WHATCOM COUNTY SYSTEM
EMS PROTOCOLS

Rev. 10/29/25

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RECEIPT OF PROTOCOLS

TO: Ralph E. Weiche, M.D.
Whatcom County Medical Program Director

SUBJECT: Whatcom County EMS Protocols (2025 Edition)

The purpose of this memo is to inform you that I have received the EMS Protocols. I have reviewed these protocols and will abide by their direction. I understand that ALS providers are responsible for knowing and following these protocols in their entirety and **BLS providers are responsible for all BLS protocols (not highlighted in pink or blue).**

If signing as a representative of an EMS agency or provider supervisory organization, I attest that responders in my organization will be trained in and adhere to these guidelines.

For medication dosing and information consult the medication protocol and/or HandTevy system.

_____
Signature

_____
Printed Name and Title

_____
Agency

_____
Date

(May be submitted electronically)

Medical Program Director's Copy
Return to WCEMSTCC Office

ADDENDUM AND REVISION LOG

MAJOR CHANGES

Change	Page
ResQ Pump removed from protocol	1
ALS Indicator: Added head injury with new paralysis, focal weakness, or numbness.	7
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Non-EMS Transport: Removed “Notify ED Charge Nurse when alternative transport is arranged to the ED.”	9
Refusal of Care: Revised refusal and medical capacity language, checklist. High risk concept.	10-14
Initiation and Termination of Resuscitation (TOR): language moved to cardiac arrest protocols	16-17 (removed), 43 (Medical), 109 (Trauma)
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WHATCOM COUNTY EMERGENCY MEDICAL SERVICES

Acknowledging the hard work, knowledge, fine attention to detail, and commitment of the following members who contributed valiantly to updating the 2025 Whatcom County EMS Protocols. Your dedication is deeply honored and greatly appreciated:

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INTRODUCTION - GENERAL PATIENT CARE PROTOCOLS

Authorization for EMS personnel to provide pre-hospital medical care comes directly from the State approved Medical Program Director (MPD).

These protocols serve as the guidelines for EMRs, EMTs, and paramedics working in Whatcom County, and may be used by EMS organizations operating in Whatcom County by agreement with the MPD. All EMS personnel are required to use the protocols appropriate to their certification level. In cases of mutual aid when an emergency is declared through official channels outside of Whatcom County, these protocols become portable. When an incident occurs beyond the normal capacity of our system multiple casualty incident (MCI), normal procedures may be superseded and BLS providers may be utilized to transport ALS patients.

This document is to be considered a set of standing orders or off-line permission to act. These protocols are not absolute treatment doctrines. They are guidelines with the flexibility to meet the complex challenges faced by the EMS provider in the field. The MPD delegates daily authorization for pre-hospital patient care and decision making to the on-line medical control physician on duty at PeaceHealth St. Joseph Medical Center's Emergency Department **(360-715-4149)** Direct Line to Medical Control. At any time, the responder is not certain that a patient or situation meets the criteria set forth, responders may contact Medical Control for guidance or to obtain on-line permission to act. In certain unusual situations, procedures not outlined here may be approved or ordered by Medical Control. If unable to reach Medical Control in rare circumstances, EMS personnel should document this carefully and do what they feel is best for the patient. Throughout this document, Medical Control refers to the on-duty Emergency Department Physician (Star Doc), or the MPD or Supervising Physician for each agency.

Whatcom County MPD along with the EMS and Trauma Care Council have approved the following as standard for EMS agencies in Whatcom County:

- ResQPOD as the standard Impedance Threshold Device
- I-gel® as the standard Supraglottic Airway
- LUCAS as the standard Mechanical Compression Device
- Exceptions must be approved by the MPD

These protocols shall replace and supersede all prior EMS Protocols in Whatcom County.

RESPONSIBILITY OF PRE-HOSPITAL PERSONNEL

1. Once EMS personnel are dispatched to a scene, they assume legal authority for patient management under the direction of the medical control physician in the Emergency Department (ED).
2. The EMS provider's primary responsibility is to the patient.
3. Treat offers of help from non-EMS providers professionally and respectfully.
    a. Request and document identification – a current medical license, medical specialty ID card, or hospital ID are acceptable.
    b. If the physician is present, has appropriate specialization for the patient's complaint, and is willing to assume responsibility for the patient's care, you may defer to the physician's orders, unless they conflict with these protocols. Document the physician's orders and acceptance of responsibility on the patient care report.
    c. To resolve conflicts, contact Medical Control and arrange telephone consultation between the physicians.
    d. If the physician is not willing to accompany the patient to the hospital, responsibility reverts to the medical control physician.

BLS ADMINISTRATION OF MEDICATIONS

EMTs may administer or assist patients with administration of the following medications as permitted by State policy.

- **Acetaminophen (Tylenol)**
- **Activated charcoal**
- **Aspirin**
- **Epinephrine IM**
- **Metered Dose Inhalers (MDIs) and nebulized Albuterol**
- **Naloxone by nasal administration**
- **Nitroglycerin**
- **Nitrous oxide**
- **Oxymetazoline (Afrin)**
- **Supplemental oxygen**

BLS providers must have received specialized training to administer albuterol, activated charcoal, epinephrine, nitroglycerin, nitrous oxide, and oxymetazoline (Afrin)

1. Confirm medication is not expired prior to administration.
2. Nitroglycerin should have been prescribed by a provider in the past.
3. Acetaminophen, albuterol, aspirin, epinephrine, and naloxone do not require prior prescriptions.
4. Activated charcoal should be recommended by Medical Control or WA State Poison Control (1-800-222-1222) prior to administration.
5. If in doubt, contact Medical Control.

Intranasal (IN) Administration

1. Attach nasal atomizer to syringe.
2. Place atomizer within the nostril and briskly administer half on each side.

EPINEPHRINE INJECTION PROCEDURE

Indications: Hypotension, hypoxemia, sustained tachycardia (before epinephrine), labored breathing, wheezing or diminished lung sounds, diffuse hives, inability to speak or swallow, oral swelling and throat tightness.

Contraindications: None in a life-threatening emergency.

Epinephrine – Intramuscular Injection

- Scrub the skin vigorously with an alcohol wipe.
- Break open ampule, or, if using a vial, cleanse vial with alcohol wipe.
- Insert the needle into the ampule or vial and withdraw the appropriate volume of medication.
- Hold the needle upright. Push any air bubbles and extra medication out of the syringe.
- Use the anterolateral thigh (preferred, especially for children) or middle deltoid. Broadly hold the muscle, stab the needle at a 90° angle to the skin surface, and inject the medication into the muscle.
- Discard the needle in the Sharps Container.
- Cover the puncture site with an adhesive bandage.

INITIAL PATIENT ASSESSMENT

Primary Survey

1. Airway - assess for obstruction, gag reflex and aspiration risk. Consider oral airway, nasal airway, supraglottic airway or intubation as needed.
2. Breathing - rate and quality. Consider oxygen based off patient necessity. Ventilate with BVM as needed, taking care not to hyperventilate.
3. Circulation – HR, blood pressure, pulses, capillary refill, cyanosis. Control external bleeding.
4. Obtain and record vital signs as indicated by patient condition, including heart rate, blood pressure (indicate patient's position), respiratory rate, temperature, skin color, GCS (or AVPU system or another indicator of level of consciousness), blood glucose, SpO2, and ETCO2.

Secondary Survey

1. Expose the patient and perform a head-to-toe assessment specific to event.
2. Obtain a brief history from the patient, family, and bystanders. Check for medical alerts and POLST forms.
3. Ask all patients about allergies and do not administer these medications unless necessary to treat a life-threatening condition.
4. Place the patient in a position of comfort.
5. Bring relevant drug containers and notes for transport with patient.
6. Reassure the patient and keep him/her informed about treatment.

Communications

1. Contact medical control for advice regarding treatment plan, when treatment not included in these protocols is considered in the patient's best interest, or when considering an unusual disposition.
2. Advise the ED Charge Nurse early of patient transport for OMI, major stroke, or stroke within 24 hours of last known normal, major trauma, multiple consecutive patients, airway issues, or other critical patients.
3. In radio or telephone information to Medical Control or ED Charge Nurse, identify:
    a. Transporting unit
    b. Patient's age, sex, and chief complaint

c. Vital signs, level of consciousness, and physical assessment findings
d. Pertinent history (medications, illnesses, allergies, mechanism of injury, etc.)
e. Treatment given and patient's response
f. Patient’s full name and birth date
g. Estimated time of arrival (ETA)

4. Advise ED of significant changes in patient's condition during transport.
5. On arrival, give a verbal report to ED nurse and/or physician.

ALS INDICATORS FOR ALL PATIENTS

1. Patients with any of the following require an ALS evaluation, though ALS may determine that the patient is appropriate for BLS transport:
    a. Decreased LOC off baseline
    b. Airway compromise
    c. Respiratory distress or rate over 30 breaths per minute
    d. Signs and symptoms of shock which include:
        i. Weak distal pulses, poor capillary refill, cyanosis, pale or diaphoretic skin
        ii. Sustained tachycardia (heart rate over 100 beats per minute)
        iii. Hypotension (systolic BP less than 90 mmHg) unless normal for the patient
    e. Chest pain or discomfort - unless secondary to minor trauma e.g. seatbelt pain
    f. Significant Trauma/Mechanism of Injury (MOI)
        i. Head injury with new paralysis, focal weakness, or numbness
        ii. Penetrating trauma to the head, neck, chest, abdomen, pelvis, or groin
        iii. Multi-system trauma or fractures at more than one location
        iv. MVC—death in same vehicle, high speed, significant vehicle deformation, auto vs pedestrian, or ejection or separation from the vehicle
        v. Falls greater than two times body height
        vi. Thrown greater than 10 - 15 feet
        vii. Extremity trauma with pulse deficit
    g. Significant pain
    h. Debilitating anxiety and/or combative agitation
    i. Uncontrolled bleeding
    j. Active seizure or multiple seizures within 24 hours
    k. EMT's Index of Suspicion (IOS) that the patient is sick or on EMT request
2. BLS units should consider transport to the ED or to rendezvous with an ALS unit if there is going to be a significant delay until ALS arrival.
3. Generally, any patient that has had an ALS procedure performed should be transported by the ALS unit. Exceptions may occur, e.g., when a saline lock is present and a trained BLS provider will be transporting, or with consent of medical control.

BLS UNITS TRANSPORTING CODE RED

Studies show transport with lights and sirens only save seconds to minutes, which are usually not clinically significant. However, BLS may transport Code Red when patient condition would benefit from getting to definitive care sooner than later, for example, for stroke with no airway compromise.

LEFT AT SCENE AND NON-EMS TRANSPORT

1. Transport by POV or by taxi voucher may be arranged for willing non-emergent patients requiring medical care who can ambulate independently.
2. If medical needs are not thought to be urgent, EMS providers may help a patient secure an appropriate outpatient appointment and transportation. EMS providers must give patient careful instructions about when to call back to 911 and patient must be able to understand the instructions.
3. If a patient is requesting EMS transport but EMS providers feel the patient does not have urgent medical needs or require EMS transport, EMS should transport or discuss with Medical Control.
4. Before leaving any patient with abnormal vital signs, this decision must be cleared by Medical Control.
5. Documentation on any patient left at scene, or transported by means other than EMS, should include a thorough history and examination, to include a full set of vital signs, a clinical impression, a summary of the discussion with the patient, and/or family, and a plan for follow-up. Also, an assessment of the patient's capacity to make decisions and care for themselves.

REFUSAL OF CARE

Mandatory Transport

1. Patient is a threat to themselves or others, e.g. suicidal or homicidal ideation or violent behavior.
2. Pediatrics/minors with possible emergent illness/injury.
3. Patient lacks capacity or there is any doubt regarding their capacity.

Have a low threshold to involve Medical Control and/or Law Enforcement. Request ALS as needed.

Medical Decision-Making Hierarchy

1. Patient's expressed wishes if, and only if, they are deemed to have capacity.
2. DNR or Advanced Directive.
3. Designated Medical Power of Attorney or Health Care Surrogate.
4. In the absence of any of the above, family hierarchy as below:

    A. Spouse or Domestic Partner

    B. Adult children

    C. Parent

    D. Adult siblings

    E. Adult grandchildren

    F. Adult nephews and nieces

    G. Adult aunts and uncles

Special Considerations

Minors

1. Minors (under 18) cannot generally consent or refuse care.
2. Guardians cannot refuse transport if a medical emergency is suspected.
3. EMS should contact a parent/guardian for consent. If unavailable, a person "in loco parentis" (e.g., teacher, relative) may consent.
4. Emancipated minors must have legal documentation or a marriage license.

Mental Health & Psychiatric Emergencies

1. Mental illness can impair capacity but not always. Psychiatric emergencies are complex,

and a patient's decisional capacity may still be intact.
2. Patient's with stated suicidal ideation or attempts do not have capacity to refuse care.
3. Attempts should be made to assure a responsible adult is present for non-transport.
4. For combative pts lacking capacity and attempting to refuse care, contact law enforcement. Patient will be transported by police or EMS to ED for evaluation.
5. EMS personnel are not required to put themselves at risk to restrain combative patients. Elicit assistance from law enforcement, mental health, DCR, MCOT, and Medical Control as needed.

Intoxicated Patients

1. Intoxication can impair capacity, but intoxication does not automatically negate decision-making ability.
2. Intoxicated patients with impaired capacity should be treated with caution, with thorough documentation and assessment of their ability to make decisions.

Transient Capacity

1. Some patients (e.g., hypoglycemia or opioid overdose) may regain decisional capacity rapidly after treatment.
2. If a patient regains capacity, their autonomy must be respected, but if they lose capacity again, standard care should resume.

Elderly Patients

1. Cognitive decline, such as dementia, does not always impair capacity.
2. For patients with cognitive decline who refuse transport, EMS must assess capacity focusing on the patient's current ability to make decisions, without bias due to their existing diagnosis, and transport for further evaluation if needed.

End-of-Life Considerations

1. Respect for autonomy is paramount in terminally ill patients refusing transport. If the patient lacks capacity, EMS should consult advanced directives, family, or online Medical Control.
2. Advanced Directives or POLST forms take precedence over family member's wishes; documentation and family consultation are critical.

REFUSAL CHECKLIST

Demographics

- Name
- Age
- DOB
- DPOA or guardian if applicable
- Primary language and/or use of interpreter

History, especially:

- Toxic exposure
- Drugs/alcohol
- Indicators of endocrine/metabolic crisis
- Trauma
- Psychiatric/behavioral health complaints

Medications

Antihyperglycemic medications, anticoagulants or antiplatelets, controlled medications, psychiatric medications

Special Considerations

- Hospice/End-of-life
- Behavioral Health Crisis; suicidal or homicidal ideation, psychosis, paranoid delusions
- Cognitive impairment
- Intoxication
- Minors

Exam

- At least one (ideally two) complete sets of vitals including: BP, HR, RR, SpO2, Temp.
- Blood glucose
- EKG as indicated
- Neuro exam as indicated
- Signs of trauma
- Signs of shock
- Signs of drug use or toxic exposures

Assessment of Patient's Medical Condition

1. Differential for suspected medical condition (i.e., in patient with chest pain- ACS/OMI, PE, Pneumothorax, Aortic Dissection, etc.).

2. Risks and suspected outcome if patient declines treatment/transport (e.g. delayed diagnosis and treatment, permanent organ injury or death).

Provide Patient With Your Clinical Recommendations

Provide patient with your medical assessment, recommended actions (treat/transport), and rationale for needing additional diagnostics, workup, and treatment in the ED. Then discuss the consequences of declining treatment/transport.

If the Patient Declines Your Recommendations, Assess the Patient's Capacity

1. Patients (or legal guardians or DPOAs if applicable) who display **ALL** of the following have decision making capacity and can make decisions regarding their medical treatment and transport:
    - **Understanding**
        - What medical problem are you having right now?
        - What options are we proposing to help you?
    - **Appreciation**
        - What could happen if you accept treatment/transport?
        - What could happen to you if you decline treatment/transport?
    - **Reasoning**
        - Why don't you want treatment/transport for your condition?
        - What factors are most important to you in making your decision?
        - Do you trust that we are trying to help you? (Why/why not)
    - **Communication**
        - Given what we have discussed, what would you like to do?
2. Patients who do not meet **ALL** of the above criteria **DO NOT** have decision making capacity and cannot make decisions regarding their medical treatment and transport. These pts should be treated and transported with implied consent.
3. Consider involving additional resources like Medical Control, EMS Captain, police, DCR or MCOT.
4. Mental illness, drugs, alcohol, toxic exposure, physical/mental impairment, psychiatric/behavioral health complaints, cognitive decline, hypoglycemia, endocrine/metabolic crisis, hypoxemia, trauma, or head injury may impair a patient, but are not sufficient to eliminate decision-making capacity alone.

Online Medical Control

Consider liberal use of Online Medical Control in cases where there is any doubt whether the patient has capacity or there is high concern for emergent disease/injury. Document any physician interaction with the patient and/or guidance given to medics. Document date, time, and physician name. If unable to reach, document attempt(s) made and time(s).

Outcome

Document decision:

- Treatment/Transport, Patient Declined, Patient taken via POV, Police assistance required for physical restraint and patient sedated for safe transport, etc.

Counseling

Counsel patient (or legal guardians, next of kin (NOK), DPOAs, as applicable:

- Patient can change their mind at any point and call 911 to proceed with treatment/transport for further assistance.
- If they do not call back, they should transport themselves to the ED (ideally) or see their primary doctor at their earliest possible convenience.

Signatures

Obtain signatures from the patient, legal guardians, DPOA and witnesses if possible.

Video

Consider taking a video of the pt refusing transport and attaching it to the ePCR.

Documentation

1. Detailed patient history of present illness and pertinent past medical history.
2. Vitals.
3. Detailed exam.
4. Narrative
    a. Discuss any of the Special Considerations (above) that are applicable.
    b. Discussion of any abnormal vitals or exam findings.
    c. Capacity Determination (I assessed the patient's capacity and deemed that they (do vs do not) have capacity).
    d. Outcome
        - Examples:
            - "Patient declined transport of further treatment and was left on scene with spouse. I counseled the patient and their family on…"
            - "Police assistance requested and patient restrained/sedated, transported with continuous monitoring and airway maintenance. No complications en route", etc.
    e. Other Parties Involved
        - (By name) DPOA, NOK, care providers, daycare workers, etc.
        - Police, MCOT, DCR etc.
    f. Attempts to contact Online Medical Control (names of physicians if possible).

WRITTEN REPORTS (EPCR)

Following all calls with patient contact, whether there is or is not a transport, an ePCR form is to be filled out completely. The EMT/FR in charge of patient care will document their report on an Electronic Health Record. In the case that Electronic Heath Record is not available, documentation may be done on a State of Washington DOH Medical Incident Report or another MPD-approved form. These reports will be reviewed and utilized as necessary for continuing education, quality assurance, and statistical information. Remember: "if it isn't written down, it wasn't done." Be sure to record vitals in timeline of ePCR. The narrative portion of the ePCR will be formatted consistent with the S.O.A.P. or similar format:

S = SUBJECTIVE: Include information you have received from dispatch, law enforcement, bystanders, family members, and the patient, as well as scene observations. This will include:

- The age, sex, and chief complaint of the patient
- Events that led to the event, mechanism of injury in the case of trauma, symptoms reported and pertinent negatives
- Pertinent past medical history, medications, and allergies

O = OBJECTIVE: Information that you and/or your team personally see, hear, feel, or smell from performing a patient assessment. Vital signs including heart rate, blood pressure, oxygen saturation, and respiratory rate should be documented on every patient, and temperature and blood glucose when pertinent to the symptoms described. The exam otherwise should include findings pertinent to the chief complaint, such as:

- Neuro: GCS, orientation, strength, sensation
- HEENT: Head, Ears, Eyes, Nose and Throat
- Spine: Cervical, Thoracic and Lumbar spine
- Chest: Heart murmurs and regularity, lung sounds
- Abdomen: Tenderness, distension, masses
- Pelvis: Laxity on lateral compression of the iliac wings
- Extremities: Tenderness, deformities, pulses, edema
- Skin: Bruising, bleeding, crepitus, capillary refill, warmth

A = ASSESSMENT: Your best impression as to what is wrong with the patient. When stating/writing your impressions, preface them by **"possible"** or **"rule out",** unless the injury or illness is obvious, e.g.: fracture.

P = PLAN: Include the actual treatments/interventions that were performed and the response to the treatment, any changes in patient condition while in your care, and the disposition (where did you leave

them and in what kind of condition). Document any conversations with Medical Control, including the provider's name and the time.

REPORTING TIMELINE

Reports should be completed as proximate to the call as possible and should not be delayed except for another call. Patients transported to the ER must have reports written within 6 hours. For other patients, reports should be completed within 12 hours after the call.

ADVANCE HEALTH CARE DIRECTIVE

1. Consult and follow the following legal documents for guidance on life-sustaining care:
    a. Durable Power of Attorney (DPA).
    b. Portable Orders for Life Sustaining Treatment (POLST).
    c. Advance Directive.
2. The patient may change their wishes from these directives at any point.
3. Comfort measures may still be initiated, including oxygen, IV lines and medications.
4. When doubt or confusion exists:
    a. Attempt to determine document validity by contacting the patient's personal physician or the ED Charge Nurse.
    b. Contact medical control.
5. Attach a photo of the above documents to the ePCR.

HELICOPTER TRANSPORT

1. Helicopter transportation may be called from the field for:

    a. Critical patients with delay to ALS arrival (i.e., over 30 min) or with a long transport time to the receiving hospital. Critical patients may include, but are not limited to:

        - Multisystem trauma with hemodynamic instability
        - Penetrating injury to head, neck, abdomen/pelvis, or proximal extremity
        - Head injury with decreased LOC
        - Severe burns
        - Amputation proximal to wrist or ankle, or possibility of reimplantation
        - Suspected unstable pelvic fracture
        - Crush injury
        - Spinal cord injury with neurologic impairment
        - OMI (occlusion myocardial infarction)
        - TPA-eligible stroke (within 4.5 hours at St. Joseph's)
        - Suspected large vessel occlusion stroke (LAMS of 4 or greater)
        - Resuscitated cardiac/respiratory arrest
        - Complications of pregnancy after 24 weeks
        - Older adults with acute abdominal pain and hypotension

    b. Patients that may benefit from immediate blood products.

    c. Mass casualty incidents, when the number of patients overwhelm resources on scene or at the receiving hospital.

    d. Patients requiring a special destination for treatment (i.e., Harborview Burn Center or Seattle Children's Hospital) in agreement with the transport destination protocol below.

    e. Scenes where ground access is limited.

2. Transport Destination.

    All helicopter transports shall be directed to the most appropriate medical center, as determined by EMS and air transport crew, in conjunction with online Medical Control, as needed.

3. Activation

    Contact Prospect to launch, or confirm auto-launch or base-standby.

CRISIS HOTLINE NUMBERS

CRISIS CENTER	PHONE
MCOT (Mobile Crisis Outreach Team) Compass Health	1-360 922-6633
National Suicide Prevention Lifeline	1-800-273-TALK (8255)
Español	1-888-628-9454
Hearing/Speech Impaired (TTY)	1-800-799-4889
Text	**988**
National Domestic Violence Hotline	1-800-799-SAFE (7233)
Hearing/Speech Impaired (TTY)	1-800-787-3224
NAMI (National Alliance on Mental Illness) Text Line	**Text HOME to 741-741**
National Sexual Assault Hotline	1-800-656-HOPE (4673)
Poison Control Center (24/7)	1-800-222-1222
WA State EMS Poison Control Center (Direct Line)	1-800-709-0911
SAMHSA's National Helpline	1-800-662-HELP (4357)
Hearing/Speech Impaired (TTY)	1-800-487-4889
Veterans Crisis Line	1-800-273-8255
VOA (Volunteers of America) Crisis Line (24/7)	1-800-584-3578
Substance Use Disorder (Recovery Helpline)	1-866-789-1511
The Trevor Project	1-866-488-7386
Text	**Text START to 678-678**

USE OF PATIENT RESTRAINTS

Occasionally, a patient exhibits behavior that is dangerous to the patient, the public or to the responders and we may need to use a device to restrain them. A device is considered a restraint if it is placed to prevent movement and done without the consent of the patient.

Process Of Restraint

1. Always try to encourage the patient to self-control their behavior BEFORE deciding to apply the restraints.
2. Offer to place “soft safety bracelets” or otherwise ask patient to allow you to voluntarily place restraints to prevent the patient from hurting him or herself or others.
3. **Be ready and able to overpower patient.** Never attempt physical restraint without the resources needed to safely overpower a patient. (**At least one responder per limb and head**)
4. Have a plan of action and assign roles. Act quickly. One provider should communicate with the patient continuously. Use only the force necessary for restraint.
5. Ideally, have police present during restraint but do not delay necessary action or risk the safety of EMS personnel by delaying restraint.
6. Use commercially available soft restraints or improvise soft restraint such as a towel and one-inch tape.

7. Law enforcement may ask BLS units to transport a patient whom they have handcuffed or otherwise physically restrained. If there is no alternative restraint and if the patient requires medical attention, an officer should accompany the patient in the ambulance for transport. If not possible, the officer should follow directly behind the ambulance.

Transporting With Restraints

1. Place patient in a supine position with legs secured to a backboard or stretcher and one arm secured high above the head and the other low at the patient's side and both secured to the backboard or stretcher. Additional restraint may be placed across the lower part of the chest, the hips, and upper thighs.
2. Monitor the patient's airway and vital signs very closely once restrained given the patient is unable to protect his or her airway.
3. Once restraints have been applied, they should not be taken off until the patient is at the ER.
4. A non-rebreather mask or spit hood may be placed to protect EMS personnel from spit.

Documentation

It is important to document the behavior that made restraints necessary as well as the restraint technique used. The documentation must reflect continual concern for the patient's safety and well-being as well as descriptions of the patient's ongoing mental status and behavior.

CRIME/ACCIDENT SCENE PROTECTION

1. Approaching the scene
    a. Safety – Do not proceed unless law enforcement has secured the scene.
    b. Route - All emergency personnel should use the same route in and out of the crime scene.
    c. Limit the number of EMS personnel on the scene to what is needed.
2. Evidence protection
    a. EMS personnel should exercise extreme caution in approaching scenes suspected or known to involve any violent act and preserve physical evidence that may be used to develop investigative leads and to prosecute defendants in court.
    b. Avoid rearranging materials at the scene, stepping on evidence, smearing fingerprints, or adding your own fingerprints. Check with law enforcement before cleaning vehicle debris from the road.
    c. If clothing must be cut, do not cut through bullet holes or knife cuts.
    d. In a hanging or other crime involving ropes, avoid cutting a rope at the knot. If the rope needs to be cut, it should be 18” from the knot. If the rope is over a limb or a beam, do not pull it down.
    e. Inform the officer in charge about any material (coat, sheet, blanket, etc.) used to cover/protect the victim from the elements.
    f. Designate a spot for trash and avoid dropping items on the scene.
    g. If you need to move a body to provide aid, mark its location beforehand.
    h. If patient is deceased or dies during your resuscitation, do not remove EKG pad/patches, ET tube, SGA, IV, IO or other EMS interventions. Mark all sites of IV/IO attempts in ink with agency initials.
3. Parking/positioning vehicles
    a. Check with incident command to determine where EMS staging area should be positioned. Notify dispatch of arrival and location.
    b. Request fire apparatus to protect/block medic units from oncoming traffic. Park medic unit to provide maximum protection to patients and EMS personnel.
    c. Avoid accident debris and tire skid marks as you approach.

MCI FIELD TRIAGE

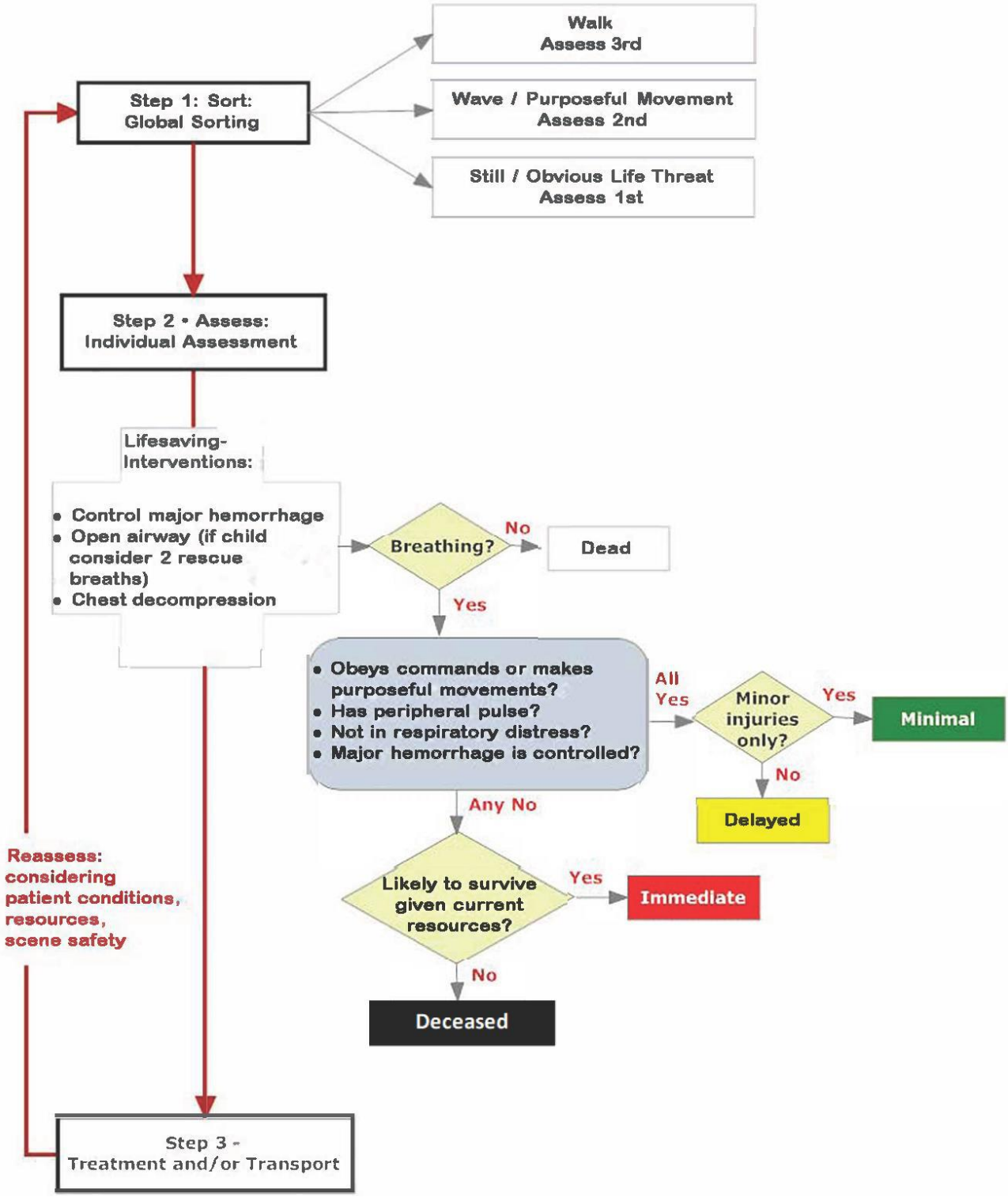
All MCI patients shall be initially triaged using the SALT (sort, assess, life-saving interventions, treatment and/or transport) system. Patient severity is identified using the following categories:

Immediate	(Red)	Critically injured patients / life threatening
Delayed	(Yellow)	Seriously injured patients / can delay up to one hour
Minimal	(Green)	Walking wounded patients / can delay up to three hours
Deceased	(Black)	Deceased and/or mortally injured patients / no care initiated

Refer to the Whatcom County Operations Manual for more detailed information on SALT.

