP > 100, and normal mental status)	IV/IO/IN	25-50 mcg	Repeat in 10 min x1 prn pain. Subsequent dosing, repeat q 20 minutes x2 prn pain. (i.e., Fastest possible dosing schedule would be at 0, 10, 30, 50 min.)
	IM	50-100 mcg	May repeat q 20 minutes x2 prn pain. (i.e., Fastest possible dosing schedule would be at 0, 20, 40 min.)

For general pain management (NOT Chest Pain):
Parkmedic & Paramedic: The first 100 mcg of fentanyl are standing order, regardless of route.

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
All protocols EXCEPT Cardiac Chest Pain (If ongoing pain, SBP > 100, and normal mental status)	IV/IO/IN	25-50 mcg	Repeat in 15 min x1 prn pain. Subsequent doses q 15 min to max total dose of 100 mcg without medical control
	IM	50-100 mcg	Repeat in 15 min x1 prn pain. Subsequent doses q 15 min to max total dose of 100 mcg without medical control

PEDIATRIC DOSING (0-10 years)			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
All protocols (If ongoing pain, SBP appropriate for age, and normal mental status)	IV/IO/IN	1 mcg/kg (Max 50 mcg/dose)	Repeat in 15 min x1 prn pain. Subsequent doses q 15 min to a max total dose of 100 mcg without medical control
	IM	2 mcg/kg (Max 100 mcg/dose)	Repeat in 15 min x1 prn pain. Subsequent doses q 15 min to a max total dose of 100 mcg without medical control

3085

Glucagon

SCOPE:	AEMT, PM, PARAMEDIC
FORM:	Two-vial kit: 1 mg powder and 1 ml of dilutant (each ambulance ONLY CARRIES 1 mg in its ALS kit)
CLASS:	Anti-hypoglycemic agent, pancreatic islet hormone
PHARMACOLOGY AND ACTIONS:	Increases blood glucose levels through release of glycogen stores from the liver. Counteracts action of insulin. Glucagon is a hormone that causes glucose mobilization in the body. It works opposite to insulin, which causes glucose storage. It is released at times of insult or injury when glucose is needed and mobilizes glucose from body glycogen stores.
ONSET:	IV/IO/IM/IN: 5-20 minutes
DURATION:	Variable
INDICATIONS:	• Known hypoglycemia (preferably demonstrated by BGL) when patient is confused or comatose and dextrose is not available or an IV cannot be started. • Possible Beta blocker overdose • Shock not responding to epinephrine in presence of beta blockers
CONTRAINDICATIONS:	**None**
PRECAUTIONS:	• IV dextrose is the treatment of choice for hypoglycemia in the patient who cannot tolerate oral glucose. The use of glucagon is restricted to patients who are seizing, comatose, combative, or with collapsed veins and in whom an IV cannot be started. PREFERRED ROUTE IM. • For hypothermic patients consider IN administration
SIDE EFFECTS AND NOTES:	• Nausea and vomiting may occur with administration • Persons who have no liver glycogen stores (malnutrition, alcoholism) may not be able to mobilize any glucose in response to glucagon. • Hyperglycemia (not clinically significant)

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Hypoglycemia	IM/IN/IV/IO	1 mg	May repeat once in 15 min. if ALOC persists and glucose remains <80
Beta Blocker overdose	IM/IN/IV/IO	2 mg	May repeat every 5 minutes for bradycardia/hypotension (shock)

PEDIATRIC DOSING (less than 14 years)

INDICATION	DOSE	ROUTE	NOTES
Hypoglycemia	IM/IN/IV/IO	0.03 mg/kg (max 1mg)	May repeat once in 15 min. if ALOC persists and glucose remains <80
Beta Blocker overdose	IM/IN/IV/IO	0.06 mg/kg	May repeat every 5 minutes for bradycardia/hypotension (shock)

Glucose - Oral (Paste)

SCOPE:	EMR, EMT, AEMT, PM, PARAMEDIC
FORM:	15g per tube
CLASS:	Carbohydrate (sugar)
PHARMACOLOGY AND ACTIONS:	Glucose is the body's basic fuel, and it produces most of the body's quick energy. Its use is regulated by insulin that stimulates storage of excess glucose from the bloodstream and glucagon that mobilizes stored glucose into the bloodstream.
ONSET:	PO: Within 1 minute
DURATION:	Variable
INDICATIONS:	When directed by specific PROTOCOL, if glucose < 80, or ALOC and unable to determine glucose.
CONTRAINDICATIONS:	**None**
PRECAUTIONS:	To give solutions orally, patients must be continually assessed for the ability to protect his or her own airway.If patient is unable to swallow, paste may be placed outside the teeth, between the gum and cheek, while patient is positioned on their side. IV/IO dextrose is preferred (first-line) for patients with altered mental status or seizure; second-line is PO glucose paste, and third-line is IM/IN glucagon.
SIDE EFFECTS AND NOTES:	• Research suggests that hyperglycemia may complicate, or worsen, a number of medical conditions (i.e., myocardial infarction, stroke). Oral glucose should be given to a conscious patient whenever hypoglycemia is documented by blood glucose meter. If the objective findings are not available, the EMT should use judgment based on signs and history. Hyperglycemia does not have clinically significant side effects. • Effects will be delayed in the elderly and people with poor circulation. • May be more tolerable if administered with liquid between dosages. Do not overfill mouth, increasing potential for aspiration. • Patient's condition may require more than one dose of oral glucose.

See specific protocols for medical control requirements

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Hypoglycemia	Oral	15 grams (one tube)	If patient is unable to swallow, paste may be placed outside of the teeth, between the gum and the cheek while the patient is positioned on their side to protect airway.
	May repeat in 10 minutes if altered mental status persists and/or blood glucose is still under 80		

PEDIATRIC DOSING (Same as adult)

3095

Haloperidol (Haldol®)

SCOPE:	PM, PARAMEDIC
MC REQUIREMENT:	Parkmedic: For any use of haloperidol. Paramedic: For subsequent doses.
STANDARD SUPPLY:	Ampule (5 mg/1 ml) (5 mg/ml)
CLASS:	Antipsychotic
MECHANISM OF ACTION:	Haloperidol is a butyrophenone that likely has antipsychotic effects by blocking postsynaptic dopaminergic receptors in the brain.
ONSET:	IV: 1-2 minutes; IM: 10 minutes
DURATION:	4-8 hours
INDICATIONS:	• Behavioral emergencies involving extreme agitation or combativeness • Excited delirium syndrome
CONTRAINDICATIONS:	• Hypersensitivity • Prolonged QT syndrome • Pregnancy • Parkinson's disease
PRECAUTIONS:	• Use caution when administering haloperidol to patients with impaired liver function. • Haloperidol is not approved for the treatment of patients with dementia-related psychosis due to increased mortality. • Haloperidol should not be administered to nursing mothers.
SIDE EFFECTS AND NOTES:	• May cause acute dystonic reactions. Treat with diphenhydramine (contact OLMC). • May cause hypotension. Treat with IV fluid administration. • May cause autonomic reactions such as dry mouth, blurred vision, urinary retention, and diaphoresis. • Respiratory depression is more likely when haloperidol is given rapidly or in patients who have taken other CNS depressants such as opioids, alcohol, and barbiturates.

