Procedures

AICD Deactivation – 30.020

DEFINITION:
An AICD is an implanted defibrillator device that consists of a lead system that senses cardiac activity, logic circuitry to analyze sensed signals, a power supply for device function and generating high voltage, and a capacitor that stores and delivers shocks. This device activates when brady and/or tachyarrhythmias are detected within programmed parameters.

INDICATIONS:
Consider application of a magnet to deactivate an implanted cardioverter defibrillator that is firing inappropriately. **Call OLMC prior to application**. Inhibition of AICD devices should be considered when continuous ECG monitoring verifies malfunction and ACLS is readily available.

PROCEDURE:
A. Contact OLMC.
B. Monitor ECG and verify sinus rhythm AND inappropriate defibrillator discharge.
C. Locate the position of the AICD device.
D. Place doughnut magnet directly over the device.
E. After proper positioning and AICD deactivation, tape magnet securely in place and transport.

NOTES & PRECAUTIONS:
A. It is very important to make the correct diagnosis before utilizing this protocol. Be sure that the ECG is showing a normal sinus rhythm without ectopy AND indications of recurrent AICD discharges.
B. Some AICD devices will emit varying beeping or continuous tones when magnets are applied, other will not. Disregard these tones.
C. If the magnet placement is successful in overriding the pulse generation of the AICD, **DO NOT REMOVE THE MAGNET**. Some units will return to normal operation after removal from the magnetic field.
D. Magnets should be stored so as not to come into contact with magnetic sensitive materials (e.g., monitor screens, tapes, credit cards, magnetic door entry cards, and other electronic equipment).
E. A small percentage of AICDs are impervious to magnetic fields (AICD recipients who normally work around magnetic fields have these special units). These will not be deactivated with the doughnut magnet. In such cases, advise OLMC and transport.
F. Consider use of the AICD magnet in deactivating cardiac pacemaker malfunctions. Application of a magnet to a pacemaker changes the pacing to asynchronous mode but will not turn off the pacemaker. Call OLMC prior to application.
G. Identification information of the AICD type, date implanted, and location of implantation should accompany the patient to the hospital. This information is typically found on a wallet card that the patient has.

Behavioral Health Emergencies (Transports to Unity Center) – 30.025

Purpose:
To establish criteria for EMS assessment, triage, and treatment of patients with potential behavioral/mental health emergencies who may be transported directly to the Unity Center for Behavioral Health (UCBH).

Definition:
Behavioral health encompasses behavioral factors in chronic illness care, care of physical symptoms associated with stress rather than diseases, and health behaviors, as well as mental health and substance use conditions and diagnoses.

Inclusion Criteria:

A. Voluntary patient or patient on police or mental health director hold.
B. 9-1-1 call or police request.
C. Age between 18 - 70 years.
D. Mental health complaint (e.g., depression, psychosis, suicidal or homicidal ideation), substance use or behavioral disorder with no acute medical or traumatic condition requiring treatment.
E. Alert and oriented to person, place, and time.
F. No evidence of trauma other than minor abrasions.
G. Able to perform activities of daily living independently (e.g., ambulate, bathe, toileting, eat, and drink).
H. If CBG is obtained, between 60 and 300 mg/dl.

Vital Signs:

A. HR 60 - 130 bpm
B. O_2 sat > 90%
C. Systolic BP 90 - 200mmHg
D. Diastolic BP < 110 mmHg
E. Temperature between 96.0° F (35.6° C) and 100.4° F (38° C), if taken

Exclusion Criteria:

A. Possible drug overdose or acute intoxication impairing ability to ambulate or perform activities of daily living.
B. Acute medical or traumatic condition including altered level of consciousness, chest or abdominal pain, significant bleeding, respiratory distress, or other acute illness or injury.
C. Patients with abnormal vital signs or physical findings.
D. Patients who require pharmacological sedation (olanzapine ODT or IM haloperidol or droperidol alone **IS NOT** an exclusion).
E. Signs/symptoms of acute drug/alcohol withdrawal (e.g., tachycardia, hypertension, tremors, visual hallucinations).
F. Patients with central or peripheral IV lines.
G. Patients requiring gastric or nasogastric tube feedings.
H. Patients requiring dialysis.
I. Pregnancy greater than 20 weeks.
J. Patients requiring CPAP or BiPAP for treatment of acute respiratory failure.
K. Patients that require continuous supplemental oxygen; tracheostomies, or that require any type of services administered by RT such as nebulization.
L. Patient weight > 500 lbs.

Behavioral Health Emergencies (Transports to Unity Center) – 30.025

Procedure:

A. Assess and assure scene safety.
B. If police or Crisis Intervention Team (CIT) is on scene, EMS assessment and intervention should not be delayed, however, police or the CIT may need to diffuse the situation in order to allow for EMS to safely assess the patient. EMS crews should get an initial report from the officer before approaching the patient. If EMS is first on scene, give an initial report to officer.
C. Approach the patient in a calm, slow, reassuring, and honest manner. Multiple people attempting to intervene may increase the patient's confusion and agitation.
D. Consider offering olanzapine ODT 10 mg for agitation.
E. Protect the patient, bystanders, and rescuers from injury. Consider restraint and follow Agitated Patient protocol, if indicated.
F. Obtain history, physical, and mental status examination.
G. Assess and treat any medical conditions per EMS protocol and then determine if patient is eligible for transport to UCBH.
H. All patients will be assessed and evaluated by EMS regardless of transport status.

Specific Precautions:

A. Red Flags that this might **not** be a psychiatric condition:
    1. Waxing and waning level of consciousness.
    2. Abnormal vital signs.
    3. Dilated or pinpoint pupils.
    4. First psychotic episode over the age of 30.
    5. Acute onset over hours/days (consider substance use).
B. Psychiatric signs/symptoms:
    1. Mood disorder: Depression, mania, suicide ideation, anxiety.
    2. Thought disorder: Hallucinations, pressured speech, racing thoughts, grandiose or paranoid ideation, delusions.
C. Medical illnesses including hypoglycemia, hypoxia, stroke, head injury, or CNS infection may mimic psychiatric illness. Do not assume the patient's condition is purely psychiatric.

Breath Actuated Nebulizer (AEROECLIPSE® II BAN®) – 30.030

DEFINITION:
The AEROECLIPSE® II BAN® Nebulizer only creates aerosol when the patient breathes in. This means medication is not wasted between breaths This puts the patient in control of their aerosol treatment and creates a safer environment. Other nebulizers continuously produce aerosol whether you are inhaling, exhaling or resting. This means the medication may be lost into the room instead of delivered to the lungs. In some cases, this can be hazardous to the health of others who may be nearby during the treatments.

INDICATIONS:
Nebulized ketamine administration for pain management. **The BAN® must be used when nebulizing ketamine to avoid the risk of secondary exposure to aerosol medications.**

CONTRAINDICATIONS:
Only to be used by patients ≥ 7 years of age.

PROCEDURE:

A. Unscrew and remove the top of the nebulizer.
B. Carefully place the prescribed medication into the nebulizer cup and replace the nebulizer top.
C. Make sure that the quarter turn valve on top of the nebulizer is pointed towards the dotted arrow which indicates that it is in breath actuated mode. (see picture below).
D. Connect the nebulizer to an oxygen source.
E. Have the patient place the mouthpiece into their mouth and instruct them to breathe slowly and deeply and to exhale normally through the device as desired.
F. The green button on the top of the BAN® will go down when the patient breathes in and will go up when the patient breathes out.
G. Follow your agency's controlled medication disposal process for any remaining medication left in the BAN®.

Continuous Positive Airway Pressure – 30.032

DEFINITION:
Continuous Positive Airway Pressure (CPAP) has been shown to rapidly improve vital signs, gas exchange, and to decrease the work of breathing, the sense of dyspnea, and the need for endotracheal intubation in patients who suffer from shortness of breath secondary to CHF/Pulmonary edema, COPD, or asthma. In patients with CHF, CPAP improves hemodynamics by reducing preload and afterload.

INDICATIONS:
Medical patients complaining of moderate to severe respiratory distress meeting **ALL** the following criteria:

A. Is awake, oriented, and has the ability to maintain an open airway.
B. Has signs and symptoms consistent with either CHF/pulmonary edema, COPD, or asthma.
C. Has a systolic blood pressure above 90 mmHg.
D. Is over 12 years old and is able to fit the CPAP mask.

CONTRAINDICATIONS:

A. Respiratory arrest.
B. Non-cooperative patient.
C. Suspected pneumothorax.
D. Hemodynamically unstable.
E. Inability to maintain mask seal.
F. Active vomiting.

PROCEDURE:

A. EXPLAIN and COACH THE PATIENT ON THE PROCEDURE.
B. Ensure adequate oxygen supply to ventilation device.
C. Place the patient on continuous pulse oximetry and end-tidal CO_2.
D. Turn on device. Set device to minimum flow (2 - 5 cmH_2O).
E. Place the CPAP over the patient's mouth and nose (consider having the patient hold the mask against their face initially to reduce anxiety).
F. Secure the mask with the provided straps.
G. Check for air leaks.
H. Monitor and document the patient's respiratory response to the treatment.
I. Continue to coach patient to keep mask in place and readjust as needed to a maximum of 10 cmH_2O.
J. IF RESPIRATORY STATUS DETERIORATES, REMOVE THE DEVICE AND CONSIDER BAG VALVE MASK VENTILATION AND/OR ENDOTRACHEAL INTUBATION.

REMOVAL PROCEDURE:
CPAP therapy needs to be continuous and should not be removed unless the patient cannot tolerate the mask or experiences continued or worsening respiratory failure.

Continuous Positive Airway Pressure – 30.032

SPECIAL NOTES:

A. If unable to maintain oxygen saturation > 90%, administer positive airway pressure via BVM and PEEP valve.
B. Contact the receiving hospital as soon as possible that a patient with CPAP is enroute to their hospital so they can be prepared for the patient.
C. Reassessment of the patient's status is critical, and documentation should be performed every 5 - 10 minutes until patient is stable.
D. CPAP mask may be removed temporarily to administer nitroglycerin.
E. Suctioning of secretions may be required on some patients.
F. Watch for gastric distention and/or nausea.
G. The CPAP monometers should be used to determine and adjust CPAP pressures as this will vary depending on the device used and whether nebulization is occurring simultaneously.
H. Monitor mean arterial blood pressure closely in all patients with CPAP.

Double Sequential External Defibrillation – 30.034

PURPOSE:
To define the procedure for performing Double Sequential External Defibrillation (DSED) for refractory ventricular fibrillation.

INDICATIONS (Must meet all indications):

A. ≥ 18 years of age.
B. Persistent Ventricular Fibrillation/Pulseless Ventricular Tachycardia after 3 defibrillation attempts.

PROCEDURE:

A. Prepare the sites for placement of external defibrillation pads by drying the sites and minimizing interference of hair or other obstacles to good pad adhesion.
B. Apply one set of external defibrillation pads in anterior-posterior location. Apply the other set of external defibrillation pads in the anterior-lateral location. **Pads must be placed anterior-lateral and anterior-posterior while assuring they do not contact.** If using LUCAS, ensure that the defibrillation pads and wires are not underneath the suction cup.

1. Anterior-Posterior (A-P) Placement (Figure 1):
    a. Place the ♥ or ✚ therapy electrode over the left precordium. The upper edge of the electrode should be just below the nipple line. Avoid placement over the nipple or the bony prominence of the sternum, if possible.
    b. Place the other pad on the posterior side of the patient below the scapula. Do not place the pad over the bony prominences of the spine or scapula.
2. Anterior-Lateral (A-L) Placement (Figure 2):
    a. Place the ♥ or ✚ therapy electrode lateral to the patient's left nipple between the mid and posterior axillary line.
    b. Place the other therapy electrode on the patient's upper right torso, lateral to the sternum and below the clavicle.

