Procedures

Airway Management / General - 30.010

PURPOSE:
Proper airway management is the first priority of the EMS Provider/Paramedic.

INDICATIONS:
A. Airway control and protection.
B. Inadequate ventilation and/or oxygenation.

Oxygenation, Maintenance of Airway and Ventilation:

A. Supplemental oxygen:
    1. A Nasal cannula is useful for small amounts of supplemental oxygen.
    2. Partial Rebreather masks (PRB) are recommended when higher flow and concentrations of oxygen need to be delivered.
    3. “Blow-by” oxygen should be used for infants and toddlers.

B. Nasopharyngeal Airways (NPA) or Oropharyngeal Airways (OPA) should be used for patients who are unable to maintain their own airway.

C. A Bag-Valve-Mask (BVM) should be used when inadequate ventilation is present.

D. CPAP should be considered for MEDICAL patients complaining of moderate to severe respiratory distress meeting ALL the criteria described in the Continuous Positive Airway Pressure (CPAP) procedure.

E. Continuous End-tidal CO_2 shall be utilized on all intubated patients.

F. PEEP valve should be considered when ventilating a patient with COPD or emphysema to maintain alveolar inflation during exhalation.

NOTES & PRECAUTIONS:
In trauma patients, airway maintenance with cervical spine control is the primary concern. If unable to establish or maintain an airway, transport the patient to the closest hospital. This includes patients entered into the Trauma System.

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, i.e., 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 abuse conditions and diagnoses.

Inclusion Criteria:

A. Voluntary patient or patient on police or mental health director hold.
B. 911 call or police request.
C. Age between 18-70 years.
D. Mental health complaint (depression, psychosis, suicide or homicidal ideation), substance abuse 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 (ambulate, bathe, toileting, eat, and drink) independently.
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 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 chemical restraint (olanzapine ODT or IM haloperidol or droperidol alone **IS NOT** an exclusion).
E. Signs/symptoms of acute drug/alcohol withdrawal (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 BPAP 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.

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 Restraint Procedure, 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 abuse)
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.

Combitube® Placement – 30.030

DEFINITION:
The Combitube® is a two-tube system similar to the PTL, EOA or EGTA airways. However, the Combitube® has combined the lumens of an endotracheal and esophageal tubes. The device is inserted blindly, entering the esophagus (approx. 90% of the time) or the trachea (approx. 10% of the time). Depending on which structure it enters it will function as an esophageal or endotracheal ventilation device. The Combitube® may be used by Paramedics and EMT-Intermediates who have received the appropriate training.

INDICATIONS:
A. Immediate intubation is not available or cannot be performed.
B. Access to the patient's head is inhibited due to entrapment.
C. Direct visualization of the larynx is inhibited.

CONTRAINDICATIONS:
A. Patient less than 16 years of age.
B. Patient under five (5) feet tall.
C. Patient who has an intact gag reflex.
D. Patient with known esophageal disease (i.e. varices, cancer).
E. Patient who has ingested a caustic substance.

PROCEDURE:
A. Pre-oxygenate.
B. Place head in neutral position.
C. Insert device using a jaw-lift maneuver to the depth indicated by the marking on the tube. The black rings on the tube should be positioned between the patient's teeth (or gums if patient has no teeth).
D. Inflate the pharyngeal (large) cuff with 100cc of air.
E. Inflate the distal (small) cuff with 15cc of air.
F. Ventilate through longer blue connector (number 1) tube.
G. Listen for sounds in both lungs and stomach.
    a. If you hear breath sounds instead of gastric sounds, continue ventilation through tube number 1.
    b. If you hear gastric sounds and no lung sounds, begin ventilation through shorter (number 2) clear tube.
H. Confirm lung sounds with 5-point auscultation.
I. Ventilate with 100% oxygen.
J. Secure using ETT securing device.
K. Apply $EtCO_2$ detection device.

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 oximetery 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.