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Behavioral emergencies, combativeness, excited delirium syndrome	IV/IN	2.5-5 mg	Contact OLMC for repeat doses
	IM	5-10 mg	Contact OLMC for repeat doses

NOT INDICATED IN PEDIATRIC PATIENTS less than 14 years old

Hydromorphone (Dilaudid®)

SCOPE:	PM, PARAMEDIC
OLMC REQUIREMENT:	Consider contacting MC on a case-by-case basis and after max dose has been administered.
STANDARD SUPPLY:	Vial (2mg/1ml) 0.5mg/ml
CLASS:	Semisynthetic opioid, analgesic
MECHANISM OF ACTION:	Hydromorphone binds to opioid receptors and inhibits pain perception. It has a relatively long duration of action. Hydromorphone results in minimal histamine release, minimal hemodynamic compromise, and minimal nausea/vomiting.
ONSET:	IV/IO: 5 minutes; IM: 5-20 minutes
DURATION:	4-5 hours
INDICATIONS:	• Severe pain in stable patients, especially when extended pain control is warranted • Analgesia after advanced airway placement
CONTRAINDICATIONS:	• Known hypersensitivity/allergy to drug class or other narcotics • Shock/hypotension, or concern for falling blood pressure
PRECAUTIONS:	• Monitor for respiratory depression. Underlying pulmonary disease may exacerbate respiratory depression. Be prepared with equipment to assist respirations and with naloxone for reversal. • Use with caution in head injuries, multi-system trauma patients, and in patients at altitudes > 8000 feet. • Side effects of hydromorphone are increased by alcohol, CNS depressants, and other narcotics.
SIDE EFFECTS AND NOTES:	• Potential side effects include respiratory depression, bradycardia, hypotension, nausea/vomiting, flushing, sedation/ drowsiness, pruritus, hypertension (rare). • Carefully monitor blood pressure and mental status before and after hydromorphone administration. • Use the lowest effective dose.

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Severe pain	IV/IO	0.5-1.0 mg	May repeat PRN every 30 minutes to max of 2 mg
Severe pain	IM	1 mg	May repeat PRN every 30 minutes to max of 2 mg

PEDIATRIC DOSING (10 - 14 years)			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Severe pain	IV/IO	0.015 mg/kg (max 1.0 mg)	May repeat PRN every 30 minutes to max of 1 mg
Severe pain	IM	0.015 mg/kg (max 1.0 mg)	May repeat PRN every 30 minutes to max of 1 mg

PEDIATRIC DOSING (< 10 years): Contact MC

3105

Ibuprofen (Motrin, Advil)

SCOPE:	EMT, AEMT, PM, PARAMEDIC
FORM:	200 mg tablet, 100mg/5ml liquid
CLASS:	Antipyretic, analgesic, Nonsteroidal Anti-Inflammatory Drug (NSAID)
PHARMACOLOGY AND ACTIONS:	Prostaglandin synthetase inhibition
ONSET:	20 minutes
DURATION:	6-8 hours
INDICATIONS:	Fever (acetaminophen is the first-line medication for fever) Pain
CONTRAINDICATIONS:	• Known hypersensitivity • Pregnancy • Known ulcer or GI bleeding • Trauma other than isolated extremity • Known renal disease
SIDE EFFECTS AND NOTES:	• May cause GI upset • If the person appears acutely ill in your judgment, do your best to convince the person of the need for evaluation. A PCR shall be completed in this instance, even if the evaluation is declined.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Fever or Pain	PO	600 mg	Repeat every 6 hours

PEDIATRIC DOSING (10-14 years)

INDICATION	ROUTE	DOSE	NOTES
Fever or Pain	PO	200 mg	Must be able to swallow tablets Repeat every 6 hours For 6mo.-10yrs.: 10mg/kg (max dose 200mg) liquid PO every 6 hours

LIQUID IBUPROFEN DOSING CHART: AGES 6 MOS.-10 YRS. (10 MG/KG)

Concentration 100 mg/5ml

Weight (LBS)	Weight (KG)	Dose (10mg/.5ml)	Total Volume to draw into syringe
5	2	20	1ml
10	5	50	2.5ml
15	7	70	3.5ml
20	9	90	4.5ml
25	11	110	5.5ml
30	14	140	7ml
35	16	160	8ml
40	18	180	9ml
45	20	Use max dose 200mg	Use max dose 10 ml
50	23		

Ipratropium Bromide (Atrovent®)

SCOPE:	EMT, AEMT, PM, PARAMEDIC
FORM:	500mcg in 2.5ml NS per unit-dose vial
CLASS:	anticholinergic, parasympatholytic
PHARMACOLOGY AND ACTIONS:	Ipratropium is an atropine derivative used for inhalation therapy. For severe asthma, ipratropium taken in addition to a short acting beta agonist (such as albuterol) can provide greater bronchodilation and clinical benefit than the beta agonist alone. It has no anti-inflammatory effects and does not decrease bronchial hyperresponsiveness.
ONSET:	15 minutes
PEAK EFFECT:	1-2 hours
DURATION:	3-6 hours
INDICATIONS:	As a supplement to albuterol in patients with respiratory distress from secondary bronchospasm such as asthma and COPD.
CONTRAINDICATIONS:	• Do not use in patients with severe glaucoma • Known hypersensitivity to ipratropium bromide • Peanut, soy, or lecithin allergy
PRECAUTIONS:	If patient gets significantly worse within 60 seconds of starting ipratropium or starts coughing (and was not previously coughing) then stop administration of ipratropium but continue albuterol.
SIDE EFFECTS AND NOTES:	• CNS: nervousness, dizziness, headache, delirium, psychosis, paresthesia, tremors. • Dry mouth, palpitations, GI distress, blurred vision, pharyngeal irritation • Increased intra-ocular pressure in glaucoma patients • Ipratropium is to be given only every 4 hours, as opposed to albuterol, which may be used continuously. • Ipratropium and albuterol can be mixed in a single nebulizer treatment.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Respiratory Distress due to bronchospasm (Asthma/COPD)	Nebulized with 10 L/ min oxygen	0.5 mg	Can combine with albuterol (DuoNeb) ipratropium should only be given every 4 hours, whereas albuterol can be used continuously Contact MC for additional doses

PEDIATRIC DOSING (Same as adult)

3115

Ketamine Hydrochloride (Ketalar)

SCOPE:	PM, PARAMEDIC
FORM:	Clear Liquid Vial: 100mg/ml (preferred concentration) or 50mg/ml
CLASS:	Dissociative agent, anesthetic, analgesic
PHARMACOLOGY AND ACTIONS:	Produces a state of anesthesia while maintaining airway reflexes, heart rate, and blood pressure. Blocks impulses of pain perception; suppresses spinal cord activity; affects CNS transmitter systems; anesthesia with profound analgesia, minimal respiratory depression; minimal skeletal muscle relaxation.
ONSET:	IV: IV: 20-30 seconds IN/IM: Sedation, 3-4 minutes; Analgesia 10-15 minutes
DURATION:	IV: 10-20 minutes IN/IM: 15-30 minutes
INDICATIONS:	• Behavioral Emergencies: extreme agitation or combativeness; Excited delirium • Moderate to severe pain with normal LOC • Sedation • Refractory bronchospasm
CONTRAINDICATIONS:	Hypersensitivity to ketamine
RELATIVE CONTRAINDICATIONS:	• Pregnancy • Hyperthyroidism • Cardiovascular disease • Gastroesophageal reflux • Hepatic dysfunction • History of alcohol abuse
PRECAUTIONS:	• With high doses or rapid administration, respiratory depression may occur. • For IV/IO administration, MUST dilute with equal amount of sterile water or saline.
SIDE EFFECTS AND NOTES:	• May cause hallucinations, hypertension, increased cardiac output, tachycardia, hypotension, bradycardia, nausea, vomiting. • Use with barbiturates or opioid analgesics may result in prolonged recovery time. • Concurrent administration with midazolam may decrease incidence of unpleasant dreams • Assess level of consciousness frequently—patient will experience a dissociative state and may emerge from this agitated, anxious, and/or hallucinating.