Fig. 1

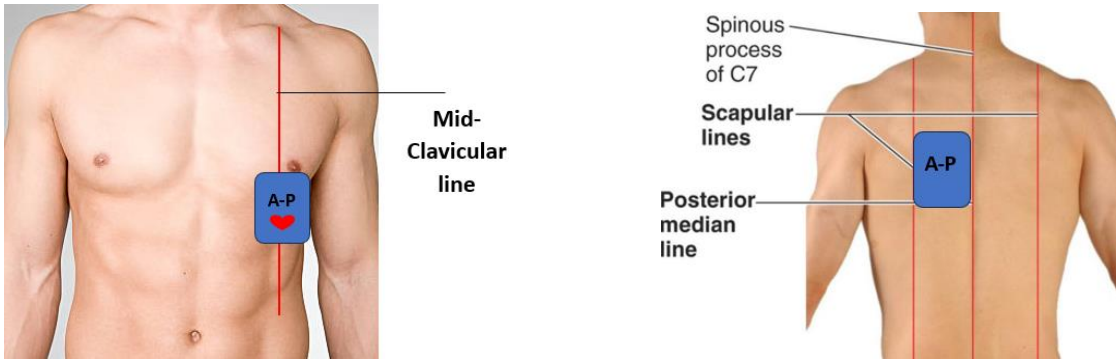
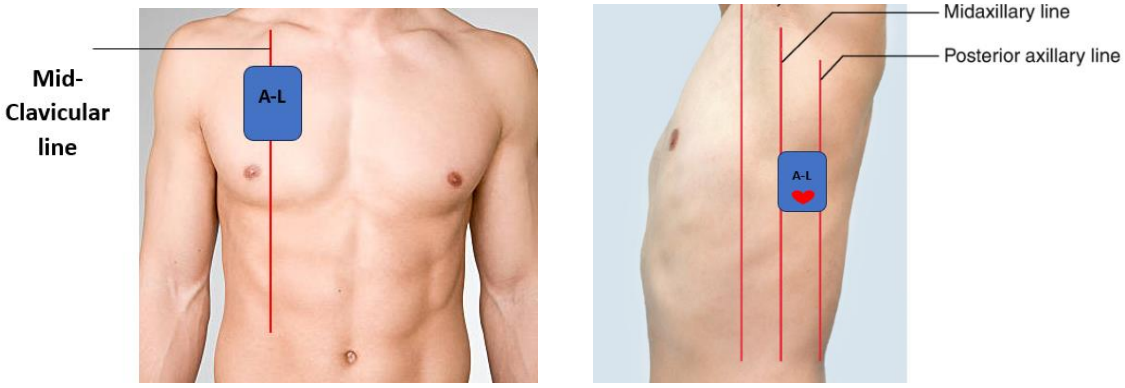


Fig. 2



C. Positon both defibrillators so they are accessible to a single operator.
D. Select the maximum energy for both defibrillators (e.g., Stryker-Physio Control LP15- 360J or Zoll 200J). When documenting DSED, the combined energy will be 720J if using 2 LP15's, 400 if using 2 Zoll's, or 560 if using 1 of each.
E. Charge both devices 15 seconds in advance of the anticipated break in CPR. Assure chest compressions continue while the devices are charging.
F. At the prescribed time in the CPR cycle, discontinue compressions and analyze the rhythm.
G. If a shock is indicated, assure all providers are clear from the patient and have a <u>single provider</u> deliver DSED by depressing the A-L defibrillator first then the A-P defibrillator as quickly as possible.
H. Immediately resume chest compressions.
I. Repeat the DSED steps for each subsequent shock until change in rhythm or ROSC.
J. Ideally, DSED should be performed after the intial dose of an antidysrhythmic (amiodarone or lidocaine) has been administered. In cases of delayed vascular access, DSED should still be performed after the 3rd unsuccessful defibrillation.
K. Following use of DSED, it is recommended that a test load shock be performed on both defibrillators that were used.

Emergency Cricothyrotomy – 30.035

INDICATIONS:
This technique is to be used only when other attempts to establish an airway have been unsuccessful (i.e., you are unable to oxygenate or ventilate using BVM) and respiratory failure exists. Such conditions are most likely to be found with foreign-body obstruction, facial and laryngeal trauma, inhalation, thermal, or caustic injury to the upper airway, angioedema, upper airway bleeding, epiglottitis, and severe croup.

PROCEDURE:
Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck. Palpate the neck in the midline and locate the slight depression just below the notch of the thyroid cartilage. This is the position of the cricothyroid membrane.

Surgical Cricothyrotomy (Patients > 40 kg)

A. Cleanse the site with antiseptic.
B. Using your non-dominant hand (thumb and middle finger), stabilize the trachea. Your index finger is used to maintain location of the cricothyroid membrane throughout the procedure.
C. Locate the cricothyroid membrane.
D. Make a vertical incision through the skin. **NOTE**: There may be significant bleeding; consider use of combat gauze to control bleeding.
E. Make a horizontal incision through the cricothyroid membrane large enough to pass the tube.
F. Follow insertion instructions for commercial device being used or follow agency specific guidelines including use of gum elastic bougie.
G. Secure device.
H. Attach end-tidal CO_2 adapter and BVM.
I. Consider sedation if necessary.

Needle Cricothyrotomy – (pediatric patients 12 years and younger).

A. Assemble equipment: 14g or 16g angiocath, 3 cc syringe, 3.0 ETT adapter, oxygen, BVM.
B. Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck unless C-Spine injury is suspected.
C. Palpate the neck in the midline and locate the slight depression just below the notch of the thyroid cartilage. This is the position of the cricothyroid membrane.
D. Prepare the area with antiseptic solution.
E. Stabilize the airway between thumb and forefingers.
F. Insert the needle with catheter into the cricothyroid membrane at a 30-degree angle caudally (toward the patient's feet).
G. When the needle is through the membrane. Stop and aspirate for air to ensure tracheal entry.
H. Advance the catheter over the needle and then remove the needle.
I. Attach the 3.0 ETT adapter to the hub of the catheter and begin ventilations with the BVM.
J. Secure the cannula with tape after confirming correct placement by auscultation for breath sounds (5-point check). Observe for kinking of cannula.
K. Consider sedation if necessary.

Emergency Cricothyrotomy – 30.035

NOTES & PRECAUTIONS:

A. Hazards in performing this procedure are primarily those of damage to nearby structures; major vessels to either side of the midline, to the vocal cords if the puncture is made too high, or a through and through injury of the trachea if the puncture is made too deeply. The latter is more commonly seen in infants and children whose tracheas may be deceptively narrow.
B. Palpation of the cricothyroid membrane is very difficult in the infant and young child. The key to success is immobilization of the trachea throughout the procedure.
C. Needle cricothyrotomy is only a temporizing measure providing oxygenation not adequate ventilation.

Endotracheal Intubation – 30.040

INDICATIONS:

A. Airway obstruction
B. Need for airway protection
C. Respiratory failure

PROCEDURE:

Cardiac Arrest Patients:

A. Patients in cardiac arrest can typically be intubated without the use of an induction agent and paralytics. Pre-oxygenation and apneic oxygenation are not indicated.
B. Assemble and check all equipment:
    1. Cardiac monitor
    2. Suction
    3. $EtCO_2$
    4. Pulse Oximeter
    5. O_2 tank w/regulator
    6. Mask and BVM
    7. Intubation equipment (VL, DL)
    8. Backup devices ready: Bougie, supraglottic airway, surgical airway (cric kit)
C. Intubate in a controlled, but timely manner. (Consider use of a supraglottic airway to minimize CPR interruptions or when ALS resources are limited.)
D. Use of the bougie is encouraged for endotracheal intubation to facilitate first pass success.
E. Verify placement of ET tube using waveform capnography and a careful five-point check. Monitor waveform capnography continuously.
F. Secure the tube utilizing ETT securing device. Record ET Tube depth at the teeth or gum line. Depth in adults is height based. Reasonable targets are 21 cm for women, and 23 cm for men at the teeth.
G. Avoid interruptions to CPR when securing a patient's airway. Once secured, deliver 1 breath every 6 secs. (10 breaths/min) asynchronous with compressions. About 1 second per breath, with visible chest rise. Optional method: 30:2 compression/ventilation ratio with advanced airway until ROSC. Post-ROSC, deliver 1 breath every 6 seconds.
H. Ventilate and monitor patient's vital signs including SpO_2.
I. If signs of "CPR Induced Consciousness" are present, administer up to 2.5 mg of midazolam IV/IO **or** 1 mg lorazepam IV/IO **and** 50 mcg of fentanyl. May repeat as needed every 5 - 10 minutes. Maximum total dose of lorazepam is 4 mg.
J. Consider orogastric tube placement.

Drug Assisted Airway Management (DAAM) in Perfusing Patients:

A. DAAM is the technique of using medications to overcome the body's protective airway reflexes to facilitate airway insertion using sedatives and paralytics.
B. Two DAAM techniques are Rapid Sequence intubation (RSI) and Delayed Sequence Intubation (DSI).
C. RSI and DSI choice should be based on paramedic discretion and/or medical director preference.
D. If the patient is agitated and difficult to preoxygenate, consider DSI with ketamine to optimize oxygenation and facilitate resuscitation.

Endotracheal Intubation – 30.040

E. Assemble and check equipment: Two O_2 tanks with regulators, nasal cannula, BVM with mask, $EtCO_2$, intubation equipment, suction, back up devices (bougie, SGA, cric kit).
F. Attach pulse oximeter, cardiac monitor, BP cuff, and waveform capnography.
G. Establish 2 IVs or IOs, if not already done.
H. Verbalize missed airway plan to the entire team and verify/mark surgical airway landmarks.
I. Physiologically optimize patient prior to intubation with a MAP > 65 mmHg (systolic BP > 100 mmHg). **Preoxygenation and denitrogenation are essential steps in every DAAM.**
J. Treat hypotension with fluids and Push Dose epinephrine 10 -20 mcg every 1- 5 minutes, with a goal MAP > 65 mmHg (SBP ≥ 100 mmHg).
K. **Place nasal cannula and administer oxygen at 15 lpm. Continue apneic oxygenation during the procedure.**

Delayed Sequence Intubation procedure

1. Administer Induction Agent:
Ketamine 1 - 2 mg/kg IV/IO slow push over 60 seconds for sedation and analgesia prior to paralysis

2. Positioning:
Ensure patient is positioned ear to sternal notch with head of bed/backboard elevated ≥ 15°. Maintain apneic O_2 via NC at 15 lpm throughout

3. Preoxygenation and Denitrogenation:
- If patient is **breathing adequately**, Hold BVM (**NO VENTILATIONS)** using 25 lpm of oxygen and NPA/OPA with two-handed mask seal **and PEEP @ 10.** Increase PEEP if unable to achieve SpO_2 ≥ 94%
- If patient is **breathing inadequately**, **VENTILATE** with BVM using 25 lpm of oxygen and OPA/NPA with two-handed mask seal **and PEEP @ 10.** Increase PEEP if unable to achieve SpO_2 ≥ 94%
- Upon reaching SpO_2 ≥ 94%, **begin 3-minute countdown** to allow for complete denitrogenation. **See letter L below**

4. Paralysis
Administer one of the following paralytics:
- Succinylcholine
- ≥ 6 years or > 20 kg - 1.5 mg/kg IV/IO
- < 6 years or < 20 kg - 2 mg/kg IV/IO **OR**
- Rocuronium 1.2 mg/kg IV/IO **OR**
- Vecuronium 0.1 mg/kg IV/IO

Rapid Sequence Intubation procedure

1. Positioning:
Ensure patient is positioned ear to sternal notch with head of bed/backboard elevated ≥ 15°. Maintain apneic O_2 via NC at 15 lpm throughout

2. Preoxygenation and Denitrogenation:
- If **breathing adequately**, administer oxygen via NRB at 25 lpm
- If **breathing inadequately**, use a BVM at 25 lpm with OPA/NPA. Perform two-person BVM ventilations with two-handed thumbs-down seal on mask
- Ensure the patient has a $SpO_2 \geq 94\%$ for at least 3 minutes before medication administration.
- If unable to achieve a $SpO_2 \geq 94\%$, consider DSI

3. Administer Induction Agent:
- Etomidate 0.3 mg/kg IV/O **OR**
- Ketamine 1 - 2 mg/kg IV/IO slow push over 60 seconds **OR**
- Midazolam 0.2 mg/kg IV/IO (least desirable option)
  -If systolic BP ≥ 100 mmHg- max dose 10 mg
  -If systolic BP < 100 mmHg- max dose 5 mg

4. Paralysis
Immediately following induction agent, administer one of the following paralytics:
- Succinylcholine
- ≥ 6 years or > 20 kg - 1.5 mg/kg IV/IO
- < 6 years or under 20 kg - 2 mg/kg IV/IO **OR**
- Rocuronium 1.2 mg/kg IV/IO **OR**
- Vecuronium 0.1 mg/kg IV/IO

L. If unable to achieve SpO_2 ≥ 94%, consider failed airway plan, including use of a supraglottic airway.

M. Perform intubation approximately 60 seconds after succinylcholine or rocuronium, and 2 - 3 minutes after vecuronium.

N. Use of the bougie is encouraged to facilitate first pass success.

O. If SpO_2 drops to < 94% during intubation attempt, ventilate with BVM using 100% oxygen before next attempt.

P. If intubation unsuccessful, consider use of BVM and/or backup supraglottic airway device.

Q. If unable to ventilate with BVM or backup airway, proceed to surgical airway (cricothyrotomy).

R. If bradycardia occurs, first ensure adequate oxygenation and ventilation, and if persistent, administer atropine 0.5 mg IV/IO (Pediatric patients: 0.02 mg/kg IV/IO. Minimum dose 0.1 mg. Do not exceed adult dose.)