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 intubate or ventilate using BVM) and respiratory obstruction 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, angioneurotic edema, 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 available 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. Insert the tracheal hook or dilator through the cricoid membrane. If using the hook secure the superior edge of the cricothyroid cartilage and apply caudal displacement.
G. Insert a 6.5 or smaller tube (rotate at 90° if necessary).
H. Remove tracheal hook.
I. Inflate the cuff.
J. Secure device.
K. Attach end-tidal CO_2 adapter and BVM.
L. Consider sedation if necessary.

PerTrach

A. Locate the cricothyroid membrane.
B. Palpate the cricothyroid membrane with gloved hand.
C. Pinch the skin, and make a 1-2 cm vertical incision, cutting away from the patient.
D. Firmly grasp the trachea and insert the needle.
E. Aspirate for air with a syringe.
F. Remove syringe, and thread dilator through needle.
G. Squeeze wings of needle and open out to split needle. Carefully remove needle.
H. Insert dilator into airway, place tube in functional position, (faceplate against skin.)
I. Remove dilator.
J. Inflate cuff with 1-8 ccs of air.
K. Secure the device to the neck and ventilate.
L. Consider sedation with midazolam as with RSI if not already given.

Emergency Cricothyrotomy – 30.035

QuickTrach

A. Place the patient in a supine position. Assure stable positioning of the neck region and hyperextend the neck.
B. Locate the cricothyroid membrane (in the midline between the thyroid cartilage and the cricoid cartilage).
C. Pinch the skin and make a vertical incision in a downward motion with a scalpel over the cricothyroid membrane large enough to introduce the device.
D. Secure the larynx laterally between the thumb and middle finger and reconfirm the location of the cricoid membrane.
E. Firmly hold the device and puncture the cricothyroid membrane at a 90-degree angle.
F. After puncturing the cricothyroid membrane, check entry of the needle into the trachea by aspirating air through the syringe. If air is aspirated the needle is in the trachea.
G. Change the angle of the needle to 60 degrees and advance the device forward into the trachea to the level of the stopper.
H. Remove the stopper being careful not to advance the device further into the trachea with the needle still attached.
I. Hold the needle and syringe firmly and slide only the plastic cannula along the needle into the trachea until the flange rests on the neck. Carefully remove the needle and syringe.
J. Secure the device to the neck.
K. Apply the connecting tube to the device and ventilate.
L. Consider sedation with midazolam as with RSI if not already given.

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 with midazolam as with RSI if not already given.

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 and 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 $EtCO_2$ and a careful five-point check. Keep patient on continual $EtCO_2$ monitoring.
F. Secure the tube utilizing ETT securing device. Record ET Tube depth at the teeth or gum line.
G. Avoid interruptions to CPR when securing a patient's airway. Once secured, ventilate at 8 – 10 breaths per minute.
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 **and** 50 mcg of fentanyl. May repeat as needed every 5 – 10 minutes.
J. Consider orogastric tube placement.

Perfusing Patients:

A. Assemble and check equipment:
    1. Two O_2 tanks w/regulators
    2. Nasal cannula
    3. Mask and BVM
    4. $EtCO_2$
    5. Intubation equipment (VL, DL)
    6. Suction
    7. Backup devices ready: Bougie, supraglottic airway, surgical airway (cric kit)
B. Attach pulse oximeter, cardiac monitor, BP cuff, and wave form $EtCO_2$ monitor.
C. Establish 2 IVs or IOs, if not already done.
D. Verbalize missed airway plan to the entire team and verify/mark surgical airway landmarks.

Endotracheal Intubation – 30.040

E. Physiologically optimize patient prior to intubation with a MAP > 65 mmHg (systolic BP > 100 mmHg), SpO_2 ≥94% for at least 3 minutes, and aggressive treatment of underlying conditions.

F. Treat hypotension with fluids as well as Push Dose epinephrine 10 mcg every 1-5 minutes, with goal for a MAP > 65 mmHg (SBP ≥ 100 mmHg).