- **Step 1** (**Sort**)
    - The initial responders enter the triage area, identify themselves and direct all those who can walk to gather and remain in a safe place. Most of these patients will eventually be tagged Green once triaged.
    - Patients that remain should be asked to follow a command (wave) to be observed for purposeful movement.
    - The patients that do not move and ones with obvious life-threatening conditions are the first ones to be assessed.
- **Step 2 (Assess)**
    - Individual assessment should begin with limited, rapid, lifesaving interventions.
- **Step 3 (Lifesaving Measures)**
    - Control major hemorrhage with tourniquets or direct pressure provided by other patients or devices.
    - BLS providers: Halo seals as indicated.
    - ALS providers: Halo seals and needle decompression as indicated.
    - Open airway through position or basic adjuncts (no advanced airways).
        - If patient is a child, consider 2 rescue breaths.
- **Step 4 (Treatment and/or Transport)**

SALT TRIAGE SYSTEM



TREATMENT PROTOCOLS

ABDOMINAL COMPLAINTS

ALS Indicators

Severe pain unrelieved by position

Signs or symptoms of shock

BLS Care

1. Prepare to suction patient if vomiting. Estimate volume and describe color and consistency of vomit.

2. Monitor vital signs every 5-15 minutes.

3. Nitrous Oxide.

ALS Care

If pain management is warranted, consider:

1. Fentanyl
2. Hydromorphone
3. Ketamine
4. Nitrous Oxide

For severe nausea or vomiting consider:

1. Ondansetron

ALTERED LEVEL OF CONSCIOUSNESS (ALOC)

ALS Indicators

First or atypical seizure

Symptoms are persistent and not resolving

Must be altered off of baseline.

BLS Care

1. Consider Oxygen.
2. If seizure is suspected, protect patient from injury, remove objects from mouth and upper airway, do not restrain patient during seizure, and remove hazardous objects near patient.
3. If patient is not alert, position in the recovery position.
4. Perform blood glucometry.
5. Consider Naloxone.
6. Consider other possible causes for patient's altered level of consciousness:

A lcohol	**T** rauma/Tumor
E pilepsy	**I** nfection
I nsulin	**P** sychosis
O verdose/Oxygen	**S** troke
U nderdose/Uremia	
U remia	

ANAPHYLAXIS

ALS Indicators

Wheezing, difficulty swallowing, hoarse or changed voice

Urticaria (hives) away from the area of contact

BLS Care

1. Consider Oxygen.
2. Remove stinger as needed.
3. Give Epinephrine if signs of anaphylaxis:
    a. Optional to help the patient administer their own EpiPen.
    b. If the patient does not significantly improve within 10 minutes, a second dose can be given with consultation to Medical Control.
    c. All patients receiving epinephrine should be transported to the ED.
4. Monitor vital signs every 5 minutes.
5. BLS transport is appropriate for stable patients with good results from epinephrine injection and if additional epinephrine is available if needed.

ALS Care

1. Provide airway and ventilatory support
2. Epinephrine
3. NS bolus
4. Diphenhydramine
5. Cetirizine
6. Prednisone
7. Glucagon for patients on BETA blockers who are not responding to Epinephrine
8. Albuterol

BEHAVIORAL

ALS Indicators

Abnormal behavior with abnormal vitals

Abnormal behavior with serious comorbidity (e.g., drug or alcohol OD)

Need for sedation (preferred over physical restraint)

- *Decision for sedation is a medical decision*

BLS Care

1. Secure safety of personnel and patient, using physical restraints, if necessary, to prevent injury to patient or others. Call ALS or Medical Control if using restraints.
2. Call police if necessary (if patient refuses transport but EMTs feel patient needs further evaluation or for responder safety). If law enforcement is reluctant to get involved, have them speak with Medical Control.
3. Monitor for mental status and physiological changes. Do not leave patient unobserved.
4. Consider possible causes for the behavioral disturbance:

A lcohol	**T** rauma/Tumor
E pilepsy	**I** nfection
I nsulin	**P** sychosis
O verdose/Oxygen	
U remia	

Transporting Handcuffed Patients: Law enforcement may ask BLS units to transport a patient whom they have handcuffed or otherwise physically restrained. If there is no alternative restraint and if the patient requires medical attention, an officer should accompany the patient in the ambulance for transport. If not possible, the officer should follow directly behind the ambulance.

ALS Care

1. For sedation, consider:
   a. Ketamine
   b. Midazolam

BURNS / SMOKE EXPOSURE

ALS Indicators

Singed facial hair, soot in mouth/nose or gravelly/distorted voice

Burns with associated injury, i.e., significant trauma, electrical shock, or arrhythmia

Lower threshold if age less than 6 or over 60

BURN CONSIDERATIONS	
DEPTH	SUPERFICIAL PARTIAL THICKNESS FULL THICKNESS
EXTENT	% BODY SURFACE AREA (USE THE RULES OF NINES)
CAUSE	THERMAL ELECTRICAL CHEMICAL LIGHT RADIATION
LOCATION	CRITICAL LOCATIONS: FACE AND UPPER AIRWAY HANDS AND FEET GENITALS OR GROIN REGION BURNS THAT ENCIRCLE BODY PARTS

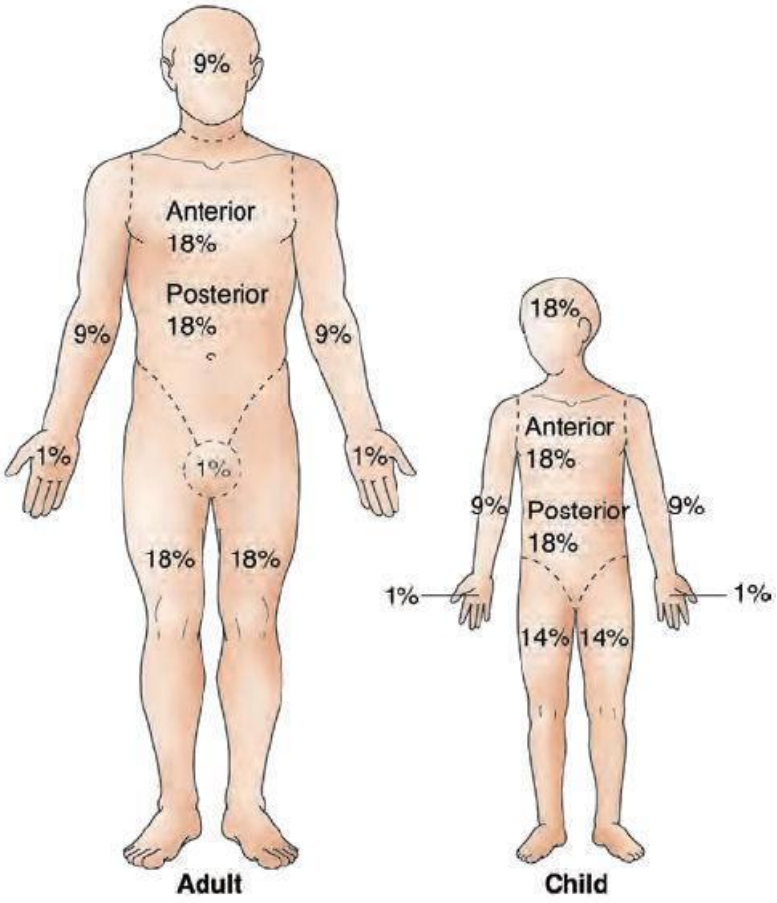
BLS Care

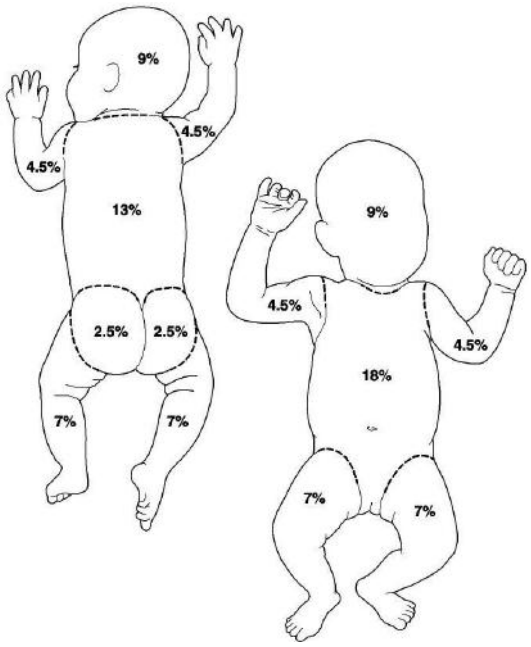
1. Remove any constrictive clothing or jewelry.
    a. Place all clothing in Patient Belonging Bag or other plastic container and label with patient's name. Transfer to hospital or law enforcement.
2. If hazardous materials are involved, advise dispatch, incident command and medical control.
    a. Brush away dry substances or chemical agents.
    b. Flush wet chemicals with water.
3. Estimate the size and depth of the burn.
    a. Superficial burn – Apply cool, moist pads for 10-15 minutes or irrigate with cool tap water.
    b. Partial thickness burn – Cover with dry dressing.
4. Avoid hypothermia.
5. Assess patient for other trauma.
6. If smoke inhalation, apply high flow Oxygen NRB given carbon monoxide can cause pulse oximetry to give falsely elevated values.
7. Eye burns
    a. Flush chemical burns to the eyes for 15 minutes with normal saline or water.
    b. Ultraviolet burns to the eyes: treat with cool compresses over closed eyes.

ALS Care

1. Observe face and oropharynx for burns/singed hairs/soot/edema and consider intubation if needed. Decreased ET tube size may be needed.
2. Measure carbon monoxide levels via carbon monoxide monitor if suspected and administer high flow Oxygen or CPAP.
3. Consider Cyanide poisoning in a patient with altered level of consciousness, especially in the presence of an elevated CO level, and administer Hydroxocobalamin (Cyanokit) prn.
4. If partial thickness burn > 10% TBSA, establish IV/IO and start slow NS.
5. Provide analgesia with Hydromorphone, Fentanyl, Ketamine and/or Nitrous Oxide as needed.
6. Consider Midazolam for anxiety.
7. Eye burns:
    a. Proparacaine. Contraindicated if suspicion for punctured/ruptured globe.

RULE OF NINES



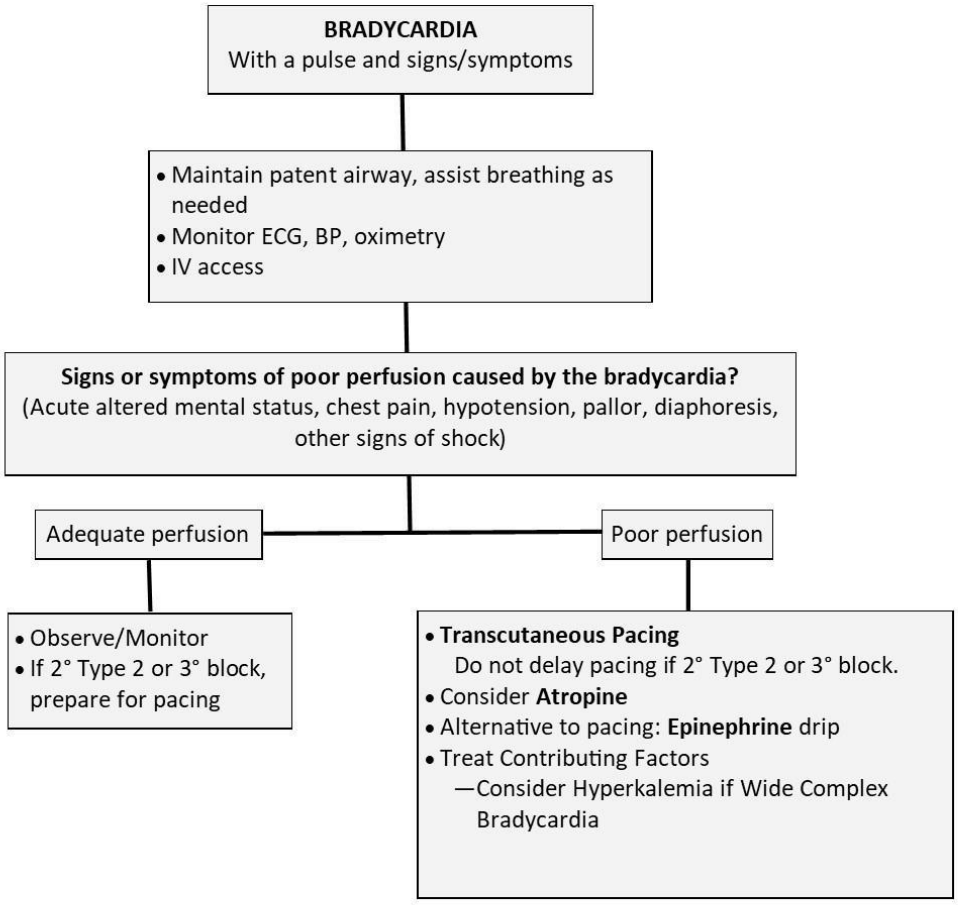


CARDIAC

ALS CARE

1. Tachycardia Algorithm.
2. Bradycardia Algorithm.
3. Magnet use with AICD/Pacemakers:
    a. Placing a magnet over an AICD or pacemaker will produce a different result depending on the device, but typically will cause a pacemaker to pace asynchronously between 70-90 bpm and will inhibit the defibrillation function of an AICD. Asynchronous pacing can lead to higher risk for ventricular tachycardia.
    b. Indications for magnet use:
        i. AICD
        ii. Inactivation during CPR or after death.
        iii. Inactivation during transcutaneous pacing.
        iv. Inactivation when inappropriately shocking. ***AICD is often shocking appropriately for VF/VT. Be sure to capture EKG and confirm shocks are inappropriate prior to use.
        v. Pacemaker
            1. Oversensing inappropriate signals, resulting in bradycardic rhythm when pacing should occur.
            2. Pacemaker-mediated tachycardia: reentry tachycardia creates inappropriate paced tachycardia.
    c. Instructions:
        i. Do not utilize the magnet unless you have pads placed on the patient's chest (adjacent to but not over their implanted device) and ready to pace/defibrillate.
        ii. Place magnet directly over the device on patient's chest. You may hear beeping lasting up to 60 seconds to confirm detection of the magnet.
        iii. Programmed function should resume once magnet is removed. Be sure to alert ED staff that a magnet has been used.

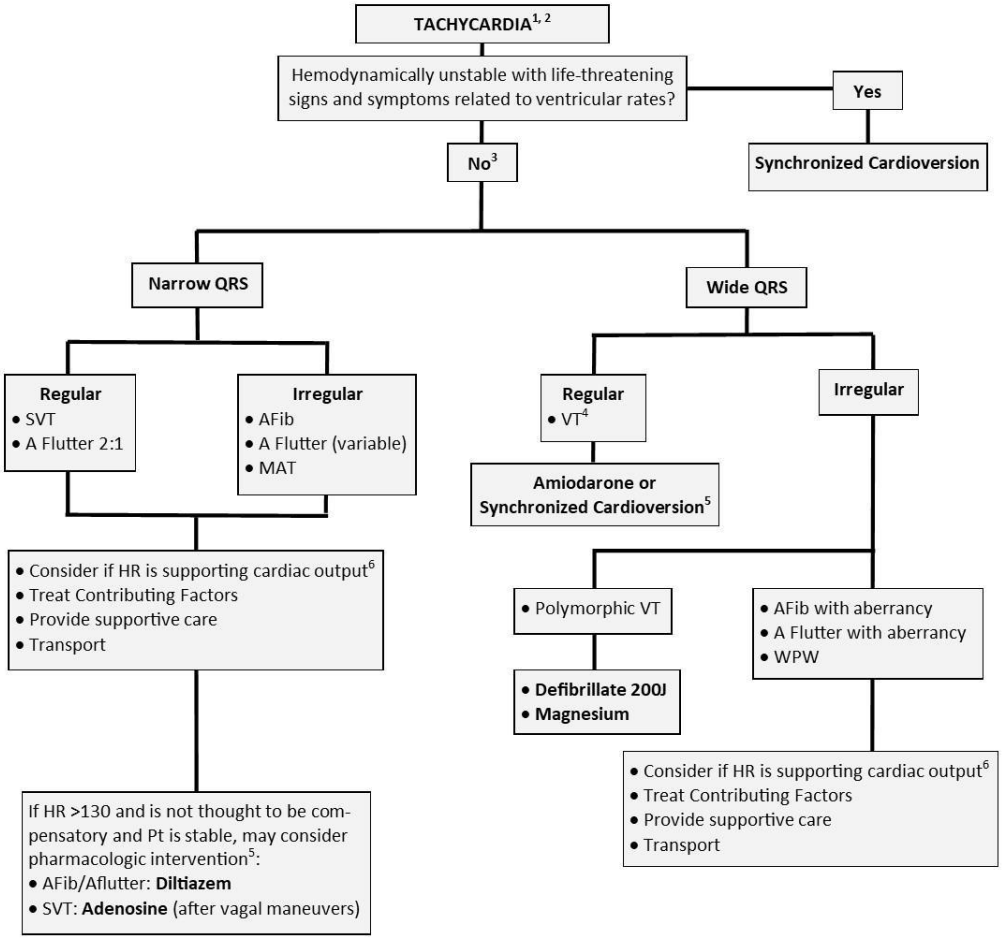
BRADYCARDIA ALGORITHM



Contributing Factors
Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypo/Hyperkalemia
Hypothermia
Hypoglycemia

Toxins
Tamponade, cardiac
Tension pneumothorax
Thrombosis (coronary or pulmonary)
Trauma

TACHYCARDIA ALGORITHM



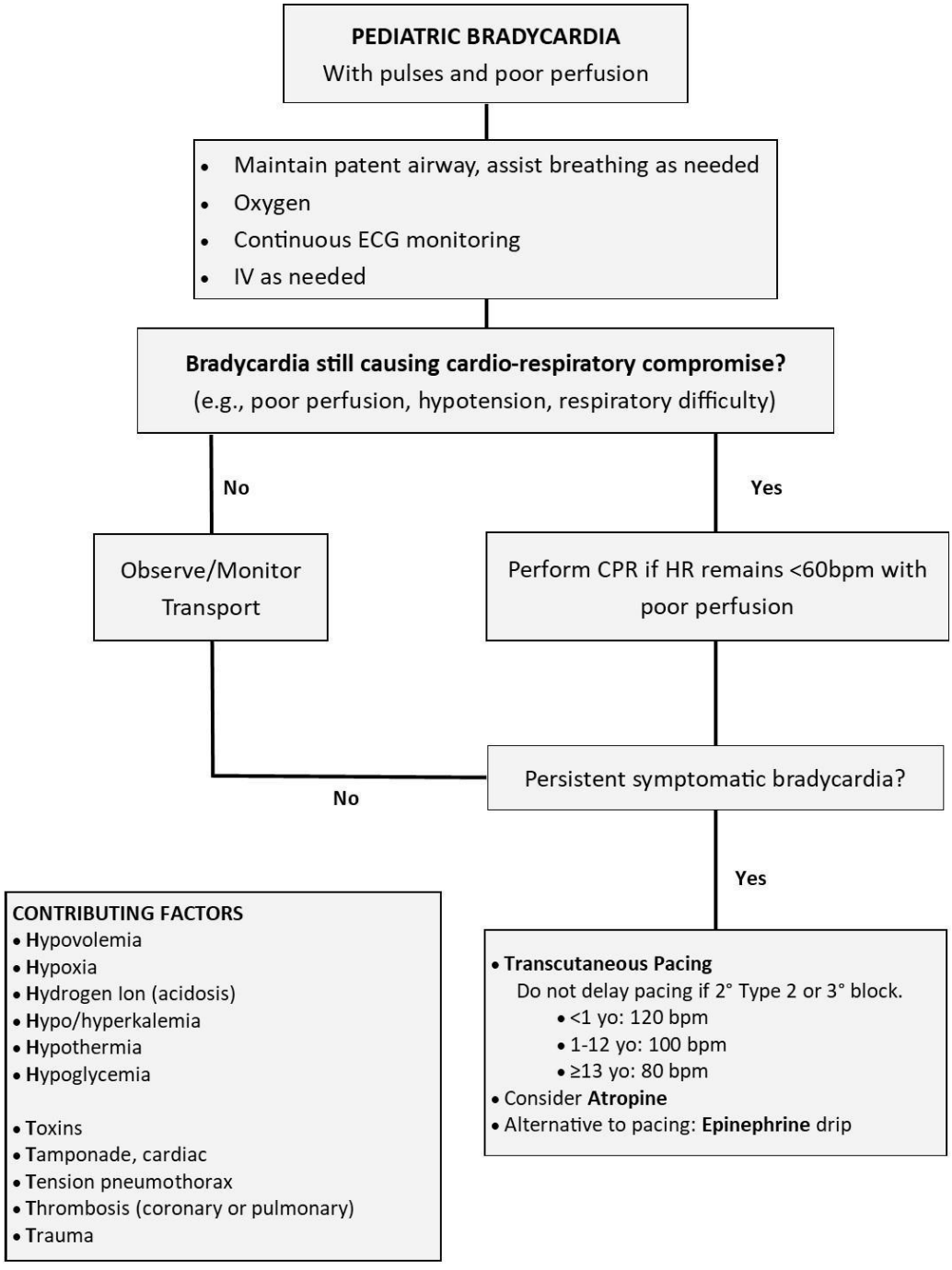
Contributing Factors
Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypo/Hyperkalemia
Hypothermia
Hypoglycemia

Toxins
Tamponade, cardiac
Tension pneumothorax
Thrombosis (coronary or pulmonary)
Trauma

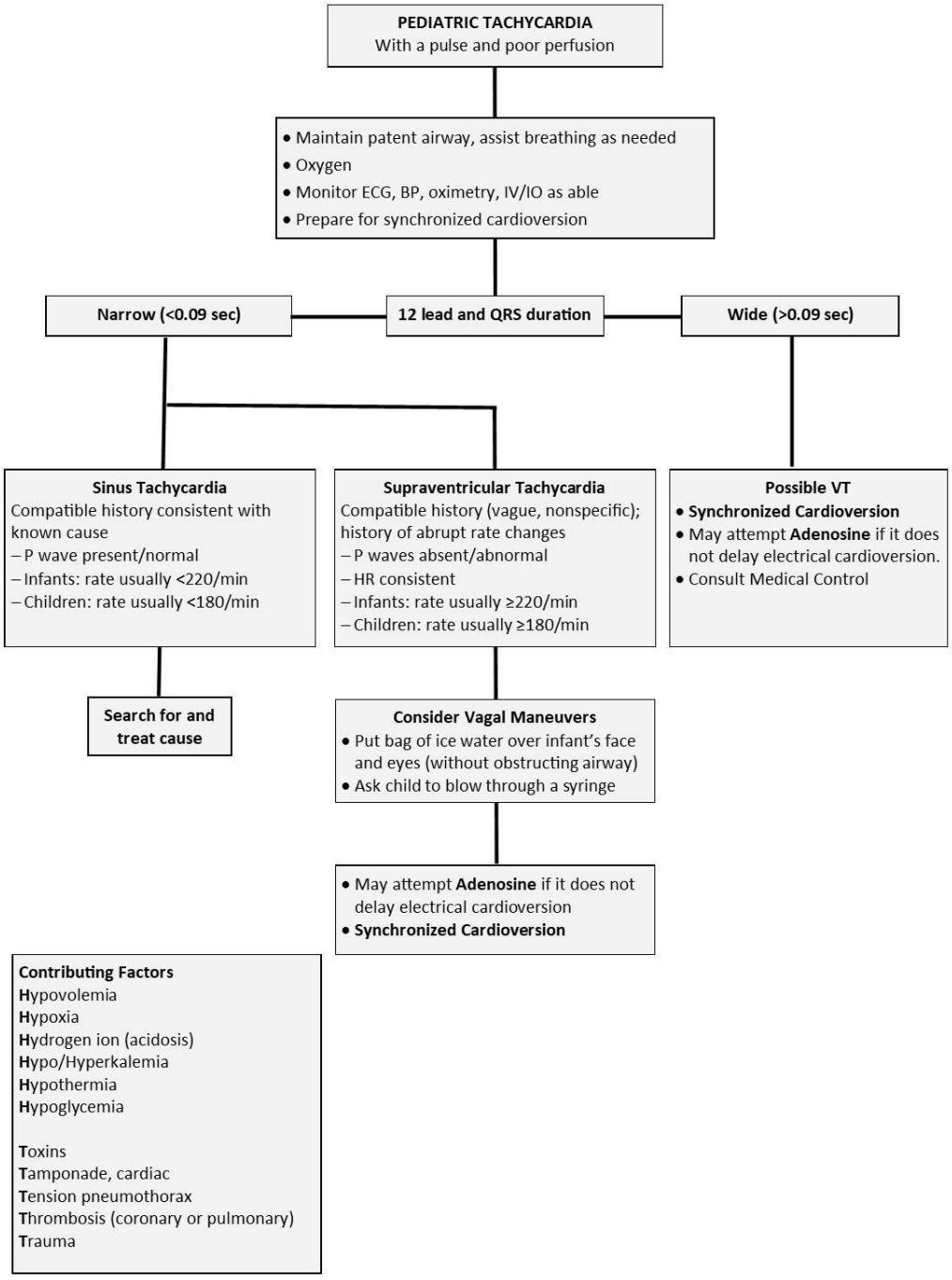
1) With pulse. If palpable pulse is lost, proceed to Cardiac Arrest Protocol.
2) Algorithm excludes sinus rhythms.
3) If at any time Pt becomes unstable, e.g. hypotensive or altered mental status, perform Synchronized Cardioversion.
4) VT typically >120 bpm.
- If HR <120 bpm or QRS >200 ms, consider hyperkalemia or sodium channel blocker toxicity.
- If VT, it will be present in all leads, e.g. sinus rhythm in one lead indicates aberrancy.

5) Stable patients should be counseled on risks of cardiac drugs or cardioversion.
6) Sepsis, hypovolemia, trauma, etc. HR is unlikely to be contributing to hypotension unless sustained >150 bpm.

PEDIATRIC BRADYCARDIA ALGORITHM



PEDIATRIC TACHYCARDIA ALGORITHM



CARDIAC ARREST

MANAGEMENT OF MEDICAL CARDIAC ARREST

Whatcom County emergency personnel will be certified in the CPR and AED standards for BLS providers, per the American Heart Association, American Red Cross or other nationally recognized organization with substantially equivalent guidelines and approved by the Department of Health. Adult CPR may be administered with the **impedance threshold device (ITD)**.

1. Prioritize high-performance CPR (adequate compression depth and rate while minimizing pauses in compressions) with timely defibrillation if indicated.
2. The LUCAS mechanical CPR device should be applied if CPR quality becomes compromised due to fatigue or personnel resource limitation, or for transport.
3. **AED**:
    a. Apply anterior/posterior (AP) pads. Do not overlap with LUCAS.
    b. Once the pads are in place and the machine is ready, CPR may be stopped at any time in the cycle to push the analyze button.
    c. If a shock is indicated, perform continuous compressions while the AED is charging before delivering the shock.
    d. **Pediatric** Considerations:
        i. Pediatric pads should be used for defibrillation in patients less than 20 kg (45lbs), however adult pads can be used if pediatric pads are unavailable.
        ii. The ITD may be used for infant and child patients in cardiac arrest who weigh more than 10kg.
4. **Ventilations with a bag-valve mask:**
    a. High-Performance CPR with appropriate ventilations.
    b. Place i-gel immediately, as appropriate.
    c. Ensure good mask seal by choosing an appropriate size mask for the patient, using two-handed technique whenever possible, and pulling the jaw up to the mask rather than pushing the mask onto the face.
    d. Consider placing an airway adjunct, such as an oropharyngeal airway (OPA) or nasopharyngeal airway (NPA).