S. Verify placement of ET tube using waveform $EtCO_2$ and a careful five-point check.

T. Continue cardiac, waveform $EtCO_2$, and pulse oximetry monitoring at all times.

U. Following intubation, titrate PEEP down to lowest setting to maintain SpO_2 ≥ 94%.

V. Insert an oral airway or compatible bite-block device if needed.

W. Secure the endotracheal tube and record the depth at the teeth/gums.

X. Recheck and document ET tube placement after every patient movement or change in vital signs. For sudden hypoxia, consider DOPE:
   1. **D**islodgement
   2. **O**bstruction
   3. **P**neumothorax
   4. **E**quipment issue

Y. After successful airway placement, administer fentanyl **PLUS** midazolam/lorazepam, **OR** ketamine for analgesia and sedation:
   1. Fentanyl and midazolam/lorazepam:
      a. Fentanyl 50 - 100 mcg IV/IO if SBP ≥ 100 mmHg (MAP > 65 mmHg), repeat every 15 minutes as necessary to maintain analgesia. (Pediatric dosing, 1 mcg/kg, not to exceed the adult dose with repeat doses at 0.5-1 mcg/kg)
      b. Midazolam 2.5 - 5 mg IV/IO if SBP ≥ 100 mmHg (MAP > 65 mmHg). Repeat every 15 minutes as necessary to maintain sedation. (Pediatric dose of midazolam is 0.1 mg/kg IV/IO up to 2.5 mg), **OR**
      c. Lorazepam 1 - 2 mg IV/IO if SBP ≥ 100 mmHg (MAP > 65 mmHg). May repeat every 5 - 10 minutes as needed to a max total dose of 4 mg. (Pediatric dose of lorazepam is 0.05 mg/kg IV/IO up to max single dose of 2 mg. May repeat every 5 - 10 minutes as needed up to a max total dose of 4 mg).

      Analgesia should be addressed first. Opioids are preferred first line agents before benzodiazepines. Ensure hemodynamic stability before giving a second agent to facilitate analgesia and sedation.
   2. Ketamine: Initial dose is 1 mg/kg slow IV/IO push if not used for induction. If used for induction, initial dose is 0.5 mg/kg slow IV/IO push. May repeat 0.5 mg/kg every 15 minutes as necessary to maintain analgesia and sedation. **Ketamine should not be used for sedation following ROSC in cardiac arrest patients.**

Z. Consider ketamine for ongoing sedation in airway management if:
   1. Non-depolarizing neuromuscular blockade (e.g. vecuronium, rocuronium) is used at any point as a paralytic agent, or
   2. Ketamine is used for DAAM.

AA. If additional paralysis is needed, administer vecuronium 0.1 mg/kg **or** rocuronium 0.5 mg/kg IV/IO.

AB. Consider orogastric tube placement.

NOTES & PRECAUTIONS:

A. If unable to establish and/or maintain an adequate airway, transport patient, including trauma patients, to the nearest hospital to obtain definitive airway control.

B. An attempt is defined as the insertion of the laryngoscope blade or rescue airway past the teeth. In most situations, intubation attempts should be limited to 2 per paramedic (with a maximum of 4 attempts prior to/during transport).

C. DO NOT rely solely on monitoring equipment. Auscultate for lung sounds and/or re-visualize with laryngoscope (VL or DL) if there is any doubt about tube placement.

D. Continuously monitor the patient's overall condition including vital signs, SpO_2, $EtCO_2$, cardiac rhythm, perfusion, and ease of ventilation post-intubation.

E. Succinylcholine, rocuronium and vecuronium do not affect the level of consciousness and should be used with etomidate/ketamine/midazolam.

F. Succinylcholine is contraindicated in the following:
   1. Known hypersensitivity.
   2. Major burns and crush injuries between 48 hours and 6 months old.
   3. Stroke or spinal cord injuries with profound residual deficits between 48 hours and 6 months old.
   4. Neuromuscular disease (e.g., muscular dystrophy).
   5. Suspected hyperkalemia (ESRD patients on dialysis).

G. Avoid vecuronium and rocuronium in patients suspected of having underlying status epilepticus (seizures).

H. In DSI, start with 1 mg/kg of ketamine for induction. If disassociation is not achieved, administer a second 1 mg/kg dose of ketamine.

I. Rapid administration of ketamine can lead to apnea. Ketamine should be administered slowly over 60 seconds. Dilute ketamine with normal saline to a minimum of 10 ml total volume for a slower administration.

J. Ketamine can cause laryngospasm and may cause an emergence reaction with vivid dreams.

K. Preoxygenation and denitrogenation can be challenging in some instances (e.g., ARDS, pneumonia). Consider a BVM with a PEEP valve or non-invasive positive pressure ventilation (e.g., CPAP/BiPAP).

L. Patients dependent on sympathetic tone may develop profound hypotension post intubation. This should be treated with fluids and/or push dose pressors per the shock protocol. It is always best to have push dose epinephrine available.

DOCUMENTATION:

Visualization of the cords (if applicable), size and depth of tube at the teeth/gums, number of attempts, 5-point check and equal chest expansion, $EtCO_2$ waveform device used/reading, SpO_2, any other devices/ techniques used, and reconfirmation of placement after each patient movement.

End-Tidal CO_2 Monitoring – 30.070

PURPOSE:
To define the various uses of end-tidal CO_2 ($EtCO_2$) and capnography monitoring.

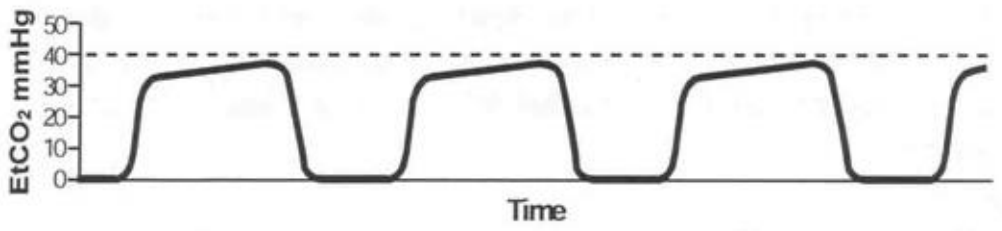
BACKGROUND:

A. Capnography (an $EtCO_2$ value with a waveform) allows for the assessment of ventilation and/or perfusion.
   1. $EtCO_2$ is primarily an indicator of ventilation in patients with normal perfusion (e.g., normal blood pressure).
   2. $EtCO_2$ is primarily an indicator of perfusion in patients with low blood flow (e.g., shock, cardiac arrest).

B. Consider use of capnography in suspected critical patients and when required by protocol.

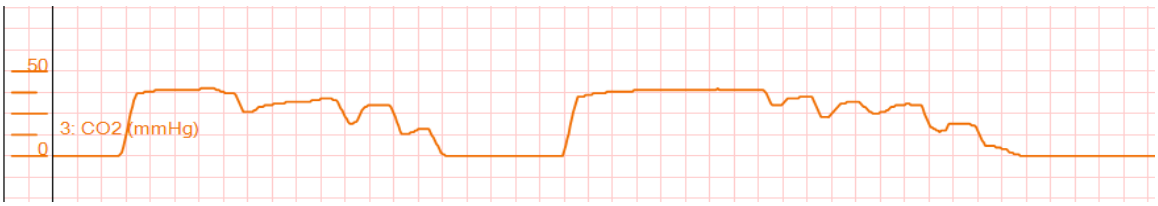
PROCEDURE:

A. Airway Management
   1. Airway Confirmation
      a. Manage airway according to ***Airway Management*** protocol.
      b. Apply waveform capnography device.
      c. Ensure appropriate normal capnographic waveform to confirm airway patency (see figure below).

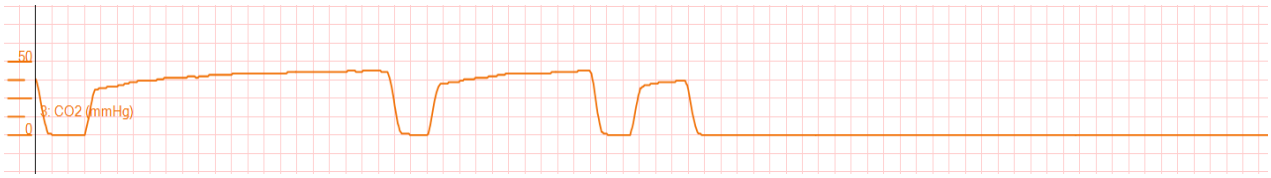


      d. Failure to obtain an $EtCO_2$ numerical reading and/or waveform requires the following immediate action:
         i. Re-visualization of the ETT using direct/video laryngoscopy.
         ii. If proper location of the ETT or i-gel is not confirmed, immediate removal of the airway and use of an alternative airway.

   2. Continued Airway Assessment
      a. A sudden drop in $EtCO_2$ output and an obvious change in the waveform (see figure below) is indicative of advanced airway displacement (most likely into the hypopharynx) or a cuff leak (e.g., under inflated balloon, balloon rupture, or poorly sized ETT or i-gel®). Re-assess airway placement immediately and take corrective action.



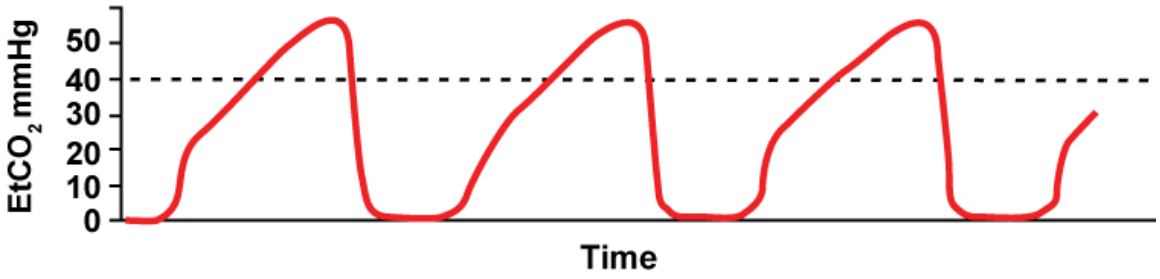
b. A sudden and sustained drop in $EtCO_2$ output (see figure below) may indicate a blocked airway (e.g., kinked tube, mucus plug).



c. Document pulse oximetry and $EtCO_2$ readings in your prehospital care report at regular intervals, especially following movement of the patient or change in vital signs.

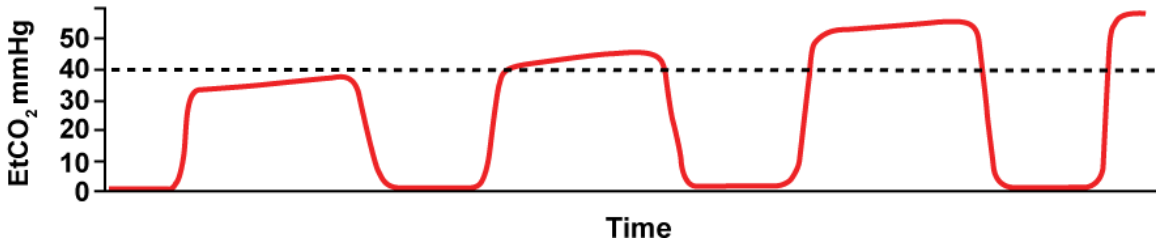
B. Cardiac Arrest
1. Manage according to ***Cardiac Arrest*** protocols.
2. Apply waveform capnography device as soon as feasible.
3. The trend of $EtCO_2$ values is the most important to guide a resuscitation.
   a. Values that decline over time may indicate poor CPR quality (e.g., need for a new compressor, LUCAS device has shifted).
4. Do NOT ventilate to EtCO2 values during cardiac arrest, as hyperventilation or hypoventilation are harmful to the patient. During cardiac arrest, the $EtCO_2$ values are indicative of pulmonary blood flow (i.e., chest compression quality).
5. A sudden and sustained rise in $EtCO_2$ values may indicate ROSC.
6. A gradual decline in $EtCO_2$ values may be the first sign of recurrent arrest in a patient who has achieved ROSC.
7. Do NOT rely solely on an $EtCO_2$ value when determining termination decisions.

C. Respiratory Distress/Respiratory Failure
1. A “shark fin” waveform can be seen in Asthma and COPD (see figure below).



2. Consider use of capnography when initiating CPAP/BiPAP as it can assist with diagnosis (e.g., evaluating for “shark fin” waveform), assess response to treatment, and can evaluate for patient decompensation.

3. Use of waveform capnography is required in patients who are experiencing respiratory depression or have received sedating medications (e.g., opiates, benzodiazepines, antipsychotics, etc.) to help detect hypoventilation (i.e. rise in $EtCO_2$ with progressively rising waveform). (See figure below).