G. Place nasal cannula and administer oxygen at 15 lpm. Continue apneic oxygenation during procedure.

Difficulty achieving SpO_2 ≥ 94% for at least 3 minutes due to physiological conditions or preferred induction option based on paramedic discretion or medical director preference.

← **Yes**

Delayed Sequence Intubation procedure

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

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

Preoxygenation:
-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%

Denitrogenation
Upon reaching SpO2 ≥ 94%, **begin 3-minute countdown** to allow for complete denitrogenation.
See letter H below

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

No →

Rapid Sequence Intubation procedure

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

Preoxygenation:
-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

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

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

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

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

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

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

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

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

N. If bradycardia occurs, first ensure adequate 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.)

O. Verify placement of ET tube using wave form $EtCO_2$ and five-point check.

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

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

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

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

T. 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

U. After successful airway placement, administer:
   1. 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)
   2. 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).

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

W. Consider orogastric tube placement.

NOTES & PRECAUTIONS:

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

A. An attempt is defined as the insertion of the laryngoscope blade or rescue airway past the teeth.

B. 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 if there is any doubt about tube placement.

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

E. With high quality CPR and mechanical CPR devices, a growing number of patients have been reported to experience “CPR Induced Consciousness”. Assess for signs of consciousness by checking for spontaneous eye opening, purposeful movement, or verbal response to include moaning.
F. Succinylcholine, rocuronium and vecuronium do not affect the level of consciousness and should be used with etomidate/ketamine/midazolam.
G. 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 (patients who have missed dialysis).
H. Avoid vecuronium and rocuronium in patients suspected of having underlying status epilepticus (seizures).
I. Start with 1 mg/kg of ketamine for induction. If disassociation is not achieved, administer a second 1 mg/kg dose of ketamine.
J. 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.
K. Ketamine can cause laryngospasm and may cause an emergence reaction with vivid dreams.
L. Pre-oxygenation 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).
M. 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, $EtCO_2$ device used/reading, any other devices/ techniques used, reconfirmation of placement after each patient movement.

End-Tidal CO_2 Monitoring – 30.070

INDICATIONS:
For use to measure effectiveness of ventilation by measuring the amount of carbon dioxide in exhaled air.

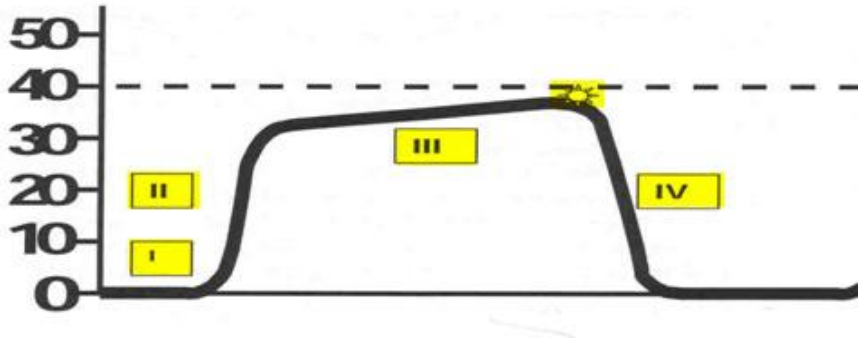
PROCEDURE:
A. Manage airway according to appropriate Airway Management Procedure.
B. Apply $EtCO_2$ monitor, if available. Maintain $EtCO_2$ output between 35-40 mmHg.

The following approximates the degree of ventilation:

> 40 mmHg	***=***	***Hypoventilation***
35 – 40 mmHg	***=***	***Normal ventilation***
30 – 35 mmHg	***=***	***Hyperventilation***
< 30 mmHg	***=***	***Aggressive hyperventilation. This should be avoided in all patients!***

C. If there are signs of traumatic brain injury (TBI) and herniation, then MILD hyperventilation to an $EtCO_2$ of 35 mmHg may be performed.