MEDICAL CARDIAC ARREST

1. Policy for suspected medical cardiac arrest. If suspected traumatic cardiac arrest, follow Traumatic Arrest policy.
2. Consider withholding care in the following patients:
    a. Signs of lividity, rigor mortis.
    b. Injuries incompatible with life.
    c. DNR.
        i. Valid form must be physically present, or contact NTL at SJH ED to inquire.
        ii. DNR trumps Power of Attorney or NOK requests
    d. POLST or Advanced Directive is absent, and Power of Attorney or NOK requests no CPR **AND** patient is terminally ill
        i. Power of attorney trumps NOK
    e. In all other patients continue with resuscitative efforts:
3. Verify circulatory arrest and ensure high performance CPR in 2-minute cycles. Do not interrupt compressions. Rotate compressors every 2 min until Lucas has been placed.
    a. Place pads in Anterior-Posterior orientation.
    b. Charge while compressions are still going.
    c. Analyze, check pulse, and shock prn in < 5 seconds (10 second max).
    d. Deliver shocks at **200J, 300J, 360J**.
    e. Place IV/IO.
4. Place an endotracheal tube without interruption in chest compressions:
    a. Use of an i-gel to oxygenate before and between tracheal intubation attempts is recommended.
    b. If patient maintains muscular tone during compressions, consider RSI meds to help obtain adequate view with laryngoscope.
    c. Once definitive airway is in place, deliver one breath every 6 seconds.
        i. Avoid hyperventilation or excessive tidal volumes.
5. Standard drug dosages:
    a. Antiarrhythmic drugs and doses
        i. 1st Line: Amiodarone **300mg** initial bolus, followed by **150mg** second bolus
        ii. 2nd Line: Lidocaine **100 mg** initial bolus, followed by **100mg** second bolus
6. Special circumstances drug dosages:
    a. Suspected hyperkalemia or calcium channel blocker overdose: Administer Calcium Chloride **1 gram**
        i. Up to 2 doses
    b. Suspected sodium channel blocker overdose (e.g. tricyclic antidepressants, amitriptyline):
        i. Administer Sodium Bicarbonate (up to **150 mEq**)
    c. Suspected Torsade de Pointe:
        i. Administer Magnesium (**2g**)
    d. Suspected opioid overdose: Administer Narcan
7. Treatment by Rhythm:

a. VF / Pulseless VT
    i. Continue CPR and Shock cycles until IV/IO access
        1. After IV/IO access and patient has been shocked at least once:
    ii. If VF/VT is present, give Amiodarone (simultaneously for first round, alternate thereafter).
    iii. Continue CPR and Analyze and Shock
    iv. After 3 defibrillation attempts consider:
        1. Double sequential external defibrillation (DSED):
            a. Using second defibrillator, attach a second set of pads to anterior-lateral orientation.
            b. At next rhythm check, deliver sequential shocks:
                i. Press shock button on first defibrillator and then with same hand press shock button on second defibrillator within one second.

        OR

        2. If DSED is not available, may attempt a vector change to A-L pad placement.

b. Asystole / PEA:
    i. Continue CPR and Analyze + Pulse Check cycles until IV/IO access.
        1. After IV/IO access administer Epinephrine and continue CPR.
    ii. Confirm rhythm in 2 leads.
    iii. Administer up to 3 total doses Epinephrine before calling Medical Control.
    iv. Consider hyperkalemia, sodium channel blocking agent overdose, and opioid overdose. If suspected, administer:
        1. Calcium Chloride (suspected hyperkalemia) or
        2. Sodium Bicarbonate (suspected sodium channel blocker OD, e.g. TCA overdose)
        3. Narcan (suspected opioid overdose)
    v. ***PEA with rates greater than 40 may be pseudo-PEA (forward flow present but not palpable). Consider hanging Norepinephrine infusion, Epinephrine infusion, or push dose Epinephrine and transporting. If palpable or dopplerable pulse is absent, CPR should continue. ***

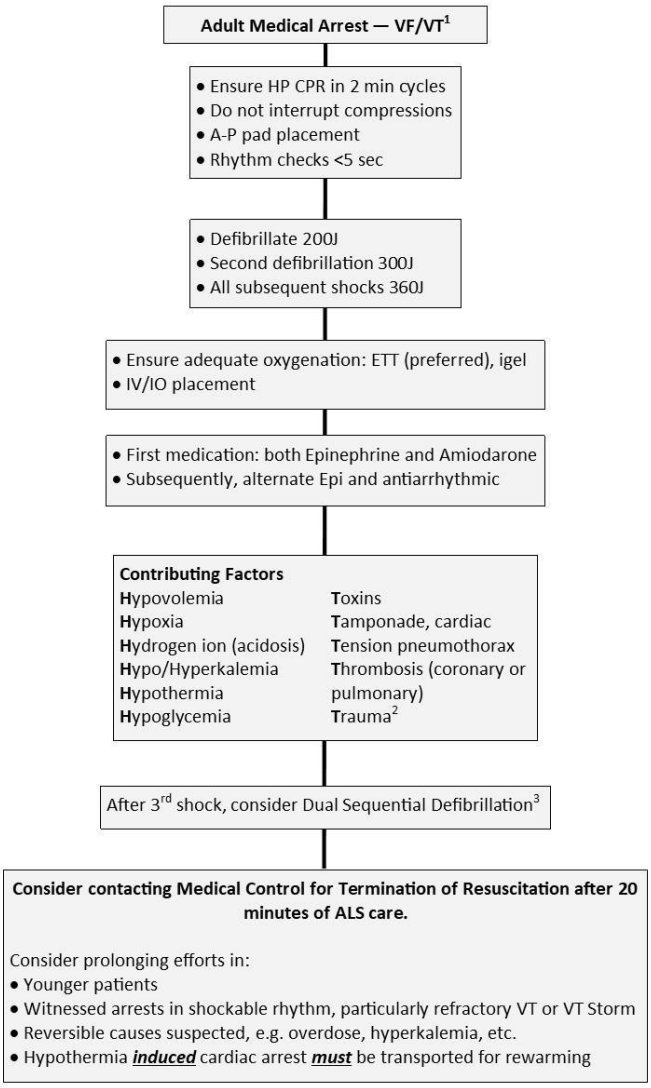
8. Special Considerations:
    a. Hypothermia Suspected (Hypothermia that preceded/caused arrest):
        i. If core temperature < 30^{o}C, then:
            1. Continue with CPR.
            2. Attempt up to 3 shocks, if indicated by presence of VF/VT.
            3. Give no more than 2 doses of Epinephrine.
            4. Early transport to hospital for rewarming.
    b. Massive Pulmonary Embolism:
        i. If massive pulmonary embolism is suspected (e.g., recent surgery, leg fracture, long flight, younger patient), proceed with normal treatment while en route to hospital (early and rapid transport).
9. Post-ROSC tactical pause and procedures prior to transport:
    a. Obtain manual blood pressure.

i. Target SBP 90mmHg
ii. Fluid challenge with **250-500** mL IVF
iii. Vasopressor infusion

b. Adjust ventilation rate to target an ETCO2 of 35 – 40 mmHg.
c. Continuously monitor pulses with doppler or manually.
d. Apply auto BP cuff q2 min.
e. Remove ResQ POD.
f. Place patient on Lucas (if available and not done).
g. Package for transport, apply clam board, prepare gurney.
h. Obtain 12-lead ECG ~10min post ROSC.

10. Consider contacting online Medical Control for Termination of Resuscitation after 20 minutes of ALS resuscitation if any of the following criteria are met:
    a. Asystole or PEA with rate <40 and not responsive to treatments.
        i. Asystole/PEA must be confirmed in two leads.
        ii. No respiratory effort is present.
    b. The patient is in a non-perfusing rhythm for 30 minutes or more, and ETCO2 is 10 mmHg or less.
    c. Termination of resuscitation may occur at any point without contact of Medical Control if valid DNR is presented or next-of-kin requests it.
11. Consider continuing resuscitation and transporting:
    a. Younger patients.
    b. Witnessed arrests in shockable rhythm, i.e., refractory VF or VT storm.
    c. Suspected respiratory arrest and unable to obtain ETT.
    d. Reversible causes suspected, e.g. overdose, hyperkalemia, etc.
    e. Hypothermia-induced cardiac arrest must be transported.

ADULT MEDICAL ARREST FLOWCHART - VF/VT

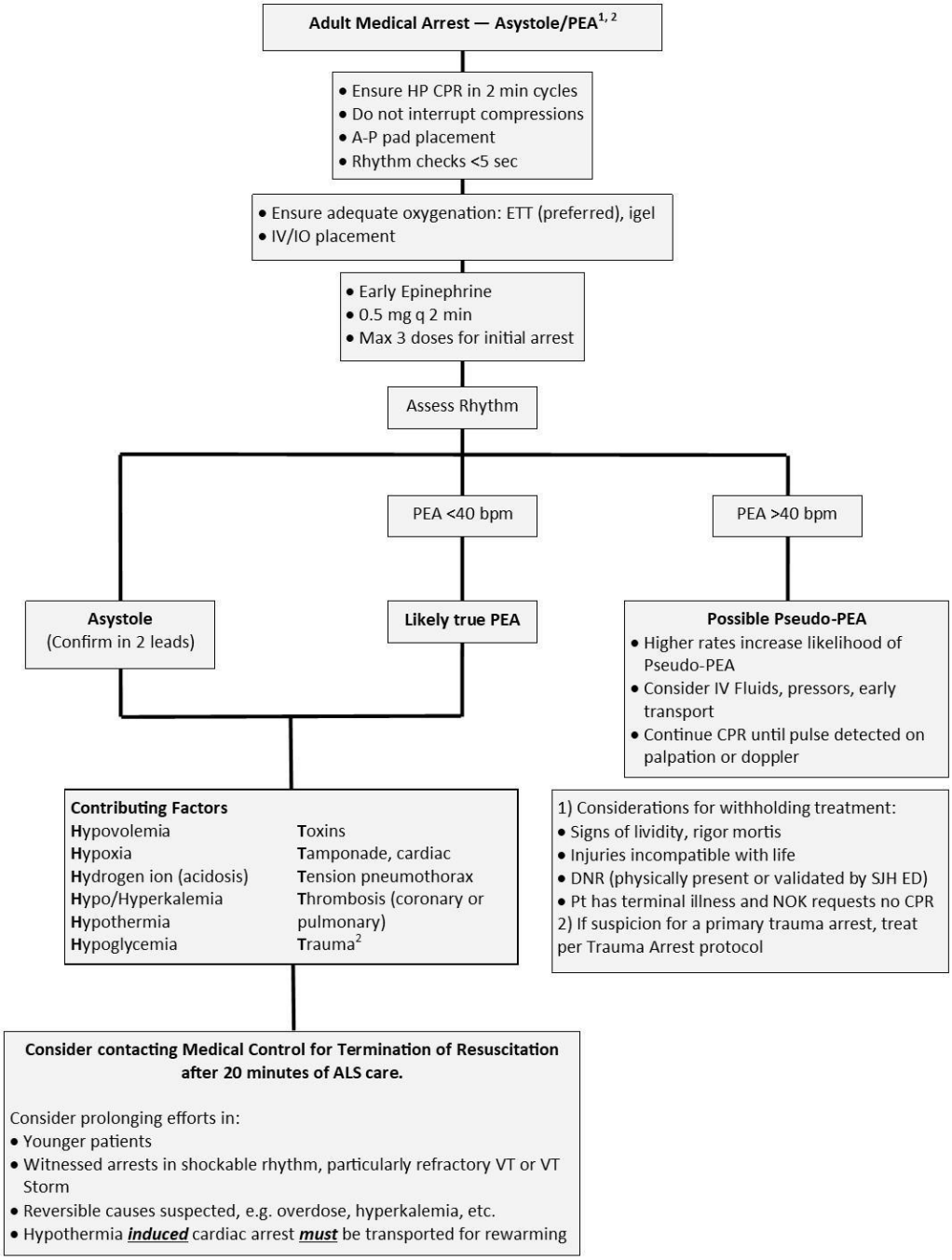


1) Considerations for withholding treatment:
- Signs of lividity, rigor mortis
- Injuries incompatible with life
- DNR (physically present or validated by SJH ED)
- Pt has terminal illness and NOK requests no CPR

2) If suspicion for a primary trauma arrest, treat per Trauma Arrest protocol

3) Dual Sequential Defibrillation
- Place a 2nd set of pads in A-L orientation. Pads should NOT be touching (1st set of pads should be in A-P orientation).
- One medic delivers both shocks ***sequentially***. *1st shock in A-L orientation followed by second shock in A-P orientation. Medic should use the same hand to press both buttons. Shocks should be delivered within 1 second of each other.*

ADULT MEDICAL ARREST FLOWCHART - ASYSTOLE/PEA



DEFIBRILLATION VECTOR CHANGE/DOUBLE SEQUENTIAL EXTERNAL DEFIBRILLATION (DSED)

Anterior/Posterior

Anterior/Posterior (AP) pad placement is the default for all indications (defibrillation, cardioversion, and pacing).

Indications

Double Sequential External Defibrillation (DSED) is optional for patients who present with refractory ventricular fibrillation/tachycardia after three or more shocks are delivered without conversion. If for any reason DSED is not available or possible, may consider vector change.

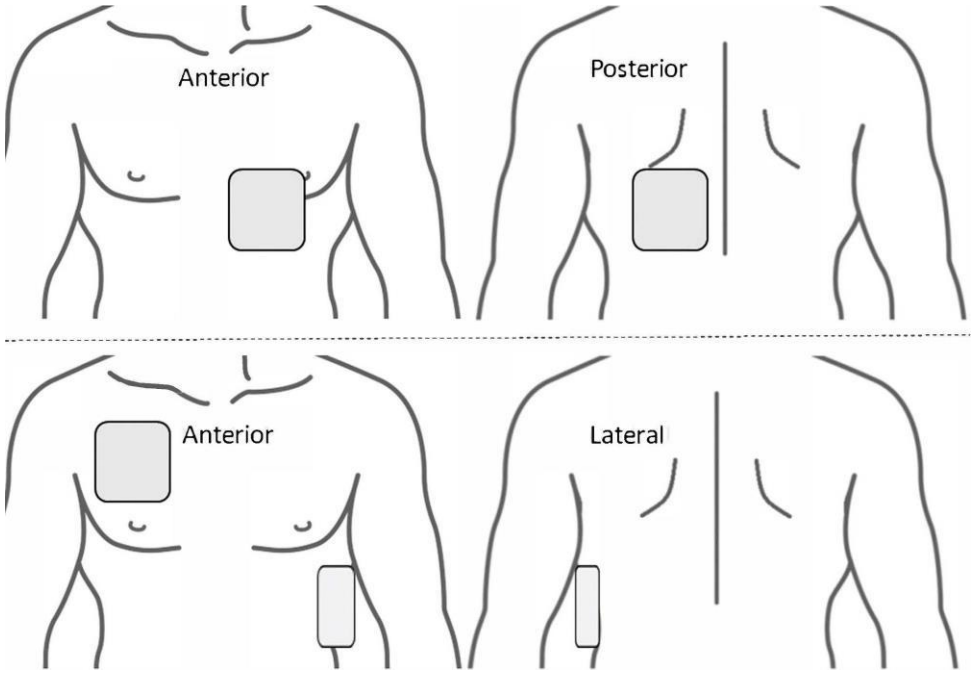
Procedure

DSED: Using a second defibrillator, attach a second set of pads to anterior-lateral orientation. At next rhythm check, deliver sequential shocks:

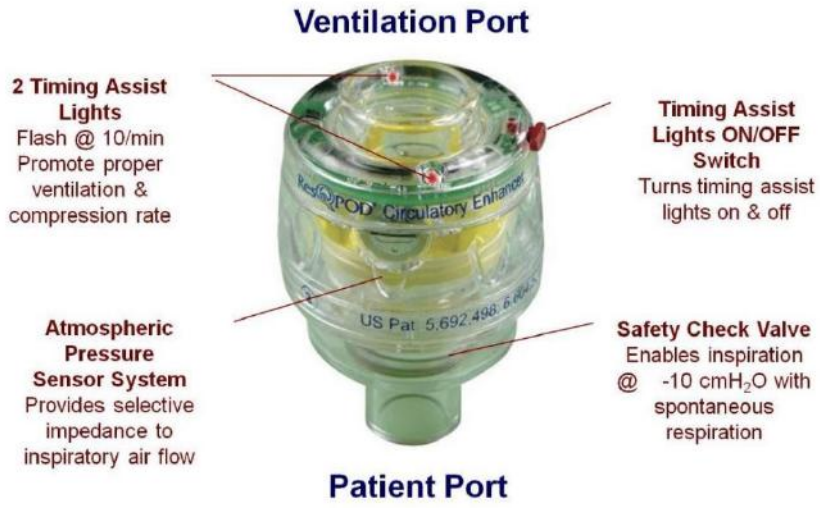
- Press the shock button on the first defibrillator and then, with the same hand, press the shock button on the second defibrillator within one second.

Vector change: Change the electrical vector from Anterior/Posterior (AP) pad placement to Anterior/Lateral (AL) pad placement.

Avoid existing pads, the LUCAS suction cup, and implanted defibrillators/pacemakers.



IMPEDANCE THRESHOLD DEVICE (RESQ POD)



1. Used during CPR only with BVM or advanced airway. Remove upon ROSC.
2. The ResQPOD utilizes the interdependence of the body's respiratory and circulatory systems to create a vacuum (negative pressure) within the chest during the recoil phase of CPR, which follows each chest compression. The ResQPOD prevents the influx of respiratory gases into the chest during the chest wall recoil (relaxation or decompression) phase, which lowers the intrathoracic pressure and draws more venous blood back to the heart. Improved blood return to the heart (preload) results in improved blood flow out of the heart (cardiac output) during the subsequent compression.

RESQCPR WITH AN ADVANCED AIRWAY (SGA OR ET TUBE)

Once the airway is secured with a SGA or ET tube, move the ResQ POD to the tube, turn on the timing assist lights, and continue chest compressions without interruption for ventilations. Ventilations should be performed 10 breaths/min (one breath every 6 seconds) for adults.

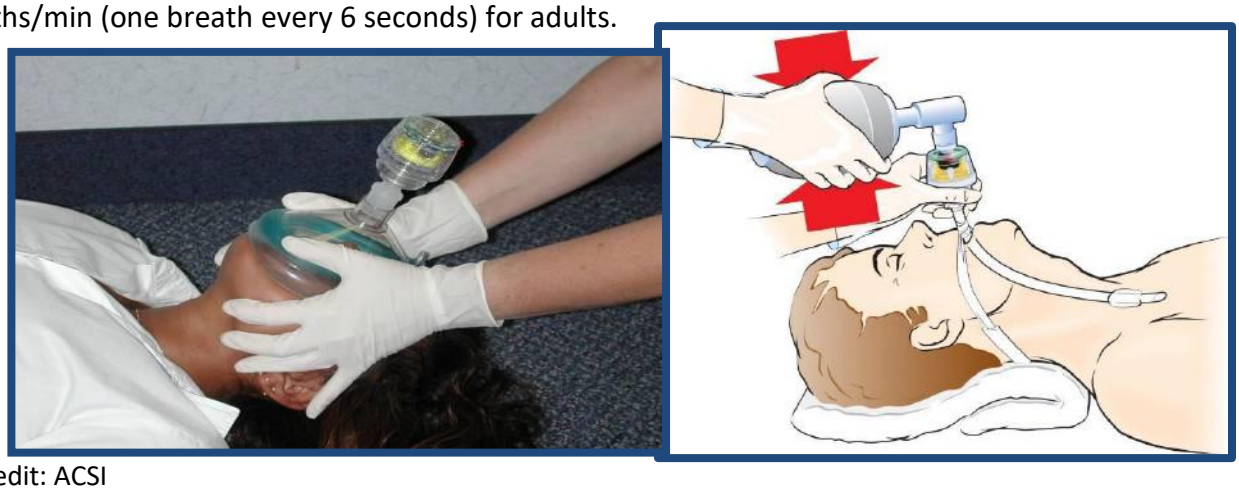
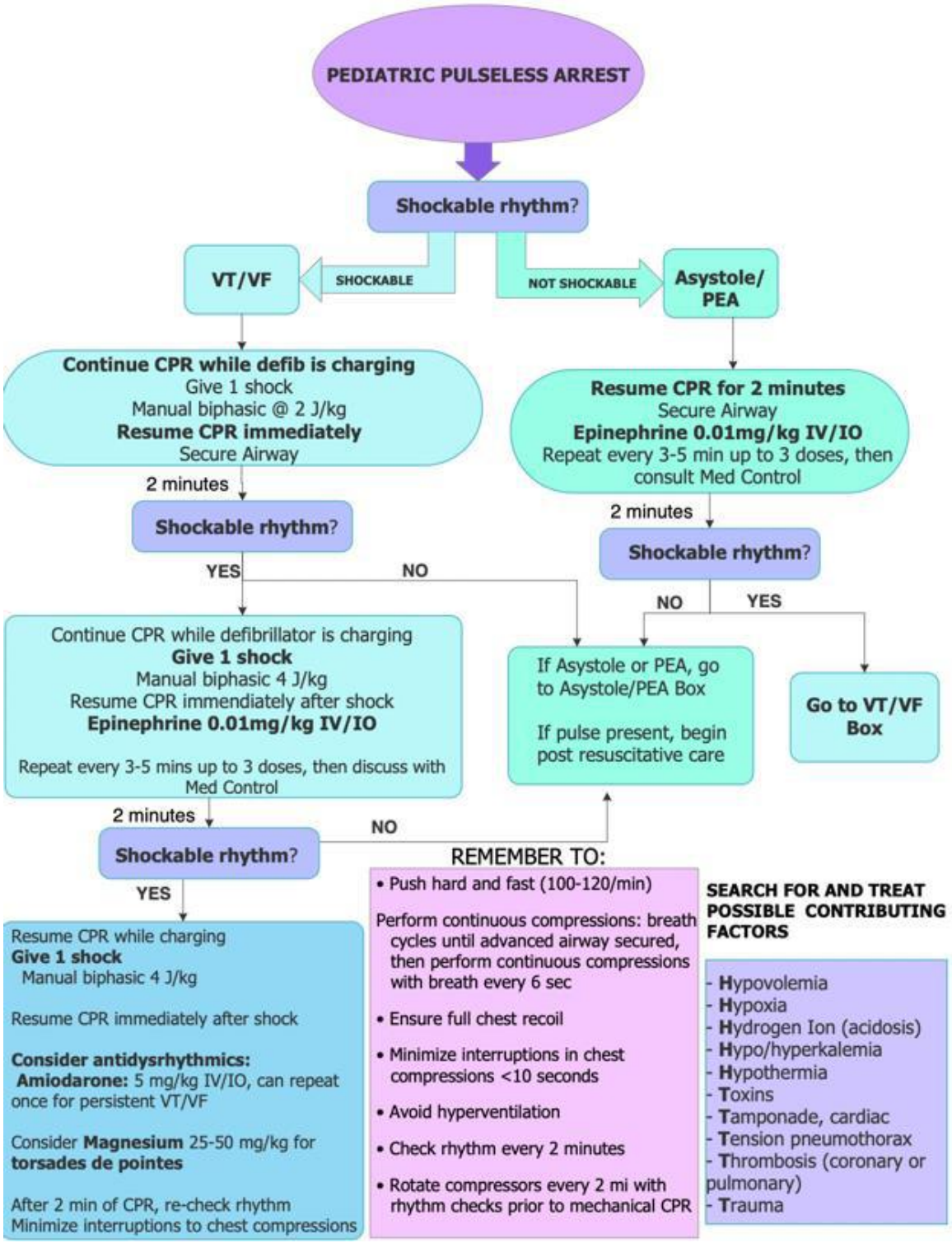
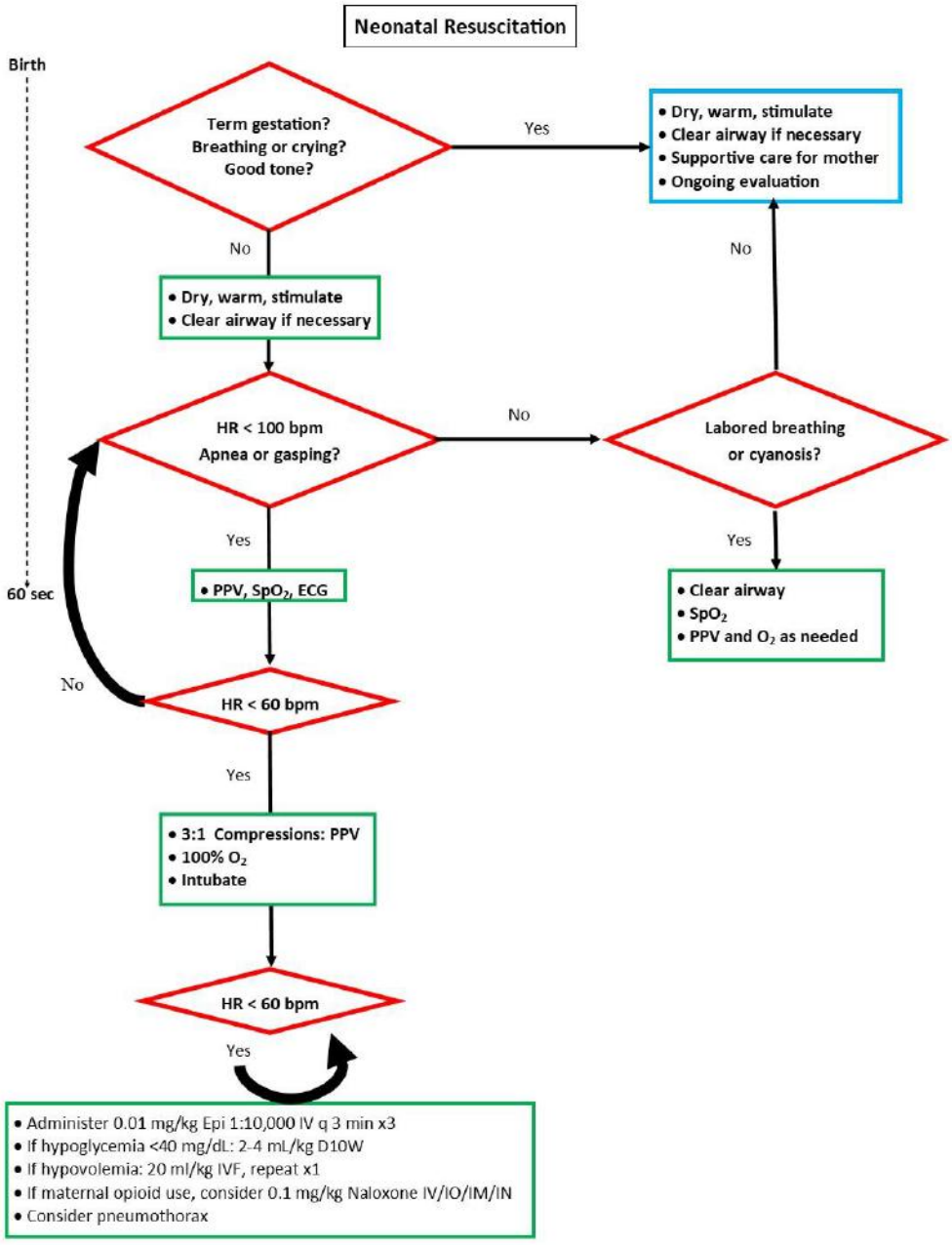


Photo credit: ACSI

PEDIATRIC PULSELESS ARREST FLOWCHART



NEONATAL RESUSCITATION (BIRTH - 28 DAYS)



CHEST DISCOMFORT

ALS Indicators

Anginal equivalents, including syncope, discomfort into the jaw, back or arm if patient is at least 35 years old or has a history of heart problems

Use of nitroglycerin

BLS Care

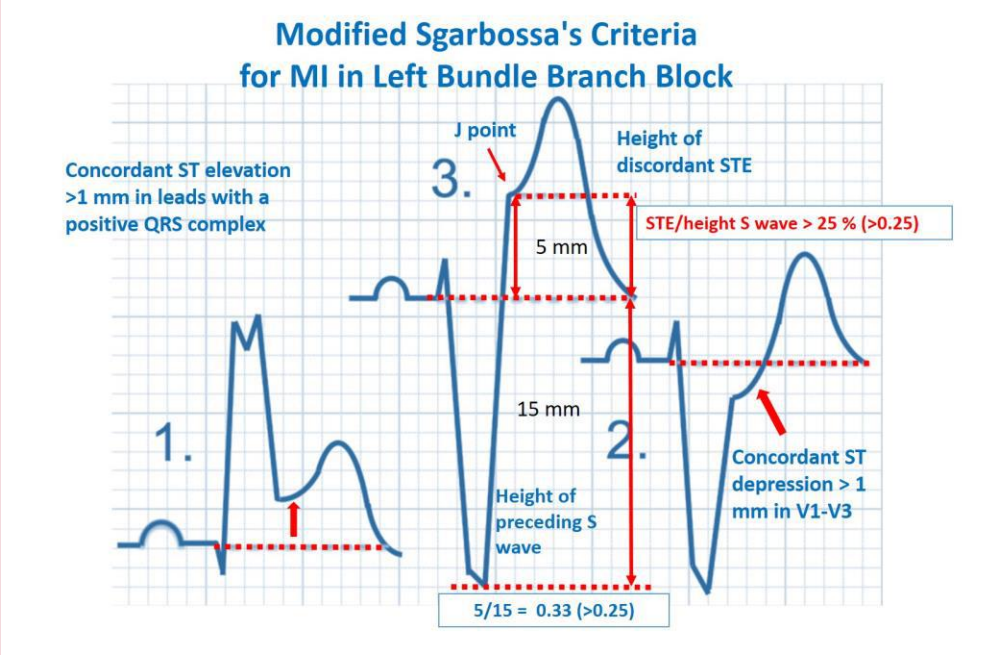
1. Administer Oxygen to maintain SpO2 of 92-95%.
2. Administer ASA if the following conditions are met:
   a. Has not taken at least 162 mg immediately prior to EMS arrival.
   b. No recent bloody stools or bleeding at other non-compressible site.
   c. Do not suspect aortic dissection (i.e., sudden stabbing pain radiating to the back, associated with left arm symptoms/hypotension, history of aortic problems).
3. Assist patient with nitroglycerin prescribed to that patient if the following conditions are met:
   a. Pain is similar to that normally experienced as angina or cardiac pain.
   b. Blood pressure greater than 100 mmHg systolic.
   c. Patient takes no more than three doses total (5 minutes apart).
   d. Prescription is current and not expired.
   e. The patient has not taken erectile dysfunction-type medications within 48 hours (i.e., Sildenafil (Viagra™), Tadalafil (Cialis™) or Vardenafil (Levitra™)).
4. Monitor vital signs every 5 minutes.