D. Acidosis
   1. Sepsis: In patients with concern for infection and ≥ 2 of the following: Respiratory rate > 20, heart rate > 90 BPM and fever (i.e., SIRS criteria), an $EtCO_2 \leq 25$ mmHg is suggestive of hypoperfusion and increased mortality. Treat per ***Sepsis Protocol.***
   2. DKA: In patients with elevated blood sugar, $EtCO_2 < 25$ may indicate DKA. Treat per ***Diabetic Emergencies-Hyperglycemia*** protocol

E. Hypoperfusion (low blood flow)
   1. A low $EtCO_2$ can help determine cases of hypoperfusion (low blood flow) given the lack of blood flow to the lungs.
   2. In trauma patients, $EtCO_2 < 25$ mmHg may indicate presence of shock and is associated with the need for blood transfusion and increased mortality.

F. Traumatic Brain Injury
   1. Maintain $EtCO_2$ output between 35 - 40 mmHg. The following approximates the degree of ventilation:
      > 40 = Hypoventilation
      35 - 40 = Normal ventilation
      30 - 35 = Hyperventilation
      < 30 = Aggressive hyperventilation
   2. Patients with signs of increased intracranial pressure (unilateral dilated pupil, posturing, focal neurologic findings) maintain $EtCO_2$ between 30 - 35.

G. Transcutaneous Pacing
   1. A sudden and sustained rise in $EtCO_2$ indicates increased pulmonary blood flow and may confirm mechanical capture.

NOTES AND PRECAUTIONS:

A. Remember: Pulse oximetry does not equate to ventilation. You can have a poorly ventilated patient displaying an oxygen saturation of 100%. Excessively high $PaCO_2$ levels can be detrimental to your patient's outcome.

B. A sudden drop in $EtCO_2$ output from normal (35 - 40 mmHg) to 15 - 20 mmHg and an obvious change in the waveform is indicative of tube displacement, most likely into the hypopharynx. Re-assess tube placement immediately and take corrective action.
C. Do not rely on pulse oximetry or $EtCO_2$ monitoring solely to determine the efficacy of intubation.
D. Waveform capnography is required for all intubated patients throughout transport.
E. Failure to obtain an $EtCO_2$ numerical reading or waveform requires the following immediate action:
    1. Immediate removal of the endotracheal tube and placement of a rescue airway or BVM ventilation.
    OR
    2. Re-visualization of the ETT using direct laryngoscopy.

i-gel® Supraglottic Airway Device – 30.072

DEFINITION:
The i-gel® is a disposable supraglottic airway created as an alternative to endotracheal intubation or mask ventilation. The i-gel® is designed for positive pressure ventilation as well as for spontaneously breathing patients.

INDICATIONS:
The i-gel® supraglottic airway device can be used as an alternative to endotracheal intubation in those patients who need a secure airway.

CONTRAINDICATIONS:
A. Trismus (clenched jaw), limited mouth opening.
B. Suspected upper airway obstructions secondary to laryngeal edema, smoke inhalation, foreign body, tumor, mass, or abscess.

SIZES:

i-gel Size		Patient Size	Patient Weight (kgs)	Patient Weight (lbs)
	1	Neonate	2.5	4-11
	1.5	Infant	5-12	11-26
	2	Small pediatric	10-25	22-55
	2.5	Large pediatric	25-35	55-77
	3	Small adult	30-60	66-132
	4	Medium adult	50-90	110-198
	5	Large adult	90+	198+

Size should be determined on lean body mass

PROCEDURE:
A. Identify correct size i-gel®.
B. Lubricate i-gel® prior to insertion with water soluble gel and only to the back side of the device.
C. If equipped, ensure that the supplemental oxygen port is capped.
D. Position the patient. The patient should always be in the "sniffing position" prior to insertion unless head/neck movements are considered inadvisable or are contraindicated.
E. If needed, use tongue depressor or curved laryngoscope blade to facilitate passage of i-gel® through the oropharynx.
F. Grasp the lubricated i-gel® firmly along the integral bite block.
G. Position the device so that i-gel® cuff outlet is facing towards the chin of the patient.
H. Introduce the leading soft tip into the mouth of the patient in a direction toward the hard palate. The leading edge of the i-gel's® tip must follow the curvature of the patient's hard palate upon insertion. Glide the device downward and backward along the hard palate with a continuous but **gentle** push until a definitive resistance is felt.
I. Determine appropriate depth of insertion. When placed correctly, the tip of the i-gel® will be within the upper esophageal opening and the cuff will be against the laryngeal framework. The incisors will be resting on the integral bite block. There is a horizontal black line on sizes 3, 4, and 5 indicating optimal position. (Fig. 1)

Fig. 1

J. Secure i-gel® to maxilla with approved holder, strap, or tape.
K. If gastric distention is present or fluid is present in the gastric channel of i-gel®, an appropriately sized lubricated orogastric tube (Fig. 2) may be passed down the gastric channel.
L. Attach capnography per protocol.

Fig. 2

i-gel Size		Maximum Size of Orogastric Tube (French Gauge) or French Suction Catheter
	1	N/A
	1.5	10
	2	12
	2.5	12
	3	12
	4	12
	5	12/14

NOTES & PRECAUTIONS:

A. Do not use excessive force to insert the device or orogastric tube.
B. Sometimes a feel of “give-way” is felt before the end point resistance is met. This is due to the passage of the i-gel® bowl through the faucial pillars (pharyngo-epiglottic folds).
C. Once resistance is met and the teeth are located on the integral bite block, do not repeatedly push the i-gel® down or apply excessive force during insertion.
D. Do not allow peak airway pressure of ventilation to exceed 40 cm H_2O (Zoll Series 731 EMV+ or equivalent).
E. Patients with any condition which may increase the risk of a full stomach (e.g. hiatal hernia, sepsis, morbid obesity, pregnancy, or a history of upper gastrointestinal surgery), may increase the risk of aspiration.

Induced Hypothermia – 30.076

PURPOSE:
To define the procedures for inducing hypothermia following post-resuscitation from sudden cardiac arrest; with the aim to reduce the patient's body temperature to 33°- 36° C (91.4°- 96.8° F).

INDICATIONS (Must meet all indications):
A. Patients with return of spontaneous circulation (ROSC).
B. Unconscious and without purposeful response to pain or verbal stimuli.
C. Systolic BP ≥ 100 mmHg (may use pressors to maintain pressure).

CONTRAINDICATIONS:
A. Age < 13 years old.
B. Traumatic cardiac arrest or suspected significant hemorrhage.
C. Hypothermia already present.
D. Pulmonary edema.
E. Known pregnancy.
F. Refractory or recurrent VF/VT, 2nd or 3rd degree heart blocks.

COOLING METHODS:
A. Exposure combined with ice packs, and/or
B. Chilled fluid (NS or LR); stored at a temperature of approximately 4° C (39° F).

PROCEDURE:
A. Remove patient's clothing (undergarments may remain in place).
B. Obtain 12-lead ECG if feasible. If STEMI is identified, follow STEMI protocol.
C. Cooling can be initiated with ice packs applied to the groin and axilla (wet towels may be used along with ice packs). Alternatively, consider infusion of up to 1 liter of chilled fluid.
D. Do not administer medications at the same time through the same IV line as the chilled fluid. If patient begins to shiver, move, or have an increased level of consciousness, administer midazolam 2.5 - 5 mg IV/IO if systolic BP is ≥ 100 mmHg, repeating every 15 minutes as necessary to maintain sedation, **OR** administer lorazepam 1 - 2 mg IV/IO if systolic BP is ≥ 100 mmHg, repeating as necessary every 5 - 10 minutes as needed to a max total dose of 4 mg.

Intraosseous Access & Infusion - 30.080

DEFINITION:
Intraosseous cannulation is an alternative technique for establishing vascular access in critical adult and pediatric patients when peripheral IV access is difficult or time sensitive.

INDICATIONS:

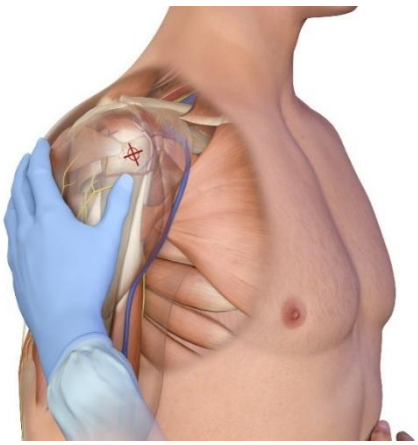
A. Intraosseous infusion is indicated in emergency situations when lifesaving fluids or drugs should be administered and IV cannulation is difficult, impossible, or too time-consuming to perform.
B. If a peripheral IV cannot be established after two attempts or within 60 - 90 seconds of elapsed time *and* in:
C. Adult and pediatric patients, within the proper weight range, who present with one or more of the following clinical conditions:
    1. Cardiac arrest.
    2. Hemodynamic instability (BP < 90 mmHg and clinical signs of shock).
    3. Imminent respiratory failure.
    4. Status epilepticus with prolonged seizure activity greater than 10 minutes, and refractory to IM anticonvulsants.
    5. Toxic conditions requiring immediate vascular access for antidote.
D. Intraosseous placement may be considered prior to peripheral IV attempts in cases of cardiopulmonary or traumatic arrest, in which it may be obvious that attempts at placing an IV would likely be unsuccessful and/or too time consuming, resulting in a delay of life-saving fluids or drugs.

EZ-IO® PROCEDURE:

A. Determine patient's weight.
B. Assemble all necessary equipment:
    1. The 25 mm (Blue) EZ-IO® needle can be utilized for patients who weigh ≥ 3 kg.
    2. The 45 mm (Yellow) EZ-IO® needle can be used for adult insertions (larger individuals weighing > 40 kg) where the 25 mm (Blue) needle is not adequate. The 45 mm needle should be used for all humeral IOs.
    3. EZ-Stabilizer® should be used to secure the needle.
C. Site selection:
    1. Proximal humerus is preferred in adult patients to achieve the following:
        a. Increased flow rates
        b. Decreased pain
        c. Closer access to central circulation (heart) during cardiac arrest and for resuscitation
    2. Proximal Tibia
    3. Distal Tibia
D. Site landmarks:
    1. Proximal humerus (contraindicated in children)
        a. Ensure that the patient's hand is resting on the abdomen and that the elbow is adducted (close to the body). Alternatively, the arm can remain adducted to the body with the arm rotated medially, thumb pointing down.

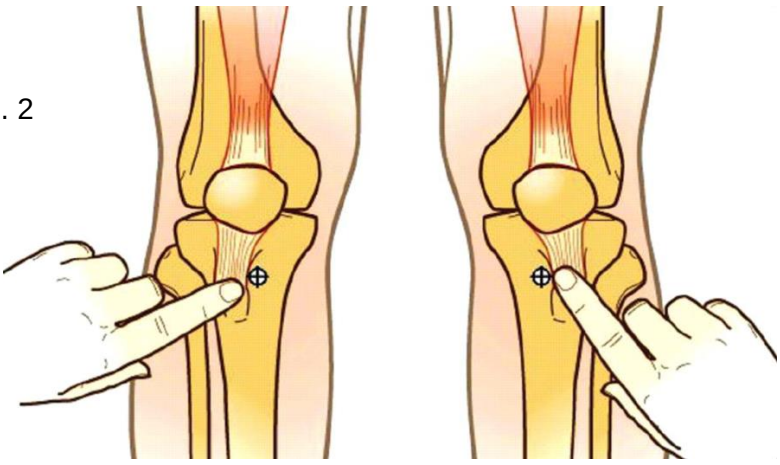
b. Insertion site is located directly on the most prominent aspect of the greater tubercle. Place palm on the anterolateral aspect of the arm and push deeply. The target will feel like a ball rolling under your palm; this is the greater tubercle. (Fig. 1)

Fig. 1



2. Proximal tibia
    a. Palpate the landmarks at the proximal tibia (patella and tibial tuberosity).
    b. Insertion site should be approximately one finger width (2 cm) medial to the tibial tuberosity, along the flat aspect of the tibia. Alternatively, landmarks are 3 cm below the patella and 2 cm medial when you can't palpate the tibial tuberosity. (Fig. 2)

Fig. 2



3. Distal tibia
   -Two finger widths proximal to the medial malleolus along the midline of the tibia. (Fig. 3)

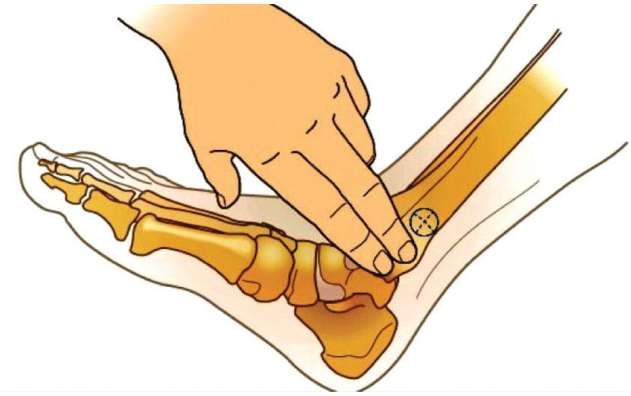


Fig. 3

E. Needle insertion
   1. Prep the surface with povidone-iodine or chlorohexidine and wipe dry with a sterile gauze pad.
   2. Stabilize patient's extremity and begin insertion from a 90-degree angle to the insertion site for both proximal and distal tibia. Insertion should be at a 45-degree angle for the proximal humerus. Push the needle set through the skin until the tip touches the bone.
   3. With the needle tip against the bone, assure adequate needle length by ensuring at least one black line (5 mm) is visible outside the skin.
   4. Gently advance the needle set into position–**do not force**. Stop when you feel the "pop" or "give" on smaller patients.
   5. When needle is in proper position, remove stylet, place the EZ-Stabilizer® on the hub, but do not secure EZ-Stabilizer® yet.
   6. Connect EZ-Connect tubing, primed with saline, to IO hub.
   7. Rapid bolus or "power" flush with approximately 10 ml normal saline **(administer lidocaine to the awake patient prior to flushing).**
   8. Confirm the catheter position:
      a. Catheter is stable at a 90-degree angle to the bone, able to aspirate blood (not always able to aspirate even with the line in the proper position), and fluids flow without evidence of extravasation.
      b. If insertion fails, leave the needle in place and clamp the EZ-Connect; do not attempt second insertion on same extremity.
   9. Secure the EZ-Stabilizer® when patency is confirmed.
   10. Consider additional bolus of saline if flow rates slower than expected.
   11. Utilize a blood pressure cuff or pressure bag around the IV bag to help infuse fluids.
   12. Monitor for patency frequently.