NOTES & PRECAUTIONS:
A. **Remember, pulse oximetry does not equate 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 CO_2 output from normal (35-40 mmHg) to 15-20 mmHg and an obvious change in 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.



- **PHASE I:** Respiratory baseline, CO_2 free dead space air, normally 0.
- **PHASE II:** Expiratory upstroke, rapid rise due to mixing of dead space air and alveolar air, should be steep.
- **PHASE III:** Expiratory plateau, exhalation of mostly alveolar air
- ☼**:** Peak $EtCO_2$ Level, end of exhaled air, peak end tidal CO_2 level, normally 35-45mmHg.
- **PHASE IV:** Inspiratory downstroke, inhalation of CO_2 free gas, quickly returns to the baseline.

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.

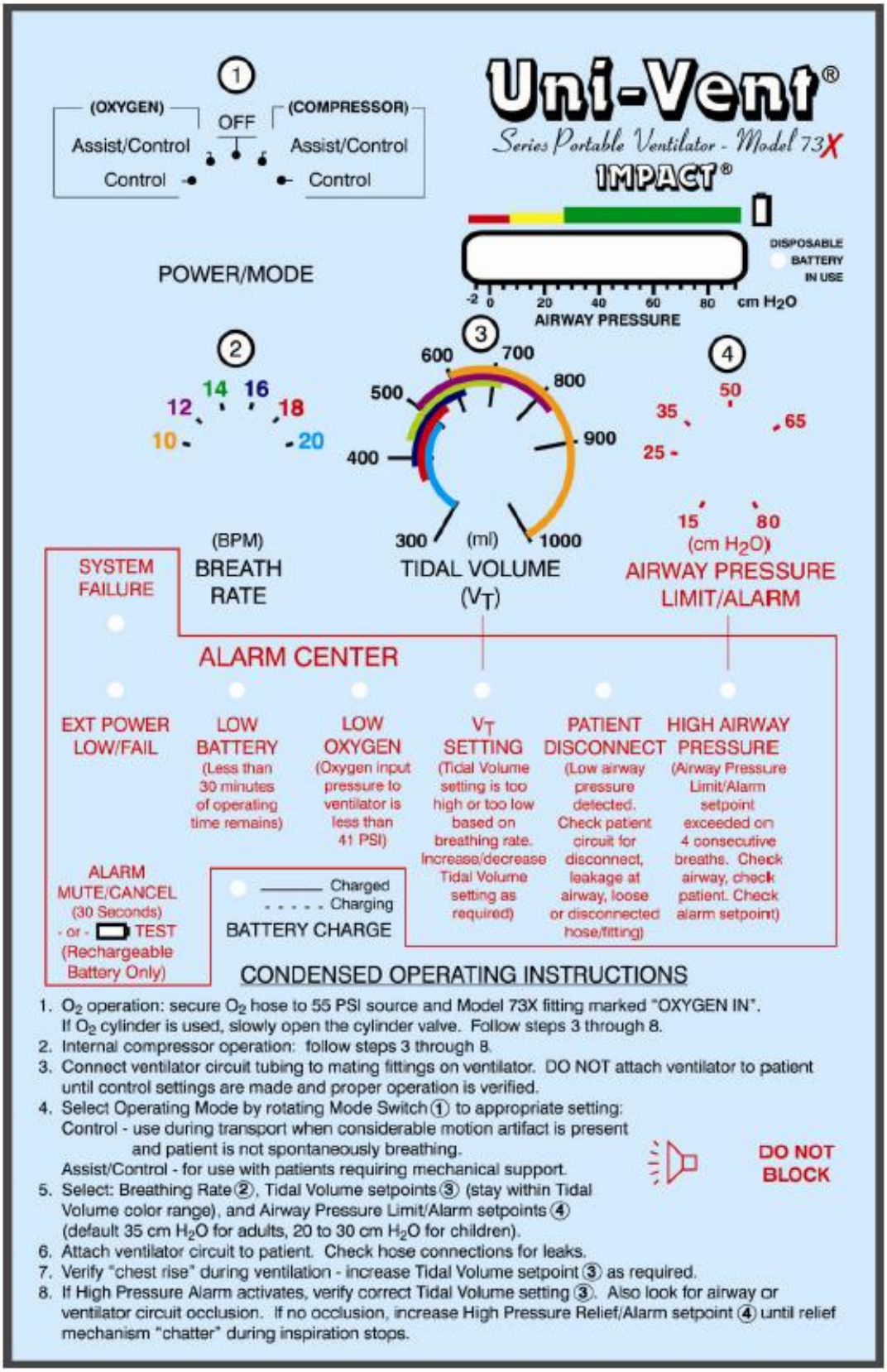
Impact Uni-vent® 73x Ventilator – 30.075