See specific protocols for medical control requirements

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Sedation (Dissociative dose)	IV/IO/IN	1 mg/kg	IV/IO: Must dilute with equal parts saline, SIVP 2 min. Repeat q 5 min x2 prn, max 3 doses total in communication failure.
	IM	2 mg/kg	Repeat q 10 min x2 prn, max 3 doses total in communication failure.
Analgesia (subdissociative dose)	IV/IO/IN	0.3 mg/kg	IV/IO: Mix dose in 100 ml NS, infuse over 5+ minutes. Repeat q 15 min prn pain max 2 mg/kg total in communication failure.
	IM	1 mg/kg	Repeat q 15 min prn pain max 2 mg/kg total in communication failure.

PEDIATRIC DOSING (0-14 years): Same as adult

KETAMINE DOSAGE CHARTS GIVEN ON FOLLOWING PAGES - CHECK YOUR MEDICATION CONCENTRATION!

Double-check your concentration!

These charts are for 100mg/ml concentration.

KETAMINE DOSE FOR SEDATION

(Dissociative Dose)

IV/IO: 1 mg/kg—MUST DILUTE with equal volume NS or Sterile Water, SIVP 60+ seconds.
IN: 1 mg/kg (add 0.1 ml for MAD device volume)
IM: 2 mg/kg

Patient Wt		IV/IO		IN	IM	
lb	kg	Dose mg	Dose ml	Add 0.1 ml for MAD	Dose mg	Dose ml
10	4.5	4.5 mg	0.05 ml	0.15 ml	9.1 mg	0.09 ml
20	9.1	9.1 mg	0.09 ml	0.19 ml	18.2 mg	0.18 ml
30	13.6	13.6 mg	0.14 ml	0.24 ml	27.3 mg	0.27 ml
40	18.2	18.2 mg	0.18 ml	0.28 ml	36.4 mg	0.36 ml
50	22.7	22.7 mg	0.23 ml	0.33 ml	45.5 mg	0.45 ml
60	27.3	27.3 mg	0.27 ml	0.37 ml	54.5 mg	0.55 ml
70	31.8	31.8 mg	0.32 ml	0.42 ml	63.6 mg	0.64 ml
80	36.4	36.4 mg	0.36 ml	0.46 ml	72.7 mg	0.73 ml
90	40.9	40.9 mg	0.41 ml	0.51 ml	81.8 mg	0.82 ml
100	45.5	45.5 mg	0.45 ml	0.55 ml	90.9 mg	0.91 ml
110	50	50 mg	0.5 ml	0.6 ml	100 mg	1 ml
120	54.5	54.5 mg	0.55 ml	0.65 ml	109.1 mg	1.09 ml
130	59.1	59.1 mg	0.59 ml	0.69 ml	118.2 mg	1.18 ml
140	63.6	63.6 mg	0.64 ml	0.74 ml	127.3 mg	1.27 ml
150	68.2	68.2 mg	0.68 ml	0.78 ml	136.4 mg	1.36 ml
160	72.7	72.7 mg	0.73 ml	0.83 ml	145.5 mg	1.45 ml
170	77.3	77.3 mg	0.77 ml	0.87 ml	154.5 mg	1.55 ml
180	81.8	81.8 mg	0.82 ml	0.92 ml	163.6 mg	1.64 ml
190	86.4	86.4 mg	0.86 ml	0.96 ml	172.7 mg	1.73 ml
200	90.0	90.9 mg	0.91 ml	1.01 ml	181.8 mg	1.82 ml
210	95.5	95.5 mg	0.95 ml	1.05 ml	190.9 mg	1.91 ml
225	102.3	102.3 mg	1.02 ml	1.12 ml	204.5 mg	2.05 ml
250	113.6	113.6 mg	1.14 ml	1.24 ml	227.3 mg	2.27 ml
275	125.0	125 mg	1.25 ml	1.35 ml	250 mg	2.5 ml
300	136.4	136.4 mg	1.36 ml	1.46 ml	272.7 mg	2.73 ml
325	147.7	147.7 mg	1.48 ml	1.58 ml	295.5 mg	2.95 ml
350	159.1	159.1 mg	1.59 ml	1.69 ml	318.2 mg	3.18 ml
375	170.5	170.5 mg	1.70 ml	1.80 ml	340.9 mg	3.41 ml
400	181.8	181.8 mg	1.82 ml	1.92 ml	363.6 mg	3.64 ml

KETAMINE DOSE FOR PAIN

(Sub dissociative Dose)

IV/IO: 0.3 mg/kg—MUST DILUTE in 100 ml NS, run over 5 minutes.
IN: 0.3 mg/kg (add 0.1 ml for MAD device volume)
IM: 1 mg/kg

Patient Wt		IV/IO		IN	IM	
lb	kg	Dose mg	Dose ml	Add 0.1 ml for MAD	Dose mg	Dose ml
10	4.5	1.4 mg	0.01 ml	0.11 ml	4.5 mg	0.05 ml
20	9.1	2.7 mg	0.03 ml	0.13 ml	9.1 mg	0.09 ml
30	13.6	4.1 mg	0.04 ml	0.14 ml	13.6 mg	0.14 ml
40	18.2	5.5 mg	0.05 ml	0.15 ml	18.2 mg	0.18 ml
50	22.7	6.8 mg	0.07 ml	0.17 ml	22.7 mg	0.23 ml
60	27.3	8.2 mg	0.08 ml	0.18 ml	27.3 mg	0.27 ml
70	31.8	9.5 mg	0.1 ml	0.2 ml	31.8 mg	0.32 ml
80	36.4	10.9 mg	0.11 ml	0.21 ml	36.4 mg	0.36 ml
90	40.9	12.3 mg	0.12 ml	0.22 ml	40.9 mg	0.41 ml
100	45.5	13.6 mg	0.14 ml	0.24 ml	45.5 mg	0.45 ml
110	50	15 mg	0.15 ml	0.25 ml	50 mg	0.5 ml
120	54.5	16.4 mg	0.16 ml	0.26 ml	54.5 mg	0.55 ml
130	59.1	17.7 mg	0.18 ml	0.28 ml	59.1 mg	0.59 ml
140	63.6	19.1 mg	0.19 ml	0.29 ml	63.6 mg	0.64 ml
150	68.2	20.5 mg	0.2 ml	0.3 ml	68.2 mg	0.68 ml
160	72.7	21.8 mg	0.22 ml	0.32 ml	72.7 mg	0.73 ml
170	77.3	23.2 mg	0.23 ml	0.33 ml	77.3 mg	0.77 ml
180	81.8	24.5 mg	0.25 ml	0.35 ml	81.8 mg	0.82 ml
190	86.4	25.9 mg	0.26 ml	0.36 ml	86.4 mg	0.86 ml
200	90.0	27.3 mg	0.27 ml	0.37 ml	90.9 mg	0.91 ml
210	95.5	28.6 mg	0.29 ml	0.39 ml	95.5 mg	0.95 ml
225	102.3	30.7 mg	0.31 ml	0.41 ml	102.3 mg	1.02 ml
250	113.6	34.1 mg	0.34 ml	0.44 ml	113.6 mg	1.14 ml
275	125.0	37.5 mg	0.38 ml	0.48 ml	125.0 mg	1.25 ml
300	136.4	40.9 mg	0.41 ml	0.51 ml	136.4 mg	1.36 ml
325	147.7	44.3 mg	0.44 ml	0.54 ml	147.7 mg	1.48 ml
350	159.1	47.7 mg	0.48 ml	0.58 ml	159.1 mg	1.59 ml
375	170.5	51.1 mg	0.51 ml	0.61 ml	170.5 mg	1.70 ml
400	181.8	54.5 mg	0.55 ml	0.65 ml	181.8 mg	1.82 ml

Double-check your concentration!