ALS Care

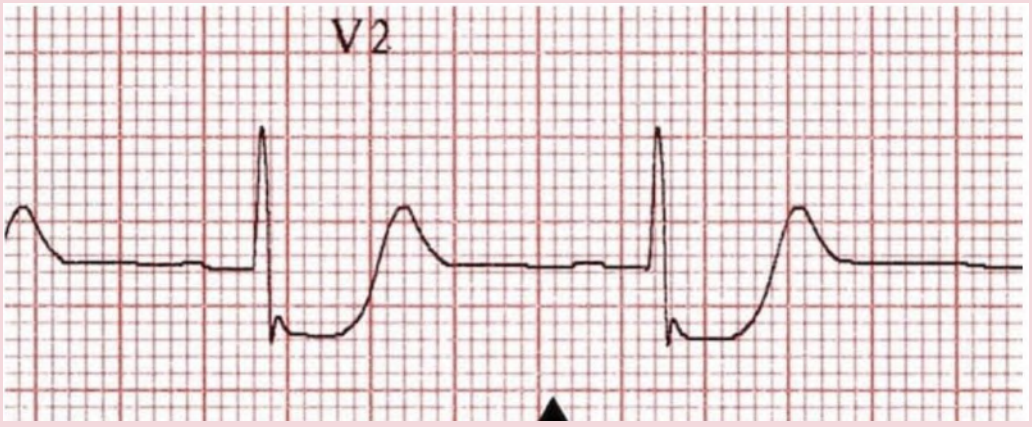
1. NS IV/IO or saline lock.
   a. Bilateral IV/IO placement in unstable patients and OMI candidates. Right-side hand or wrist and left-side AC 20G or larger preferred.
   b. Consider fluid challenge for patients who are hypotensive or suspected of inferior wall acute myocardial infarction.
2. Nitroglycerin
3. Hydromorphone
4. Fentanyl
5. Midazolam
6. If OMI:
   a. Atorvastatin
   b. Early notification to ED Charge Nurse
   c. Code Red transport

OCCLUSIVE MYOCARDIAL INFARCTION (OMI) - CATH LAB ALERT CRITERIA

1. In Patients with Left Bundle Branch Block or paced rhythm: Positive Sgarbossa Criteria, as below:
    a. **Concordant ST elevation** ≥ 1 mm in ≥ 1 lead
    b. **Concordant ST depression** ≥ 1 mm in ≥ 1 lead of V1-V3
    c. ***Proportionally* excessive & discordant STE** in ≥ 1 lead anywhere. STE will be BOTH ≥ 1 mm above QRS onset, AND ≥ 25% of the depth of the preceding S-wave.



2. In patients without LBBB or paced rhythm:
    a. ST-Segment Elevation in 2 or more Anatomically Contiguous Leads*
        i. 2mm or greater in V2 and V3
        ii. 1mm or greater in all other leads.
    b. Flat ST segment depression in V1-V3 with tall R waves (Posterior MI – can confirm with posterior leads. Only requires 0.5 mm elevation in either V7 OR V8).



c. Hyperacute T-waves, as below:

*Anatomically contiguous leads are two or more leads that look at adjoining areas of cardiac tissue:

- If the leads have the same name they are anatomically contiguous leads (e.g., anterior, inferior, lateral, septal)
- If the leads are consecutively numbered they are also anatomically contiguous leads (e.g., V4/V5)

Anterior: V3, V4

Inferior: II, III, aVF

Lateral: I, aVL, V5, V6

Septal: V1, V2

Treatment for OMI Criteria with or without chest pain:

Aspirin

Atorvastatin

Sweating, Nausea/Vomiting, and Radiation to shoulder (R>L) or jaw, all increase the pretest probability that the patient is having chest pain due to ischemia. In women, diabetics, and elderly patients, chest pain may be completely absent.

COLD-RELATED CONDITIONS

ALS Indicators

Temperature less than 95° F (35°C) oral or tympanic with evidence of exposure

Cessation of shivers in a cold patient

Significant comorbidities (e.g., elderly, illness, trauma, alcohol, or drugs)

BLS Care (Hypothermia)

1. Remove patient from wet clothing and the cold environment. Warm the patient with heated blankets and hot packs and the ambulance.
2. Provide supplemental Oxygen and/or ventilatory assistance as necessary. SpO_2 readings may be difficult to obtain and/or unreliable.
3. Monitor patient's vital signs and rectal temperature ideally. Use ECG monitor if authorized.
4. Patients can have extreme bradycardia. Do not initiate CPR if pulse or breathing is present. If patient is in extremely rural/wilderness environment and no pulse is detectable, do not initiate CPR given the risk of inducing ventricular fibrillation.
5. Be gentle moving patients given the risk of inducing ventricular fibrillation.

BLS Care (Frostbite)

1. Splint and/or bandage the cold-injured part to protect from further injury and do not let the patient walk on or use it.
2. Remove constricting jewelry (e.g., rings, watchbands).
3. Do not rub or massage injured tissue.
4. Do not rewarm frozen tissue unless transport time will exceed two hours, it is certain that the thawed tissue will not refreeze, and you have consulted Medical Control. Rewarming should be done with 100°F - 104°F (37.8 – 40° C) water. Do not use dry heat; it heats unevenly and may burn frozen tissue. Stop rewarming when the tissue turns red-purple and becomes pliable.
5. Transport to an emergency room.

ALS Care (Hypothermia)

1. For rectal temperature <90° F (32° C), also administer warm IV fluids.

Hypothermia Induced Cardiac Arrest

Criteria: A patient in cardiac arrest that is suspected to be due to hypothermia, not a patient that suffered a cardiac arrest and then became hypothermic.

Hypothermia may be:

1. Prolonged immersion in cold water without drowning (wearing personal flotation device), or sudden immersion in glacial or near freezing water.
    a. Puget Sounds is not cold enough and patient will likely drown before going into hypothermic arrest (unless wearing a personal flotation device).
2. Subacute/Exertion (e.g. individual lost in the woods).
3. Chronic/ “urban” (e.g. elderly individual with no heat in home.)

Exclusion Criteria:

1. Patients in cardiac arrest that meet criteria for DOA (see medical and trauma arrest protocol).
2. Body tissue/chest wall frozen solid.
3. Hypothermia patients whose body temperature has reached the temperature of the surrounding environment with other signs of death (decomposition, lividity, etc.).

DROWNING

ALS Indicators

Any underwater rescue

SCUBA diving related incidents

BLS Care

1. Remove the victim from the water. **Do not become a victim**.

2. Neutral in-line cervical stabilization during removal from water with a backboard if spine injury is suspected or patient is unresponsive.

3. If there is no suspected spinal injury, consider recovery position.

4. Prepare suction, expect vomiting.

5. Oxygen, consider BVM and CPAP

All immersion incidents should be transported to the hospital for further evaluation (unless determined dead in the field).

Care for Scuba Diving Accidents

1. Position patient supine or on side if airway compromise.

2. Full neurological and orientation exam for baseline.

3. Call Divers Alert Network (**1-800-446-2671**) if unsure of symptoms or for further treatment guidance (www.diversalertnetwork.org).

DYSTONIC REACTION

Dystonic reactions are jerking or spastic involuntary movements, often in the face or neck, in response to use of dopaminergic medications such as prochlorperazine or haloperidol. They are often painful and uncomfortable, and treatment is focused on calming and reassuring the patient. Examples include but are not limited to:

Phenothiazines: Prochlorperazine/Compro, Compazine; chlorpromazine/Thorazine; trifluoperazine/Stelazine

Dopamine Antagonists: haloperidol/Haldol, droperidol; metoclopramide/Reglan

ALS Care

Diphenhydramine

ELECTRONIC CONTROL DEVICES (TASER) DART REMOVAL AND CARE

Electronic Control Devices (ECD, e.g.: TASER®, stun gun) may be used by Law Enforcement to subdue a patient. The ECD fires two darts attached by wires and delivers up to 50,000 volts of electricity for up to 5 seconds. This is generally not harmful to pacemakers or cardiac function unless electrical discharge lasts more than 15 seconds.

BLS Care

1. Assure the scene and crew safety. Police must remain in custody of patient.
2. Do not remove darts if:
    - Patient is not under control
    - In the eye
3. Remove ECD cartridge from gun or cut wires *before removing darts*
    - Grasp dart firmly with one hand and pull to remove. Treat all darts as contaminated needle and dispose of them in sharps container or ECD cartridge.
4. Bandage wounds as appropriate.

ELECTROCUTION

BLS Care

1. If downed electrical lines are present, stay clear of the scene until lines are deenergized or controlled by electric utility authority.
2. Examine patient for entrance and exit wounds.
3. Assess patient for other trauma.

ALS Care

1. Continuous cardiac monitoring.
2. Treat pain as needed with Fentanyl, Hydromorphone, Ketamine, or Nitrous Oxide.

EPISTAXIS (NOSEBLEED)

BLS Care

1. Have the patient sit down and lean forward.
2. Blow nose on affected side to clear clots.
3. Pinch and hold nostrils closed for 10 minutes.
4. Discourage patient from swallowing blood.
5. If the patient loses consciousness, place in recovery position.
6. May spray Oxymetazoline into each nostril after blowing nose. Repeat after 10 minutes as needed.

HEAT-RELATED EMERGENCIES

BLS Care

1. Cool patient:
    a. Remove from the hot environment and place in a cool environment (air conditioner running on high).
    b. Loosen or remove clothing.
    c. Apply cool packs to neck, groin and/or armpits, cheeks, soles of feet, and/or palms of hands.
    d. Keep skin wet by applying cool water with sponge or towels.
    e. Fan aggressively.
2. Have patient drink water or other fluid replacement if responsive and not nauseated.
3. Monitor patient's vital signs and temperature (ideally rectal).
4. Avoid shivering if possible.

ALS Care

1. IV fluid challenge.
2. Cardiac monitoring – patient may experience dysrhythmias.

Transport

1. Decreased level of consciousness, unstable vital signs, or postural changes.
2. Age extremes (pediatric or elderly).
3. Complex medical conditions or significant comorbidities.

HYPERKALEMIA

Signs of hyperkalemia may include:

Peaked T waves, loss of P waves, and widened QRS on EKG

Arrhythmias

Cardiac arrest

Suspect in patients with:

1. Kidney disease and dialysis dependence
2. Rhabdomyolysis
3. Burns and crush injuries 72 hours post event
4. Addison's disease

ALS Care

1. IV/IO access.
2. Continuous cardiac monitoring.
3. Calcium Chloride - 1st line, prioritize early administration.
4. Albuterol
5. Sodium Bicarbonate

Administer Sodium Bicarbonate in a separate IV/IO line from Calcium Chloride and Epinephrine or thoroughly flush in between administrations using at least 10mL of normal saline (will precipitate).

HYPO/HYPERGLYCEMIA

ALS Indicators

Failure to respond to oral glucose

Suspected diabetic ketoacidosis

Blood glucose < 60 and unable to safely eat or drink

Blood glucose > 300 with decreased LOC or abnormal vital signs

BLS Care

1. Perform blood glucometry after the ABCs and initial assessment have been completed.
2. Common symptoms of symptomatic hypoglycemia include nausea, dizziness, fatigue, irritability and diaphoresis. Severe symptoms include loss of consciousness, seizure, loss of coordination, motor weakness, slurred speech, and confusion.
3. If blood glucose <70, position upright and give oral glucose, honey, juice, or other food high in simple sugar. May be followed by complex carbohydrates.
4. If unable to swallow, position on side, ventilate as necessary, and await paramedics.
5. Monitor vital signs and recheck glucose. Target blood glucose is >70.

ALS Care

1. D10
2. Glucagon

Transport

Transport should be recommended for patients who:

1. Take oral diabetic medications or long acting insulin
2. Do not have a responsible party on scene
3. Remain hypoglycemic below 70 mg/dL
4. Do not intake oral food

Patients may refuse transport and should sign AMA. See Capacity Checklist.

OBSTETRIC

ALS Indicators

Imminent birth

Hypertension in pregnancy (systolic > 140 mmHg) after 20 weeks gestational age

Excessive vaginal bleeding

Any abdominal trauma to mother after 20 weeks of pregnancy

Dispatched to birthing center/midwife

IMMINENT DELIVERY

General Care

1. Prepare delivery area.
2. Position mother in semi-reclining position.
3. Consider Nitrous Oxide for pain control in third trimester deliveries.
4. Deliver high flow Oxygen NRB until delivery unless you have a way to measure fetal HR (such as with accompanying midwife) and it remains 120-180 bpm.
5. If membrane has ruptured and mother feels urge to push, prepare OB equipment, and don sterile gloves, gowns, and eye protection
6. Allow the mother to push and as baby crowns, support head on the front and the back as it rotates.
7. If cord is around the baby's neck, gently slip it over the head. If the cord is too tight to slip over the head, apply umbilical cord clamps and cut between them.
8. Be prepared for body to deliver quickly after the head and to catch the baby with a towel.
9. If arm or leg presentation, breech presentation, shoulder dystocia, prolapsed cord, significant hemorrhage, decreased fetal heart rate or other significant complication:
    a. Contact Medical Control immediately.
    b. Administer Oxygen
    c. Place patient on her left side or in knee to chest position (McRoberts position), as appropriate.
    d. If prolapsed cord, place sterile gloved index and middle fingers into vagina and push fetal head up to relieve pressure on cord.
    e. Transport code red to L&D with early notification.

POST-DELIVERY INSTRUCTIONS

BLS Care

Baby:

1. Dry and stimulate the baby. Wrap in a warm blanket and prevent hypothermia.
2. Place two clamps on the cord two inches apart and six inches away from the baby. Cut the cord between the clamps. Inspect the cord for bleeding.
3. Document the time of birth and APGAR score at 1, 5, and 10 minutes.
4. Allow mother to hold baby if both patients are stable. Monitor vital signs every 5-15 minutes.

APGAR SCORING

Score at **1. 5,** and **10 minutes** after birth.

Clinical Sign	0 points	1 point	2 points
A			
Appearance	Blue, pale	Body pink, extremities blue	Completely pink
P			
Pulse	Absent	Less than 100 /minute	More than 100/minute
G			
Grimace	No response	Grimaces to stimulation	Cries
A			
Activity	Limp	Some flexions of extremities	Active motion
R			

Respiratory Effort	Absent	Slow, irregular	Strong cry or respirations

Maternal:

1. Observe mother's perineum for excessive bleeding and apply pressure if bleeding seems to come from skin tearing. A small to moderate amount of bleeding from the vagina is normal.
2. Massage the uterus through the lower abdomen to stimulate uterine contraction.
3. The placenta should be delivered spontaneously within 20 minutes. Do not pull on the umbilical cord. Once delivered, wrap the placenta in the bag supplied in the OB Kit and send with the mother to the hospital.
4. Monitor vital signs every 5-15 minutes.
5. BLS transport of mother and baby to hospital is appropriate if no ALS indicators.
6. **ALS Care:** For continued postpartum hemorrhage, administer TXA.

PREECLAMPSIA / ECLAMPSIA

Preeclampsia may be present in a pregnant woman without history of hypertension who is over 20 weeks' gestation and has persistent SBP > 140mmHg or DBP > 90 mmHg.

Seizures in a woman over 20 weeks' gestation should be presumed to be due to eclampsia.

BLS CARE

Eclampsia

1. Oxygen by NRB at 10-15 L/min

ALS Care

Pre-Eclampsia

IV

Eclampsia

1. IV/IO
2. Magnesium Sulfate is the drug of choice. Effort should be made to administer IV/IO and wait 5 minutes. If an IV/IO is not obtainable then give IM.
3. Midazolam
    a. If an IV/IO is not obtainable then give IM Midazolam immediately.
    b. If the pt continues to seize 5 minutes after IV/IO Magnesium Sulfate admin, follow up with Midazolam.

OPIATE WITHDRAWAL

ALS Indicators

ALOC

Respiratory distress

Common Signs and Symptoms

HR >100, restlessness, anxiety, dilated pupils, excessive sweating, muscle aches, abdominal cramps, diarrhea, nausea or vomiting, yawning, goosebumps, runny nose or tearing, Positive history of opioid use and confirmation of withdrawal (e.g., family/caregiver information or prescription records).

BLS Care

1. Ask the patient if a social worker/healthcare worker can follow up:
    a. Document contact phone number
    b. Document address or current/preferred location
2. Optionally document clinical opiate withdrawal scale (COWS - see below):
    a. Scores ≥5, while not required, are highly suggestive of opiate withdrawal, indicating tx may be beneficial
3. Recommend transport - patients suffering from opiate withdrawal can be better managed by the hospital.
4. If patient refuses transport: leave at-home Narcan kit.

ALS Care

1. Ondansetron
2. Buprenorphine - if opiate withdrawal is suspected or confirmed. The threshold to provide Buprenorphine should be low.
    a. May be given following Naloxone administration.
    b. Patient is not required to consent to long term treatment.
    c. Reassess:
        i. Look for improvements in withdrawal symptoms.
        ii. Watch for adverse effects (e.g., sedation, respiratory depression).
3. Encourage transport to ED for further treatment of opiate use disorder

Example questions that may be helpful:

“How are you feeling right now?”

“Do you feel like you’re withdrawing”?

“Would you like some medicine to help you feel better ?”

“We have a medicine that helps stop withdrawal symptoms. It can keep you safe from overdose and help you feel better right now.”

Exclusion Criteria for Buprenorphine Administration

1. Methadone use in the past 48 hours.
2. Respiratory depression: RR <12 or Pulse Oximetry ≤ 92%.
3. Altered mental status (e.g. GCS <15).
4. Severe hepatic impairment.
5. Known allergy or hypersensitivity to buprenorphine.
6. Concurrent use of benzodiazepines or alcohol.
7. Inability to safely swallow or take oral medications.
8. Pregnant.
9. Age <16
10. Severe medical illness (sepsis, respiratory distress, etc.).
11. No clinical opioid use disorder symptoms.

Clinical Opiate Withdrawal Scale (COWS)

Flow-sheet for measuring symptoms for opiate withdrawals over a period of time.

For each item, write in the number that best describes the patient's signs or symptom. Rate on just the apparent relationship to opiate withdrawal. For example, if heart rate is increased because the patient was jogging just prior to assessment, the increase pulse rate would not add to the score.

Patient's Name:_____ Date: _____

Enter scores at time zero, 30min after first dose, 2 h after first dose, etc.

	Times: ------	------	------	------
Resting Pulse Rate: (record beats per minute) *Measured after patient is sitting or lying for one minute* 0 pulse rate 80 or below 1 pulse rate 81-100 2 pulse rate 101-120 4 pulse rate greater than 120				
Sweating: *over past ½ hour not accounted for by room temperature or patient activity.* 0 no report of chills or flushing 1 subjective report of chills or flushing 2 flushed or observable moistness on face 3 beads of sweat on brow or face 4 sweat streaming off face				
Restlessness *Observation during assessment* 0 able to sit still 1 reports difficulty sitting still, but is able to do so 3 frequent shifting or extraneous movements of legs/arms 5 Unable to sit still for more than a few seconds				
Pupil size 0 pupils pinned or normal size for room light 1 pupils possibly larger than normal for room light 2 pupils moderately dilated 5 pupils so dilated that only the rim of the iris is visible				
Bone or Joint aches *If patient was having pain previously, only the additional component attributed to opiates withdrawal is scored* 0 not present 1 mild diffuse discomfort 2 patient reports severe diffuse aching of joints/ muscles 4 patient is rubbing joints or muscles and is unable to sit still because of discomfort				
Runny nose or tearing *Not accounted for by cold symptoms or allergies* 0 not present 1 nasal stuffiness or unusually moist eyes 2 nose running or tearing 4 nose constantly running or tears streaming down cheeks				

OVERDOSE/POISONING

ASPIRIN OVERDOSE

Description

Toxic Adult Dose: > 150 mg/kg

Chronic OD: 100 mg/kg for 2 or more consecutive days.

Symptoms

Mild: Nausea/vomiting, tinnitus, dizziness, tachypnea.

Severe: Fever, hypoglycemia, confusion/hallucinations, pulmonary edema, seizure, coma

BLS Care

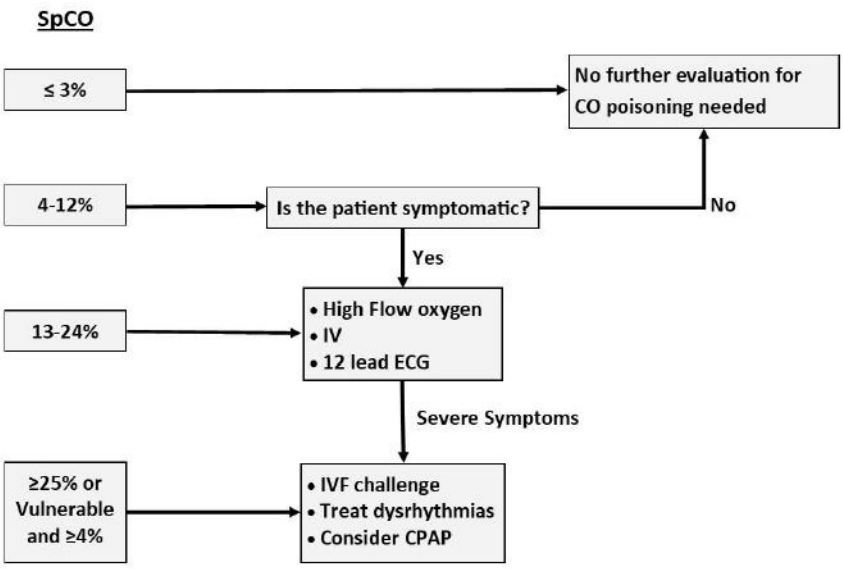
1. ABCs and supportive care as indicated in General Patient Care Protocols.

2. If needed, ventilate at patient's inherent tachypneic respiratory rate to compensate for respiratory/metabolic acidosis.

ALS Care

1. Provide airway and ventilatory support only if patient seems to be tiring, shows signs of respiratory failure or is unable to maintain their own airway.
2. IV fluid bolus.
3. If hypotension, cardiac arrest, or requiring ventilation, Sodium Bicarbonate.

CARBON MONOXIDE EXPOSURE FLOWCHART



Common Symptoms:
- SOB
- Chest pain
- Nausea
- Dizziness
- Fatigue

Severe Symptoms:
- Altered mental status
- Syncope
- Severe headache
- Vomiting
- Dysrhythmias and ST changes
- Respiratory arrest
- Seizures
- Shock

Vulnerable Patients:
- Pregnant women
- Elderly
- Young children
- Suspected COPD

"Cherry-red" skin is <u>not</u> a reliable indicator and is a late sign of CO poisoning.

CYANIDE POISONING

Description

Cyanide poisoning results from inhalation, ingestion, or dermal exposure to cyanide-containing compounds, including smoke from closed-space fires. Cyanide is a byproduct of synthetic material combustion and is also used in a variety of manufacturing and metallurgy processes. Cyanide poisoning prevents cells from utilizing oxygen, which causes a shift to anaerobic metabolism, resulting in lactate production, cellular hypoxia, and metabolic acidosis. Treatment is based on early recognition and antidote administration.

Signs and Symptoms:

Early: headache, confusion, vomiting, dyspnea, tachypnea, chest tightness

Late: hypotension, dysrhythmias, seizures, coma, and cardiovascular collapse

Suspect cyanide poisoning in smoke-inhalation victims presenting with:

1. Exposure to fire or smoke in an enclosed area.
2. Presence of soot around the mouth, nose, or oropharynx.
3. Altered mental status.

BLS Care

1. High flow Oxygen.
2. Airway and ventilatory support as needed.
3. Personal protective equipment and decontamination measures as needed. Use ambulance exhaust vent fan during transport.

ALS Care

1. At least 2 large bore IV/IO lines
2. NS fluid bolus.
3. Cyanokit (Hydroxocobalamin):
    a. Mixing instructions, age-based dosages, and drip rates are found on the package.
    b. Administer in separate IV line from other drugs due to incompatibility.

HYDROGEN FLUORIDE

Description

Used in industrial processes such as glass etching, aluminum refining, and rodenticides.

Has a sharp and irritating odor.

Health Hazard

Highly toxic. Extreme caution must be taken.

Signs and symptoms

1. Irritation of eyes, eyelids, nose, and skin.
2. Coughing, choking due to inflammation of the lungs (pneumonitis), and pulmonary edema.
3. If ingested: salivation, nausea, vomiting, diarrhea, abdominal pain. Painful burns.
4. Cardiovascular collapse is possible.

BLS Care

1. Use PPE and consider SCBA. Remove patient from contaminated area.
2. Irrigate contaminated skin with water for at least 15 minutes.
3. For eye burns, irrigate with running water or NS continuously.

ALS Care

1. Apply Calcium Gel to skin burns. For hand burns, consider placing calcium gel inside a glove, if provided by refinery.
2. IV fluid bolus as needed for hypotension.
3. If ingested, *give oral calcium such as milk or calcium carbonate* (Tums). Discuss administration of Calcium Chloride with Medical Control physician.
4. CPAP as needed for respiratory distress if there was no HF ingestion.

INGESTED POISONS

BLS Care

1. ABCs and supportive care as indicated in General Patient Care Protocols.

2. Bring any containers, bottles, etc. to ED.

3. For respiratory depression or coma of unknown etiology, consider Naloxone.

4. Consider calling Poison Control:
   1 (800) 222-1222
   1 (800) 709- 0911 (Washington State)

5. Activated Charcoal

ALS Care

1. Cardiac monitor. Treat dysrhythmias.
2. IV/IO.

OPIOIDS

ALS Indicators

Continued decreased LOC or respiratory compromise after naloxone

BLS Care

1. Ventilatory support. Consider 2 minutes of BVM and an airway adjunct prn.
2. Naloxone.
3. Continue ventilating patient prn.
4. If no arousal occurs after 5-10 minutes, proceed down Altered Level of Consciousness (ALOC) protocol.
5. BLS transports are appropriate for stable patients with good results from naloxone administration and additional naloxone is available to give if needed.

ALS Care

1. Monitor ETCO2 to evaluate for respiratory depression.

TRICYCLIC ANTIDEPRESSANTS

Description

Examples include but are not limited to:

Amitriptyline- Elavil

Desipramine - Norpramin, Pertograne

Doxepin - Adapin, Sinequan

Imipramine - Tofranil, Presamine

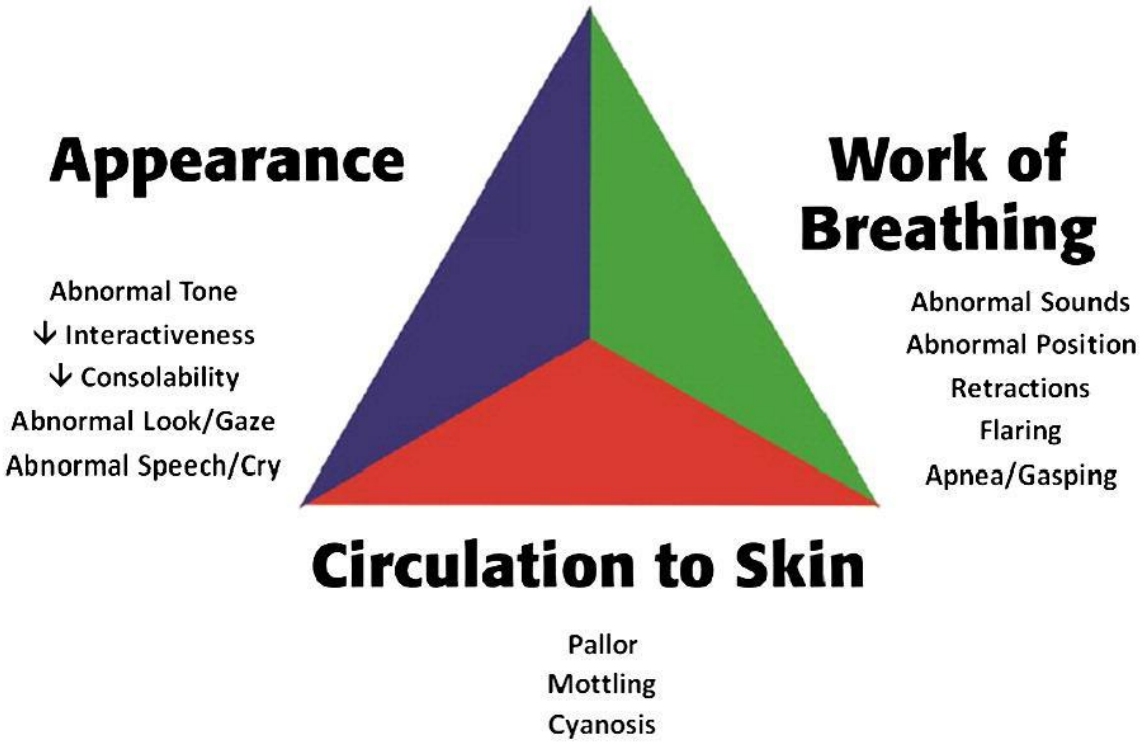
TCAs bind to cholinergic receptors and block neurotransmitter reuptake into neurons. Additionally, TCAs can cause sodium blockade in conducting tissues. Patients can deteriorate quickly.

BLS Care

1. ABCs and supportive care as indicated in General Patient Care Protocols
2. If needed, ventilate at patient's inherent tachypneic respiratory rate to compensate for respiratory/metabolic acidosis.
3. Obtain history of ingested poison. Bring any containers, bottles, etc. to ED.

ALS Care

1. Consider early intubation and mild hyperventilation. Match patient's inherent respiratory rate and maintain ETCO2 at 32-35 mmHg to raise pH.
2. NS IV/IO.
3. Cardiac monitoring and 12-Lead ECG.
4. If patient has a widened QRS complex, ventricular dysrhythmia, decreased level of consciousness or seizure:
    a. Sodium Bicarbonate
5. Consider and treat other causes such as:
    a. Hyperkalemia.
    b. Digoxin toxicity.
    c. Ventricular pre-excitation like WPW.
    d. H's and T's, other contributing factors.



ALS Indicators

Signs/symptoms of meningitis: stiff neck, petechial rash

General information

1. Minimum normal systolic blood pressure approximately 80 + 2 x age in years.
2. Weight estimate 8 + 2 x age in years = weight in kg.
    a. Premature infant weight:
        i. Below 28 weeks = <1kg
        ii. 28-34 weeks = 1-2 kg
        iii. 34-38 weeks = 2-3 kg
        iv. Above 38 weeks = term birth = > 3 kg
3. Respiratory rates:
    a. Infant 30-60/minute.

b. Toddler 20-40/minute.

c. Older child 18-30/minute.

4. Pulse rate:

    a. Infant 85-205/minute.

    b. Toddler 100-190/minute.

    c. Older child 60-140/minute.

High Risk Medical Criteria - Recommend Transport

Any pediatric patient that had an episode of any of the following should be transported even in the presence of normal vitals and a full resolution of symptoms:

1. Cyanosis or pallor.
2. Absent, decreased, or irregular breathing.
3. Marked change in tone (hyper- or hypotonia).
4. Altered level of responsiveness (including seizure like activity).