INDICATION:
Need for prolonged ventilation.

PROCEDURE:
A. O_2 operation:
    1. Secure O_2 hose to 55 PSI source and model 73x fitting marked "Oxygen In".
    2. If O_2 cylinder is used, slowly open the cylinder valve. Follow steps 3-8.
B. Internal compressor operation: follow steps 3-8.
C. Connect the 3 ventilator circuit tubing (Gas Output, Transducer, and Exhalation Valve) to mating fittings on ventilator. Do not attach ventilator to patient until control settings are made and proper operation is verified.
D. Select Operating Mode by rotating Power/Mode Switch (1) to appropriate setting:
    1. Control - used during transport when considerable motion artifact is present and patient is not spontaneously breathing.
    2. Assist/Control - for use with patients requiring mechanical support.
E. Select :
    1. Breath Rate (2) between 8-12 breaths per minute.
    2. Tidal Volume (VT) set points (3) between 6-10 ml/kg ideal body weight , (stay within the Tidal Volume color range), and
    3. Airway Pressure Limit / Alarm (4) set points (Default 35 cm H20 for adults, 20-30 cm H2O for children).
F. Attach ventilator circuit to patient.
G. Check hose connection for leaks.
H. Verify chest rise during ventilation. Increase Tidal Volume (VT) set point as required.
I. If High Pressure Alarm activates, verify correct Tidal Volume setting (3). Also look for airway or ventilator circuit occlusion. If no occlusion, increase High Pressure Relief Alarm (4) Set point until relief mechanism "chatter during inspiration stops.
J. Adjust settings to maintain PaO_2 > 90%, $ETCO_2$ between 35-40 mm Hg.

NOTES & PRECAUTIONS:
A. Contraindications include Active CPR, suspected pneumothorax, inability to maintain adequate oxygenation (PaO_2 > 90%), pediatric patient under 30 kg (66 lbs).
B. Initial settings should be 100% oxygen, ventilatory rate between 8-12 breaths per minute, and tidal volume 6-10 mL/kg ideal body weight. Attempt to decrease tidal volume to 6 mL/kg to minimize barotrauma.
C. If patient becomes unstable or saturations < 80% disconnect from ventilator and bag patient with 100% FiO_2.

Impact Uni-vent® 73x Ventilator – 30.075



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 $\geq$ 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 $\geq$ 100 mmHg. Repeat as necessary to maintain sedation.

Intranasal Medication Administration – 30.078

DEFINITION:
In the absence of an established IV, intranasal is a rapid route offering high level of bioavailability of the medication being administered. The intranasal route can reduce the risk of needle sticks while delivering effective medication levels. The rich vasculature of the nasal cavity provides a direct route into the bloodstream for medications that easily cross the mucous membranes.