F. Pain Management
   1. If the procedure is performed on a conscious patient, immediately following placement of the IO needle **and before saline flush**, administer 2 ml (40 mg) of 2% lidocaine slowly over 2 minutes (rule is 2 ml of 2% over 2 min). Wait approximately 60 seconds before flushing with normal saline.
   2. In the event a patient regains consciousness and complains of severe pain secondary to the IO insertion, temporarily stop infusing the fluids, and administer lidocaine as in Fig.1 above. Wait approximately 60 seconds before continuing fluid administration.
   3. If fluids do not flow freely, flush IO site with an additional 10 ml normal saline.

PEDIATRIC EZ-IO® PROCEDURE (patients weighing 3 - 39 kg)

A. Assemble all equipment
   1. The 15 mm (Pink) EZ-IO® needle or 25 mm (Blue) EZ-IO needle should be used for patients who weigh less than 3 kg (approximately 6 lb.). The 15 mm needle, if carried, is used primarily on neonates.
   2. The 25 mm (Blue) EZ-IO® needle should be utilized for pediatric patients who weigh $\geq$ 3 kg or when the 15 mm (Pink) is deemed inadequate or not carried.
   3. EZ-Stabilizer should be used to secure the needle.

B. Site selection (Patients weighing 3 - 39 kg)
   1. Proximal Tibia
      a. Palpate the landmarks at the proximal tibia (patella and tibial tuberosity).
      b. Insertion site should be one finger width below the patella and one finger width medial to the tibial tuberosity. If the tibial tuberosity cannot be identified on the child, then the insertion site may be 1 cm below the patella and 1 cm medial.
   2. Distal femur
      a. Secure the leg outstretched to ensure the knee does not bend.
      b. Locate upper edge of the patella. Insertion site is one finger width above and then one finger width medial (towards the inner leg, “BIG TOE IO”) from the upper patella edge. This location will avoid the growth plate of the distal femur. (Fig. 4)

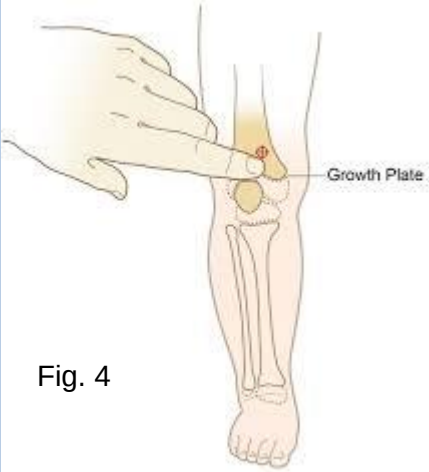


Fig. 4

C. Needle insertion
1. Prep the surface with povidone-iodine or chlorohexidine and wipe dry with a sterile gauze pad.
2. Stabilize patient's leg and begin insertion from a 90-degree angle to the insertion site. Push the needle set through the skin until the tip touches the bone.
3. With the needle tip against the bone, assure adequate needle length by ensuring at least one black line (5 mm) is visible outside the skin.
4. Gently advance the needle set into position–do not force. Stop when you feel the "pop" or "give".
5. When needle is in proper position, remove stylet, place the EZ-Stabilizer® on the hub, but do not secure EZ-Stabilizer® yet.
6. Connect EZ-Connect tubing, primed with saline, to IO hub.
7. Rapid bolus or "power" flush with approximately 5 ml normal saline.
8. Confirm the catheter position:
    a. Catheter is stable at a 90-degree angle to the bone, able to aspirate blood, and fluids flow without evidence of extravasation.
    b. If insertion fails, leave the needle in place and clamp the EZ-Connect; do not attempt second insertion on same extremity.
9. Secure the EZ-Stabilizer® when patency is confirmed.
10. Consider additional bolus of saline if flow rates slower than expected, no more than 2 - 3 ml normal saline
11. Consider a blood pressure cuff or pressure bag to help infuse fluids.
12. Monitor for patency frequently.

D. Pain Management
1. If the procedure is performed on a conscious patient, immediately following placement of the IO needle, administer 0.5 mg/kg of 2% lidocaine slowly over 2 minutes, not to exceed adult dose of 40 mg. Wait approximately 60 seconds before flushing with normal saline.
2. If fluids do not flow freely, flush IO site with an additional 2-3 ml normal saline.

Intraosseous Access & Infusion - 30.080

PEDIATRIC PROCEDURE WITH MANUAL IO DEVICE:

A. Assemble equipment
   1. Approved bone marrow needles, 15- or 18-gauge size (Jamshidi)
   2. Povidone-iodine or chlorohexidine preps
   3. Two small syringes (3 - 5 ml)
   4. One large Luer-lock® syringe (35 - 50 ml)
   5. Flush solution
   6. Sterile gauze pads and tape

B. Site Selection – Proximal tibia. Palpate the landmarks and note the entry point that is the anteromedial flat surface 1 - 3 cm below the tibial tuberosity.

C. Prep the surface with povidone-iodine or chlorhexidine prep and wipe dry with a sterile gauze pad.

D. Needle Insertion
   1. Insert the needle at the proximal tibial site, directing the needle caudally. The needle should penetrate the skin and subcutaneous tissue and be pushed through the cortex of the bone using rotation (avoid rocking the needle) until a “pop” or “give” is felt.
   2. Confirm placement of the needle by:
      a. Firm fixation of the needle and free aspiration of marrow/blood.
      b. Infusion of 2 - 3 ml of NS, palpating for extravasation or noting significant resistance. If extravasation occurs, further attempts at the site should be avoided.
      c. It is not always possible to aspirate blood/marrow, but the line may be patent.

E. Tape and secure IO needle firmly in place.

F. Start Infusion
   1. Although gravity drainage may suffice, pressurized infusions may be needed during resuscitation.
   2. When infusing medications via an IO route, pressure must be applied to the fluid bag to maintain flow rates. The provider must continually monitor the rate of infusion.

CONTRAINDICATIONS:

A. Suspected fracture of the bone selected for IO insertion.
B. Prior prosthetic joint replacement involving bone selected for IO insertion.
C. Previous significant orthopedic procedures (IO within 48 hours, surgery, etc.).
D. Infection at the site of insertion.
E. Excessive tissue at insertion site with the absence of landmarks.

NOTES & PRECAUTIONS:

A. Osteomyelitis, growth plate injury (in pediatric patients), and extravasation of fluid with compression of popliteal vessels or the tibial nerve may occur.
B. Airway and breathing should be established first in accordance with other protocols.
C. Do not perform more than one attempt in each extremity.
D. Any ALS medication may be administered IO.
E. Do not give hypertonic saline through an IO line.
F. In the event of driver failure, EZ-IO® needle may be inserted manually.
G. All EZ-IO® needles are 15 gauge regardless of length.

King Airway® Placement – 30.105

DEFINITION:
The KING LT-D® is a disposable supraglottic airway created as an alternative to tracheal intubation or mask ventilation. The KING LT-D® is designed for positive pressure ventilation as well as for spontaneously breathing patients.

INDICATIONS:
Use of the King LT-D® airway is indicated if endotracheal intubation cannot be performed and the patient needs a secure airway.

CONTRAINDICATIONS:
A. Intact gag reflex.
B. Airway obstruction.
C. Patients under 3 feet in height.
D. Known or suspected caustic ingestion.
E. Known esophageal disease.

PROCEDURE:
A. Attach pulse oximeter and monitor oxygen saturation.
B. If vomitus, blood or other foreign material is present in the hypopharynx, rapid and aggressive suctioning and/or manual removal must be done prior to placement of the King Airway®.
C. Ventilate with BVM to optimize oxygen saturation prior to King LT-D® intubation especially if several endotracheal intubations were attempted.
D. Estimate patient's height (for sizing of King LT-D® airway) and select proper tube size.

Type	LTD	LTD	LTS-D	LTS-D	LTS-D
Size	2	2.5	3	4	5
Tube Color	Green	Orange	Yellow	Red	Purple
Patient Height	3-3.5 feet	3.5 feet	4-5 feet	5-6 feet	Greater than 6 feet
Inflation Volume	25-35 mL	30-40 mL	40-55 mL	50-70 mL	60-80 mL
Age	4-8 years	5-10 years	Adult →		

E. Lubricate the posterior distal end of the King Airway® with a water-soluble gel.
F. Place patients head into a "sniffing" position. If suspected or potential cervical spine injury keep patients head in neutral position during insertion.
G. Using a midline approach, introduce tip into mouth and advance behind base of tongue. The blue orientation line on the tube should face the chin of the patient.
H. Without using excessive force, advance tube until the base of the connector is aligned with the teeth and/or gums. Never force the tube into position.
I. Inflate the cuff using the appropriate volume of air (see table above).

J. Attach bag valve device to the tube with supplemental oxygen. While gently bagging the patient to assess ventilation, simultaneously withdraw the King Airway® until ventilation is easy and free flowing (large tidal volume with minimal airway pressure).
K. Listen for lung sounds in both lung fields and over epigastrium.
L. As soon as feasible, secure the King Airway® with an endotracheal tube holder.
M. Monitor oxygen saturation, chest rise, and attach continuous $EtCO_2$ monitor.
N. After successful placement, continue to monitor for adequate ventilations and possible displacement or cuff failure.

SUCTIONING THROUGH THE KING LTS-D:

A. Use of the gastric access lumen for suctioning and removal of stomach contents will be at the discretion of the user.
B. Attach a maximum size 18 Fr suction catheter to a portable suction unit.
C. If necessary, lubricate the catheter with a water-soluble gel.
D. Insert the suction catheter into the opening of the gastric access lumen and advance to the maximum depth.
E. Turn on suction unit and maintain continuous suction until there is no further return of stomach contents.
F. After detaching suction unit, the catheter may be left in place to prevent any additional stomach contents from being expelled from the gastric access lumen.
G. If active suctioning is not performed, a suction catheter may be placed in the gastric access lumen to act as a passive vent, and to prevent stomach contents from being expelled from the lumen.

NOTES & PRECAUTIONS:

A. It is important that the tip of the device be maintained in the patient's midline. Keeping the tip at midline assures that the distal tip is properly placed in the hypopharynx and upper esophagus.
B. Depth of insertion is key to providing a patent airway. A shallow initial insertion will require deflation of the cuffs to advance the tube deeper.
C. It is extremely important to open the airway and ensure that the tip of the King Airway® advances past the base of the tongue.
D. Unlike the Combitube®, the King LT-D® device is not designed to ventilate the patient if placed in the trachea. If unable to ventilate the patient after placement deflate balloons and adjust depth of tube to optimize ventilation.

Left Ventricular Assist Devices LVAD – 30.107

BACKGROUND:

Left ventricular assist devices (LVADs) are designed to assist the pumping function of the patient's left ventricle. The HeartWare HVAD®,HeartMate II®, and HeartMate III® devices attach to the apex of the left ventricle (pump inflow) and propel blood to the ascending aorta (pump outflow). These devices utilize an external wearable system that includes a small controller connected to the internal pump by an external driveline and is powered by two batteries. They may also be "plugged in" to 110 or 12 V power, depending on the device. When managing an LVAD patient, follow these general assessment guidelines.