BLS Care

1. Fever (temperature ≥100.4℉/ 38℃):

    a. Acetaminophen

    b. Remove clothes and apply cool towels to reduce temperature.

ALS Care

1. NS Bolus for hypotension, dehydration, or significant tachycardia.
2. Endotracheal tube sizing: (AGE + 16)/4.
3. Arrhythmia with signs of shock and cardiac arrest – see Flowcharts.

RESPIRATORY DISTRESS

RESPIRATORY DISTRESS

ALS Indicators

Ashen color, cyanosis.

Audible wheezing or crackles (rales).

Failure to respond to inhaler/nebulizer.

BLS Care

1. Position patient upright unless hypotensive, then place in Trendelenburg position.
2. Monitor vital signs every 5 to 10 minutes depending on patient's condition.
3. If in respiratory distress or cyanotic, apply Oxygen immediately via non-rebreather.
    a. Obtain SpO2 and apply/titrate supplemental oxygen via nasal cannula or non-rebreather to achieve SpO2 92-95% (if history of COPD, SpO2 88-92%)
4. Provide ventilatory assistance with BVM as indicated.
5. If anaphylaxis is suspected: Epinephrine.
6. If asthma/COPD exacerbation is suspected, assist patient with inhaler or nebulizer. Repeat doses or administer continuously as needed. (BLS providers may administer regardless of pt prescription in Whatcom County)
7. If apparent choking:
    a. Encourage patient to cough.
    b. Heimlich maneuver
        i. If obese or pregnant: chest thrusts.
        ii. Infants <1 yr: alternate chest thrusts and back blows.
8. Consider CPAP. Request respiratory therapist from ED charge nurse if using CPAP.

ALS Care

1. Consider pneumothorax, asthma/COPD exacerbation, pulmonary edema, pulmonary embolism, foreign body, pneumonia.
2. Monitor ETCO2 value and waveform.
3. Cardiac monitor: rhythm strip and 12-lead ECG.
4. IV/IO.

Asthma/COPD

1. Prednisone
2. If severe respiratory distress or hypotensive despite Albuterol/Xopenex, consider Epinephrine IV/IM.
3. If severe respiratory distress, consider Magnesium Sulfate.
4. If ventilation is required, allow for a prolonged expiratory phase to prevent barotrauma. Consider chest compression to assist with expiratory phase.

Apparent choking

1. If patient is unconscious, use laryngoscope and Magill forceps to remove foreign body

Advanced airway support as indicated.

CONGESTIVE HEART FAILURE/PULMONARY EDEMA

Background

Features of dyspnea associated with congestive heart failure and pulmonary edema:

1. History of CHF, reduced ejection fraction, cardiomyopathy, coronary artery disease, chronic kidney disease.
2. Medications that include a diuretic such as furosemide (Lasix), torsemide (Demadex), bumetanide (Bumex), etc.
3. Pt may report recent unexplained weight gain, decreased urine output to usual diuretic dose, increased leg swelling, increased shortness of breath when lying flat, increased shortness of breath with walking short distances, i.e., from bedroom to bathroom.
4. Exam:
    a. Crackles or rales on auscultation of the lungs, starting in the bases.
    b. JVD when patient is sitting upright.
    c. Increased pitting edema in lower extremities (patient may note that it has extended up legs and even into low back or abdomen).

Severity

1. **Mild**: Mild dyspnea at rest, despite oxygen administration and able to speak in full sentences, or dyspnea with minimal exertion.
2. **Moderate**: Moderate dyspnea, pulse oximetry less than 94% on supplemental oxygen. SBP is usually greater than 150 mmHg. Unable to speak in full sentences. No altered mental status.
3. **Severe**: Severe dyspnea, respiratory failure, hypoxia with pulse oximetry less than 90% on supplemental oxygen, diaphoresis, SBP usually greater than 180 mmHg. Speaking one word at a time, may have altered level of consciousness.

Treatment

1. Provide supplemental O2 for sats <94%.
2. Initiate CPAP in:
    a. All Moderate-Severe patients
    b. Mild patients if
        i. Pt is still dyspneic on NC or NRB
        ii. SBP is rising,
        iii. Overall clinical trajectory is felt to be declining
3. Administer Nitroglycerin in patients with Moderate-Severe exacerbations if SBP>150 and mental status allows for oral drug administration. *
    a. For blood pressures between 150-175, target SBP of 140-150.
    b. For blood pressure greater than 175, target a 20% reduction in SBP.
        i. Initial SBP 200 => target 160
        ii. Initial SBP 225 => target 180
        iii. Initial SBP 250 => target 200
        iv. Initial SBP 275 => target 220

**CPAP is the preferred method of lowering blood pressure over nitroglycerin. Once CPAP is initiated, do not remove for the purpose of administering repeat doses of nitroglycerin*

Cardiogenic Shock

For treatment in patients with suspected cardiogenic shock (pulmonary edema, respiratory distress, hypotensive, poor perfusion, possibly with altered mental status:

1. Strongly consider trialing CPAP with close monitoring.
2. May trial small fluid bolus (max 250cc) if patient appears dry on exam (dry mucus membranes).
    a. It is possible for CHF patients to be extravascular volume overloaded while being intravascularly volume depleted
    b. Reassess q 3-5 minutes. If pressures worsen or respiratory effort or sats worsen, discontinue immediately
3. Initiate epinephrine infusion, targeting SBP >90.
4. If the patient becomes bradycardic, treat per symptomatic bradycardia algorithm.
5. If the patient needs to be intubated, avoid ketamine due to its potential cardiac stunning effect in heart failure.

PEDIATRIC RESPIRATORY DISTRESS – CROUP, RSV, AND EPIGLOTTITIS

Epiglottitis may be signified by drooling, stridor, and leaning forward. **Croup** typically presents with a barking cough and stridor may be present. **Asthma** is uncommon under age 2 and respiratory distress is often caused by **RSV infection**, which may cause wheezing along with congestion and cough.

BLS Care

1. Check SpO2 and pulse.
2. If the child exhibits respiratory distress, intercostal retractions, nasal flaring, or rapid respirations:
    a. High flow Oxygen blow-by, mask, or nasal cannula.
    b. Suction nasal congestion using bulb syringe or olive tip aspirator unless stridor present.
3. For the child in extremis (manifested by marked respiratory distress or respiratory failure with a decreased LOC):
    a. Gently assist respirations with bag valve mask with 100% Oxygen. Also give Oxygen by high flow NC under mask.

ALS Care

1. For suspected RSV with nasal congestion, consider deep suction and using 1-2 ml normal saline (from a flush) into each nostril.
2. If croup or epiglottitis is suspected and the child exhibits respiratory distress with consistent stridor when calm, intercostal retractions, nasal flaring, and rapid respirations:
    a. Nebulized Epinephrine
    b. Epinephrine IM
    c. Albuterol
    d. Magnesium
3. For the child in extremis (manifested by marked respiratory distress or signs of respiratory failure with a decreased LOC):
    a. Consider continuous nebulization through the BVM.
4. For respiratory arrest where bag valve mask ventilation is unsuccessful:
    a. Attempt intubation with a tube one size smaller than usual for age.
    b. Needle cricothyrotomy as a last resort. Use commercial device if available.

SEIZURES

ALS Indicators

1. First time seizure
2. Atypical seizure
3. Multiple seizures in same day
4. Seizure longer than five minutes
5. Severe headache
6. Seizure due to:
    a. Hypoglycemia
    b. Hypoxia
    c. Trauma
    d. Drugs or alcohol
    e. Pregnancy

BLS Care

1. Obtain a medical history including details of seizure, past seizure history, medications, drug and alcohol use, diabetes history, and recent head injury.
2. During seizure, position the patient on his/her side and protect from injury. Note duration and type of seizure activity in verbal and written reports.
3. Provide Oxygen during seizure and immediate postictal period.
4. Obtain blood glucose and measure temperature.
5. Perform exam to evaluate for neurologic deficits and trauma sustained.
6. Transport
    a. EMS transport required for first time seizure, more than one seizure in 24 hrs., or atypical seizure for the patient.
        i. Febrile seizures are always generalized tonic/clonic in nature. Any focal seizure is not a febrile seizure until proven otherwise
    b. Patient may not require transport to the ED if the patient has a seizure history, seizure was typical for their pattern, has returned to baseline mental status, and is with a responsible person. Suggest that the patient follow-up with a physician at the next available time. Discuss with Medical Control if uncertain.
    c. Patient may go to the ED or PCP by POV if febrile seizure is suspected, patient is 6 months to <6 years old, and had only one seizure lasting under 5 minutes.

ALS Care

1. NS IV/IO or saline lock if:
    a) Seizure lasted more than 5 minutes.
    b) More than one seizure in 24 hours.
    c) Suspected hypoglycemia.
    d) Suspected electrolyte imbalance.
    e) Pregnancy.
2. For ongoing seizures or status epilepticus:
    a) Midazolam Repeat every 5 minutes as needed for status seizures.
    b) For seizure persisting after 2 doses of Midazolam (10 minutes after initial dose), consider Ketamine.
    c) Consider intubation once treating with third round of medications (~10-15 min).
3. If blood glucose <70 mg/dL:
    a) D10
4. If fever, remove clothing to cool patient (but prevent shivering).
    a) Acetaminophen for fever >38° C (100.4° F):
    b) If patient is unconscious or unable to take orally, administer rectal Acetaminophen.
5. If patient is over 20 weeks pregnant and is seizing or has had recent seizure:
    a) See Obstetric - Preeclampsia/Eclampsia.

SEPSIS

Suspect in any patient with suspected infection and at least 2 of the following:

1. Temperature < 36°C (96°F) or > 38°C (100.4°F)
2. Heart rate > 100
3. Respiratory Rate > 20

AND any 1 of the following:

1. Systolic BP <100
2. Altered mental status
3. Significant clinical concern

Consideration of ETCO2 25mmHg or less as possible indication for Sepsis.

ALS Care

1. Two large bore IV/IO lines.
2. ETCO2 monitoring.
3. NS fluid bolus.
4. Consider Norepinephrine drip
5. Consider Push-dose Epinephrine as an alternative.
6. Call ED and provide early notification of Code Sepsis Alert.

STROKE

ALS Indicators

Vomiting

BLS Care

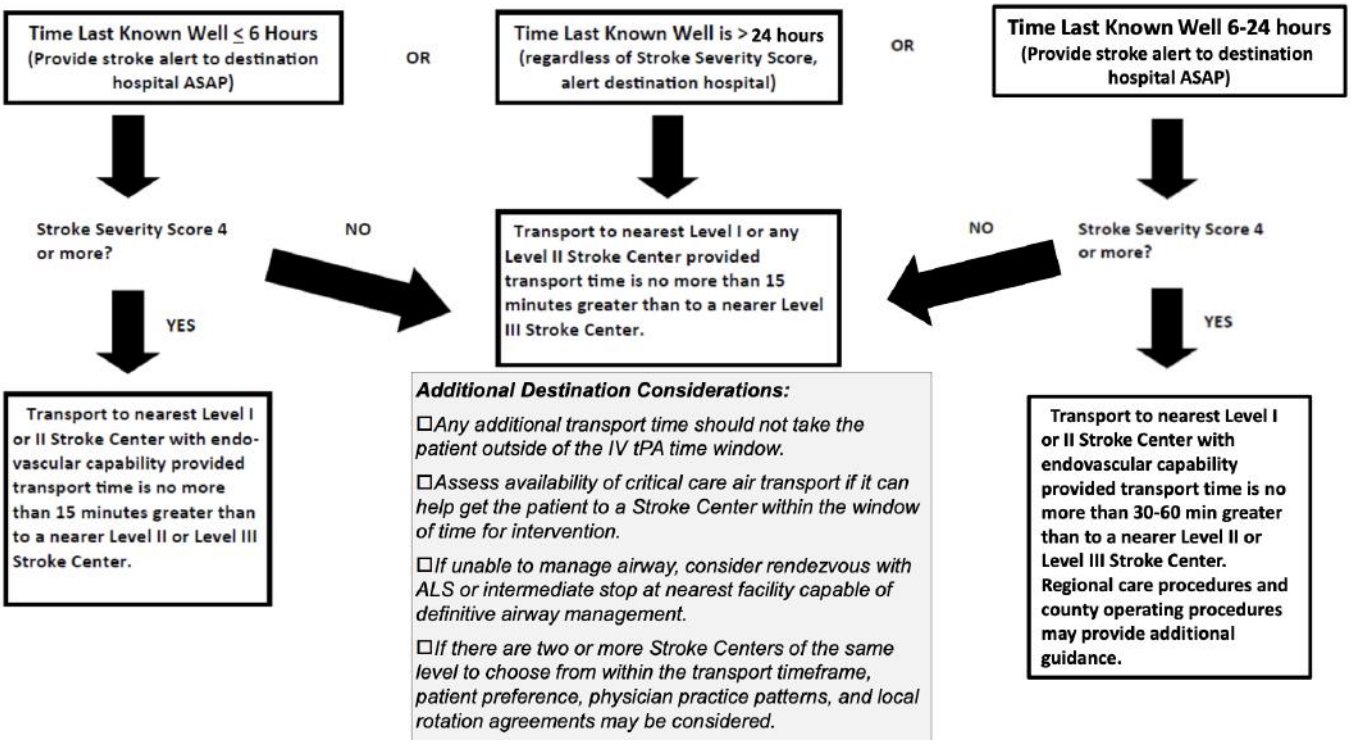
1. Determine time of last known well.
2. Perform **BEFAST** assessment
    i. **B**alance (assess for sudden change in balance or coordination, i.e., assess gait for ataxia as patient transfers to gurney)
    ii. **E**yes (assess for acute blurred vision or loss of vision in one part of visual field)
    iii. **F**ace (facial droop - assess for paralysis of one side of face with smiling and eye closure)
    iv. **A**rm Drift (ask patient to hold arms outstretched in front and assess whether one arm drifts compared to the other)
    v. **S**peech (assess for slurred speech, inappropriate words, or muteness)
    vi. **T**ime (time when patient was last seen normal)
3. Measure blood glucose and temperature
4. Notify Medical Control as soon as possible
5. Calculate a LAMS Score (see below). Scores of 4 or greater indicate large vessel occlusion (LVO).
6. Position pt supine to increase cerebral blood flow unless hemorrhagic stroke is suspected (13% of strokes).
7. Transport:
    i. Stroke signs with onset <4.5 hours with no ALS indicators = Air or BLS Code Red
    ii. Stroke signs with onset >4.5 hours with no ALS indicators = BLS Code Yellow
    iii. Advise the ED early for stroke within 24 hours of last known normal

ALS care

1. IV/IO (preferably 20g or larger in AC).
2. Cardiac monitor, 12-lead ECG

LAMS SCORE

Los Angeles Motor Scale (LAMS)[22]		
Face	0	Both sides move normally
	1	One side is weak or flaccid
Arm	0	Both sides move normally
	1	One side is weak
	2	One side is flaccid/doesn't move
Grip	0	Both sides move normally
	1	One side is weak
	2	One side is flaccid/doesn't move
Total	0–5	



CODE STROKE

A Code Stroke is a patient eligible for thrombolysis with TNK (tenecteplase) within 4.5 hours of Last Known Well. Identifying and rapidly transporting these patients is one of the most time-critical interventions in EMS. Every minute matters—millions of neurons are lost until the vessel is opened.

The Last Known Well (LKW) time is crucial for determining eligibility. LKW is not the same as symptoms onset. LKW is when the patient was last observed at baseline. Studies show that over half of stroke patients had an earlier LKW than reported by EMS, risking improper treatment. For example, if a patient goes to bed healthy and wakes up with stroke symptoms, LKW is when the patient went to bed, not when they woke up.

At the scene, ensure you document the LKW time accurately. When you give your report at the bedside, be ready to explain how you determined this time and provide the contact information of the person who confirmed it. This is essential for confirming accuracy before treatment.

Upon arrival, the stroke team will meet the patient at the door, and they'll go straight to a CT scanner. Those arriving within 4.5 hours of their LKW will be evaluated and treated as Code Stroke patients, with the potential for thrombolysis. This process remains unchanged.

STROKE STANDBY

A new process is the Stroke Standby. These are patients who test positive using the BEFAST criteria but fall outside the 4.5-hour thrombolysis window. However, their LKW is within 24 hours, making them potential candidates for thrombectomy.

If you have a patient in this category, contact the Emergency Department Nurse Team Leader (NTL) to initiate a Stroke Standby. Transport should be prompt, though a BLS code yellow transport is acceptable unless traffic would cause significant delays—then code red is warranted.

Transportation by BLS

Considerations:

1. The Head of Bed (HOB) should remain flat. A recent trial, ZODIAC, demonstrated that patients with large vessel occlusions have better outcomes if their head of bed is left flat until thrombectomy. All potential stroke patients should be transported with their HOB flat.

2. Evaluating your patient for atrial fibrillation and determining whether they are on blood thinners will help the stroke team determine whether they had an embolic stroke and are eligible for thrombolysis.

Paramedics should get a 12 L EKG, and BLS should print a rhythm strip, but transport should not be delayed. Whether the patient is in atrial fibrillation is only helpful for the hospital, but it does not determine transport.

ALS should get an EKG because they can, but BLS can just get a three lead because they can, and this will be enough to tell us if they're in atrial fibrillation for making our own risk assessment until we get our own EKG in the emergency department.

For ALS transport, establish an 18 or 20 gauge IV in the right antecubital (AC) and obtain a rhythm strip or EKG to check for new atrial fibrillation. However, don't let this delay transport. Once at the hospital, the patient will immediately go to the scanner for a CT and CTA to check for large vessel occlusion. If a large vessel is occluded, the patient will be transferred to Harborview for intra-arterial thrombolysis, aiming for a door-in, door-out time of 90 minutes or less.

WAKE-UP STROKE

Another new process is for Wake-Up Stroke patients, where the LKW is unknown. Call the NTL and alert the stroke team of a wake-up stroke. These are often patients who were normal when they went to sleep but woke up with stroke symptoms. While technically the LKW is when they went to bed, the stroke may have occurred within the 4.5-hour window for thrombolysis. In these cases, MRI findings can help determine if they are eligible for treatment.

However, MRI requires more time and involves powerful magnets. It's crucial to obtain next-of-kin information and check if the patient has any metal in their body before transport, such as pacemaker, ICD, joint replacement, cochlear implant, implanted pain stimulators or shrapnel. This extra step can save valuable time later.

For Wake-Up Stroke patients who may be within the 4.5-hour window:

1. Obtain the next-of-kin contact.

2. Transport quickly—use code red only if traffic delays would significantly affect arrival time.

Patients must be between the ages of 18 and 80 to meet criteria for thrombolysis under this process.

By staying informed and following these updated protocols, you will help ensure the best possible outcomes for stroke patients in our community. Thank you for your continued commitment to excellence in care.

SYNCOPE

BLS Care

1. Check blood glucose.
2. Neurologic exam.

ALS Care

1. Cardiac monitor, 12-lead ECG
2. Assess ECG for:
    a. Arrhythmia
    b. Ischemia
    c. Long QT (QTc > 440 ms)
    d. Wolff-Parkinson-White (WPW)
        - PR interval < 120 ms, Delta wave, QRS prolongation > 110ms, Discordant ST-segment and T-wave changes
    e. Hypertrophic Cardiomyopathy (HCM)
        - Nonspecific findings include: dagger like Q waves, particularly in the inferior and lateral leads (suggestive of hypertrophied septal depolarization and should raise suspicion for the disorder), localized or widespread repolarization changes (including T-wave inversions), prominent precordial voltages and left axis deviation (suggestive of ventricular hypertrophy), and P-wave abnormalities (suggestive of left atrial enlargement).
    f. Brugada sign
        - Coved (frowny face) ST segment elevation >2 mm in >1 of V1-V3 followed by a negative T wave.
3. <u>IV/IO</u>

TRAUMA

SEVERE TRAUMA

ALS Indicators - See "ALS indicators For ALL Patients"

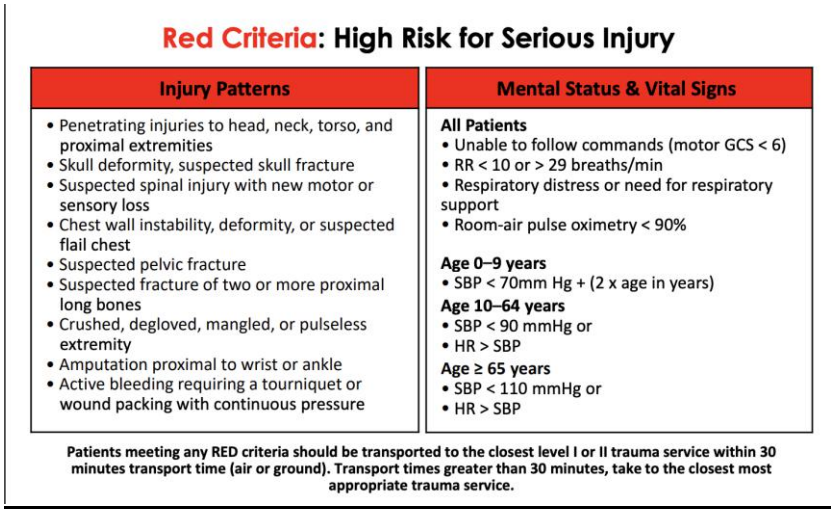
Significant Trauma/Mechanism of Injury (MOI) -Have a high suspicion for deterioration even if initial vitals are normal.

a. Head injury with new paralysis, focal weakness, or numbness.
b. Penetrating trauma to the head, neck, chest, abdomen, pelvis, groin, or proximal limb.
c. Uncontrolled bleeding.
d. Multi-system trauma or fractures at more than one location.
e. MVC-death in same vehicle, high speed, significant vehicle deformation, auto vs pedestrian, or ejection or separation from the vehicle.
f. Falls greater than two times body height.
g. Thrown greater than 10 - 15 feet.
h. Extremity trauma with pulse deficit.
i. Severe burns or degloving injury.
j. Amputation proximal to wrist or ankle.

BLS Care

1. Expedite scene time as much as possible.
2. Consider activation of air medical support or placing on standby for traumas meeting ALS trauma indicators or that are "High Risk" by EMS Trauma Triage guidelines
3. Address the components of M-A-R-C-H (as below), while
4. Maintaining clinical momentum toward the hospital.

If patient deteriorates and arrests, see Trauma Arrest Protocol for decisional support on transport and withdrawing/ceasing efforts.



Red Criteria: High Risk for Serious Injury

Injury Patterns	Mental Status & Vital Signs
• Penetrating injuries to head, neck, torso, and proximal extremities • Skull deformity, suspected skull fracture • Suspected spinal injury with new motor or sensory loss • Chest wall instability, deformity, or suspected flail chest • Suspected pelvic fracture • Suspected fracture of two or more proximal long bones • Crushed, degloved, mangled, or pulseless extremity • Amputation proximal to wrist or ankle • Active bleeding requiring a tourniquet or wound packing with continuous pressure	**All Patients** • Unable to follow commands (motor GCS < 6) • RR < 10 or > 29 breaths/min • Respiratory distress or need for respiratory support • Room-air pulse oximetry < 90% **Age 0–9 years** • SBP < 70mm Hg + (2 x age in years) **Age 10–64 years** • SBP < 90 mmHg or • HR > SBP **Age ≥ 65 years** • SBP < 110 mmHg or • HR > SBP

Patients meeting any RED criteria should be transported to the closest level I or II trauma service within 30 minutes transport time (air or ground). Transport times greater than 30 minutes, take to the closest most appropriate trauma service.

M.A.R.C.H.

Massive hemorrhage
Airway
Respiration
Circulation
Hypothermia/Head & Neck

Massive Hemorrhage

1. Apply tourniquets and pressure bandages to control any massive hemorrhage.

Airway

1. Support oxygenation with BLS maneuvers.
2. Monitor patient: ECG, SPO_2, $ETCO_2$, q3min vitals.

Respiration

1. Apply chest seals to anterior & posterior penetrating wounds to the thorax.
2. Support inadequate respirations with bag-mask ventilation.
3. If signs of tension pneumothorax are present, perform needle thoracostomy.
4. Depending on patient's habitus, consider using either:
    a. The 2nd intercostal space, midclavicular line, over the 3rd rib, or
    b. The 4th or 5th intercostal space, anterior axillary line
5. If persistent respiratory distress despite maximal BLS airway management, proceed with intubation:
    a. Pre-oxygenate with bag valve mask with PEEP at 10 cm H_2O or non-rebreather mask at 25 L/min AND nasal cannula at 25 L/min.

b. If possible, resuscitate with volume expansion (e.g. blood via air medical services) prior to intubation.
c. Intubate using the following medications/doses:
    i. If hypotensive, use *half-dosing (*i.e. Ketamine **1 mg/kg**, otherwise **2mg/kg**).
    ii. Rocuronium **1 mg/kg**.
d. Verify tube placement and monitor $ETCO_2$
    i. In patients primarily suspected of hemorrhagic shock:
        1. If the initial ETCO2 after intubation is < 35 mm Hg, then maintain that lower $ETCO_2$, e.g. if the initial ETCO2 after intubation is 29 mm Hg, then bag faster to maintain ETCO2 of 29 mm Hg after intubation.
    ii. In patients primarily suspected of traumatic brain injury:
        1. Target ETCO2 of 35 mmHg and SPO2 of 95%.

Circulation

1. Perform initial attempt at large bore peripheral IV prior to transport (18g minimum in adults, preferably 16g).
    a. If initial attempt is unsuccessful, insert IO.
2. Continue to attempt IV access in route to the hospital. Bilateral IO's are acceptable.
3. Consider prehospital blood via air medical services if available
    a. If blood is not available, treat as follows:
        i. Penetrating trauma: Saline lock only and rapidly transport.
        ii. Blunt trauma: Consider conservative crystalloid fluid resuscitation with maximum of **1L IVF** (**20cc/kg in pediatrics**).
4. Resuscitation via Blood or IVF should be titrated to systolic pressures of:
    a. 90 mmHg in patients with hemorrhagic shock (permissive hypotension)
    b. 135 mmHg in patients with suspected primary TBI
5. Administer Tranexamic Acid (**2g**) for patients suspected of severe uncontrolled hemorrhage or severe TBI

Hypothermia, Head & Neck Injury

1. Remove wet clothing, keep patient wrapped, expose skin only as needed.
2. Proactively heat ambulance.
3. If there is suspicion for spine injury, restrict spinal motion.
4. In suspected severe TBI, manage airway and circulation as above.
5. Consider hypoglycemia.

Notes

1. The above treatment guidelines apply to adult and pediatric patients.

2. Tension pneumothorax may present differently depending on the ventilatory status of the patient:
    a. For spontaneously breathing patients, signs and symptoms include chest pain, respiratory distress, diminished breath sounds, hypoxia, and tachycardia. Hypotension is typically a late development. JVD and tracheal deviation are relatively uncommon presentations but may be present.
3. Low ETCO2 (<25) predicts severe hemorrhagic shock in trauma patients.
4. In patients who are combative and agitated and cannot be redirected or verbally de-escalated, Ketamine may be needed to control the scene. Consider using:
    a. Ketamine **IM 5 mg/kg**
    b. Ketamine **IV 0.5 mg/kg, repeat** prn (2 mg/kg max)

TRAUMATIC ARREST

Traumatic Circulatory Arrest

1. If the mechanism of cardiac arrest appears to be non-traumatic in origin, follow medical arrest protocols.
2. Dead on Arrival (DOA): Consider withholding resuscitation and not transporting in the following cases:
    a. Decapitation or injuries incompatible with life.
    b. Burns beyond recognition.
    c. Obvious signs of prolonged death, rigor mortis (not hypothermic), decomposition, or lividity.
    d. Avalanche victims in cardiac arrest with snow/debris in airway.
    e. Upon arrival of EMS, the patient is apneic with no signs of life and is in asystole or PEA with a rate <40 bpm. ***
    f. Exceptions to this rule:
        i. Pt's suspected of possible hypothermia induced arrest.
        ii. Pregnant patient known to be >24 weeks pregnant or with visible fundus **and** <20 min to hospital.
3. Continue with Resuscitation and Rapid Transport in all other patients:
    a. Use the monitor and check for a rhythm and the presence of an SPO2 waveform.
    b. Address Reversible Causes (M-A-R-C-H):
        i. Major Hemorrhage
            1. Control of major hemorrhage should be prioritized over all other interventions.
            2. Hemorrhage control can be achieved through use of tourniquets, direct pressure, wound packing, and/or hemostatic dressings.
        ii. Airway
            1. Patients with isolated head trauma can develop primary apnea resulting in hypoxia as a cause of their arrest. Prioritize effective ventilation in these patients with BVM/igel/ETT.
            2. Treat hypoxia/airway obstruction through placement of an endotracheal tube or i-gel.
        iii. Respiration
            1. If the mechanism of injury is blunt trauma or penetrating injury to the torso, perform bilateral needle thoracostomies.
            2. Depending on the patient's anatomy, use either:
                a. The 2nd intercostal space, midclavicular line, over the 3rd rib, or

b. The 4th or 5th intercostal space, anterior axillary line

iv. Circulation

1. Place IV/IO. Consider early activation of ALNW for prehospital blood:
    a. If blood is not available.
    b. In blunt trauma, infuse up to **1L** of IVF.
2. If ROSC is achieved, titrate blood pressure to:
    a. SBP 90mmHg in primary hemorrhagic shock.
    b. SBP 135mmHg in primary TBI.

v. Hypothermia/Head Injury/Hypoglycemia (if ROSC achieved)

1. Prewarm rig.
2. Remove wet clothing, keep patient wrapped, expose skin only as needed.
3. Consider severe TBI.
4. Check blood glucose.

c. If resources are available, perform high-performance CPR.
d. Prioritize interventions above to fix reversible causes of traumatic cardiac arrest as CPR has little benefit if the cause of arrest is not reversed.
e. If the above interventions do not result in ROSC, and pt suffers an EMS witnessed asystolic or true PEA arrest (rates <40 bpm) perform 3 rounds of High-Performance CPR.
f. If patient remains in arrest, contact Medical Control for Termination of Resuscitation.