INDICATIONS:

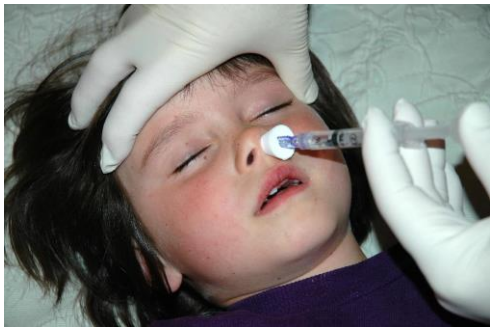
A. Patient without IV access requiring urgent medication administration (e.g., active seizure, respiratory arrest secondary to opiate overdose).
B. Alternate administration route for fentanyl administration for pain management.

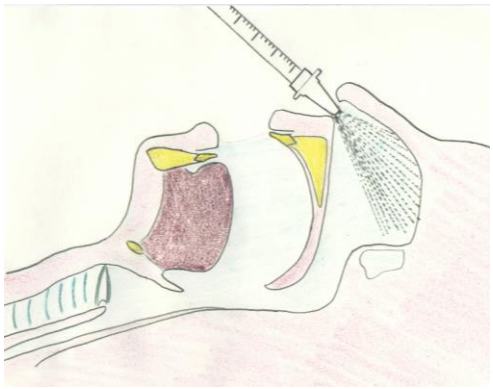
CONTRAINDICATIONS:

A. Epistaxis
B. Nasal Trauma
C. Nasal septal abnormalities
D. Nasal congestion or discharge

PROCEDURE:

A. Patient should be in a supine or recumbent position. If the patient is sitting, then compress the nares after administration.
B. Draw up medication into a syringe using appropriate transfer device.
C. Remove air from syringe.
D. Remove transfer device and place atomizer onto syringe and confirm it is secure.
E. Administer medication by briskly compressing the plunger to expel and atomize the medication administering a maximum of 1cc of solution per nare.
F. Evaluate medication effectiveness and continue with treatment protocol.





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.

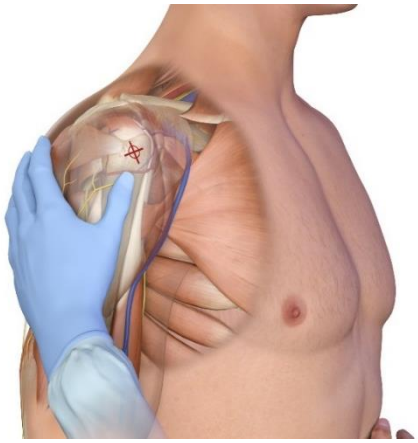
INDICATIONS:

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.

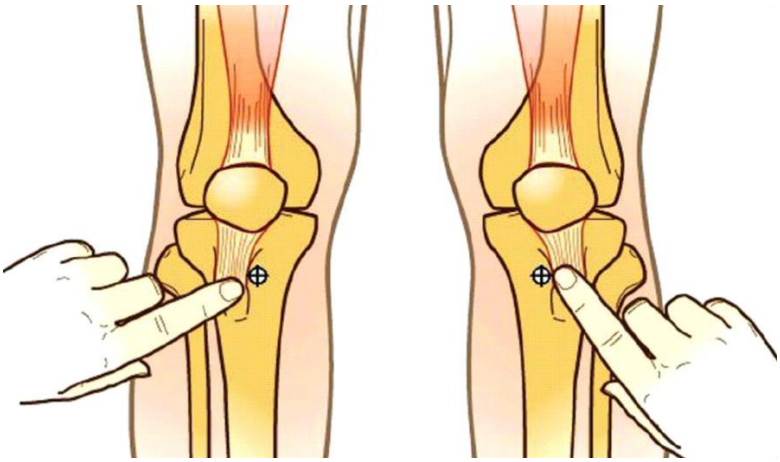
EZ-IO® PROCEDURE:

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 $\geq$ 3 kg.
    2. The 45 mm (Yellow) EZ-IO® needle can be used for adult insertions (larger individuals) 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).