These charts are for 50mg/ml concentration.

KETAMINE DOSE FOR SEDATION

(Dissociative Dose)

IV/IO: 1 mg/kg—MUST DILUTE with equal volume NS or Sterile Water, SIVP 60+ seconds.
IN: 1 mg/kg (add 0.1 ml for MAD device volume)
IM: 2 mg/kg

Patient Wt		IV/IO		IN	IM	
lb	kg	Dose mg	Dose ml	Add 0.1 ml for MAD	Dose mg	Dose ml
10	4.5	4.5 mg	0.09 ml	0.19 ml	9.1 mg	0.18 ml
20	9.1	9.1 mg	0.18 ml	0.28 ml	18.2 mg	0.36 ml
30	13.6	13.6 mg	0.27 ml	0.37 ml	27.3 mg	0.55 ml
40	18.2	18.2 mg	0.36 ml	0.46 ml	36.4 mg	0.73 ml
50	22.7	22.7 mg	0.45 ml	0.55 ml	45.5 mg	0.91 ml
60	27.3	27.3 mg	0.55 ml	0.65 ml	54.5 mg	1.09 ml
70	31.8	31.8 mg	0.64 ml	0.74 ml	63.6 mg	1.27 ml
80	36.4	36.4 mg	0.73 ml	0.83 ml	72.7 mg	1.45 ml
90	40.9	40.9 mg	0.82 ml	0.92 ml	81.8 mg	1.64 ml
100	45.5	45.5 mg	0.91 ml	1.01 ml	90.9 mg	1.82 ml
110	50	50 mg	1 ml	1.1 ml	100 mg	2 ml
120	54.5	54.5 mg	1.09 ml	1.19 ml	109.1 mg	2.18 ml
130	59.1	59.1 mg	1.18 ml	1.28 ml	118.2 mg	2.36 ml
140	63.6	63.6 mg	1.27 ml	1.37 ml	127.3 mg	2.55 ml
150	68.2	68.2 mg	1.36 ml	1.46 ml	136.4 mg	2.73 ml
160	72.7	72.7 mg	1.45 ml	1.55 ml	145.5 mg	2.91 ml
170	77.3	77.3 mg	1.55 ml	1.65 ml	154.5 mg	3.09 ml
180	81.8	81.8 mg	1.64 ml	1.74 ml	163.6 mg	3.27 ml
190	86.4	86.4 mg	1.73 ml	1.83 ml	172.7 mg	3.45 ml
200	90.0	90.9 mg	1.82 ml	1.92 ml	181.8 mg	3.64 ml
210	95.5	95.5 mg	1.91 ml	2.01 ml	190.9 mg	3.82 ml
225	102.3	102.3 mg	2.05 ml	2.15 ml	204.5 mg	4.09 ml
250	113.6	113.6 mg	2.27 ml	2.37 ml	227.3 mg	4.55 ml
275	125.0	125 mg	2.5 ml	2.6 ml	250 mg	5 ml
300	136.4	136.4 mg	2.73 ml	2.83 ml	272.7 mg	5.45 ml
325	147.7	147.7 mg	2.95 ml	3.05 ml	295.5 mg	5.91 ml
350	159.1	159.1 mg	3.18 ml	3.28 ml	318.2 mg	6.36 ml
375	170.5	170.5 mg	3.41 ml	3.51 ml	340.9 mg	6.82 ml
400	181.8	181.8 mg	3.64 ml	3.74 ml	363.6 mg	7.27 ml

KETAMINE DOSE FOR PAIN

(Sub dissociative Dose)

IV/IO: 0.3 mg/kg—MUST DILUTE in 100 ml NS, run over 5 minutes.
IN: 0.3 mg/kg (add 0.1 ml for MAD device volume)
IM: 1 mg/kg

Patient Wt		IV/IO		IN	IM	
lb	kg	Dose mg	Dose ml	Add 0.1 ml for MAD	Dose mg	Dose ml
10	4.5	1.4 mg	0.03 ml	0.13 ml	4.5 mg	0.09 ml
20	9.1	2.7 mg	0.05 ml	0.15 ml	9.1 mg	0.18 ml
30	13.6	4.1 mg	0.08 ml	0.18 ml	13.6 mg	0.27 ml
40	18.2	5.5 mg	0.11 ml	0.21 ml	18.2 mg	0.36 ml
50	22.7	6.8 mg	0.14 ml	0.24 ml	22.7 mg	0.45 ml
60	27.3	8.2 mg	0.16 ml	0.26 ml	27.3 mg	0.55 ml
70	31.8	9.5 mg	0.19 ml	0.29 ml	31.8 mg	0.64 ml
80	36.4	10.9 mg	0.22 ml	0.32 ml	36.4 mg	0.73 ml
90	40.9	12.3 mg	0.25 ml	0.35 ml	40.9 mg	0.82 ml
100	45.5	13.6 mg	0.27 ml	0.37 ml	45.5 mg	0.91 ml
110	50	15 mg	0.3 ml	0.4 ml	50 mg	1 ml
120	54.5	16.4 mg	0.33 ml	0.43 ml	54.5 mg	1.09 ml
130	59.1	17.7 mg	0.35 ml	0.45 ml	59.1 mg	1.18 ml
140	63.6	19.1 mg	0.38 ml	0.48 ml	63.6 mg	1.27 ml
150	68.2	20.5 mg	0.41 ml	0.51 ml	68.2 mg	1.36 ml
160	72.7	21.8 mg	0.44 ml	0.54 ml	72.7 mg	1.45 ml
170	77.3	23.2 mg	0.46 ml	0.56 ml	77.3 mg	1.55 ml
180	81.8	24.5 mg	0.49 ml	0.59 ml	81.8 mg	1.64 ml
190	86.4	25.9 mg	0.52 ml	0.62 ml	86.4 mg	1.73 ml
200	90.0	27.3 mg	0.55 ml	0.65 ml	90.9 mg	1.82 ml
210	95.5	28.6 mg	0.57 ml	0.67 ml	95.5 mg	1.91 ml
225	102.3	30.7 mg	0.61 ml	0.71 ml	102.3 mg	2.05 ml
250	113.6	34.1 mg	0.68 ml	0.78 ml	113.6 mg	2.27 ml
275	125.0	37.5 mg	0.75 ml	0.85 ml	125.0 mg	2.5 ml
300	136.4	40.9 mg	0.82 ml	0.92 ml	136.4 mg	2.73 ml
325	147.7	44.3 mg	0.89 ml	0.99 ml	147.7 mg	2.95 ml
350	159.1	47.7 mg	0.95 ml	1.05 ml	159.1 mg	3.18 ml
375	170.5	51.1 mg	1.02 ml	1.12 ml	170.5 mg	3.41 ml
400	181.8	54.5 mg	1.09 ml	1.19 ml	181.8 mg	3.64 ml

Ketorolac (Toradol®)