ASSESSING PATIENT WITH LVAD:

A. Establish airway and provide supplemental oxygen if any respiratory signs or symptoms are present.
B. **If a patient with an LVAD is having a medical emergency, it does not necessarily mean that it is a device issue. Consider the whole clinical picture and perform a thorough patient assessment, including device function. Infection, volume depletion, stroke, bleeding, and dysrhythmias may be the cause of patient's symptoms. Most LVAD patients are anticoagulated and are at risk for bleeding complications.**
C. Auscultate heart sounds to determine if the device is functioning. Both the HeartWare HVAD® and HeartMate II®, are continuous flow devices and you should hear a "whirring" sound". Because these devices diminish pulsatile flow in the circulation, peripheral pulses may not be palpable. The HeartMate III®, although continuous flow, may provide artificial pulsatility (as well as a pulsatile hum) due to the addition of intermittent speed reduction which was designed into the device. Since this artificial pulse is not synchronized with the patient's heart rate, it may augment or diminish the native pulse. If a pulse is palpable, a BP can be attempted. Assess other signs of circulation—capillary refill, absence or presence of dizziness, temperature/ moisture of skin, end-tidal CO_2, and mental status to determine perfusion status.
D. Standard blood pressure devices may not work. If unable to obtain a blood pressure consider using the following, if available, to estimate perfusion pressure:
    1. End-Tidal CO_2 - Expected values should be between 35 – 45 mmHg.
    2. Doppler cuff pressure - Estimates the mean arterial pressure. The goal range for Doppler MAP is > 60 and less than 90.
    3. Other clinical signs – Capillary refill, mental status.
E. Locate the device to identify which type is in place and follow the device specific troubleshooting guidelines. Intervene appropriately based on the type of alarm and device.
F. Start Large Bore IV and treat with fluids as needed.
G. Pulse oximetry may not be accurate due to the continuous flow nature of the device. You may not get an accurate reading in the field.
H. Your cardiac monitor **will** work, and a reliable ECG may be obtained. Because the LVAD creates continuous flow independent of left heart function, not all arrhythmias will be symptomatic, including ventricular arrhythmias. If a patient requires defibrillation, leave the pump running and all components in place. The LVAD does not interfere with electrical conduction. In general, LVAD patients also have an AICD/Pacemaker. Do not place defibrillation pads directly over the pump or AICD/Pacemaker (consider anterior/posterior placement).
I. All ACLS medications may be administered if necessary.
J. **If suspected cardiac arrest, proceed to following flow chart:**

Call Patient's VAD Center
- St. Vincent's: 971-678-4042
- Kaiser: 503-449-4672
- OHSU: 503-494-9000 (ask for on-call LVAD coordinator to be paged)

Unresponsive LVAD patient

Is the patient breathing **AND** can you hear a VAD hum?

NO

Initiate CPR and follow ACLS protocols

YES

Doppler MAP > 50mmHg OR $ETCO_2$ > 20mmHg?

NO

YES

2nd Responder available and/or trained family member assess LVAD function:
- Look/Listen for alarms
- Check driveline connection to LVAD controller
- Check power connection to LVAD controller

If any of the following true?
- Absent VAD hum
- "Pump Off" displayed
- Flow < 1 L/min
- Pulsatility < 1

Perform controller exchange

LVAD restarted AND
- Doppler MAP > 50mmHg

OR
- $ETCO_2$ > 20mmHg

YES

Follow standard protocols except **NO CHEST COMPRESSIONS** because the VAD is likely providing adequate forward flow

NO

Continue CPR and follow ACLS protocols

- Refer to the LVAD Protocol for detail instructions on the battery and controller.
- DO NOT USE MECHANICAL CPR.
- The 2 most common causes of pump failure are disconnection of the power and failure of the controller.
- Transport LVAD patient in circulatory arrest to the nearest VAD hospital; otherwise transport the patient to their designated VAD center.
- Patients on LVAD support frequently do not have a palpable pulse or recognizable BP yet have adequate perfusion.
- In the non-invasive assessment of the BP, use a manual BP cuff with Doppler when available, with ETCO2 as the second option.
- Assess and treat non-LVAD pathology:
  - 5 H's: Hypovolemia, hypoxia, hydrogen ion (acidosis), hypo/hyperkalemia, hypothermia
  - 5 T's: Toxins, tamponade, tension pneumothorax, thrombosis-heart, thrombosis-lung
- **Keep all back-up equipment with the patient during transport!**

Left Ventricular Assist Devices LVAD – 30.107

TRANSPORTING AN LVAD PATIENT:

A. Consider transporting the LVAD patient in circulatory arrest to the nearest VAD hospital; otherwise transport the patient to their designated VAD center. **Call the number on the device and follow advice of the LVAD Coordinator on call for troubleshooting the device.**
B. For all other concerns contact OLMC.
C. The patient must be supported by battery power. **Remember to also transport the backup controller and the spare batteries.**
D. The controller should be kept close to the patient, and care taken to not kink the leads.
E. If removing or cutting patients clothing, use caution as not to sever the driveline.
F. Do not put external pressure on any area of the LVAD system.
G. Place gurney straps underneath the leads, and keep the batteries easily accessible.
H. Allow the trained caregiver to ride in the transport vehicle if possible to act as an expert on the device in the absence of consciousness in the patient.
I. Bring all of the patient's equipment.

NOTES AND PRECAUTIONS:

A. LVAD patients who are anticoagulated have a higher risk of bleeding and hemorrhage.
B. There are no valves on an LVAD, so there is the risk of retrograde flow and stagnation of blood if the device stops, or flow is impeded.
C. These patients are pre-load and afterload dependent, so hypovolemia can have a profound effect.
D. If a patient is **hypertensive**, flow through the device may be reduced.

Orogastric Tube Insertion and Maintenance – 30.115

OVERVIEW:

While a patient is being ventilated with a BVM, trapped air can gather in the stomach increasing the risk of vomiting and aspiration. In addition, an enlarged stomach pushes against the diaphragm to increase intrathoracic pressure, decrease venous return, and interferes with lung ventilation.

INDICATIONS:

To alleviate gastric distention, reduce aspiration, and facilitate ventilation in intubated patients.

CONTRAINDICATIONS:

A. Known alkali or acid ingestion.
B. Known esophageal varices.
C. Esophageal obstruction.
D. Suspected epiglottitis or croup.

PROCEDURE:

A. Assemble equipment:
    1. Proper size orogastric tube
    2. Lubricant
    3. 30 or 60 cc syringes
    4. Suction unit

Gastric Tube Size Guide	
Age	**Size**
Less than 1 year	Refer to Pediatric Guide
1 yr. to 16 yrs.	10 - 14 French
Older than 16 yrs.	Up to 18 French

B. With patient's head in a neutral position measure tube length from xiphoid process to angle of jaw to corner of the mouth. Place a mark on the tube to indicate how far to advance the tube.
C. Lubricate end of tube; about 3 - 4 inches.
D. Gently insert tube and advance toward posterior oropharynx.
E. For non-traumatic patients, repositioning the head into a slightly flexed forward position may facilitate OG tube passage past the hypopharynx and into stomach.
F. Continue to insert tube to the measured mark. Secure tube with tape.
G. Attach syringe to the distal end of the OG tube.
H. Confirm tube placement by placing stethoscope over epigastrium and auscultate while inserting 30 - 60 ml of air in tube. You should hear gastric gurgling.
I. Secure tube in place with tape.
J. Place the tube to low continuous suction as needed, gastric contents should be visible in tubing.
K. Document tube size and depth, color, consistency, and amount of gastric contents.

Orogastric Tube Insertion and Maintenance – 30.115

NOTES AND PRECAUTIONS:

A. OG tube placement can cause bradycardia.
B. Do not delay transport for this procedure.
C. Monitor SpO_2 and $EtCO_2$ continuously.

Patellar Dislocation Reduction – 30.118

INDICATIONS:

Isolated non-traumatic lateral patellar dislocation.

CONTRAINDICATIONS:

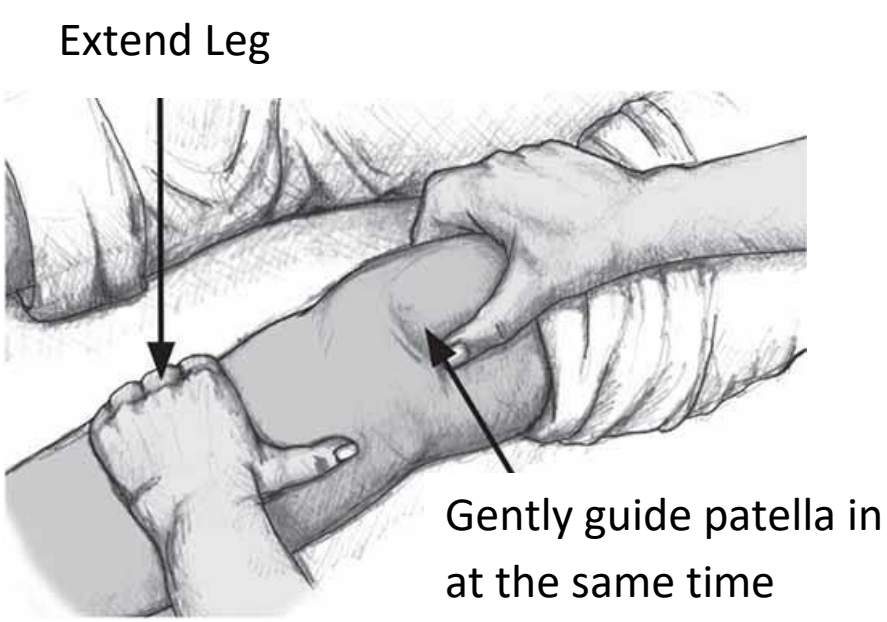
A. Direct traumatic mechanism of injury (impact directly to the knee).
B. Any sign of associated patella fracture (crepitus).
C. Any associated injury to same extremity (femur fracture, tibia/fibula fracture, pelvic fracture).

PROCEDURE:

A. Follow Pain Management protocol.
B. Patient will usually present with the knee flexed and an obviously laterally displaced patella.
C. Gently apply pressure to the lateral aspect of the patella (directing it medially) while extending the leg.

NOTES & PRECAUTIONS:

A. Reductions should not be attempted for medial dislocations, as these commonly have associated fractures.
B. Patients should be splinted and transported regardless of success of reduction attempt. If a patient does not want transport after successful reduction, OLMC contact is mandatory as part of the refusal process.



PICC Line Access – 30.140

BACKGROUND:
A Peripherally Inserted Central Line (PICC) is a common method of maintaining long-term venous access in select patients. PICC lines are typically inserted into the antecubital fossa, and then threaded into central circulation. PICC lines are flushed with heparin to maintain patency and therefore it is imperative to aspirate 5 ml of blood from the line prior to use.

INDICATIONS:

A. PICC lines may be accessed when there is a need for drug or fluid administration and traditional means of venous access are unsuccessful.
B. Patient or patient's caregiver requests use of PICC line.

CONTRAINDICATIONS:

A. Inability to aspirate or infuse through the catheter.
B. Catheter located in any place other than the patient's upper arm.
C. Need for rapid fluid resuscitation.

PROCEDURE:

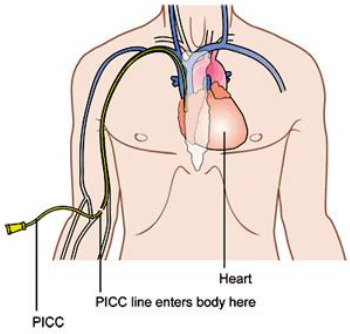
A. Use clean gloves and maintain sterility as much as possible.
B. If there is a needleless type port on the distal end of the catheter, perform the following: *(figure 1)*
    1. Scrub the port with an alcohol pad for at least 15 seconds and allow to dry for at least 5 seconds.
    2. Attach a 10 ml syringe (without saline) to the port.
    3. Unclamp if necessary (needleless port may not have a clamp).
    4. Attempt to aspirate at least 5 ml of blood. Blood should draw freely. If it does not, remove the syringe and DO NOT use the catheter for access.
    5. If blood aspirates freely, remove the 10 ml syringe with blood and discard.
    6. Attach a 10 ml syringe with NS and gently flush the line. Never use a smaller syringe. If line does not flush, remove the syringe and DO NOT use the catheter for access.
    7. If line flushes, remove the syringe and attach the catheter to the end of the IV tubing and begin infusion of NS or LR. Adjust the rate to the needs of the patient within the limits of the catheter.
    8. Administer medications though IV tubing port if indicated.