4. Guidelines for transport vs cessation of efforts:
    a. Continue with resuscitation and transport in the following cases:
        i. ROSC is achieved.
        ii. Patient arrests in route.
        iii. Patient is known to be 24 weeks pregnant (or uterine fundus palpable above the umbilicus).
            1. During transport, displace uterus to left to optimize blood flow to the heart
        iv. Suspected arrest due to hypothermia/exposure (avalanche victims with snow in airway are excluded).
        v. Penetrating trauma arrests in PEA/VT/VF, witnessed by EMS, and transport or time to blood (ALNW) is <15 minutes.
        vi. Trauma patients in PEA with rates > 40 bpm. ***
    b. Consider ceasing or withdrawing efforts and not transporting in the following cases:
        i. Patients that meet DOA criteria, as above.
        ii. Blunt trauma patients with asystolic arrest, or PEA with rates <40 bpm*** while still on scene.

1. In blunt trauma arrests in VT/VF, treat per Medical Arrest Policy

iii. Penetrating trauma patients with asystole or:

1. VT/VF or true PEA (< 40 bpm) arrest unwitnessed by EMS.
2. VT/VF or true PEA (< 40 bpm) arrest witnessed by EMS with transport time or time to blood >15 minutes.

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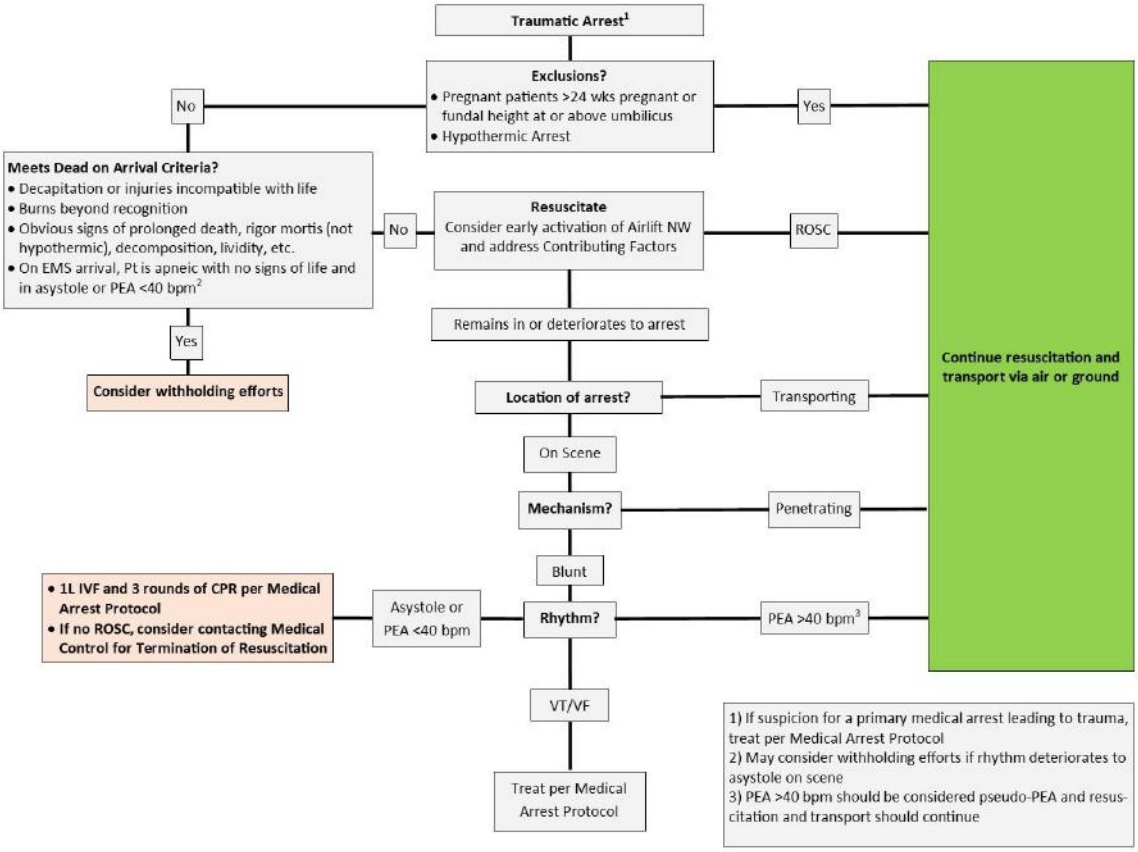
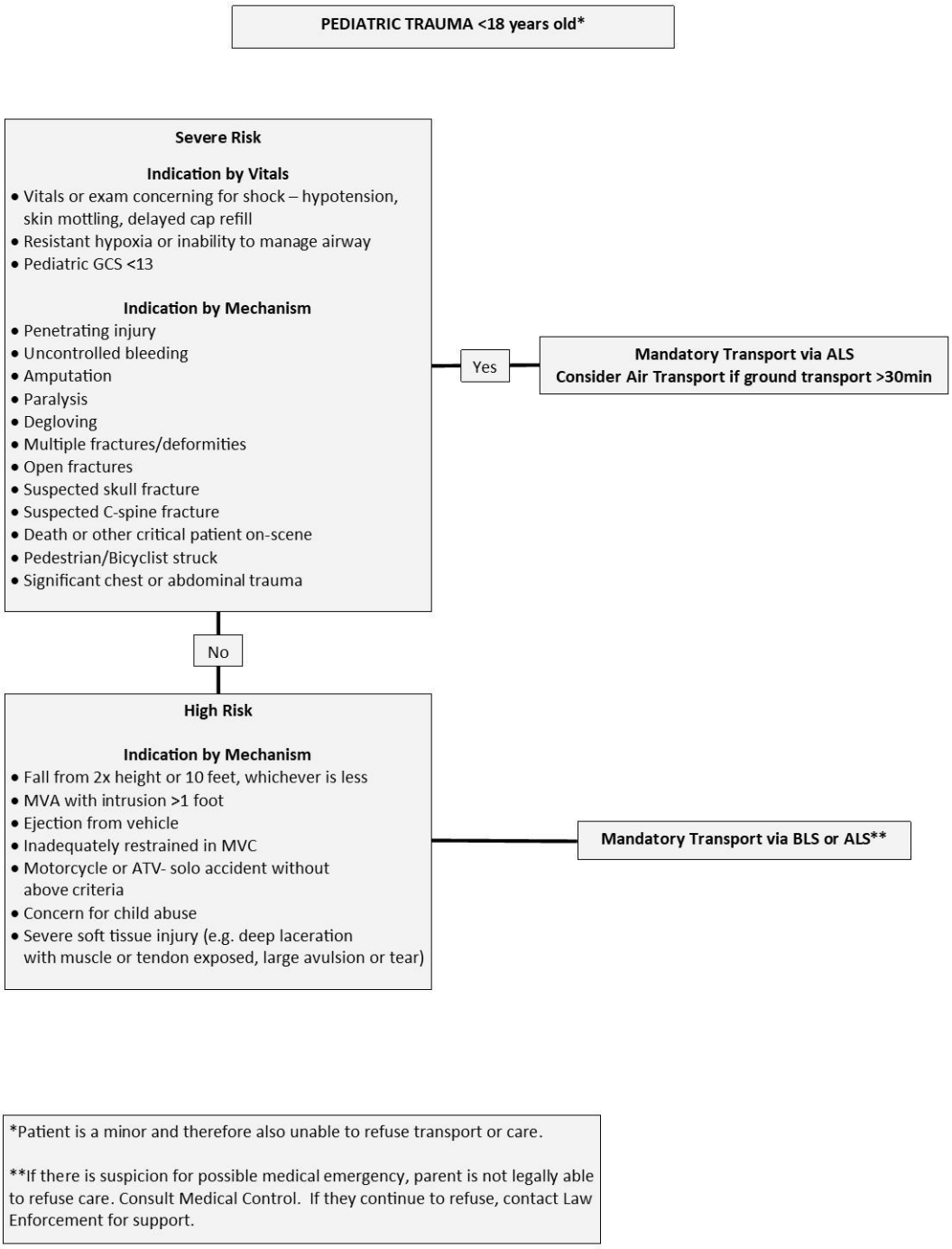
***PEA with rates >40 bpm should be considered pseudo-PEA, and resuscitative efforts and transport should be continued, even if there is no matching SPO2 waveform.

TRAUMATIC ARREST FLOWCHART



PEDIATRIC TRAUMA TRIAGE FLOWCHART



*Patient is a minor and therefore also unable to refuse transport or care.

**If there is suspicion for possible medical emergency, parent is not legally able to refuse care. Consult Medical Control. If they continue to refuse, contact Law Enforcement for support.

SPINE INJURY FIELD ASSESSMENT AND TREATMENT

Purpose and Overview

The goal of Spinal Motion Restriction (SMR) is to reduce unwanted movement of the potentially injured spine, preventing secondary neurologic injury. Consistent with guidelines from the National Association of EMS Physicians (NAEMSP), the American College of Emergency Physicians (ACEP), and the American College of Surgeons (ACS), this protocol emphasizes clinical assessment over routine immobilization.

Field Assessment Algorithm

1. **Mental Status:** Assess the reliability of the patient:
    a. No altered level of consciousness.
    b. No barriers to evaluation (e.g., language barrier, intoxication, distracting injury, dementia, acute stress reaction) in patients with high-risk MOI.
    c. If the patient is unreliable, proceed with SMR as indicated by mechanism and presentation.
2. **Symptom Assessment**
    a. No new numbness or motor weakness.
3. **Physical Exam – Spine and Neurologic**
    a. No midline spinal tenderness on palpation of each vertebra (over skin or light clothing).
    b. Able to range neck 45 degrees to the right and left without inducing numbness or motor weakness.
    c. Normal motor and sensory exam bilaterally:
        i. Wrist flexion/extension, grip strength.
        ii. Dorsal/plantar flexion of feet and great toe against resistance.

If all above are normal and no risk factors are present, SMR is not required at provider discretion. If any abnormality is found, initiate spinal precautions.

Spinal Motion Restriction Technique

1. Avoid backboards for transport. Use for extrication only.
2. Patients that are ambulatory can move to stretcher and be transported supine in c-collar
3. Vacuum mattresses preferred for immobilization.
4. Use appropriately sized cervical collar.
5. All transfers carry risk of spine displacement. Minimize transfers between surfaces.
6. Remove extrication device once on gurney, if sufficient personnel are available.
7. If short transport anticipated, consider delaying device removal until hospital arrival.

Special Considerations – Pediatrics

1. Age alone should not dictate SMR. Use clinical findings and mechanism.

2. Consider pediatric versions of validated tools like NEXUS or PERCARN for clearance.
3. Head-to-Body Ratio
    a. Young children have proportionally larger heads, which causes neck flexion when lying flat.
    b. Use padding under the shoulders (not the head) to maintain neutral cervical alignment, especially in children under ~8 years old.
    c. Use pediatric-sized collars and equipment.
4. Behavioral Considerations
    1. Agitation may worsen spinal risk. Let caregivers stay close or hold the child if possible.
    2. Immobilization can be traumatizing; try to calm the child and minimize unnecessary restraint.

Suspected Cervical Misalignment

1. Attempt gentle, single in-line repositioning to neutral position only if no resistance, new pain, or worsening symptoms occur. If unsuccessful, immobilize in current position.

SECONDARY/DETAILED TRAUMA EXAM

BLS Care

1. Expedite scene time as much as possible.
2. Assess ABCs, GCS, and treat life threatening hemorrhage.

GLASGOW COMA SCALE (GCS)

CATEGORY	CRITERIA	SCORE
EYE OPENING	Opens eyes spontaneously	4
	Opens eye to loud command	3
	Opens eyes to pinch	2
	Does not open eyes	1
VERBAL RESPONSE	Oriented, time, place person	5
	Confused, disoriented	4
	Talks, makes no sense	3
	Unintelligible sounds	2
	No verbal sounds	1
BEST MOTOR RESPONSE	Follows simple commands	6
	Pulls tester's hand away	5
	Withdraws from pinch	4
	Decorticate posturing	3
	Decerebrate posturing	2
	No response to pinch	1
Glasgow Coma Scale Total		

3. High flow **Oxygen 15 L/min** for all patients with shock or suspected severe internal/external hemorrhage.
4. Proactively treat for hypothermia with a heated ambulance and warm blankets. Consider hot packs.
5. Expose patient, perform secondary survey, and obtain more thorough history of the event.
6. Head trauma:
    a. If low suspicion for spinal injury based on exam, complaints, and mechanism, and GCS <9, then elevate head of gurney by 30 degrees.
    b. If taking blood thinners (Warfarin/Coumadin, Apixaban/Eliquis, Rivaroxaban/Xarelto, Dabigatran/Pradaxa, Lovenox, etc.), patient must be transported. Consult Medical Control if the patient refuses.

7. Helmet Removal
    a. Helmets and pads should be removed prior to stabilizing with vacuum splint.
8. Suspected Cervical Injury with non-alignment
    a. Perform one attempt to realign neck to the neutral, in-line position unless new pain, or other worsening symptoms or resistance encountered.
    b. If unable to realign then secure in the original position.
9. Dental trauma
    a. Place avulsed/dislodged teeth in milk or patient's saliva and transport with the patient.
10. Eye trauma:
    a. Stabilize impaled objects in place, avoiding any pressure on the eye, and cover both eyes with cups and dressings.
11. Chest Trauma
    a. Cover penetrating wounds between navel and neck with a Halo chest seal or occlusive dressing.
12. Abdominal trauma:
    a. Evisceration: Apply saline soaked bulky dressing. Do not replace organs in abdomen.
    b. Stabilize impaled objects.
13. Pelvic Sling
    a. Apply if significant trauma with signs of shock or for suspected open-book pelvic fractures per Pelvic Binder Placement protocol.
14. Extremity trauma:
    a. Refer to "Splinting/Traction" protocol.
    b. Elevate injured limb if possible and apply cold packs to injured area.
15. Amputation:
    a. Wrap amputated parts in sterile dressings, then place in a watertight container and then in a second container. Place the container on ice or chemical cold pack.
    b. Do not submerge the amputated part in water, place directly on ice, or use dry ice.
16. Soft tissue injuries:
    a. Control external bleeding with:
        i. Direct pressure – apply firm direct pressure over the source of bleeding.
        ii. Pressure dressing– particularly useful in junctional wounds, e.g. axilla or groin, as well as very proximal extremity wounds, or slower bleeds not requiring a tourniquet.
            1. Wipe away blood to identify the primary source of the bleeding.
            2. Create a tight ball of gauze and place this directly over the

source of bleeding. Apply firm downwards pressure.
3. Backfill the entirety of the wound cavity with gauze, replacing pressure as you go, hand over hand.
4. Continue until the gauze packing stands above surface of the skin, in order to create a fulcrum.
5. Wrap tightly with ace wrap, applying counter tension with each wrap so as to not shift the wound packing.

iii. Topical coagulant
1. Expose wound and identify actively bleeding tissues. This may require removal of superficial clots.
2. Apply topical coagulant product (chitosan based non-thermogenic product such as Celox preferred).
3. Apply firm pressure for up to 3 minutes then repeat if bleeding has not stopped completely.
4. Consider hemostatic agents.
5. Consider wound packing.

iv. Tourniquet –apply for massive uncontrollable bleeding from limb wounds.
1. Apply the tourniquet as proximal as possible on the affected limb.
2. Tighten tourniquet until distal pulses are lost.
3. Write the time of application on the patient's skin or on tourniquet, i.e., TK 1645.
4. Initiate rapid transport, notifying ER of tourniquet placement.

v. Dressing and bandaging:
1. Wear appropriate personal protective equipment.
2. Secure the dressing with a bandage that is snug but does not impair circulation, unless a tourniquet is required.
3. Large, easily removed debris, such as glass, splinters, or gravel should be removed before bandaging. Secure deeply embedded fragments or projectiles in place with the bandage.
4. Leave patient's fingers or toes exposed if possible and assess distal circulation after dressing application with pulse or capillary refill.

17. Early notification to the ED to determine if Trauma Code should be called.

ALS Care

1. Obtain 2 large bore IVs or IOs if significant trauma. Do not delay transport for vascular access.
2. Suspected Traumatic Brain Injury:
   a. Target SPO2 of 95%.

b. In patients requiring positive pressure ventilation, ventilate to maintain ETCO2 at 35 mmHg.
c. Target SBP of 135 mmHg.
d. May consider TXA particularly for GCS < 12.

3. Eye trauma: Proparacaine as needed for pain due to suspected corneal abrasion. Contraindicated if suspected punctured/ruptured globe.
4. Chest trauma:
    a. Perform needle thoracostomy for signs of tension pneumothorax (tachycardia, hypotension, decreased lung sounds and tracheal shift).
5. Extremity trauma:
    a. Attempt to realign (open or closed) long bones fractures with compromise of distal circulation, or if needed to facilitate packaging for transport.
        - If resistance to movement is encountered or pain is too severe, discontinue realignment efforts and immobilize in place.
        - Administer pain or sedation medications as needed to facilitate realignment.
        - Check and document CMS before and after splinting and/or realignment.
6. Administer TXA IV for severe uncontrolled bleeding or severe TBI
7. Treat pain and anxiety with Hydromorphone, Fentanyl, Midazolam, Ketamine or Nitrous Oxide as needed.

PROCEDURES/EQUIPMENT USE

CPAP (CONTINUOUS POSITIVE AIRWAY PRESSURE)

Background

CPAP provides positive pressure, which helps treat CHF by increasing intrathoracic pressures, which, in turn:

1. Decreases preload.
2. Decreases afterload (blood pressure).
3. Increases transmural pressures on the heart (helps squeeze).
4. Increases oxygenation.

Indications

1. CHF with suspected pulmonary edema and SOB indicated by signs such as rales or coarse wheezes, pedal edema, hypertension, and/or JVD.
2. Near drowning.
3. Reactive airway disease exacerbation (Asthma, COPD).
4. Other causes of acute pulmonary edema.
5. Pneumonia (often not effective, have low threshold to escalate to intubation if sats are not stabilizing).

Contraindications

1. Age < 8 (due to mask size).
2. Systolic BP < 90.
3. Suspected pneumothorax.
4. Major head or facial trauma.
5. Active vomiting.
6. Pulmonary fibrosis (relative – use with caution).

**Use with caution in patients with decreased LOC, and monitor at all times in case patient begins to vomit or aspirate

Procedure:

1. Place patient in seated position.

2. Connect tubing to appropriate-sized mask and to oxygen source.
3. Place mask on patient and ensure a good seal.
4. If patient becomes anxious/agitated, consider mild sedation using Midazolam, Ketamine, or Hydromorphone.

CRICOTHYROTOMY/TRANSTRACHEAL JET VENTILATION

ALS Care

Indications

1. Hypoxia or apnea requiring definitive airway, and inability to intubate the trachea and failure of alternative airway to provide adequate ventilation or oxygenation due to causes such as edema of the glottis, fracture of the larynx, severe oropharyngeal bleeding, severe maxillofacial injuries, or complete airway obstruction.

Contraindications

Ability to intubate the trachea or maintain adequate oxygenation and ventilation by other means.

Methods

1. Surgical Cricothyrotomy Field Pack.
2. Needle Cricothyrotomy with jet ventilation (preferred method under age 12).

DOPPLER

Indications

1. Assess pulse in possible ischemic limb.

2. Assess pulse during pulse check in cardiac arrest resuscitation.

3. Assess quality of compressions during CPR.

4. Assess difficult blood pressures.

Contraindications

Non-intact skin.

Procedure:

1. Turn on doppler and apply gel liberally to the tip.

2. Place doppler tip over artery to be assessed (radial, dorsalis pedis, posterior tibialis, femoral). Recommend placing over femoral pulse for cardiac arrest resuscitations. Adjust placement and angle as needed.

3. Listen for whooshing sound to signify pulse wave.

END-TIDAL CAPNOGRAPHY

Indications

1. Verification of endotracheal tube placement.
2. Monitoring of ventilation in intubated patients.
3. To identify and monitor hypercapnia in patients with SOB.
4. To monitor for apnea/hypopnea in patients with opiate overdose.
5. To monitor quality of CPR and prognosis in cardiac arrest.
6. Early detection of shock.

Procedure:

1. All patients should have a continuous waveform with each peak indicating a breath.

   If ETCO2 decreases below 35 and RR is < 6, patient may need ventilatory assistance or naloxone in the case of opiate overdose.
2. If very elevated ETCO2 (i.e., >55), patients may be retaining CO2 due to COPD, asthma or another cause and require medications or ventilatory assistance.
3. In intubated patients:
   a. A very low ETCO2 value (i.e., < 20) and lack of waveform may indicate tube misplacement.
   b. Ventilate to maintain ETCO2 between 35-45.
4. Cardiac arrest:
   a. Once intubated, monitor ETCO2. Try to improve CPR quality to attain ETCO2 >30.
5. Document in the ePCR:
   a. The initial ETC02 value and the presence of a good wave form.
   b. ETC02 value every 5 minutes.

EMMA END-TIDAL CO_2 MONITORING

Indications

In the absence of ETCO2 monitoring capabilities via LIFEPAK, the EMMA End-Tidal CO_2 device should be used in the following situations:

1. Airway Confirmation:
    a. To verify the proper placement of an iGel airway.
    b. To monitor continued airway placement during transport.
2. Cardiac Arrest:
    a. To assess the effectiveness of chest compressions, targeting an $EtCO_2$ of greater than 10 mmHg.
    b. To monitor for return of spontaneous circulation (ROSC) (sudden rise in $EtCO_2$ >35 mmHg).
3. Respiratory Distress or Failure:
    a. To monitor patients with suspected respiratory compromise.
    b. To assist in assessing the severity of respiratory failure.
4. Head Trauma or Stroke:
    a. To assess for potential hyperventilation or hypoventilation in altered mental status patients.
5. Sepsis or Metabolic Disorders
    a. To aid in detecting metabolic acidosis or respiratory compensation.

Procedure

1. Secure the EMMA device to the iGel airway.
2. Ensure proper waveform and numerical $EtCO_2$ values appear on the display.
3. Continuously monitor $EtCO_2$ readings and waveform capnography for changes.
4. Document $EtCO_2$ values and trends throughout transport.

Additional Information

1. Normal & Critical $EtCO_2$ Values:
    a. Normal Range: 35-45 mmHg
    b. Hypoventilation (↑ $EtCO_2$ >45 mmHg) → May indicate respiratory depression or inadequate ventilation.
    c. Hyperventilation (↓ $EtCO_2$ <35 mmHg) → May indicate shock, metabolic acidosis, or excessive ventilation.
    d. Cardiac Arrest: Persistent $EtCO_2$ <10 mmHg suggests poor perfusion or ineffective CPR.

Special Considerations

1. In low-perfusion states (e.g., shock, cardiac arrest), $EtCO_2$ values may be unreliable without continuous waveform analysis.
2. Sudden loss of $EtCO_2$ waveform may indicate airway dislodgment or apnea.

3. Always correlate $EtCO_2$ values with clinical assessment and other vital signs.

Documentation

1. Initial and ongoing $EtCO_2$ values.
2. Any interventions and patient response.
3. Capnography waveform trends.
4. ImageTrend iGel Worksheet.

ENDOTRACHEAL INTUBATION

Indications

1. Cardiac arrest.
2. Impending airway compromise
3. Refractory hypoxemia or hypercapnia despite less invasive airway management.
4. Combative patients requiring a high level of sedation.

Procedure:

1. General principles:
    a. Optimize scene and patient positioning before administering medications.
    b. If acute trauma with possible cervical spine injury, designate one provider to maintain in-line cervical spine stabilization manually during intubation, then replace spinal motion restriction after intubation.
    c. Pre-oxygenate with high flow oxygen (15 L/min) NRB or gentle BVM for at least 3 minutes prior to intubation. Additionally, place high flow oxygen through nasal cannula with second oxygen source and maintain during intubation until airway is secured.
    d. Test laryngoscope and suction prior to medication administration.
    e. Use video laryngoscopy preferentially.
    f. Strongly consider use of Eschmann/Bougie as an additional tool to confirm tracheal intubation in all intubations, by feeling tracheal rings followed by placing ET tube over the introducer.
    g. Treat hypotension with IV fluids or vasopressors per protocol. Attempt to ensure SBP 90 mmHg prior to induction of intubation.
    h. Read Pre-Intubation Checklist out loud prior to every intubation except cardiac arrest with ongoing CPR. See **Intubation Review CQI Checklist**
    i. In pediatric patients in shock or under age 1, consider administration of Atropine prior to induction.
2. If attempt fails, ventilate and reoxygenate with BVM to saturations at least in the high 90s if possible before attempting intubation again.
    a. Change at least one parameter (person intubating, technique, use of Eschmann tube introducer, size of tube or blade, positioning, etc.).
    b. If unsuccessful after 3 attempts, place supraglottic airway.

c. If inadequate oxygenation or ventilation with a supraglottic airway, proceed with cricothyrotomy.

3. **Rapid Sequence Intubation (RSI):**

   a. Administer Midazolam or Ketamine

      - Consider half dose in patients with shock

   b. Immediately administer Rocuronium.

4. **Delayed Sequence Intubation (DSI):**

   a. Indications:

      - Inability to adequately pre-oxygenate patient due to combativeness, altered mental status, or other cause.
      - Shock

   b. Administer Midazolam or Ketamine.

   c. Administer oxygen by NRB and then BVM if patient becomes apneic until patient has had SpO2 > 95% for at least 2 minutes, ideally.

   d. Administer Rocuronium and proceed with intubation.

5. **Post-intubation:**

   a. Verify and document ET tube placement with at least three methods:

      - ETCO2 waveform and value
      - Bilateral breath sounds, absent epigastric sounds
      - Mist in the tube
      - Chest rise

   b. Secure tube approximately at 21 cm at teeth for females, 23 cm at teeth for males.

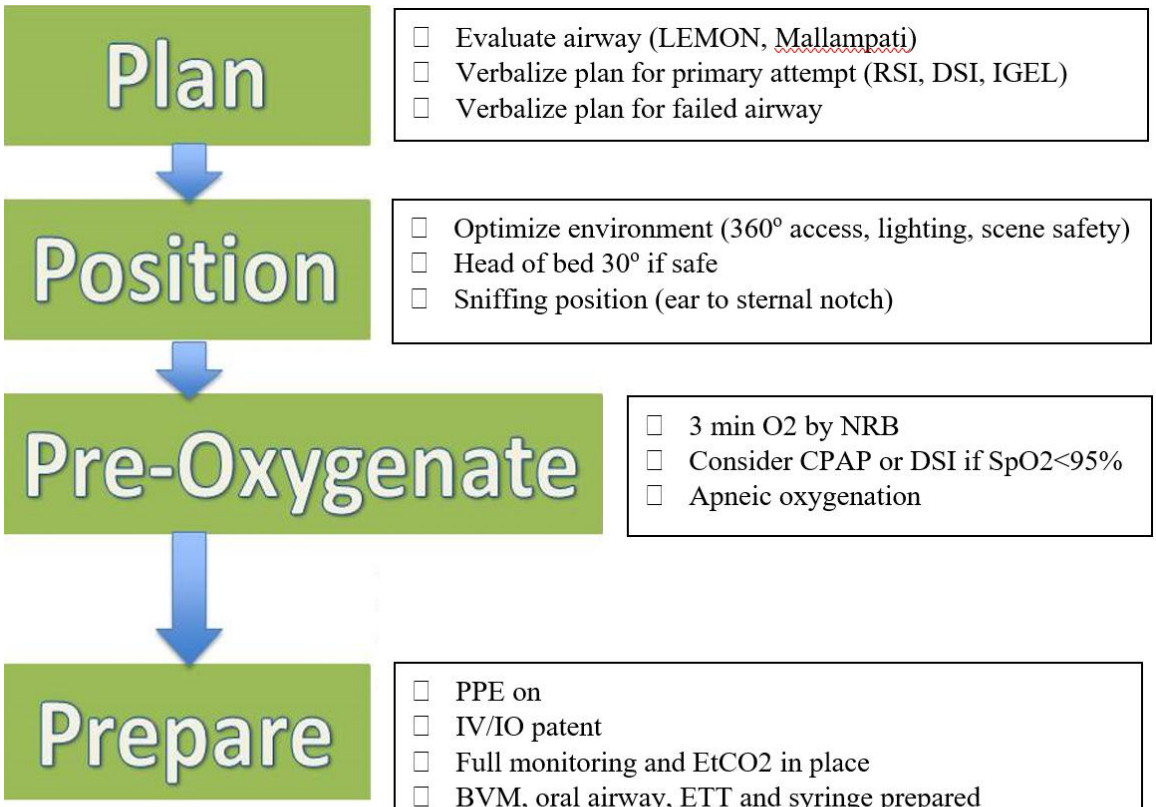
   c. Attach patient to ventilator, preferably. If BVM is required, take care not to hyperventilate.

   d. Administer oxygen only as needed to maintain SpO2 92-95% (or 88-92% in patients with COPD).

   e. Decompress stomach with OG or NG tube.

   f. Continue sedation with Midazolam or Ketamine.

PRE-INTUBATION CHECKLIST



Plan

- ☐ Evaluate airway (LEMON, Mallampati)
- ☐ Verbalize plan for primary attempt (RSI, DSI, IGEL)
- ☐ Verbalize plan for failed airway

Position

- ☐ Optimize environment (360° access, lighting, scene safety)
- ☐ Head of bed 30° if safe
- ☐ Sniffing position (ear to sternal notch)

Pre-Oxygenate

- ☐ 3 min O2 by NRB
- ☐ Consider CPAP or DSI if SpO2<95%
- ☐ Apneic oxygenation

Prepare

- ☐ PPE on
- ☐ IV/IO patent
- ☐ Full monitoring and EtCO2 in place
- ☐ BVM, oral airway, ETT and syringe prepared
- ☐ Induction, paralytic, and post-intubation sedation meds/doses confirmed with partner
- ☐ Suction tested
- ☐ Laryngoscope tested
- ☐ Back-up ETTs, blades, IGEL, and cric kit prepared
- ☐ Push-dose vasopressors as needed for hypotension
- ☐ Post-intubation ventilation plan

I-GEL® SUPRAGLOTTIC AIRWAY PLACEMENT (ALS OR BLS WITH ENDORSEMENT)

Indications

1. Cardiac and/or respiratory arrest.
2. Unconscious patient without a gag reflex.
3. Failed intubation.

Contraindications

1. Responsive patient with intact gag reflex.
2. Caustic ingestions.
3. Upper-airway obstructions due to foreign bodies or pathology.