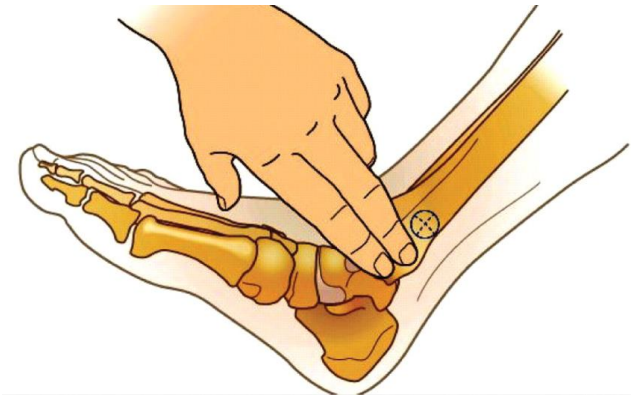
b. Insertion site is located directly on the most prominent aspect of the greater tubercle. Slide thumb up the anterior shaft of the humerus until you feel the greater tubercle, this is the surgical neck. Approximately 1 cm (depending on patient anatomy) above the surgical neck is the insertion site.



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.



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



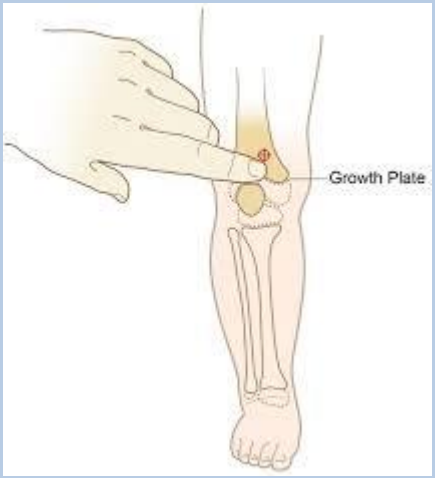
E. Needle insertion
   1. Prep the surface with povidone-iodine or chlorohexidine and wipe dry with a sterile gauze pad.
   2. Stabilize patient's extremity and begin insertion from a 90-degree angle to the insertion site. Push the needle set through the skin until the tip touches the bone.
   3. With 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 of 2 ml of 2% over 2 min). Wait approximately 30–60 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 F.1 above. Wait approximately 30–60 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 3kg (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 ≥ 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 and one finger width medial of the tibial tuberosity.
      c. If the tibial tuberosity cannot be identified on the child, then the insertion site may be two finger widths below the patella, then medial along the flat aspect of the tibia.
   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) from the upper patella edge. This location will avoid the growth plate of the distal femur.



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 30–60 seconds before flushing with normal saline.
2. If fluids do not flow freely, flush IO site with an additional 2-3 ml normal saline.

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 in order to maintain flow rates. The EMT 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 tibia.
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.

Intravenous Access & Infusion – 30.090

INDICATIONS:

A. Normal Saline or Lactated Ringers is indicated for replacement of fluid volume losses such as in trauma, burns, dehydration, or shock.
B. A saline lock may be substituted for an IV line in all situations, except where IV fluid is the therapy of choice for volume replacement. If an IV line is started, it should be a regular macro drip unless otherwise indicated.

PROCEDURE FOR IV ACCESS:

A. IV access:
   1. Select vein and appropriate gauge catheter for the vein according to the patient's condition.
   2. Prep the skin with an antiseptic solution. If using 2% chlorhexidine allow to dry before covering with dressing.
   3. Insert the needle with the bevel up.
   4. Advance the catheter into the vein. Never reinsert the needle through the catheter.
   5. Remove tourniquet.
   6. Connect IV line or saline lock. For trauma system and burn patients, connect extension set between the IV hub and the solution bag and tubing.
   7. Assure free flow of the fluid.
   8. Cover the site with a sterile dressing.
   9. Label the IV with date and time, catheter gauge, and name/ID of the person starting the IV.