C. If there is a capped needle-type port on the distal end of the catheter, perform the following: *(figure 2)*
    1. Scrub the cap with an alcohol pad for at least 15 seconds and allow to dry for at least 5 seconds.
    2. Clamp the catheter tubing using ONLY the existing clamp on the catheter and then remove the cap. **Never allow a central line to be open to air.**
    3. Attach a 10 ml syringe on the catheter end.
    4. Unclamp the catheter.
    5. Attempt to aspirate at least 5 ml of blood. Blood should draw freely. If it does not, re-clamp the line and remove the syringe. DO NOT use the catheter for access.
    6. If blood aspirates freely, clamp the catheter again.
    7. Remove the 10 ml syringe with blood and discard.

8. Attach a 10 ml syringe with NS.
9. Unclamp and gently flush the line. Never use a smaller syringe. If line does not flush, re-clamp the line and remove the syringe. DO NOT use the catheter for access.
10. If line flushes, re-clamp and remove the syringe.
11. Attach the catheter to the end of the IV tubing.
12. Unclamp the catheter and begin infusion of NS or LR. Adjust the rate according to the needs of the patient within the limits of the catheter.
13. Administer medications though IV tubing port if indicated.

NOTES & PRECAUTIONS:

A. **Do not administer medications, flush, or aspirate with less than a 10-cc syringe. Smaller size syringes generate too much pressure and can damage the catheter.**
B. **Do not attempt to reinject aspirated blood as it may contain clots.**
C. The maximum flow rates for a PICC line is 125 ml/hr for less than size 2.0 French, and 250 ml/hr for catheters over 2.0 size French.
D. Keep patient's arm straight to avoid kinking the PICC line and obstructing flow.
E. Ensure all line connections are secure.
F. PICC lines access the patient's central circulation and the risk of infection is high. Avoid contamination to ports and connections while accessing.
G. **Do not administer the following medications through a PICC line:**
    1. **Adenosine** - The line may rupture during rapid infusion due to over pressurization.
    2. **Dextrose 50%** – The catheter can be damaged due to the viscosity of the fluid.



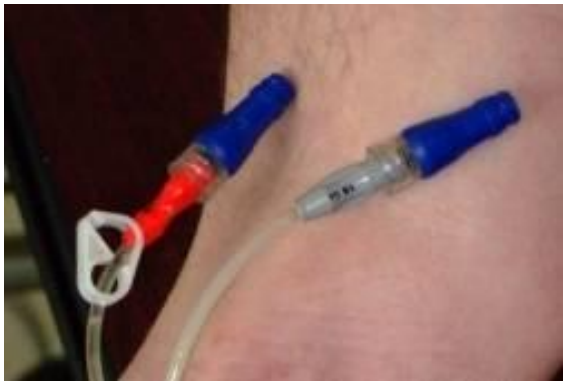


Figure 1- Needleless port

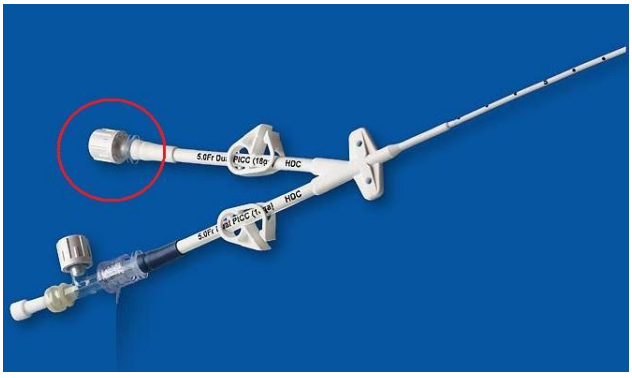


Figure 2 – Non-needleless type port with cap

Positive End-Expiratory Pressure (PEEP)– 30.145

DEFINITION:
Positive end-expiratory pressure (PEEP) is a method of ventilation in which airway pressure is maintained above atmospheric pressure at the end of exhalation by means of a mechanical impedance (PEEP valve). PEEP has some similarity to CPAP/BiPAP although it is delivered through bag instead of a facemask. It can be delivered via bag-valve-mask or bagging into an endotracheal tube. At the end of exhalation PEEP prevents alveolar collapse (i.e., the alveoli stay open) and improves oxygen exchange across the alveolar membrane. Additionally, PEEP may recruit more alveoli that have collapsed, which may further improve oxygenation. **ADDING PEEP IS DONE TO IMPROVE OXYGENATION.** The disadvantage to PEEP is that it may increase intrathoracic pressure, which may reduce blood flow in cardiac arrest or a shock state.

INDICATIONS:
Hypoxia, either prior to or post intubation despite appropriate bag ventilation with 100% oxygen.

CONTRAINDICATIONS:
A. Cardiac arrest (absolute).
B. Hypotension or shock state (relative). May still choose to apply PEEP when preparing to RSI a hypoxic/hypotensive patient.

PROCEDURE:
A. If not already applied, apply PEEP valve to bag device.
B. Dial PEEP valve to 5 cm H_2O and bag per usual.
C. Increase PEEP by 5 cm H_2O every 3 - 5 minutes until hypoxia resolves (oxygen saturation > 95%).
D. Maximum PEEP is 15 cm H_2O.

NOTES AND PRECAUTIONS:
A. Increasing bagging rate will not necessarily improve oxygenation but can cause hyperventilation, which can be detrimental to patients.
B. PEEP valve may come out of the package set to five or zero. Be aware of valve settings.
C. **Maximum PEEP in pediatrics is 5 cm H_2O.**

Sports Equipment Removal – 30.160

DEFINITION:
To provide direction on the safe removal of protective sports equipment that includes helmet and shoulder pads. This procedure page uses football gear as an example, but these guidelines can be used with other sports equipment as well.

PROCEDURE:

A. **Initial Evaluation**
   1. The initial evaluation should begin by assessing level of consciousness, breathing, and circulation. If the athlete is breathing and stable, but a neck injury is suspected, a quick sensory and motor nerve exam should be initiated.
   2. After the quick neurological exam on a stable athlete, the facemask should always be removed.

B. **Face Mask Removal**
   1. Stabilize the head.
   2. Release side attachments first by quick release or screwdriver. Second unscrew top loops to remove facemask. Cutting should be the last resort if quick release or screwdriver does not work.
   3. Quick release face masks are also in use and found on newer helmets. One popular device looks like a “rivet” instead of a screw (pictured below). The release mechanism can be activated by pressing it down with a pen or tip of a screwdriver.
   4. Athletic trainers and coaching staff are familiar with this and can provide assistance.

C. **General equipment removal guidelines:**
   1. Equipment should be removed on the field if an athletic trainer and/or 3+ individuals trained in technique are present. If no athletic trainer is present, and individuals are not comfortable with removal, leave gear intact, but attempt to remove facemask should be performed for airway access.
   2. Equipment removal should be performed by at least three trained and experienced rescuers.
   3. **If removing equipment, always remove the helmet and the shoulder pads, never just one or the other.** Leaving the helmet on or just the shoulder pads on by itself creates head, neck, or spinal cord flexion.

D. **Removal of helmet and shoulder pads as a unit:**
   1. Gear removal starts from the head and proceeds down the body.
   2. Remove the helmet first and then remove the shoulder pads, and leg gear. **Do not start with the shoulder pads.**
   3. Cut chin straps.
   4. Remove ear pad or deflate pad bladder.
   5. Use a **two-person technique** to remove the helmet.
      a. Person at the top firmly holds manual c-spine at the top using two hands to stabilize the patient's helmet.
      b. The other responder, starting at the chin, slides his or her hands inside the patient's helmet "firmly" gripping the head and sliding their hands inside the helmet.
      c. Responders transition manual c-spine responsibility from the person at the top of the head/ helmet to the person supporting the patients head from underneath.
      d. Firm control of the head and neck is the goal. The person at the top proceeds to remove the helmet off the patient's head in a coordinated and smooth manner. **DO NOT SPREAD APART SIDES OF HELMET.**
      e. Once helmet is removed, the person at the top of the head resumes manual c-spine until full c-spine precautions are in place.
   6. Cut shoulder pad straps.
   7. Cut both the jersey and shirt up sleeves towards midline of body.
   8. Person at head stabilizes maxilla and occiput and gives commands.
   9. Position three people on each side, with one stabilizing the head. Another person removes the equipment as a unit.

<u>While backboard and straps are being prepared</u>:

E. **Chest access:**
   1. Cut jersey and front laces of shoulder pads.
   2. Flip out shoulder pads. Some newer systems allow the shoulder pads to come apart prior to removal. Athletic trainers and coaching staff are familiar with these systems and can provide assistance.
   3. Place hands on shoulders with thumbs grasping the clavicle and fingers surrounding the upper trapezius muscles.
   4. Secure the athlete's head between the responder's forearms.

F. **Backboard utilization:**

1. If an athletic trainer is present an 8-person lift and slide technique is preferred as it causes the least amount of cervical movement. If no athletic trainer is present and the athlete is too big for lift and slide, a log roll technique will be performed.
2. The person at head initiates commands and oversees proper placement and techniques.
3. Position three responders on each side of body; one at shoulders, one at hips, and one at legs.
4. One other person is in charge of the backboard and slides it into place.
5. If the helmet is not resting on board, padding can be added to fill space.
6. Fasten straps and tape helmet to board.
7. Chinstrap remains in place unless it interferes with airway.
8. Recheck sensory and motor nerve vitals for changes and document.
9. If C-Spine injury is suspected with neurological deficits, spine board should be utilized in route to the hospital.
10. If athlete is sitting or standing, a c-collar can be utilized, and athlete can be carefully placed on the gurney.

NOTES & PRECAUTIONS:

Athletic Trainers and coaching staff are subject matter experts when it comes to the gear regardless of the sport. Collaborate with them early and often.

Suctioning – 30.161

INDICATIONS:
When patient is exhibiting respiratory difficulty secondary to secretions in airway or the potential for aspiration exists.

PROCEDURE:

A. Oral Suctioning

1. Pre-oxygenate patient with 100% oxygen.
2. Assemble equipment: Suction unit with tonsil tip or dental tip, personal protective equipment (gloves, goggles, gown).
3. Attach required monitoring equipment.
4. Turn suction unit on and confirm mechanical suction is present.
5. Insert tip without suction.
6. Cover thumbhole to begin suction if using a tip other than dental tip.
7. Apply suction for < 15 seconds.
8. Monitor patient's oxygen saturation.
9. Re-oxygenate patient for at least 2 - 3 minutes between suctioning attempts.

B. Tracheal Suctioning

1. Pre-oxygenate patient with 100% oxygen.
2. Assemble equipment: Suction unit, correct size suction catheter, sterile rinse, personal protective equipment (gloves, goggles, gown).
3. Attach required monitoring equipment.
4. If patient is being ventilated with BVM through an endotracheal tube prior to suctioning, have someone else remove the bag from end of ET tube prior to suction attempt.
5. Insert catheter into the ET tube without applying suction.
6. Advance catheter as far as possible.
7. Withdraw slowly using **intermittent** suctioning while rotating catheter.
8. Do not suction more than 15 seconds.
9. Monitor patient's oxygen saturation.
10. Rinse catheter in sterile saline.
11. Re-oxygenate patient for at least 2 - 3 minutes between suction attempts.

C. Suctioning with Meconium Aspirator

Tracheal suctioning is generally not indicated in the vigorous infant born with meconium-stained fluid, whatever the consistency. You can use a bulb syringe or large bore catheter to clear secretions from the mouth and nose as needed. If the newborn is having respiratory distress, then meconium aspiration should be performed as follows.

1. Assemble equipment: Suction unit, appropriate size ET tube, personal protective equipment (gloves, goggles, gown).
2. Attach required monitoring equipment.
3. Turn suction unit on and confirm mechanical suction is present.
4. After infant has been intubated, attach meconium aspirator to end of ET tube.
5. Cover thumbhole to begin suctioning while slowly withdrawing the ET tube. Do not suction for more than 15 seconds.

6. Monitor patient's oxygen saturation and heart rate and stop if patient becomes bradycardic.
7. Re-oxygenate patient for at least 2 - 3 minutes between suctioning attempts.
8. If patient has not been intubated and meconium is thick, at the least, aggressive oropharyngeal suctioning should be carried out with the largest diameter suction device available.

D. Suctioning with Nasal Aspirator Device

1. Assemble equipment: Bulb syringe, suction unit with nasal aspirator, personal protective equipment.
2. If nasal secretions are thick consider instilling 1 - 4 drops of NS into nares to loosen prior to suctioning.
3. If using electric suction be sure vacuum is set less than 100 mmHg.
4. Gently place device tip into nostril. Avoid placing against inside walls of nostril.
5. Apply suction (< 15 seconds if using electric suction).
6. Repeat as needed.

NOTES & PRECAUTIONS:

A. Oral and tracheal suctioning can cause trauma to the oropharynx and airway, bradycardia, or hypoxia. It should not delay other resuscitation.