SCOPE:	PM, PARAMEDIC
OLMC REQUIREMENT:	For administration to pediatric patients.
FORM:	Vial (30 mg/1 ml)
CLASS:	Analgesic, nonsteroidal anti-inflammatory drug (NSAID)
PHARMACOLOGY AND ACTIONS:	Inhibits the synthesis of prostaglandins.
ONSET:	IV/IM: 10 minutes
DURATION:	IV/IM: 4-6 hours
INDICATIONS:	Moderate to severe pain.
CONTRAINDICATIONS:	• Allergies to NSAIDs or aspirin • Pregnancy, active labor, or women who are breastfeeding • Renal impairment • Bleeding or high risk of bleeding, such as: multi-system trauma; suspected internal bleeding; GI bleeding/ulcers; Suspected or confirmed cerebrovascular bleeding; asthmatics, esp. with nasal polyps.
PRECAUTIONS:	• Avoid use in dehydrated patients. • Do not administer to patients with renal failure (stage 4 CKD). Use caution in patients with hepatic impairment. • NSAIDs can cause edema and fluid retention in patients with cardiac disease or hypertension: use caution. • Carefully observe patients with bleeding disorders or those who take anticoagulants.
SIDE EFFECTS AND NOTES:	• Ketorolac is an NSAID that provides opioid-level analgesia. • Ketorolac has been shown to be as safe and effective as narcotics in patients with kidney stones (renal colic). • Use lower dose (15mg) IV/IM in patients > 65 y/o or with concern for renal function. • Side effects include headache and dyspepsia. Serious adverse effects include acute kidney injury, GI bleed or ulcer perforation, prolong bleeding times (ketorolac inhibits platelet aggregation).

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Pain management	IV	15 mg	Max one dose IM or IV. For extended patient care >6 hours, contact MC.
	IM	30 mg	

PEDIATRIC DOSING >30 kg: Same as adult, <30kg, contact MC

3125

Lidocaine 2% (Xylocaine)

SCOPE:	PM, PARAMEDIC
SUPPLIED:	100 mg/5 ml
CLASS:	Local anesthetic
PHARMACOLOGY AND ACTIONS:	Lidocaine works as a numbing agent when used prior to administration of fluids and medications after IO insertion. Produces local anesthesia by reducing sodium permeability of sensory nerves, which blocks impulse generation and conduction.
ONSET:	45-90 seconds
DURATION:	10-30 minutes
INDICATIONS:	Intraosseous access needle use only, for pain control at injection site.
CONTRAINDICATIONS:	Hypersensitivity to amide-type anesthetics (lidocaine, bupivacaine, mepivacaine).
PRECAUTIONS:	Watch for adverse reactions, particularly anaphylaxis, seizures, dysrhythmia
SIDE EFFECTS AND NOTES:	• Side effects are rare, but can include slurred speech, drowsiness, confusion, nausea, vertigo, ataxia, tinnitus, paresthesia, muscle twitching, psychosis, seizures, respiratory depression, allergic reaction, anaphylaxis, dysrhythmia, palpitations, hypotension • Toxicity is more likely in elderly patients.

See specific protocols for medical control requirements

ADULT DOSING		
INDICATION	**DOSE**	**NOTES**
IO Insertion	40 mg (2ml)	push slowly over 2 minutes, once, if conscious or significant pain

PEDIATRIC DOSING		
INDICATION	**DOSE**	**NOTES**
IO Insertion	0.5 mg/kg (max of 40 mg)	push slowly over 2 minutes, once, if conscious or significant pain

Magnesium Sulfate

SCOPE:	PM, PARAMEDIC
FORM:	50%, 5 gm in 10 ml vial (500 mg/ml)
CLASS:	Antiarrhythmic, anticonvulsant, electrolyte, smooth muscle relaxant
PHARMACOLOGY AND ACTIONS:	Magnesium is a cation that has antiarrhythmic effects by prolonging conduction of cardiac impulses and stabilizing excitable membranes. It may relax bronchial smooth muscle in patients with severe bronchospasm
ONSET:	IV Immediate
DURATION:	3-4 hours
INDICATIONS:	• **Eclampsia:** In third trimester patients with hypertension and active seizures. Administer magnesium sulfate to stop eclamptic seizure and then may be continued to prevent recurrent seizures. • **Preeclampsia:** OLMC may order magnesium for preeclampsia prophylaxis or for patients who have recently suffered a seizure secondary to eclampsia. • **Pulseless Torsades de pointes:** after defibrillation, epinephrine, and amiodarone in the treatment of pulseless Torsades de pointes or cardiac arrest from suspected hypomagnesemia Torsades de pointes with a pulse: do not delay defibrillation of unstable patients to administer magnesium. • **Severe asthma:** in severe/life-threatening exacerbations after conventional treatment has failed.
CONTRAINDICATIONS:	• 2nd or 3rd degree heart blocks • Renal disease • Hypersensitivity
PRECAUTIONS:	In the nonarrest patient magnesium sulfate may cause hypotension, bradycardia, decreased reflexes, and respiratory depression.

NOTE: Use of magnesium sulfate for eclampsia/preeclampsia and any administration to pediatric patients is by Medical Control only.

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Eclampsia/ preeclampsia	IV/IO	5 g in 500 ml NS over 20 minutes	After initial dose, consider infusion of 1-2g/ hour
	IM	10 g divided 5 g each glute in actively seizing patient	If no IV access, may use 10g IM to stop eclamptic seizure. Then establish IV and contact MC for orders.
Torsades de pointes	IV/IO	1-2 g slow IV (15 minutes) in 100ml NS	Give as IV push in pulseless Torsades de pointes
Asthma	IV/IO	Usual dose is 2 g in 100 ml NS over 20 minutes	Contact MC for use in this situation

PEDIATRIC DOSING (<14 years 50 mg/kg up to max 2 g): MC orders ONLY (not Comm Failure)

NOTE: If <14 yo patient is pregnant or has recently given birth (< 4 weeks postpartum), treat as an adult.

3135

Midazolam (Versed®)

SCOPE:	PM, PARAMEDIC
FORM:	5 mg in 1 ml vial
CLASS:	Benzodiazepine, sedative/hypnotic, anticonvulsant, muscle relaxant
PHARMACOLOGY AND ACTIONS:	Midazolam binds to benzodiazepine receptors in the central nervous system, resulting in hyperpolarization and stabilization of neuronal membranes. It has potent sedative, anti-anxiety, and anticonvulsant properties. It depresses level of consciousness and causes significant amnesia.
ONSET:	IV/IO/IN: 1-2 minutes IM: 7-8 minutes
DURATION:	20-30 minutes
INDICATIONS:	• Active seizures, status epilepticus • Chest pain associated with cocaine use • Sedation during cardioversion or pacing • Behavioral emergencies: extreme agitation or combativeness; consider for ketamine-induced emergence reactions • Sedation after ALS airway (Supraglottic Airway)
CONTRAINDICATIONS:	• Hypotension • None, if actively experiencing seizures • Respiratory depression
PRECAUTIONS:	Midazolam causes respiratory depression and/or hypotension especially if administered rapidly. All patients should be closely monitored using EtCO2 and pulse oximetry to assess for respiratory depression.
SIDE EFFECTS AND NOTES:	• Common side effects include drowsiness, altered mental status, hypotension, respiratory depression, and apnea. These are more likely to occur in the elderly or COPD patients. Rarely, patients may experience paradoxical agitation. • Respiratory depression is more likely in patients who have taken other CNS depressant drugs such as opioids, alcohol and barbiturates, or when midazolam is given rapidly. • Midazolam is metabolized in the liver and excreted by the kidney. Doses should be adjusted accordingly in patients with underlying hepatic or renal diseases and low flow states such as congestive heart failure. • All patients should be on oxygen if possible to support possible respiratory depression • In communication failure, titrate IV/IN or IM doses to control active seizures or behavioral emergencies, without maximum, while carefully monitoring vitals. • Midazolam is metabolized in the liver and excreted by the kidney. Doses should be adjusted accordingly in patients with underlying hepatic or renal diseases and low flow states such as congestive heart failure. • Consider midazolam to treat/prevent emergence reactions in patients receiving ketamine (start with 1mg IV/IO/IN).