Procedure:

1. Slide i-gel into the throat with airway opening oriented inferiorly until unable to advance further.
    a. Tutorial: iGel Training and Guidance
2. Confirm correct placement by lung sounds, chest rise and positive trending pulse oximetry.
    a. If unable to confirm by these parameters, remove and resume ventilating with BVM and OPA.
3. If patient develops a gag or begins breathing, suction and remove i-gel.

Weight-based sizes

ALS Care

1. Neonate: Size **1** (pink), 2-5 kg (5-11 lbs)
2. Infant: Size **1.5** (blue), 5 - 12 kg (11-25 lbs)
3. Small pediatric: Size **2** (gray), 10- 25 kg (22-55 lbs)
4. Large pediatric: Size **2.5 (**white) ,25- 35 kg (55-77lbs)

BLS Care

1. Small adult: Size **3** (yellow), 30-60 kg (65-130 lbs)
2. Medium adult: Size **4** (green), 50-90 kg (110-200 lbs)
3. Large adult: Size **5** (orange), 90+ kg (200+ lbs)

INTRAOSSEOUS PLACEMENT

Indications

1. In cardiac arrest, concurrently with attempts to establish an IV.

2. In critically ill patients with urgent need for IV access and in whom IV placement has failed twice or is unobtainable.

Contraindications

1. Infection at or near insertion site.
2. Suspected or known fracture of the extremity being used.
3. History of orthopedic surgery near insertion site (joint replacement, hardware in place).

Preferred sites

1. Humeral Head:
    a. Adult/Pediatric: Anterior humeral head at base of greater tubercle (approximately 2 finger widths inferior to line between the coracoid process and the acromion). Adduct humerus (palm over abdomen) and position elbow on ground/gurney.
2. Proximal Tibia:
    a. Adult: 1 finger width medial to the tibial tuberosity.
    b. Pediatric:
        i. If tibial tuberosity CAN be palpated: 1 finger width below the tuberosity and then medial along the flat aspect of the tibia.
        ii. If tibial tuberosity CANNOT be palpated: 2 finger widths below the patella and then medial along the flat aspect of the tibia.
3. Anterior Distal Femur:
    a. Adult/Pediatric: Identify the anterior midline of the distal femur 1-2 finger widths above the patella. Bariatric needle is required for adult patients and consider the adult needle on Pediatric patients.
4. Distal Tibia (Medial Malleolus):
    a. Adult: 2 finger widths proximal to the medial malleolus on the distal tibia.
    b. Pediatric: 1 finger width proximal to the medial malleolus on the distal tibia.

Equipment

1. EZ-IO drill and Adult (>40 kg), Pediatric (3 – 39kg), or bariatric needle (>40 kg) per patient size and insertion site.

Special Considerations

1. All fluids and medications may be given by intraosseous route.
    a. Pressure infusion is required in most cases. Flush catheter with a 10 ml saline syringe prior to fluid challenge.
2. When placing an IO in a conscious patient:
    a. Administer Lidocaine. Dependent upon patient presentation, allow for cavity numbing prior to flushing with 10ml saline. May repeat Lidocaine at half IO dose for patient comfort.

Removing an IO

An IO may be removed in the field if the patient does not require transport. Puncture site should be properly cleaned and covered with a Band-Aid.

LUCAS DEVICE USE

Indications

Cardiac Arrest requiring CPR

Contraindications

Too small (approximately age 8 or small chest wall) or too large for device (plunger is unable to come down to chest wall)

Instructions: (See Lucas Placement Guidelines)

1. Position so that the piston is over the lower sternum.

2. Use the neck stabilization strap.

3. Observe for any migration of the piston below the xyphoid process or to the upper sternum. If noted, reposition to correct location.

LUCAS PLACEMENT GUIDELINES

GENERAL GUIDANCE AND CONSIDERATIONS WHEN PLACING LUCAS DEVICE:

The WCEMSS believes the LUCAS device can be deployed within a reasonable amount of time, provided that the crew performing this task is both familiar and proficient with the process.

NOTE: BLS Agencies may place the Lucas Device before ALS arrival.

- WCEMSS strives to keep all breaks in compressions less than six seconds, never delaying compressions for more than ten seconds. Remove backplate from the case and place towards patient's head; remove neck strap from the case and place nearby.
- Complete two rounds of continuous HP-CPR with breaths being performed through compressions with or without SGA.
- Defibrillation takes priority over the placement of the LUCAS.
- One minute after the shock (or no shock), lift the patient's torso and place the backplate underneath the patient's upper back. Immediately resume manual compressions. This is not meant to be part of pulse check /rhythm analysis.
- **Limited Manpower:** In a coordinated fashion, one member standing in front of the patient grabs both arms and elevates the patient's torso. At

the same time, another provider places the backplate high on the patient's back, and compressions are rapidly resumed—the goal of the transition: ≤ 3 seconds.

- Adjust defib pads as necessary to minimize overlap between suction cup and pads.
- Adjust patient's arms out of the way of the device.
- Ensure that the control panel is facing the provider in the Compressor position and lock the side of the device farthest from the Compressor.
- At the end of the 2-minute CPR cycle lock the second side of the device onto the backplate.
- Lower piston/suction cup to the patient's chest, check that the lower edge of the suction cup is just above the end of the sternum, and press PAUSE (2); the device will slightly adjust.
- Press PLAY (3 top- continuous) to initiate LUCAS compressions.
- Apply neck strap and secure patient's wrists/forearms.
- Ensure the suction cup is compressing in an appropriate position and consider marking the position on the chest. All LUCAS adjustments should be made at one minute past the pulse check/rhythm analysis.
- Ensure compression cycles remain every 2 minutes, pressing PAUSE (2) to check rhythm at the end of each cycle.
- Reconfirm good femoral pulses with LUCAS CPR: adjust suction cup position as required.
- Reconfirm EtC02. If decreased after LUCAS transition: adjust suction cup position; if unresolved, return to manual and recheck.

NEEDLE THORACOSTOMY

SPEAR™ Device

Indications

1. Signs and symptoms of pneumothorax:
    a. Respiratory distress
    b. Subcutaneous air over chest wall or neck
    c. Decreased lung sounds on one side
    d. Tracheal deviation
    e. Hypotension and tachycardia

Insertion sites on the affected side are in the following preferred order:

1. The anterior axillary line, in the third or fourth intercostal space:
    a. Mark and cleanse area over the 4th or 5th rib, anterior axillary line.
2. The midclavicular line, in the second intercostal space:

. Mark and cleanse area over the 3rd rib, midclavicular line.

For both sites, insertion is as follows:

1. Insert needle perpendicular to chest wall firmly against anterior surface of rib.

2. MARK and HOLD ≤ 3 centimeters above the skin using finger as guide.

3. Advance SPEAR™ into the thoracic cavity just over the superior margin of rib, careful not to exceed 3 cm in depth.

4. While anchoring needle, direct the assembly toward the **middle of the clavicle** and release the needle from the catheter by rotating the slip-lock.

5. Advance the catheter while keeping the needle stationary as a guide.

6. Remove one-way valve from proximal end of needle hub and attach to the catheter hub. Secure with tape.

Special Considerations

1. Raise patient's arm above their head prior to insertion to expose ribs and decrease chest wall thickness.

2. Needle placement should always be just superior to the rib, to avoid blood vessels on inferior margin of rib.

3. Rush of air should be detected upon placement to confirm intrapleural placement.

4. Monitor closely through transport for continued leak of air or blood.

5. If the patient continues to deteriorate, insert a second needle in an alternate chest wall site.

If available, SamThorasite® may be used.

1. Push Axilla Hook into the armpit until fully inserted into axillary fossa.
    - **Note: Keep patient's arm positioned by their side, no greater than 90° upward**.
2. Point Alignment Arrow toward the hip, aligning the iliac crest.
    - **Note: Base of the device should be parallel to patient's spine**.
3. Palpate within Safe Zone Window to feel intercostal space (ICS).
    - **Note: If two intercostal spaces are identified within the Safe Zone Window, select the upper ICS**.
4. Vent in identified intercostal space within the Safe Zone Window.
    - **Note: If ribs cannot be palpated, vent in the center of the Safe Zone Window. If a rib is encountered, redirect above the rib**.

PELVIC BINDER PLACEMENT

1. The Pelvic Sling is the preferred pelvic binder device. If hip circumference is too small or large for the splint (< 32 or > 50 inches), tie a sheet tightly around the iliac wings.

2. Approximate size by circumference around hips and buttocks (not waist)
    a. Large: 36 – 60-inch circumference
    b. Standard: 32 – 50-inch circumference
    c. Small: 27 – 47-inch circumference

3. Review use instructions on the package.
    a. Clothing should be removed before placing the Sling.
    b. Apply with buckle centered over the pubic symphysis.
4. May be used concurrently with Traction Device.

SPLINTING / TRACTION

Appropriate splinting can reduce or minimize dislocation, hemorrhage, swelling, and pain.

Indications:

1. Deformed fractures / dislocations with compromised distal pulse of capillary refill.
2. Deformed fracture / dislocation where realignment is necessary to facilitate packaging for transport.
3. Mid-shaft femur fracture is suspected without suspected fracture of the lower leg, knee, or hip.

GENERAL PRINCIPLES

1. Remove or cut away clothing.
2. Dress and bandage significant wounds using a sterile dressing.
3. Check CMS distal to injury before and after splinting.
4. If distal pulse or capillary refill is compromised, attempt to realign fracture into anatomical position until the pulse returns, excessive pain is felt, or resistance is encountered. If resistance to movement is encountered or pain is too severe, discontinue realignment efforts and immobilize in place.
5. Immobilize joints above and below injured bones.
6. Pad splints generously.
7. Elevate extremity after splinting, if possible.
8. May be used concurrently with Pelvic Binder

Midshaft femur fractures

1. Size splint to uninjured leg
2. Have one team member stabilize the injured leg while the other applies the traction device. The preferred traction device in Whatcom County is the Kendrick Traction Device.
3. Apply groin strap, ankle hitch, and knee strap. Extend the splint and apply the thigh and calf straps.

SYNCHRONIZED CARDIOVERSION

Indications

1. Hemodynamic instability due to tachyarrhythmia
    a. SBP <90 or altered mental status
2. Ventricular tachycardia

Contraindications

Tachycardia secondary to obvious non-cardiac causes such as sepsis, hypovolemia, or trauma.

Procedure

1. Apply pads in AP placement.
2. Provide sedation with Midazolam, avoiding delays if patient is unstable.
3. **Synchronize** machine prior to each shock.
    a. Ensure the caret accurately tracks R waves.
4. Shock at **200J,** then **300J**, then **360J** for all additional shocks.
    a. **Pediatric:** shock at **1J/kg**, then **2J/kg** repeated until successful (do not exceed adult dosing).

TRANSCUTANEOUS PACING

Indications

1. Symptomatic bradycardia
2. Overdrive pacing in repetitive monomorphic VT
3. Overdrive pacing in slow A fib that is symptomatic

Procedure:

1. Place pads in AP position
2. Provide sedation with Midazolam, avoiding delays if patient is unstable.
3. Push "Pacer" on monitor and set to Demand mode
4. Set rate to 70 or to 10 bpm above patient's intrinsic rate, whichever is higher
5. Set mA to 70
6. Start pacing and increase mA until electrical capture on monitor and mechanical capture as evidenced by pulse.
    a. If capture is not achieved by 130 mA, reassess electrode positioning and consider adjusting pad position then repeat above.
    b. Once capture is achieved, set current at 5-10 mA above level of capture.
7. If symptoms have not improved (i.e., improvement of mental status, dizziness, chest pain, SOB, etc.), titrate the rate until improvement.
8. Be prepared to defibrillate if VF or persistent VT occur.

Overdrive pacing:

Follow instructions above and set Mode to "Fixed" and Rate to 90-110 bpm. This may prevent Torsades by shortening the QT interval and preventing PVCs.

Complications

1. Failure to pace
2. Discomfort

COMMUNITY PARAMEDIC PROTOCOLS/GUIDELINES

Introduction

Under the community assistance referral and education services program established by RCW 35.21.930, a community can provide outreach and assistance to the residents of its jurisdiction in order to improve population health and advance injury and illness prevention. The medical oversight for these programs is provided by the EMS medical program director as authorized in RCW 35.21.930, 18.71, 18.73, 70.168, and WAC 246.976.

Whatcom County residents may be eligible to receive services from the local community assistance referral and education services program if they have:

1. Been identified as a high utilizer of the 911 system. A high utilizer is defined as a patient with a call volume that may overwhelm the local EMS resources.
2. A referral from local community agencies. Community partners who request additional outreach help for their clients.
3. Been identified as a risk for hospital readmission. Patients who are recently released from hospital needing assistance to follow-up appointments, medication use, or fall risk assessment.

Description

In Whatcom County a Community Paramedic (CP) is an individual, who in addition to utilizing all standard advanced life support (ALS) protocols, has completed MPD specialized training under WAC 246-976-024. CP performs paramedic duties through assignment to an emergency response-capable vehicle equipped with ALS equipment. Activities will be focused on those residents whose needs, and/or EMS utilization, may best be served by a more focused approach.

Activities may include the administration of medications, picking up and delivering medications to people who lack transportation, or performing various skills and procedures within current scope of practice and in accordance with established protocols under the direction of the Whatcom County Medical Program Director. CPs may also transport people who do not require ambulance transport to destinations other than a medical facility.

CPs will work with a person trained to conduct activities as an intensive case manager (ICM). The ICM provides intensive care management of the social and logistical needs of the client. This partnership facilitates patient use of, and integration with social/medical support services with a primary goal of decreasing 911 utilization for non-emergent purposes and connecting patients to appropriate resources.

Aripiprazole (Abilify)
Naltrexone (Vivitrol)
Haloperidol
Paliperidone Palmitate (Invega Sustenna and Invega Trinza)

ARIPIPRAZOLE (ABILIFY) PARENTERAL LONG ACTING

Pharmacologic Effects

1. Atypical antipsychotic
2. Used to treat schizophrenia and bipolar disorder
3. Modulates neurotransmission overactivity of dopamine

Metabolized (Parenteral)

1. Metabolized in the liver. Excreted in urine and feces
2. Half-life is 75 hours
3. Steady state takes 10-14 days

Indications

Must be prescribed by the patient's PCP for:

1. Schizophrenia
2. Bipolar disorder

Contraindications

1. Allergy to Aripiprazole
2. Pregnant or breastfeeding

Cautions

Suicidal ideation

Dosage and Administration

1. Must be reconstituted and warmed to room temperature before administration.
2. Follow instructions for use of syringe as prescribed with sterile water.
3. Comes as prefilled dual chamber syringe 300 or 400 mg.
4. Give 300 or 400 mg deep IM in gluteal or deltoid muscle as prescribed by PCP.
5. Monitor for suicidal ideation in patients with history of SI.

Adverse Effects

1. Injection site pain
2. Extrapyramidal symptoms
3. Sedation
4. Hyperglycemia and weight gain
5. Increased risk of CVA
6. Increased fall risk and orthostatic hypotension
7. Esophageal dysmotility and aspiration risk

Pharmacologic Effects

1. First-generation typical antipsychotic
2. Blocks dopamine receptors

Metabolized

1. Metabolized in the liver
2. Half-life is 14-37 hours (depending on administration route)

Indications must have a previous diagnosis of:

1. Schizophrenia
2. Psychosis

Must have a valid prescription.

Contraindications

1. Parkinson's disease and dementia with Lewy bodies diagnosis
2. Conditions marked by significant CNS depression

Cautions

1. Pregnant or breastfeeding
2. Conditions or drugs that induce CNS depression
3. Impaired liver function

Dosage and Administration

1. Maximum initial dose: 100 mg; if greater than 100 mg is needed, the dose should be administered in 2 separate injections (100 mg followed by the balance in 3 to 7 days)

2. Maintenance dose: 10 to 15 times the previous daily oral dose IM once a month, titrated to response

3. Maximum monthly dose: 450 mg

Adverse Effects

Extrapyramidal symptoms
Injection site reaction
Orthostatic hypotension

NALTREXONE EXTENDED-RELEASE INJECTABLE SUSPENSION (VIVITROL)

Pharmacologic Effects

3. Opiate antagonist
4. Also used to treat alcohol dependence

Metabolized

3. Metabolized in the liver
4. Half-life is 5-10 days

Indications

Must be prescribed by the patient's PCP for

3. Alcohol dependence
4. Opioid dependence

Contraindications

3. Opioid use within the last 7 days
4. Pregnant or breastfeeding

Cautions

4. Suicidal ideation.
5. Known liver disease

Dosage and Administration

4. Must be reconstituted and warmed to room temperature before administration.
5. Supplied in vials containing 380 mg of powder and a second vial containing 1.4 ml of diluting solution. Reconstituted the volume is 4.2 ml.
6. 380 mg gluteal IM injection monthly (alternating glute each month).

Adverse Effects

Opioid withdrawal
Opioid overdose
Injection site reaction
Liver failure and hepatitis

PALIPERIDONE PALMITATE EXTENDED-RELEASE INJECTABLE SUSPENSION (INVEGA SUSTENNA AND INVEGA TRINZA)

Pharmacologic Effects

1. Dopamine antagonist
2. Serotonin antagonist

Metabolized

Metabolized in the liver

Indications

Must be prescribed by the patient's PCP for:

1. Schizoaffective disorder
2. Schizophrenia

Contraindications

1. Hypersensitivity to Risperidone
2. Prolonged QTc syndrome
3. Dysrhythmia history
4. Dementia

Cautions

1. Bradycardia
2. QT prolongation
3. Hypovolemia
4. Seizure history (relative)
5. High environmental temperature
6. Patients over 65 years of age

Dosage and Administration

1. Ideally should have been started by PMD.
2. Continue to monitor for suicidal ideation in patients with history.
3. IM Injection in deltoid or glute.
4. Invega Sustenna is Monthly prescribed at the following doses: 39 mg, 78 mg, 117 mg, 156 mg, or 234 mg.
5. Invega Trinza is Every 3 Months following >= 4 months of adequate treatment with Invega Sustenna. Invega Trinza is prescribed at the following doses: 273 mg, 410 mg, 546 mg, 819 mg, 234 mg.
6. Consult with PMD on dosing for patients with renal impairment.

Adverse Effects

1. Injection site reaction
2. QT prolongation
3. Dystonia
4. CNS depression
5. Risk of CVA
6. Hyperglycemia
7. Dyslipidemia
8. Weight gain
9. Esophageal dysmotility and aspiration risk
10. Orthostatic hypotension and fall risk
11. Extrapyramidal symptoms and sync

MEDICATIONS

ACETAMINOPHEN (TYLENOL)

Pharmacologic Effects

An analgesic and antipyretic

Metabolized

1. Onset of therapeutic effect – 30 minutes (PO).
2. Hepatic.

Indications

1. Fever over 100.4°F.
2. Pain.

Contraindications

1. Cirrhosis.
2. Patient has received full dose acetaminophen within last 6 hours.
3. Administration would exceed max dose of 4g/day.

Dosage and Administration

1. **1000 mg PO**
    a. **Pediatric: 15 mg/kg** max 1000mg.
2. **Rectal dose: 20 mg/kg,** max 1000mg. Insert blunt end first.

ACTIVATED CHARCOAL

Pharmacologic Effects

Binds to ingested chemicals to block their absorption into the GI tract

Metabolized

Charcoal passes through the GI tract without being absorbed

Indications

Known or suspected toxic ingestions within 1 hour of ingestion

Contraindications

1. Decreased level of consciousness.
2. Vomiting.
3. Ingestion of:
   - Heavy metals (Iron, Zinc, Mercury, Lead, Arsenic, Cadmium)
   - Ions (i.e., Lithium, Calcium, Potassium, Magnesium)
   - Strong acids and alkalis
   - Alcohols (Ethanol, Methanol, Ethylene glycol, Isopropanol, Acetone)

Dosage and Administration

1. **1 g/kg** max 100g.
2. Can be diluted slightly with water, milk, or another liquid to increase palatability.
3. Call Medical Control or Poison Control for advice prior to administration.
4. **Pediatric:** Call Medical Control.

Adverse Effects:

Vomiting and aspiration may cause pulmonary irritation.

ADENOSINE

Pharmacologic Effects

Slows conduction at the AV node

Metabolized

1. Onset – immediately.
2. Duration – usually <10 seconds.

Indications

1. Stable paroxysmal regular supraventricular tachycardias that are resistant to vagal maneuvers.

Contraindications

1. Active asthma exacerbation.
2. 2nd or 3rd degree heart block or sick sinus syndrome.

Cautions

1. History of asthma.

Dosage and Administration

Doses should be given rapid IV/IO push into the most proximal IV/IO port followed immediately by a rapid saline flush.

1. **12 mg** may repeat once if no change after 1 min.
    a. Reduce dose to **3mg** in patients on Carbamazepine (Tegretol) and dipyridamole (Persantin).
2. **Pediatric: 0.1 mg/kg** may repeat once in 1 min prn.

Adverse Effects

1. VT/VF or another dysrhythmia.
2. Chest discomfort.
3. Flushing, nausea, dizziness.
4. Dyspnea.

ALBUTEROL

Pharmacologic Effects

1. Selective beta-2 agonist causing smooth muscle relaxation.
2. Reactivates the sodium/potassium pump, driving potassium intracellularly.

Metabolism

1. Onset of action – 5-10 mins
2. Duration – 3-6 hours

Indications

1. Asthma, COPD, and reversible bronchospasm (BLS providers may administer regardless of pt prescription in Whatcom County).
2. Hyperkalemia.

Cautions

1. History of congestive heart failure
2. Pneumonia

Dosage and Administration

1. Asthma/COPD/Bronchospasm:
    a. MDI: 2-8 puffs one breath at a time with aerochamber if available.
    b. Nebulized: **5 mg**. May be nebulized continuously.
2. Hyperkalemia: **10mg** nebulized.

Adverse Effects

1. Tachycardia/Palpitations, premature ventricular contractions
2. Tremor, dizziness, agitation
3. Headache, nausea/vomiting
4. Hyperglycemia

AMIODARONE

Pharmacologic Effects

Class III antiarrhythmic agent with properties of all four antiarrhythmic classes:

1. Class I: Prolongs the action potential and refractory period in myocardial tissue by inhibiting inactivated Na channels.
2. Class II: Anti-adrenergic.
3. Class III: Increases action potential duration via blockade of slow potassium channels.
4. Class IV: Calcium channel blockade.

Metabolized: Hepatic

Indications

1. Pulseless VT/VF.
2. Post VT/VF cardiac arrest.
3. Stable VT

Contraindications

1. Hypotension (except in cardiac arrest).
2. Second- and Third-Degree Blocks.
3. Bradycardia.
4. Pregnancy except in VF/VT cardiac arrest.
5. Wolff-Parkinson-White (WPW)
6. TCA Overdose.

Dosage and Administration

1. Pulseless VT/VF: **300 mg IV/IO push.** Repeat 150 mg IV/IO push once for refractory VT/VF.
    a. **Pediatric: 5 mg/kg IV/IO,** may repeat once. Do not exceed adult dose.
2. Post VT/VF cardiac arrest, Stable VT: **150 mg IV/IO infusion** over 10 minutes (Macro drip adset in 100 mL D5W @ 2 gtt/sec = 8 min infusion).
    a. **Pediatric: 5mg/kg IV/IO infusion** over 15 min, max 150 mg (Macro drip adset in 100 mL D5W @ 1 gtt/sec = 16 min infusion)

Adverse Effects

1. Hypotension.
2. Q-T prolongation.

ASPIRIN

Pharmacologic Effects

1. Inhibits platelet function in clot formation for 1 week
2. An antipyretic, anti-inflammatory agent, and inhibitor of prostaglandin production

Metabolized

Hepatic

Indications

1. Chest pain or suspected acute coronary syndrome.

   Note: May be omitted if the patient has taken ≥ 162 mg of aspirin immediately prior to your arrival.

Contraindications

1. Aspirin or NSAID (i.e., Ibuprofen) allergy.
2. Suspected aortic dissection based on history of aortic dissection, sudden onset chest pain radiating to the back, difference in blood pressure measurements between arms, etc.
3. Recent GI bleeding, surgery, or other non-compressible site of recent/active bleeding.
4. Pregnancy (except in OMI).

Cautions

1. Patients with asthma or reactive airway disease

Patients on anticoagulants such as Coumadin

Dosage and Administration

324 mg PO.

Adverse Effects

May induce a reactive airway attack

ATORVASTATIN

Pharmacologic Effects

1. Statin (HMG CoA reductase inhibitor).
2. Reduces LDL (low-density lipoprotein) and triglycerides, increases HDL (high-density lipoprotein).
3. Reduces acute inflammation and platelet adhesion (reduces reperfusion injury).

Metabolized

Hepatic

Indications

Acute OMI

Contraindications

1. Known allergy to statins.
2. Pregnancy.

Cautions

Consider giving half the dose (40mg) in the presence of known serious liver disease.

Dosage and Administration

80 mg PO.

Adverse Effects

Rare muscle cramping after a single dose.

ATROPINE SULFATE

Pharmacologic Effects

1. Cardiac: Increases firing rate of sinoatrial node & cardiac tissue conduction velocity by decreasing parasympathetic/vagal stimulation.
2. Non-Cardiac: Parasympathetic nervous system blockade causing pupillary dilation and cycloplegia, decreased secretions, and decrease in bladder tone and GI motility.

Metabolized

Hepatic

Indications

1. Bradycardia resulting in hypotension, chest pain, SOB, decreased mentation, and/or ventricular irritability (ventricular escape beats).
2. Organophosphate poisoning (insecticides, herbicides, nerve gas) as directed by Poison Control Center or Medical Control.
3. Pre-treatment prior to intubation in pediatric patients < 1 year of age or in shock.

Cautions

1. Patients with glaucoma (increased pressure in eyes)

2. Atrial fibrillation/flutter (unless life threatening slow atrial fibrillation)

Dosage and Administration

1. Symptomatic bradycardia: **0.5 mg rapid IV/IO push**, followed by incremental doses of 0.5 - 1.0 mg every 3 - 5 minutes, not to exceed a total dosage of 3 mg.
2. Organophosphate poisoning: **5 mg rapid IV/IO push** followed by 1-2 mg IV every 15-30 mins or as directed by Poison Control/Medical Control.
3. **Pediatric: 0.02 mg/kg rapid IV/IO push** (min dose 0.1 mg, max dose 0.5mg).

Adverse Effects

1. Cardiac:
    a. Arrhythmias and interval changes.

2. Non-Cardiac
    a. Dryness of mouth.
    b. Ocular: acute angle closure glaucoma, dry eyes, blurred vision.
    c. Urinary retention, constipation, nausea.
    d. Restlessness, irritability, or change in mental state.

BUPRENORPHINE (SUBOXONE)

Pharmacologic effects

Long-acting partial opiate agonist

Indications

Suspected opiate withdrawal

- May be given following Naloxone administration

Contraindications

1. Methadone use in the past 48 hours.
2. Respiratory depression: RR <12 or Pulse Oximetry ≤ 92%.
3. Altered mental status (e.g., GCS <15).
4. Severe hepatic impairment.
5. Known allergy or hypersensitivity to buprenorphine.
6. Concurrent use of benzodiazepines or alcohol.
7. Inability to safely swallow or take oral medications.
8. Pregnant.
9. Age <16
10. Severe medical illness (sepsis, respiratory distress, etc.).
11. No clinical opioid use disorder symptoms.

Dosage and Administration

1. Give water to moisten mucous membranes.
2. **16mg SL/PO** followed by 8mg SL/PO after 10 min prn.
3. Instruct patient not to chew or swallow until fully dissolved
4. Monitor for correct administration and patient tolerance.

Adverse Effects

1. Nausea
2. Dizziness
3. Headache

CALCIUM CHLORIDE

Pharmacologic Effects

1. Affects cell membrane permeability to sodium and potassium.
2. Decreases myocardial excitability in hyperkalemia.
3. Increases force of myocardial and skeletal muscle contraction.

Metabolized

Renal

Indications

1. Hyperkalemia
2. Tetany post thyroid or parathyroid surgery
3. For suspected hypocalcemia in cardiac arrest patients (i.e., on high dose calcium channel blockers)
4. Calcium channel blockers use with symptomatic bradycardia
5. Reverses effects of Magnesium Sulfate (i.e., respiratory depression of newborn baby after mother was given Magnesium Sulfate prior to delivery)
6. Hydrogen Fluoride topical exposure

Contraindications

1. Digoxin use – calcium chloride administration may result in fatal dysrhythmias
2. Hypercalcemia

Dosage and Administration

1. **1 g IV/IO** (repeat once in 2 min in cardiac arrest).
2. **Pediatric: 5 mg/kg** (max 1g).
3. Prevent and monitor for extravasation given this may cause tissue sloughing.
4. Topical for HF exposure: mix with lubricant gel and apply topically.

Administer Sodium Bicarbonate in a separate IV/IO line from Calcium Chloride and Epinephrine or thoroughly flush in between administrations using at least 10mL of normal saline (will precipitate).

Adverse Effects

1. Hypotension
2. Bradycardia

CETIRIZINE (ZYRTEC)

Pharmacologic Effects

1. H1 blocker with theoretically less drowsiness compared to first generation H1 blockers such as diphenhydramine given less crossing of the blood brain barrier.
2. Onset of action 20 minutes, peak effect in 1 hour. Duration 24 hours.

Metabolized

Renal and hepatic

Indications

Anaphylaxis and allergic reactions where patient can manage oral intake

Cautions

Kidney or liver disease

Dosage and Administration

1. **Ages 6 and up: 10mg PO**. May chew or swallow.
2. **Ages 1-5: 5mg (½ tablet) PO.** May chew or swallow.

Adverse Effects

1. Sedation/Drowsiness
2. Dry mouth

CYANOKIT - HYDROXOCOBALAMIN

Pharmacologic effects

Hydroxocobalamin combines with Cyanide to make Cyanocobalamin (Vitamin B12) which is excreted renally.

Indications

Suspected cyanide poisoning (see Carbon Monoxide Exposure protocol).