B. Suction pressure should be set as low as possible and yet effectively clear secretions. Negative pressure of less than 80 - 100 mmHg in neonates and less than 150 mmHg in adults are recommended.

C. When suctioning the intubated patient, the diameter of the suction catheter should not exceed one half of the internal diameter of the endotracheal tube.

TASER® Barb Removal – 30.162

INDICATIONS:

TASER® barbs should be removed at the request of law enforcement if:

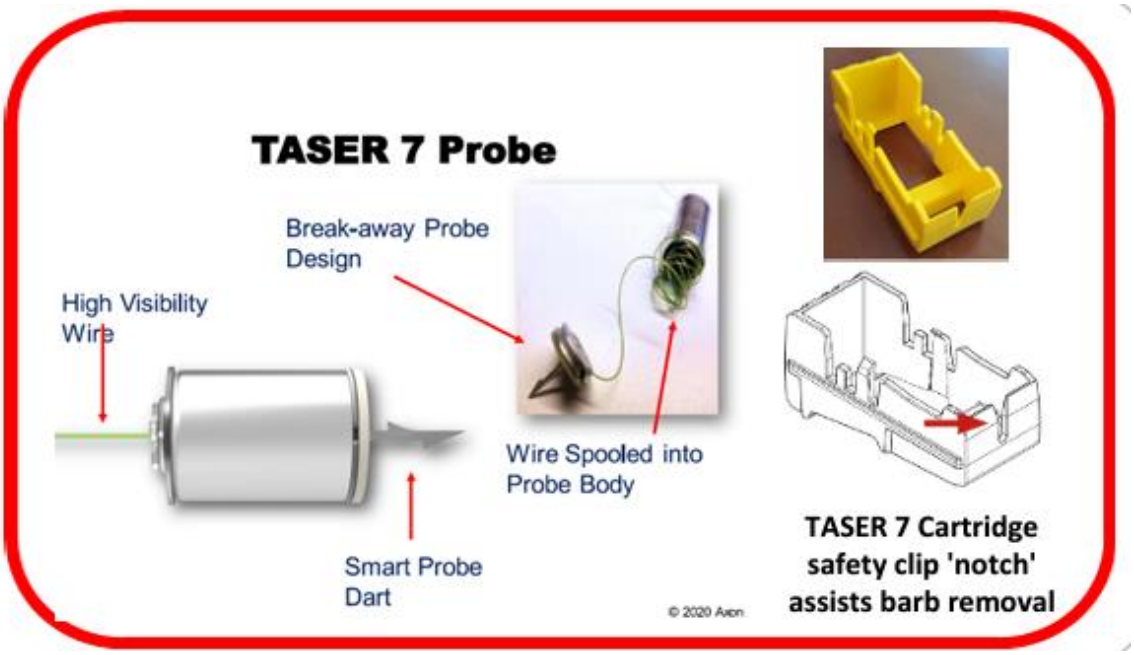
A. The patient has been adequately subdued so as not to pose a danger to Fire/EMS personnel. AND,
B. The barbs are not embedded in the face, neck, or groin areas.

PROCEDURE:

A. Perform patient assessment.
B. Monitor vital signs and LOC. Ensure that vital signs are in the normal limits for the situation.
C. Expose the area where TASER® barb has implanted under the skin.
D. Cut wires from the barb if still attached.
E. Place thumb and forefinger above and below the barb parallel to the portion of the shaft implanted in the patient's skin.
F. Spread your thumb and forefinger apart to stretch the skin tightly over the barb.
G. Holding tension, use needle-nose pliers (or similar tool) with gripping strength and grasp the end of the barb protruding out of the skin near the wire lead and firmly pull out the barb with one quick jerking motion.
H. If probe removal tool is available (see TASER® 7 picture below)
    1. Place one hand on the patient in the area where the probe is embedded and stabilize the skin surrounding the puncture site.
    2. Slide the safety clip notch between the probe and the subject, catching the probe between the dart body and the dart point.
    3. In one uninterrupted motion, pull the safety clip, and probe with it, straight out of the puncture site maintaining a 90-degree angle to the skin (avoid twisting or bending the probe).
I. Assess the skin where the barb was removed. The skin should be cauterized from the electrical current. Dress the wound to prevent infection.
J. Contact OLMC if unsure whether to transport.

NOTES & PRECAUTIONS:

A. Patients should be in police custody and monitored by police for the safety of medical personnel.
B. Do not remove TASER® Barbs from the face, neck, or groin area. Stabilize the barbs and transport to the Emergency Department.
C. TASERS® emit two barbs. Make sure both are removed. Treat all barbs as a biohazard and dispose as you would any other sharps. Some law enforcement agencies may direct you to place the probe back into the cartridge as evidence.
D. Potential trauma may have occurred before (during a struggle) or after the patient was hit by the TASER® (e.g., patient falls and hits head).
E. Consider whether the patient meets criteria for Altered Mental Status or Poisonings and Overdoses protocols.
F. CAUTION: Where barbs have wires still connected to the TASER® Gun, shock can still be delivered.


TASER 7 Probe
Break-away Probe Design
High Visibility Wire
Wire Spooled into Probe Body
Smart Probe Dart
© 2020 Axon
TASER 7 Cartridge safety clip 'notch' assists barb removal

Tension Pneumothorax Decompression – 30.170

DEFINITION:
The emergency decompression of a tension pneumothorax using an over-the-needle catheter.

INDICATIONS:
To warrant chest decompression in the field, the patient must be <u>significantly symptomatic or in extremis (at risk of death)</u> with:

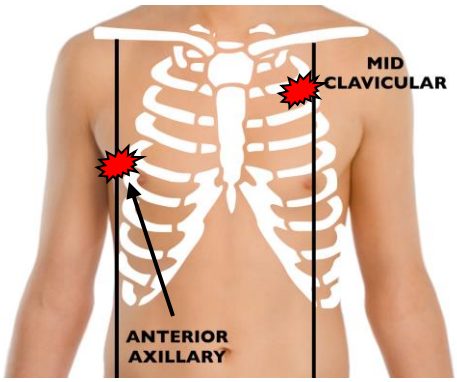
A. High clinical suspicion **and**,
B. Progressive respiratory distress **and**,
C. Shock symptoms with low or rapidly decreasing blood pressure.

<u>and</u> at least one of the following:

A. Decreased or absent breath sounds.
B. Consistent history (e.g., chest trauma, COPD, asthma).
C. Distended neck veins.
D. Tracheal shift away from affected side (late sign).
E. Asymmetrical movement on inspiration.
F. Hyper-expanded chest on affected side.
G. Drum-like percussion on affected side.
H. Increased resistance to positive pressure ventilation, especially if intubated.

EMS witnessed traumatic arrest patients with abdominal or chest trauma for whom resuscitation is indicated should have bilateral chest decompression performed even in the absence of the above signs.

PROCEDURE:
A. Expose the entire chest.
B. Establish landmarks:
    1. Anterior – 2nd intercostal mid clavicular **<u>or if unavailable.</u>**
    2. Lateral – 4th intercostal space <u>anterior</u> axillary (<u>above nipple</u>).
C. Clean chest vigorously with appropriate antiseptic.
D. On affected side, locate the landmark and insert a large gauge over-the-needle catheter with syringe attached along **<u>the superior margin</u>** of the rib below (e.g., top of third rib to enter second intercostal space).
E. If the air is under tension, the barrel will pull easily and "pop" out of the syringe.
F. Remove syringe, advance catheter, and remove needle.
G. Secure from movement.



Tension Pneumothorax Decompression – 30.170

NOTES & PRECAUTIONS:

A. Patient's chest should be auscultated often for return of tension or other respiratory complications.
B. Tension pneumothorax is a rare condition, but can occur with trauma, spontaneously, or as a complication of intubation. Tension takes time to develop, but forceful positive ventilation may increase the rate of development.
C. Simple or non-tension pneumothorax is not life threatening and should not be decompressed in the field.
D. The ideal decompression catheter length is three inches.
E. Possible complications:
    1. Creation of pneumothorax if none existed previously.
    2. Laceration of lung or pericardium. Stop needle advancement once it has popped through the pleura and advance the catheter only.
    3. Laceration of blood vessels. (Always slide the needle above the rib).
    4. Infection. Clean rapidly but vigorously; use sterile gloves if possible.
F. Tension pneumothorax can be precipitated by the occlusion of an open chest wound. If the patient deteriorates after dressing an open chest wound, remove the dressing.

Tourniquet Placement – 30.175

DEFINITION:
Placement of a circumferential band around a limb to occlude arterial blood flow distal to the band.

INDICATIONS:
Extremity hemorrhage that is uncontrollable by less aggressive means (direct pressure, bandaging, or pressure dressing) OR a wound that could cause life threatening extremity hemorrhage during an ongoing tactical problem (e.g., potential building collapse, mass casualty event, amputation).

PROCEDURE:

A. Fully expose and evaluate the wound.
B. Apply tourniquet directly to the skin, 2 - 3 inches proximal to the most proximal limb wound, not over a joint.
C. Tighten until all bleeding stops and no distal pulse is palpable.
D. Secure the windlass per manufacturer instructions.
E. If one properly placed tourniquet does not control bleeding, a second should be placed proximal to the first and tightened appropriately.
F. Endeavor to keep all tourniquets exposed.
G. Mark with time of application and communicate this to receiving providers.
H. Re-evaluate tourniquets frequently to ensure they have not loosened.

NOTES & PRECAUTIONS:

A. If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove the improvised tourniquet if operationally feasible**.**
B. Properly applied tourniquets will rarely damage tissue if removed within two hours.
C. If unable to fully expose a limb and identify all wounds on that limb place the tourniquet as high on the limb as possible. Once all wounds on that limb can be identified, every effort should be made to move the tourniquet to 2 - 3 inches proximal to the most proximal wounds, and not on a joint.
D. Intermittently loosening and tightening a tourniquet to “reperfuse” a limb is of no benefit and dangerous as it encourages additional bleeding.
E. A single commercially available tourniquet completely occludes femoral artery blood flow about 70% of the time. Two tourniquets placed side by side completely occlude about 80% of the time.
F. The ability of the tourniquet to completely occlude arterial flow is dependent on limb circumference. Larger limbs are more difficult to occlude.
G. A persistent pulse, continued venous congestion / distention, re-bleeding after initial hemorrhage control, and expanding hematoma are all indications of an ineffective tourniquet.
H. Clothing, padding under the tourniquet, and limb movement all cause tourniquets to loosen over time and should be avoided.
I. Tourniquets can cause significant pain and may require narcotics for pain control.
J. Proper placement of a CAT® tourniquet on a lower extremity requires threading the circumferential band through both slits of the buckle.
K. Proper placement of the SOFTT tourniquet requires tightening the knurled screw on the buckle before tightening the windlass.

Transcutaneous Pacing – 30.180

DEFINITION:
Transcutaneous pacing is the technique of electronic cardiac pacing accomplished by using skin electrodes to pass repetitive electrical impulses through the thorax.

INDICATIONS:
Transcutaneous pacing should be considered in bradycardia with evidence of inadequate perfusion, (e.g. altered mental status, chest pain, hypotension, other signs of shock).

PROCEDURE:
A. Ensure ECG pads are attached, and monitor displays a rhythm.
B. Attach pacing electrodes to anterior and posterior chest just to the left of the sternum and spinal column, respectively. Alternatively, pads may be placed in the standard anterior and lateral position as with defibrillation. If there is difficulty in obtaining capture, try alternative position.
C. Begin pacing at a heart rate of 80 beats per minute and 30 mA current output.
D. Increase current by increments of 10mAs while observing monitor for evidence of electrical capture. Confirm mechanical capture by checking pulses and BP.
E. If patient is comfortable at this point, continue pacing. If patient is experiencing discomfort, consider analgesia per pain management protocol and/or sedation with a benzodiazepine per appropriate medication protocol if blood pressure allows.
F. If the patient remains unconscious during pacing, assess capture by observing the monitor and evaluating pulse and blood pressure changes. In the event of electrical capture and no pulses, follow PEA protocol.
G. If there is no response to pacing and drugs, consult with OLMC. If a change in pacing rate is desired, contact OLMC.

PEDIATRIC PATIENTS:
Use above guidelines except:
A. Use anterior/posterior pad placement first for patients less than 1 year.
B. Begin pacing at smallest mA output.
C. Increase current in increments of 10 mA while observing monitor for evidence of electrical capture.
D. Confirm mechanical capture by checking pulses and BP.
E. Contact OLMC for adjustments to rate based on age and response to pacing.

NOTES & PRECAUTIONS:
Transcutaneous pacing should not be used in the following settings:
A. Asystole.
B. Patients meeting Death In The Field criteria.
C. Patients in traumatic cardiac arrest.