SCOPE: PM, PARAMEDIC

NOTE: Use of midazolam for behavioral emergencies in children <10 years of age is by Medical Control only.

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Agitation, ketamine-induced emergence, pacing, cardioversion, chest pain caused by sympathomimetic drug use (e.g., cocaine, methamphetamine)	IV/IO/IN	1-5 mg (estimated 0.05 mg/kg)	May repeat once in 5 min
	IM	5 mg	Call MC for repeat dosing.
Seizures, status epilepticus	IV/IO/IN	2 mg	May repeat every 3-5 minutes prn, max dose 10 mg without MC.
	IM	5 mg	May repeat every 15 minutes prn max dose 10 mg without MC.
Chemical Restraint	IV/IO/IN	2 mg	May repeat every 3-5-minute prn max dose 10 mg without MC.
	IM	5-10 mg	May repeat every 10-15 minutes prn max dose 10 mg without MC.

PEDIATRIC DOSING (<10 years)			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Agitation, ketamine-induced emergence, pacing, cardioversion, chest pain caused by sympathomimetic drug use (e.g., cocaine, methamphetamine)	IV/IO/IN	0.05 mg/kg	May repeat once in 5 min to a max of 0.1 mg/kg up to 2mg then call MC.
Seizures, status epilepticus	IV/IO/IN	0.05 mg/kg (max 2 mg)	May repeat once in 5 min to a max of 0.1 mg/kg then call MC.
	IM	0.1 mg/kg (max 5 mg)	May repeat once in 5 min to a max of 0.2 mg/kg then call MC.
Chemical Restraint	IV/IO/IN	MC ONLY	
	IM		

3140

Morphine Sulfate

SCOPE:	PM, PARAMEDIC
FORM:	10mg in 1 ml, vial or preloaded syringe
CLASS:	Narcotic analgesic
PHARMACOLOGY AND ACTIONS:	Acts on specific receptors in the brain to relieve pain, depress mental status, and depress respiratory drive. Peripheral vasodilation causing decreased venous return to the heart, decreased systematic vascular resistance, and hypotension. All decrease oxygen demand of the heart.
ONSET:	IV/IO: immediate IM: 10-30 minutes
DURATION:	IV/IO/IM: 3-4 hours
PEAK EFFECT:	IV/IO: 20 minutes IM: 40-60 minutes
INDICATIONS:	• Chest pain unrelieved by nitroglycerin. • Severe pain in hemodynamically STABLE patients. • Analgesia after ALS airway (see Supraglottic Airway)
CONTRAINDICATIONS:	• Patients in whom respiratory depression or histamine release should be avoided (asthma/COPD) • Patients in whom CNS (mental status) depression should be avoided (head injury) • Shock/hypotension • Allergy to morphine • Altitude Illness—HAPE
PRECAUTIONS:	• SBP > 100 and normal mental status to administer (SBP appropriate for age, pediatrics) • If transport time >2 hours, or if repeated doses of fentanyl are ineffective, consider switch to administration of morphine 15- 30 minutes after previous dose fentanyl. Discuss with medical control. • Do NOT use without medical control order if any other systems injured (e.g., traumatic abdominal pain, altered mental status) • Hypotension should be treated with fluids. Use caution with altitudes >8,000 ft, elderly who may require smaller doses and are more susceptible to hypotension, and alcohol or drugs that are CNS depressants.
SIDE EFFECTS AND NOTES:	• May cause hypotension, flushing, sedation, dizziness, respiratory depression, nausea, vomiting • Monitor vitals and mental status before and after each dose • Be prepared for respiratory depression and monitor closely with EtCO2. Have equipment to assist respirations and naloxone prepared for drug reversal if necessary

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Chest Pain or Severe Pain	IV/IO/IM	2-5 mg (0.2-0.5ml)	Repeat dose q 15 min prn pain (max 20mg)

PEDIATRIC DOSING (0-10 years)

INDICATION	ROUTE	DOSE	NOTES
Severe pain	IV/IO	0.1 mg/kg (0.01ml/kg) 5 mg max single dose	Repeat dose in 15 minutes x1 prn pain. (Max 10 mg)
	IM	0.2 mg/kg (0.02ml/kg) 5 mg max single dose	Repeat dose in 15 minutes x1 prn pain. (Max 10 mg)

Naloxone (Narcan®)

SCOPE:	EMR, EMT, AEMT, PARAMEDIC
FORM:	Preloaded syringe, 2 mg/2 ml
CLASS:	Opioid narcotic antagonist
PHARMACOLOGY AND ACTIONS:	Naloxone is an opioid antagonist that competes with narcotics for opiate receptor sites in the brain that affect pain and breathing, thereby reversing the respiratory depressant effects of narcotic drugs.
ONSET:	IV/IO: 2 minutes IM/IN: 5 minutes
DURATION:	1-4 hours
INDICATIONS:	• Suspected narcotic intoxication with altered mental status AND apnea or slow shallow breathing. • Altered level of consciousness (ALOC) of unknown etiology
CONTRAINDICATIONS:	None
PRECAUTIONS:	• In patients physically dependent on opioids, violent withdrawal symptoms may occur (combativeness, pain, nausea, vomiting, diarrhea, hypertension, tachycardia, tremors). Be prepared to restrain the patient and contact OLMC for guidance on managing patients in withdrawal. • Administering a lower dose (0.5 mg) to chronic opioid users may lessen withdrawal symptoms. If giving a lower dose, closely monitor the patient and ensure patient is breathing adequately. Administer additional doses as necessary. • Some opioid overdoses (e.g., methadone, designer drugs) may require multiple doses of naloxone to treat. • Patients with damaged nasal mucosa or prolific nasal secretions may be unable to absorb intranasal naloxone and may require either higher doses or naloxone administration by a different route.
SIDE EFFECTS AND NOTES:	• The effect we are attempting to reverse is respiratory depression/failure. Adequate airway management is the first goal that must be achieved. • Some opioids have longer durations of action than naloxone; repeat doses may be necessary. Monitor the patient closely. • Patients who have received naloxone must be transported. Symptoms may recur when naloxone wears off. • Pinpoint pupils are a classic sign of narcotic use/overdose. However, pupil findings may vary in multi-drug intoxications. • Naloxone is remarkably safe and side effects are rare. Do not hesitate to use it if indicated. • If no effect is seen from naloxone administration, consider other causes of altered mental status or respiratory depression. • For use of patient's own autoinjectors or nasal spray, follow instructions on drug packaging.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Reversal of opioid effects, ALOC of unknown etiology	IN/IM/ IV/IO	0.5 - 2.0 mg titrate to effect	Additional doses every 2-5 minutes prn ALOC (max 10mg)

PEDIATRIC DOSING (<20 kg)

INDICATION	ROUTE	DOSE	NOTES
Reversal of opioid effects, ALOC of unknown etiology	IN/IM/ IV/IO	0.1 mg/kg (Max 2 mg)	Additional doses every 2-5 minutes prn ALOC (max 10mg)

3150

Nifedipine (Procardia)