Dosage and Administration

1. Incompatible with many resuscitation drugs. Administer the Cyanokit in its own line.
    a. If there is no other option, remove the Cyanokit, flush the lock with 10 ml NS, administer meds, flush again, and continue the Cyanokit.
2. May affect CO and blood glucose measurements. Obtain values prior to administration.
3. Reconstitute with 200 ml NS.
4. Invert and roll the bottle (do not shake) for 30 seconds.
    a. Mixed solution should be dark red and particulate free.
5. Administer over 15 minutes:
    a. **5g (200 ml), 4-5 gtt/sec IV/IO**. (The Cyanokit adset is 20 gtt/ml)
        i. **Pediatric: 6-13 years: 2.5g (100 ml), 2 gtt/sec IV/IO**.
        ii. **Pediatric: 3-5 years: 1.25g (50 ml), 1 gtt/sec IV/IO.**
        iii. **Pediatric 0-2 years: .625g (25 ml), 0.5 gtt/sec IV/IO.**

Adverse Effects

1. Nausea/vomiting
2. Abdominal pain
3. Headache
4. Dizziness
5. Red skin and red urine

DEXTROSE/GLUCOSE

Pharmacologic Effects

Energy source for cellular metabolism

Indications

1. Oral Glucose: Hypoglycemia
2. D5W: To provide a vehicle for the mixing and administration of medications.
3. D10W: Hypoglycemia, defined as a blood glucose (BG) of 70 mg/dL or less in adults, a BG < 50 mg/dL in children, and a BG < 40 mg/dL in neonates (birth to 28 days).

Caution:

If patient is an alcoholic, transport patient and notify ED that dextrose was administered.

Dosage and Administration

1. Oral Glucose: per packaging.
2. D5W: Mix and administer as instructed for specific medications.
3. D10W: **100ml IV/IO bolus (10g)**
    a. **Pediatric**: **2-4 ml/kg IV/IO bolus**
4. Titrate to patient's alertness and/or normal blood glucose range and reassess for further administration.
5. Prevent and monitor for extravascular infusion which may cause tissue sloughing.

DILTIAZEM HYDROCHLORIDE

Pharmacologic Effects

1. Calcium Channel blocker.
2. Decreases automaticity of all pacemaker tissues, including SA node.
3. Slows conduction through AV node via increased refractory period.
4. Decreases contractile force of ventricles with some negative inotropic and chronotropic effect.
5. Decreases coronary artery vasospasm.

Metabolism

1. Hepatic
2. Onset of Action: IV 2 – 4 minutes

Indications

Narrow complex supraventricular tachyarrhythmias needing rate control (i.e., atrial fibrillation and SVT) without obvious non-cardiac causes such as sepsis, hypovolemia, or trauma.

Contraindications

1. Wide complex tachyarrhythmias
2. Advanced AV heart block (second degree or complete)
3. Wolf-Parkinson-White (WPW)
4. Pediatric patients less than 1 year of age without consent of medical control.
5. Hypotension
6. Tachycardia secondary to obvious non-cardiac cause such as sepsis, hypovolemia, or trauma.

Cautions

Patients on beta blockers

Dosage and administration

1. **0.25 mg/kg (max 20 mg) slow IV** over 1-2 min. Repeat once in 10 min prn.
    a. Start with a half dose in elderly patients.

Adverse Effects

1. Hypotension, dizziness, headache
2. Dysrhythmia, bradycardia, AV block
3. VT/VF (if WPW or another accessory pathway)

DIPHENHYDRAMINE (BENADRYL)

Pharmacologic Effects

1. Antihistamine
2. Sedative effect
3. Anticholinergic (blocks acetylcholine)

Metabolized

Hepatic and renal

Indications

1. Allergic reactions
2. Severe dystonic reactions due to phenothiazines (e.g., Haldol, Compazine, Thorazine)
3. Nausea in pregnancy

Cautions:

Long QTc or known long QT syndrome

Dosage and Administration

1. **50 mg slow IV/IO push** over two minutes, or **IM**.
2. **Pediatric: 1 mg/kg slow IV/IO push** over two minutes, or **IM** (max 50mg)

Adverse Effects

Sedation/Drowsiness

DROPERIDOL

Classification

Antipsychotic

Description

Droperidol is a neuroleptic, antipsychotic agent that acts on Alpha and Dopamine receptors, resulting in sedation.

Mechanism of Action

Droperidol is a butyrophenone antipsychotic. Its antiemetic effect is a result of blockade of dopamine stimulation of the chemoreceptor trigger zone.

PHARMACOKINETICS

Onset: 5-15 minutes (IM & IV)

Peak Effects: 30 minutes

Duration: 2-4 hours

Half-Life: 2 hours

Indications

Moderate and/or severe agitation in patients < 65 years old

Moderate or severe nausea or vomiting

Contraindications

None in the emergency setting

Pregnancy

Pediatric patients less than 15 years old

Cautions

Use with caution in a patient that is already taking other sedatives (e.g., benzodiazepines, alcohol, etc.)

Dosage and Administration

Antiemetic: **1.25 mg IV** once.

Combative agitation: (adults <65 only) **5 mg IV; 10mg IM**.

Side Effects

Hypertension, Hypotension, QTc prolongation, Tachycardia, Anxiety, Drowsiness, Dystonia, Hallucinations, Hyperactivity, Laryngospasms, Anaphylaxis, Shivering, Bronchospasms

EPINEPHRINE (ADRENALIN)

Pharmacologic Effects

1. Alpha and beta agonist:
    a. Increases blood pressure through peripheral vasoconstriction and increased force of myocardial contraction.
    b. Increases pulse rate by increasing conduction velocity through the A-V node.
    c. Bronchodilator.

Metabolized

Hepatic

Indications

1. Anaphylaxis / Severe allergic reactions
2. Cardiac arrest
3. Shock/Hypotension
4. Symptomatic or unstable bradycardia
5. Severe asthma
6. Croup / Epiglottitis

Contraindications

1. None in life-threatening emergencies

Cautions

1. Hypertension
2. Elderly patients
3. Severe Cardiac disease
4. Hemorrhagic or hypovolemic shock
5. Epi may be ineffective in Beta Blocker overdose, consider Glucagon.
6. Administer Sodium Bicarbonate in a separate IV/IO line from Calcium Chloride and Epinephrine or thoroughly flush in between administrations using at least 10mL of normal saline (will precipitate).

Dosage and Administration

1. Anaphylaxis / Severe Allergic Reactions / Severe Asthma:
    a. **0.3 mg 1:1,000 IM**
    b. **Pediatric: 0.15 mg 1:1,000 IM**
    c. Repeat every 10 min as needed. (BLS should contact Medical Control).
    d. Consider Epinephrine infusion for severe symptoms.
2. Cardiac Arrest - Asystole, PEA, VF and Pulseless VT:
    a. **0.5 mg 1:10,000 IV/IO** q 2 min cycle (max 3 doses).
    b. **Pediatric**: **0.01mg/kg 1:10,000 IV/IO** q 2 min cycle (max 3 doses).
    c. Discuss further doses with Medical Control if thought to be beneficial.
3. Shock/hypotension/unstable bradycardia:
    a. Infusion: mix 1 mg of Epinephrine in 100 ml D5W or NS (Concentration: 10 mcg/ml). Administer **0.1 mcg/kg/minute*** then titrate to effect.

        **NOTE: This is the same concentration as push dose epi (1:100,000) and can be administered as below.*

    b. Push dose epinephrine: Push dose epinephrine is a concentration of 10 mcg/ml (used for all patients), which can be made as follows:

        - Discard 9 ml of Epi 1:10,000 (0.1 mg/ml) from a cardiac 10ml prefilled glass syringe.
        - Draw up 9 ml of Normal Saline to create the push dose concentration (10 mcg/ml or 1:100,000), and roll gently to mix.

        Adult
        10-20 mcg (1-2 ml) q 3-5 min prn.

        Pediatric
        2 Kg = **2mcg (0.2 ml)**
        4 Kg = **4mcg (0.4 ml)**
        6 Kg = **6mcg** (**0.6 ml)**
        8 Kg = **8mcg** (**0.8 ml)**
        10 Kg+= **10mcg (1ml)**

q 3-5 mins to max dose of 100 mcg (10 ml)

2. Epiglottitis or croup:
    a. **5mg 1:1,000 (5ml) Neb**.

Adverse Effects

1. Hypertension
2. Supraventricular tachycardia
3. Ventricular Dysrhythmias (PVCs, VT, VF)

FENTANYL

Pharmacologic Effects

1. Synthetic narcotic analgesic.
2. Ten times more potent than hydromorphone.

Metabolized

1. Hepatic.
2. Duration of action: IV/IO: 30-60 minutes, IM: 1-2 hours.

Indications

1. Severe pain

Contraindications

MAO inhibitors

Cautions

1. Children 2 years old or younger.
2. Altered mental status.
3. Hypotension.

Dosage and Administration

1. **25-100 mcg slow IV/IO** or **IM/IN** q 5 min (max 200mcg)
2. **Pediatric: 1-2 mcg/kg slow IV/IO** or **IM/IN** repeat once in 5 min (do not exceed adult dosing).

Rapid administration may cause muscle rigidity, particularly involving muscles of respiration.

Adverse Effects

1. Sedation
2. Hallucinations
3. Respiratory depression
4. Hypotension
5. Nausea, vomiting
6. Bradycardia

GLUCAGON

Pharmacologic Effects

1. A hormone secreted by the alpha cells of the pancreas which causes a breakdown of stored glycogen to glucose.
2. Glucagon is thought to increase heart rate and contractility while decreasing renal vascular resistance.

Metabolized

Hepatic

Indications

1. Hypoglycemia when unable to give IV dextrose or oral glucose.
2. Beta blocker overdose with unstable or symptomatic bradycardia. Epinephrine may be ineffective.

Cautions

1. Severe liver disease.

2. Children under age 1 due to possible insufficient hepatic stores of glycogen.

3. Any patient with suspected insufficient hepatic glycogen storage (i.e., malnourished).

Dosage and Administration

1. Reconstitute vials containing 1 mg (1 unit) of powder and a second vial containing 1 ml of diluting solution.
2. Hypoglycemia: **0.5 - 1 mg IV/IO/IM**.
    a. **Pediatric: 0.03 mg/kg IV/IO/IM (max 0.5mg)**. Rarely used in pediatric patients below 1 year of age
3. Beta-blocker overdose: **2 mg IV/IO/IM**.
    a. **Pediatric:** for children 2-11 years of age and weighing less than 45kg:
        i. **50 mcg/kg IV/IO**

Adverse Effects:

Nausea and vomiting

HYDROMORPHONE (DILAUDID)

Pharmacologic Effects

Narcotic analgesic

Metabolized

Hepatic

Indications

Severe pain, i.e., myocardial infarction, trauma

Cautions

1. Respiratory depression.
2. Elderly patients (due to slower metabolism).
3. Hypotension (absorption unpredictable).
4. Decreased level of consciousness/

Dosage and Administration

1. **0.5 - 1 mg slow IV/IO push** q 10-15 min prn.
2. **1-2 mg IM**.
3. **Pediatric: 0.01 - 0.02 mg/kg slow IV/IO push**.

Adverse Effects

1. Respiratory depression.
2. Hypotension.
3. Drowsiness/lethargy.

KETAMINE

Pharmacologic Effects

1. Class III Phencyclidine (PCP) derivative that produces a “dissociative” anesthesia with minimal to no respiratory depression.

Metabolized

Hepatic

Indications

1. Non-narcotic pain management
2. Combative agitation and other behavioral emergencies
3. Refractory seizures
4. Induction agent for intubation

Contraindications

1. Induction doses in heart failure and OMI patients (lower doses are acceptable)

Cautions

1. Hypertension
2. Tachycardia
3. Aneurysm
4. Psychotic Disorders
5. History of CAD
6. In pregnancy, consider using lower doses given lower plasma clearance.

Dosage and Administration

1. Pain Management
    a. **0.2 mg/kg slow IV/IO push** over 1 minute (max 25 mg)
    b. **0.4 mg/kg IM**
    c. **1 mg/kg IN**
2. Combative agitation (8 years of age or older)
    a. **5 mg/kg IM** (depending on volume, may need to split between 2 different sites of administration)
    b. **2 mg/kg IV/IO**
3. Refractory seizures
    a. **1 mg/kg IV/IO**
    b. **2 mg/kg IM/IN**

Repeat above doses x1 prn after 5 minutes for IV/IO and 10 min for IM/IN. Contact medical control for further doses.

4. Intubation
    a. **2 mg/kg slow IV/IO push** over 1 minute
        i. **1 mg/kg IV/IO** for pts in shock*
    b. **5 mg/kg IM**
        i. 2.5mg/kg IM for pts in shock*
    c. For ongoing sedation repeat every 10 (IV/IO) - 20 (IM) minutes or prn for signs of consciousness.

*As above, contraindicated in patients with suspected cardiogenic shock

Adverse Effects

1. Hypersecretions
2. Emergence reaction as patient is awakening. Consider Midazolam as needed.
3. May cause rebound pulmonary edema in CHF.

LIDOCAINE

Pharmacologic Effects

1. Class lb antiarrhythmic works by blocking sodium channel.
2. As a local anesthetic - blocks neurotransmission to CNS.

Metabolized

1. Hepatic. Rapidly metabolized 90%
2. Excreted by the Renally

Indications

1. Ventricular Cardiac Dysrhythmias (second line after discussion with Medical Control)
2. Pain with IO infusion

Contraindications

1. Second degree heart block type II
2. Third degree heart block

Dosage and Administration

1. **Pediatric: 1 mg/kg** for all uses unless otherwise specified
2. Cardiac arrest (VT/VF): **100 mg IV/IO push.** Repeat once in 2 min prn.
3. Malignant ventricular rhythms (non-cardiac arrest): **100 mg slow IV/IO push** over 2 minutes. Repeat once in 20 min prn
4. Pain relief from IO infusion: prior to a fluid challenge, inject Lidocaine **40 mg slowly** titrating administration speed to pt pain tolerance, followed by 10 ml saline, and then Lidocaine 20 mg prn for pain in a conscious patient.
    . **Pediatric: 0.5 mg/kg**.

Adverse Effects
Cardiac dysrhythmia
Methemoglobinemia
Seizures
Malignant Hyperthermia

MAGNESIUM SULFATE

Pharmacologic Effects

An electrolyte necessary for normal function of the nervous and cardiovascular systems.

Metabolized

1. 50% is deposited in bone, 45% is an intracellular cation, and 5% is in the extracellular fluid

2. Renal

Indications

1. Eclampsia
2. Cardiac dysrhythmias:
    a. Torsades de Pointe (drug of choice).
    b. Ventricular fibrillation (second line to Amiodarone).
    c. Ventricular tachycardia (second line to Amiodarone).
3. Digoxin toxicity (i.e., second- and third-degree heart block)
4. Known or suspected hypomagnesemia
5. Refractory Asthma

Contraindications

1. Third degree or Type II Second degree heart block (except in Digoxin toxicity)
2. Known renal impairment (call Medical Control for dosing).

Cautions

Renal disease

Dosage and Administration

1. Administer IV/IO drip over 15 min (Macro drip adset in 100 mL D5W @ 1 gtt/sec = approx. 18-minute infusion) In cardiac arrest and torsades may be given IV/IO push.

2. Cardiac dysrhythmias, digitalis toxicity, and hypomagnesemia: **2g IV/IO**.
3. Refractory Asthma **2g IV/IO**.
4. Eclampsia: **6g IV/IO** heavily preferred.
    - **5g IM** into each buttock (10g total) as a last resort. Start 2g/hr IV/IO drip if access is obtained later.
5. **Pediatric:**
    - **50 mg/kg IV/IO** (max 2g)
    - **25 mg/kg IV/IO** (max 2g) for hypotensive pts

Adverse Effects

1. Respiratory depression and CNS depression
2. Hypotension with fast infusion
3. Hypermagnesemia (rare) resulting in muscle weakness and ECG changes (increased PR, QRS, and QT interval)
4. Nausea and diarrhea

MIDAZOLAM (VERSED)

Pharmacologic Effects

1. Short-acting benzodiazepine

Metabolized

1. Hepatic
2. Onset of action is 1–5 minutes for IV/IO injection, 10-15 min for IM injection
3. Elimination half-life is 2-5 hours

Indications

1. Seizures
2. Induction of intubation
3. Ongoing Sedation for post-intubation
4. Sedation for painful procedures
5. Combative Agitation
6. Severe anxiety

Contraindications

1. Hypersensitivity to benzodiazepines
2. Pregnancy except active seizure. Discuss with Medical Control if you feel that it is needed for any other indication in a pregnant pt.

Caution

1. Decreased level of consciousness

Dosage and Administration

1. Seizures: **5mg IV/IO** q 5 min prn for ongoing seizures or **10 mg IM** once.
   . **Pediatric: 0.2 mg/kg IV/IO/IM** q 5 min prn for ongoing seizures (do not exceed adult dosing).
2. Induction for intubation: **5-10mg IV/IO**.
   a. **Pediatric: 0.2 mg/kg IV/IO** (max 5mg)
   b. For ongoing sedation post intubation: repeat dosing q 5 min or prn for signs of

consciousness.

3. Procedural sedation:
    a. **2mg IV/IO** repeat once in 1 min prn
    b. **4mg IM/IN** repeat once in 5 min prn
    c. **Pediatric:**
        i. **0.05 mg/kg IV/IO** repeat once in 1 min prn.
        ii. **0.1 mg/kg IM** repeat once in 5 min prn.
        iii. **0.3 mg/kg IN** repeat once in 5 min prn.
        iv. Do not exceed adult dosing.
4. Combative Agitation: **5mg IV/IO** repeat once in 5 min prn or **10mg IM** once.
5. Anxiolysis: **1-2mg IV/IO**, **2-4mg IM/IN**.

    Pediatric:
        i. **0.05 mg/kg IV/IO** repeat once in 1 min prn.
        ii. **0.1 mg/kg IM** repeat once in 5 min prn.
        iii. **0.3 mg/kg IN** repeat once in 5 min prn.
        iv. Do not exceed adult dosing.

<u>Adverse Effects</u>

Respiratory depression

Phlebitis

NALOXONE (NARCAN)

Pharmacologic Effect

Narcotic antagonist that competes with narcotic agents at opiate receptor sites.

Metabolized

Hepatic

Indications

Suspected/possible opiate overdose in patients with reduced level of consciousness and respiratory depression (**RR < 6**) or apnea.

Contraindications:

None

Dosage and Administration

1. **0.4 - 4 mg IV/IO/IM/IN** q 2 min, titrating to respiratory rate >6.
    a. **Pediatric: 0.1 mg/kg IV/IO/IM/IN** (max single dose 4mg) q 2 min, titrating to respiratory rate >6.
2. Use **4 mg** initial dose in cardiac arrest.
3. Repeat or higher doses may be needed in patients on suboxone and fentanyl.
4. Use smaller doses in patients with chronic opioid use.
5. The goal is to restore spontaneous respirations, NOT to wake the pt up.
6. There is no maximum dose for naloxone.

Adverse Effects

Withdrawal symptoms (sweating, tremor, nausea, vomiting, agitation, violence, anxiety). Be prepared to restrain patients if needed.

NITROGLYCERIN

Pharmacologic Effects

1. Vasodilator
2. Decreases blood pressure and afterload

Metabolized: Hepatic

Indications

1. Angina and/or anginal equivalents in patients with suspected OMI
2. Congestive heart failure exacerbation

Contraindications

1. Hypotension (SBP <100 mm/Hg)
2. Patients has taken erectile dysfunction-type medications within 48 hours (i.e., Sildenafil (Viagra), Tadalafil (Cialis) or Vardenafil (Levitra)).
3. Suspected aortic dissection or intracranial hemorrhage

Cautions

1. Suspected inferior wall MI. IV should be in place and NS bolus prepared before NTG administration.
2. Patients on other systemic vasodilators (i.e., isosorbide mononitrate or dinitrate)
3. Glaucoma

Dosage and Administration

1. Chest pain: **0.4 mg SL spray** or tab (if patient's own med) q 3 - 5 minutes until resolution of angina or equivalent symptom, max 3 doses.
2. Pulmonary edema/CHF:
    a. 0.8mg SL, for SBP ≥ 150mmHg
    b. 1.2mg SL, for SBP ≥ 200mmHg
3. Reassess SBP q 3-5 minutes and readminister prn to achieve target blood pressure. *
    a. For blood pressures between 150-175, target SBP of 140-150.
    b. For blood pressure greater than 175, target a 20% reduction in SBP.
4. Call Medical Control to discuss administration in children.

**Do not remove CPAP to administer additional doses*

Adverse Effects

1. Headache
2. Skin flushing
3. Hypotension

NITROUS OXIDE (NITRONOX)

Pharmacologic Effects

1. A blended mixture of 50% nitrous oxide and 50% oxygen.
2. Potent analgesic

Metabolized:

Excreted by the lungs within 2 - 5 minutes.

Indications

1. Trauma patients with fractures, burns, etc.
2. Chronic back pain of musculoskeletal origin
3. Kidney stones
4. Delivery of baby in third trimester
5. Any other patient in pain not presenting with a contraindication
6. Chest pain secondary to suspected MI

Contraindications

1. Decreased level of consciousness
2. Traumatic chest injuries with possible pneumothorax
3. Serious facial injuries where a good seal cannot be obtained
4. COPD
5. Pregnancy, other than delivery in third trimester
6. Suspected bowel obstruction or perforation

Dosage and Administration

1. Patient should self-administer nitrous oxide until the patient drops the regulator or the pain is significantly relieved.
2. Keep the tank upright during use due to the possibility of liquid nitrous oxide escaping.

Adverse Effects

Nausea/vomiting.
Bizarre behavior
Numbness of the lips and/or ringing in the ears

NOREPINEPHRINE

Pharmacologic Effects

1. Stimulates alpha receptors in the peripheral vasculature, producing vasoconstriction and increasing systemic blood pressure.
2. Stimulates beta receptors, increasing heart rate and contractility and causing mild bronchodilation.

Metabolized

Hepatic

Indications

SBP<90 due to cardiogenic, septic, or neurogenic shock.

Contraindications

Severe bleeding/trauma

Dosage and Administration

1. May be administered concurrently with NS
2. Only administer into large proximal veins (preferably 20G or larger and antecubital) to decrease the risk of overlying skin necrosis, or administer IO.
3. Mix 4 mg in D5W 250 ml, for a concentration of 16 mcg/ml. Administer through microdrip adset (60 gtt/ml).
4. Infuse at **8 mcg/minute (1 gtt/2 sec)**, titrate up to 16 mcg/min (1 gtt/sec) to maintain systolic BP ≥ 90.
    a. **Pediatric: 2-12 mcg/minute**, titrated to systolic BP > 90. (Discuss with Medical Control prior to use).
5. If local extravasation occurs, stop administration, remove IV, apply light compression dressing, and notify the receiving physician.

Adverse Effects

1. Tissue necrosis following extravasation
2. Headache
3. Tachycardia
4. Chest pain
5. Hypertension
6. Reflex bradycardia from increased BP

NORMAL SALINE IV FLUIDS

Pharmacologic Effects

1. Grossly isotonic fluid to supplement intravascular volume.
2. Dissociates into sodium and chloride to increase plasma concentration of those ions.

Metabolized

Renal

Indications

1. Sepsis
2. Hypotension
3. Hypovolemia due to dehydration, bleeding, etc.

Cautions:

1. Dialysis-dependent patient
2. CHF or suspected pulmonary edema

Dosage and Administration

1. Administer up to **2L IV** except in trauma, in which case, limit to 1L.
    a. Reassess BP and breath sounds after each 500ml increment
2. **Pediatric: 20ml/kg**, may repeat once after reassessment.
3. Vasopressors may be given concurrently if indicated (except dehydration)

Adverse Effects

Volume overload

ONDANSETRON (ZOFRAN)

Pharmacologic Effects

1. Antiemetic
2. Serotonin antagonist

Metabolized

1. Hepatic
2. Onset in 3 - 10 minutes following IV/IO injection (longer IM/PO). Full effect may not be apparent for 20 minutes, duration of action is 2 - 4 hours (dose dependent).

Indications

Severe nausea and/or vomiting

Cautions

Known long QT interval. PO is a safe route in this case.

Contraindications:

Pregnancy: has been associated with renal agenesis, cleft palate and cardiac anomalies when administered during 1st trimester. Contact Medical Control for admin.

Dosage and Administration

1. **8 mg slow IV/IO push or PO/IM**
2. **Pediatric: 0.1 mg/kg slow IV/IO push or PO/IM** repeat once in 10 min prn (max 8 mg).

Adverse Effects

1. Rare side effects may include:
    a. Blurred vision
    b. Dizziness
    c. Headache

OXYGEN

Pharmacologic Effects

1. Oxygen is a life-sustaining element, essential to cellular respiration.
2. Excess oxygen can form damaging free radicals.

Metabolized

Metabolized during cellular respiration.

Indications

1. Hypoxemia
2. CO poisoning
3. Shock
4. Suspected severe internal/external hemorrhage.
5. Pre-intubation
6. Asphyxia

Cautions

COPD. Oxygenation above the patient's baseline may contribute to worsening respiratory status and respiratory arrest.

Dosage and Administration

1. Titrate to saturations of 92-95% (88-92% if history of COPD)
2. CO Poisoning: SpO2 will be falsely elevated. Administer **high flow NRB 15L/min** or direct ventilatory support.
3. Shock/severe internal/external hemorrhage: **high flow NRB 15 L/min**
4. Pre-intubation: **high flow NC 15L/min** for at least 3 min.

Adverse Effects

1. Formation of free radicals, causing increased mortality in some conditions
2. Respiratory failure in COPD patients

OXYMETAZOLINE (AFRIN)

Pharmacologic Effects

An alpha-adrenergic agonist used as a nasal decongestant and vasoconstrictor.

Metabolized

Hepatic

Indications

May be used to assist in controlling epistaxis in conjunction with direct nasal pressure.

Contraindications

SBP>180 or DBP>110

Pregnancy

Cautions

History of significant cardiovascular disease

Dosage and Administration

1. Blow nose to clear clots,
2. **1-2 sprays IN** into the affected nostril.
3. Apply direct pressure to nares under the bridge of the nose.

Adverse Effects

1. Hypertension
2. Tachycardia

PREDNISONE

Pharmacologic Effects

Synthetic glucocorticoid (corticosteroid)

Anti-inflammatory

Metabolized:

Hepatic; to prednisolone

Indications

Asthma and reactive airway disease

Allergic reactions

Contraindications

No absolute contraindication for life-threatening illness

Cautions:

Nausea and vomiting

Dosage and Administration

1. **60 mg PO**
2. **Pediatric: 1 mg/kg PO** (max 40 mg).

Adverse Effects:

GI upset

PROPARACAINE 0.5% OPHTHALMIC SOLUTION

Pharmacologic Effects

Topical anesthetic

Metabolized

Locally - hepatic

Indications

Short term relief of pain in non-penetrating eye trauma (e.g., corneal scratches)

Contraindications

Suspected perforation of the globe

Dosage and Administration

1 - 2 drops into the affected eye.

Adverse Effects

Erythema and conjunctival swelling

ROCURONIUM

Pharmacologic Effects

Non-depolarizing neuromuscular blocking agent. Rocuronium competes with acetylcholine for receptor sites at the motor end plate causing muscular paralysis.

Metabolized

1. Hepatic; excreted by the kidneys.
2. Onset of action in 60 to 90 seconds depending on dose and age of patient.
3. Muscular paralysis typically lasts between 20 to 60 minutes.

Indications

Paralytic for intubation

Cautions

1. Significant liver disease
2. Pulmonary hypertension – may increase pulmonary vascular resistance
3. Valvular heart disease – may increase pulmonary vascular resistance and worsen symptoms of right heart failure

Dosage and Administration

1. **1 mg/kg IV/IO**.
2. Patients must be premedicated with a sufficient dose of a sedative as Rocuronium has no effect on the patient's level of consciousness. Due to extended paralysis, appropriate sedation of the patient should be maintained by readministering Midazolam or Ketamine.

Adverse Effects

1. Hypertension and tachycardia
2. Transient hypotension

SODIUM BICARBONATE

Pharmacologic Effects

1. Alkalinizing agent
2. Increases potassium influx into cells

Metabolized

1. Bicarbonate is excreted renally and by the lungs as carbon dioxide
2. Sodium is excreted renally

Indications

1. Hyperkalemia potentially indicated by peaked T waves or wide complex rhythm
2. Aspirin overdose
3. Tricyclic antidepressant overdose
4. Metabolic acidosis in cardiac arrest

Contraindications

1. Metabolic alkalosis
2. Hypokalemia
3. Hypocalcemia

Cautions

1. Pulmonary edema
2. Administer Sodium Bicarbonate in a separate IV/IO line from Calcium Chloride and Epinephrine or thoroughly flush in between administrations using at least 10mL of normal saline (will precipitate).
3. Observe carefully to avoid extravasation (may cause tissue necrosis)

Dosage and Administration

1. Hyperkalemia: **2 amps (100 mEq) slow IV/IO push** over 2 minutes, followed by 1 amp (50 mEq) in 100ml D5W over 10 minutes.
2. Aspirin /Tricyclic overdose: **2 amps (100 mEq) slow IV/IO push** over 2 minutes, followed by 1 amp (50 mEq) in D5W over 10 minutes
3. Metabolic Acidosis in Cardiac arrest: **2 amps (100 mEq) IV/IO push** (ONLY if suspected hyperkalemia, Aspirin OD, or Tricyclic Antidepressant OD)
4. **Pediatric: 1 mEq/kg slow IV/IO push** over 2 min repeat once in 10 min prn to narrow QRS. If the patient is < 1 year dilute 1:1 with NS.

Adverse Effects:

Shortness of breath in patients with respiratory disease.

TRANEXAMIC ACID (TXA)

Pharmacologic Effects

1. A lysine analog that binds plasminogen to competitively inhibit activation, delaying the physiologic breakdown of platelet aggregation.
2. TXA is ineffective or harmful if administered greater than 3 hours after injury, after full activation of endogenous fibrinolysis begins.
3. May reduce systemic inflammatory response over subsequent 24 - 48 hours.

Metabolized

1. 2-hour half-life
2. 95% excreted unchanged renally

Indications

1. Blunt or penetrating trauma with evidence of severe uncontrolled bleeding and signs of poor tissue perfusion or failing vital signs
2. Suspected severe TBI, especially for GCS < 12.
3. Postpartum hemorrhage.

Contraindications

1. Injury > 3 hours old
2. GI Bleed

Dosage and Administration

1. **2 g slow IV/IO push.**
    a. **Pediatric: 20mg/kg slow IV/IO push.**
2. Administer as soon after injury as possible
3. Rapid administration may contribute to hypotension.

Adverse Effects

May rarely contribute to coagulopathies.