SCOPE:	UNIT SPECIFIC
FORM:	30 mg ER or 20 mg ER
CLASS:	Calcium Channel Blocker
PHARMACOLOGY AND ACTIONS:	Nifedipine, in its use as an altitude treatment agent, is predominantly for its pulmonary vasodilatory effect.
ONSET:	IPO - 30 minutes (Extended release)
DURATION:	24 hours
INDICATIONS:	High Altitude Pulmonary Edema (HAPE) prophylaxis in susceptible individuals and for treatment of those demonstrating symptoms of HAPE
CONTRAINDICATIONS:	• Hypersensitivity to Calcium Channel Blockers • Cardiogenic shock • Hypotension
PRECAUTIONS:	Although hypotension is not commonly seen with these doses, be aware that it is a possibility
SIDE EFFECTS AND NOTES:	• Flushing • Dizziness • Cough

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Treatment of HAPE	30mg ER q 12 hr or 20mg ER q 8hr	PO	

PEDIATRIC DOSING (no signs of puberty)

INDICATION	DOSE	ROUTE	NOTES

Nitroglycerin

SCOPE:	EMT, AEMT, PM, PARAMEDIC
FORM:	pump spray or tablet (0.4 mg per spray or tablet); paste: multi-dose or single dose tube
CLASS:	Nitrate, vasodilator
PHARMACOLOGY AND ACTIONS:	Increases cardiac output primarily by decreasing preload, but also decreases afterload and dilates coronary arteries. Nitroglycerin is an organic nitrate and is a vasodilating agent. Its cardiovascular effects include reduced venous tone (causing pooling of blood in the peripheral veins and decreased return of blood to the heart), decreased peripheral resistance and dilation of coronary arteries.
ONSET:	Tablet/Spray: immediate to 2 minutes; Paste: 10 minutes
DURATION:	Tablet/Spray: 10-30 min; Paste 24 hours
INDICATIONS:	Chest pain thought to be related to cardiac ischemia Pulmonary edema from CHF (not HAPE or noncardiogenic)
CONTRAINDICATIONS:	• Hypotension (SBP < 100) • Erectile dysfunction drug use in past 24 hours: • Viagra (sildenafil citrate), Levitra (vardenafil HCl) or Cialis (tadalafil) • Cerebral edema or increased intracranial pressure
PRECAUTIONS:	• Generalized vasodilation may cause profound hypotension and reflex tachycardia • Use with caution in patients with borderline blood pressure or with inferior/ right side MI. • Tablets should be placed under tongue, not chewed nor swallowed • Always handle nitro paste with gloves and place away from potential AED pad sites • Monitor vitals after 2-3 minutes after each dose • Patients taking nitrates chronically may develop a tolerance and require higher doses • Date bottle after opening. It is good for 2 months once opened. Protect it from heat and light.
SIDE EFFECTS AND NOTES:	• Common side effects are headache, hypotension, tachycardia, flushing, dizziness, diaphoresis, rash. • Nitroglycerin is not indicated for children.

See specific protocols for medical control requirements

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Chest Pain	SL	0.4 mg tablet or one spray every 5 minutes prn chest pain (max 8 tablets/ sprays)	If SBP > 100 mmHg
	Topical	One inch on special paper and applied to anterior chest wall	Wipe paste off if SBP <90
CHF/Pulmonary Edema	SL	SBP=100-120: 0.4 mg tablet or one spray OR SBP=120-200: two 0.4 mg tablets/ sprays OR SBP >200: three 0.4 mg tablets/sprays and call medical control Dose can be repeated per protocol.	Wipe paste off if SBP<90
	Topical	One inch on special paper and applied to anterior chest wall	Wipe paste off if SBP <90

PEDIATRIC DOSING (NOT indicated)

3165

Ondansetron (Zofran®)

SCOPE:	EMT, AEMT, PM, PARAMEDIC
FORM:	4 mg/2 ml vial OR 4 mg ODT (orally dissolving tablet)
CLASS:	Antiemetic
PHARMACOLOGY AND ACTIONS:	Ondansetron is a potent, highly selective serotonin (5-HT3) receptor agonist. Treats and prevents nausea and vomiting. Its precise mode of action in the control of nausea is not known. Pharmacologic agents and other triggers may cause release of 5-HT3 receptors. Ondansetron blocks the initiation of this reflex. Ondansetron is commonly used in the treatment of nausea in patients who are receiving chemotherapy or as a postoperative nausea treatment.
ONSET:	IV/IO/IM/ODT 2-5 minutes
PEAK EFFECT:	IV/IO 5 minutes IM 20 minutes SL/PO 30-120 minutes
DURATION:	IV/IO/IM/ODT 5-6 hours
INDICATIONS:	Prevention and control of uncomplicated nausea and vomiting
CONTRAINDICATIONS:	• Known hypersensitivity to ondansetron or similar medications • Prolonged QTc
PRECAUTIONS:	• Hypersensitivity reactions have been reported in patients who have exhibited hypersensitivity to other HT3 medications (Anzemet, Kytrik) • Patients with bowel obstruction should be monitored closely following administration. • Ondansetron may precipitate if mixed with alkaline solutions
SIDE EFFECTS AND NOTES:	• The most common side effects include headache, dizziness, drowsiness, diarrhea, dry mouth, and shivers • Body aches, agitation, dysuria, hypotension, and rash have also been reported in a very small number of patients. • Rare cases of angina and tachycardia have been reported as well • Consider administration of ondansetron prior to transport in patients who are fully immobilized.

See specific protocols for medical control requirements

ADULT DOSING			
INDICATION	**ROUTE**	**DOSE**	**NOTES**
Nausea and Vomiting	IV/IO	4 mg	SIVP over 2-5 min., repeat in 15 minutes x2 prn (max 3 doses)
	ODT	4 mg	May repeat in 15 minutes x2 prn nausea (max 3 doses)
	IM	8 mg	May repeat in 15 minutes x1 prn nausea (max 2 doses)

PEDIATRIC DOSING (3 mo-14 yrs)			
Nausea and Vomiting	IV/IO	0.1 mg/kg (max 4 mg)	SIVP over 2-5 min., repeat in 15 min. x2 prn (max 3 doses)
	ODT	Age 4-10 yo: ½ tab (2mg)	
	IM	0.2 mg/kg (max 8 mg)	May repeat every 15 minutes x1 prn nausea (max 2 doses)
MC CONTACT required for patients age 0-3 months (NOT in communication failure) 0.1 mg/kg SIVP only possibility.			

Oxygen

SCOPE:	EMR, EMT, AEMT, PM, PARAMEDIC
CLASS:	Medical Gas
PHARMACOLOGY AND ACTIONS:	Oxygen added to the inspired air raises the amount of oxygen in the blood and the amount delivered to the tis-sues. Breathing in most persons is regulated by small changes in acid/base balance and CO2 levels and it takes a large drop in oxygen concentration to stimulate respiration.
INDICATIONS:	• Suspected hypoxemia or respiratory distress from any cause (Adults: RR<10 or RR>24, Pediatric: see APPENDICES: Pediatric Parameters) • Acute chest pain, in which cardiac ischemia or myocardial infarction is suspected • Shock from any cause • Major trauma • Carbon monoxide poisoning • Irregular heart rhythms (Adult: HR<50 or HR >120, Pediatric: see APPENDICES: Pediatric Parameters) • Acute altered mental status/neurologic symptoms
CONTRAINDICATIONS:	None
PRECAUTIONS:	• If the patient is not breathing adequately on their own, the treatment of choice is ventilation with oxygen, not just supplemental oxygen • With COPD patients, administration of oxygen may decrease respiratory drive. Do not withhold oxygen because of this possibility. Start O2 at 2L/min via nasal cannula. If patient is continuing to be dyspneic, increase oxygen gradually until cyanosis clears. Change to NRBM and high flow if still cyanotic at 6L/min. Be prepared to assist ventilation if needed with BVM. • If patient is experiencing cardiac chest pain titrate to 90%. If 90% or greater, do NOT administer oxygen. • In a patient with a head injury, altered mental status, or possible stroke use low flow oxygen and titrate oxygen saturation to 94%. If 94% or above, DO NOT administer oxygen. Never withhold oxygen for patients with respiratory distress.
SIDE EFFECTS AND NOTES:	• Humidified oxygen should be used if the patient experiences airway discomfort, transport time is greater than 1 hour, or if directed by a specific protocol. • Restlessness may be an important sign of hypoxia • Oxygen toxicity is not a risk in acute administration • Nasal cannula prongs work equally well on nose and mouth breathers (move nasal prongs to mouth)

DOSING

ADJUNCT	FLOW	INSPIRED O2
Nasal cannula (mild distress, stable vitals)	2-6 liters/minute	24-40%
Nonrebreather Mask (severe distress, unstable vitals, ALOC)	10-15 liters/minute	90%
BVM (apnea, respiratory distress) (Target SaO2 is 100%)	Room air	21%
	15 liters/minute	40%
	With reservoir	90+%
CPAP	10-25 liters/minute	90+%

3170

Sodium Bicarbonate

SCOPE:	PM, PARAMEDIC
FORM:	50 mEq/50 ml prefilled syringe (1 mEq/ml)
CLASS:	Alkalinizing agent
PHARMACOLOGY AND ACTIONS:	Buffers the acids present in the body during and after severe hypoxia or ischemia; Counteracts cardiac effects of Tricyclic Antidepressants (TCAs); Alkalinizes urine to enhance elimination of some drugs (TCAs, aspirin); Lowers serum potassium; Acids are increased in the blood when body tissues become hypoxic due to cardiac or respiratory arrest. Acidosis depresses cardiac contractility and cardiac response to catecholamines and makes the heart more likely to fibrillate and less likely to defibrillate. In the nonperfusing patient sodium bicarbonate has been shown to increase the intracellular acidosis and worsen acid/base balance; thus, it is not recommended in the routine cardiac arrest sequence.
ONSET:	IV/IO Immediate DURATION: IV/IO 30 minutes
INDICATIONS:	• Cardiac arrest/dysrhythmias • Suspected hyperkalemia • Consider for TCA or ASA OD with abnormal vitals or wide QRS on ECG • Acidosis, including that caused by prolonged cardiac arrest/dysrhythmias or drug intoxication (i.e., barbiturates, salicylates [aspirin], methyl alcohol, tricyclic antidepressants) • Consider in excited delirium
CONTRAINDICATIONS:	None
PRECAUTIONS:	• Addition of too much bicarbonate may result in alkalosis that is difficult to reverse and may cause as many problems in resuscitation as the initial acidosis. • May increase cerebral acidosis, especially in diabetics who are ketonic. • Although no longer recommended in routine cardiac arrest, sodium bicarbonate may be indicated with a history of toxicologic exposure, renal failure, or excessive exertion. • Flush IV line before and after administration of any other drugs. • Severe tissue necrosis may occur of sodium bicarbonate extravasates. • May worsen CHF
SIDE EFFECTS AND NOTES:	• Hypoventilation, volume overload, muscle cramps, pain, tetany • Each amp of sodium bicarbonate contains 50 mEq of sodium. This may increase intravascular volume and hyperosmolarity resulting in cerebral impairment.

MC REQUIRED: Parkmedic—in cases other than cardiac arrest. Paramedic—in cases other than cardiac arrest or overdoses

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Overdoses: Tricyclic antidepressant or ASA	IV/IO	1 mEq/kg (max 50 mEq)	SIVP, consider serial ECGs to titrate to effect.
Cardiac Arrest	IV/IO	1 mEq/kg (max 50 mEq)	SIVP, may repeat at 0.5 mEq/kg in 10 min
Hyperkalemia	IV/IO	1 mEq/kg (max 50 mEq)	SIVP, consider serial ECGs to titrate to effect.

PEDIATRIC DOSING (0-14 years): Contact MC for dosing. Children <10kg, dilute with equal parts NS prior to administration.

Tranexamic Acid(TXA)

SCOPE:	PM, PARAMEDIC
FORM:	1 gm/10ml vial (100 mg /ml)l
CLASS:	Antifibrinolytic, antihemophilic, hemostatic agent
PHARMACOLOGY AND ACTIONS:	Tranexamic acid inhibits the conversion of plasminogen to plasmin, thus preventing the breakdown of fibrin, the protein that holds clots together (i.e. TXA stabilizes blood clots).
ONSET:	10 minutes
DURATION:	Up to 48 hours
INDICATIONS FOR TOPICAL USE:	Uncontrolled epistaxis or dental bleeding
INDICATIONS FOR TRAUMA (MUST MEET ALL CRITERIA BELOW):	• Adult (age 15 or greater) with signs of hemorrhagic shock from trauma OR postpartum hemorrhage • Obvious bleeding from external wounds (neck to mid-thigh) and/or suspected severe internal injuries from blunt or penetrating trauma
AND CRITERIA FOR USE:	• Trauma occurred within the last 3 hours • Sustained tachycardia (HR > 110) and/or sustained hypotension (SBP ≤ 90mmHg)
CONTRAINDICATIONS:	• Non-hemorrhagic shock • Hemorrhagic shock stabilized by other hemostatic interventions • Patient < 15 years of age
SIDE EFFECTS AND NOTES:	• TXA has not been shown to cause significant increase in deep venous thrombosis, pulmonary embolism, myocardial infarction, or stroke in published trials to date, despite theoretical concerns that it may do so. • Give TXA as soon as possible if all indications are met.

ADULT DOSING

INDICATION	ROUTE	DOSE	NOTES
Hemorrhagic shock with all criteria for use met (see above indications)	IV/IO	2 gm	Mixed in 100 ml NS over 10 min
Uncontrolled epistaxis or dental bleeding	Topical	5 ml on gauze	Soak gauze/cotton with 5ml TXA, and apply to area of bleeding for 30min (inside nostril, or in mouth)

PEDIATRIC DOSING (0-14 years): Not Indicated

Appendix

SECTION 4000

4005

Canine Opioid Exposure – Narcan Administration

WHEN TO ADMINISTER NARCAN TO A K9.

Known overdose of opioid

- Heroin, morphine, fentanyl, carfentanil
- Clinical Signs can present within 15 minutes

Clinical Signs can include:

- Drowsiness
- Difficulty standing
- Failure to respond to commands
- Blank stare
- Weakness, progressing to unconsciousness
- Inability to breathe, leading to death

WHAT IS THE DOSAGE?

- 4.0 mg Intranasal (IN)
- Dose will depend on the amount of opioid exposure

ATOMIZER

- 2.0 mg
- 4.0 mg

ADMINISTRATION

- Hold snout closed with one hand and place tip of atomizer inside one nostril
- Compress atomizer
- Place basket muzzle on dog IMMEDIATELY after administration
  - » Allow dog to pant (cooling mechanism), vomiting MIGHT occur
  - » HUMAN should wear mask, eye cover and gloves
- Repeat every 2 minutes if clinical signs do not resolve
  - » If not breathing, apply tight fitting facemask and attach to ambubag and ventilate 6 breaths per minute
  - » Remove muzzle to re-dose and replace immediately, continue to monitor for breathing
- Transport to veterinary facility

ADVERSE SIGNS TO OBSERVE FOR:

- Excitability, vomiting and tachycardia (rapid heart rate)

Dogs can come out of the overdose very excited and disoriented. They may not respond to handler commands. Care should be taken to keep dog from harming itself, the handler, and bystanders.

National Park Service
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