B. IV access with a saline lock:
   1. Establish IV access as above.
   2. Connect pre-flushed extension set to IV hub.
   3. Flush with normal saline checking for extravasation.
   4. If the IV lock system is used for the administration of medication, the line must be flushed after each administration.

PROCEDURE FOR IV MEDICATION INFUSION:

A. Using a Buretrol®, Volutrol®, or Soluset® volume control type device:
   1. Establish IV access and prepare solution.
   2. Connect the volume control device between the IV bag and the IV catheter.
   3. Place one hour's solution into the chamber and close the connection between the volume control device and the IV bag.
   4. Begin infusing solution at the appropriate rate.
   5. If necessary, additional solution may be placed in the volume control device chamber.
   6. Do not place more than one hour’s worth of solution in the chamber.

B. Using an infusion pump:
   1. Establish IV access and prepare solution.
   2. Connect compatible IV tubing to infusion pump according to manufacturer's directions.
   3. Begin infusing solution at the appropriate rate.

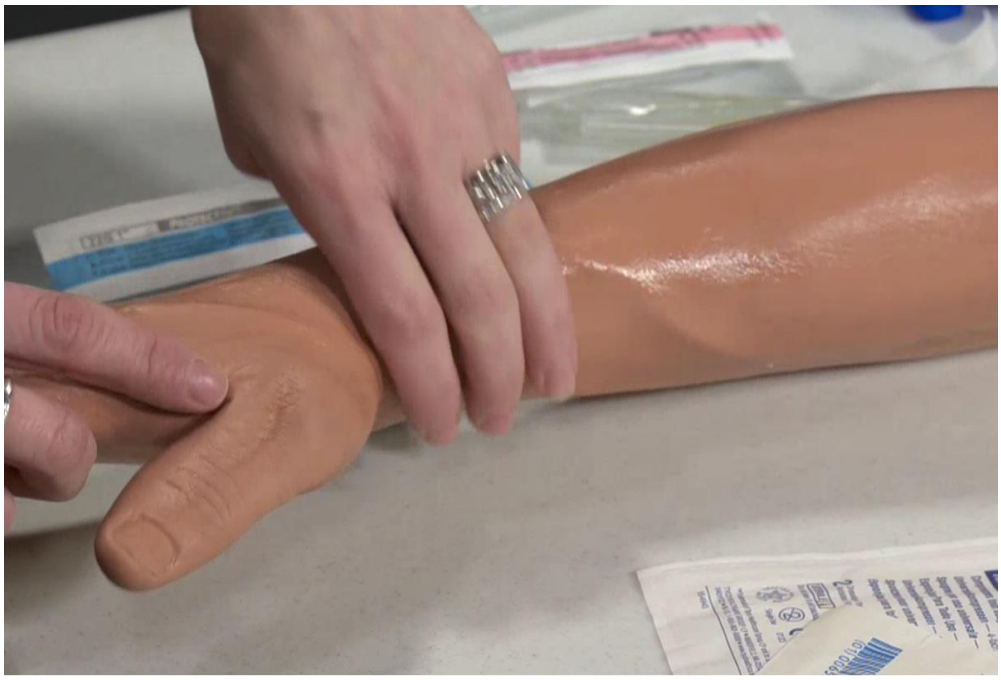
NOTES & PRECAUTIONS:

A. Normal Saline and Lactated Ringers should be used with caution in patients with renal impairment (hyperkalemia), cardiac and respiratory disorders (fluid overload), or extremes of age.
B. Avoid having the tourniquet on longer than two minutes as this can result in hemolysis and vasospasm in the extremity.
C. If possible, avoid wrist area as shown below secondary to possible radial nerve damage.
D. If patient has had a mastectomy or lymphectomy, avoid starting IV on that side as there is an increased risk of complications to the patient.

IV CATHETER FLOW RATES:

SIZE	ML/Min
18G x 1 1/4"	110
20G x 1"	65
20G x 1 1/4"	63
22G x 1"	38
24G x 5/8"	24

AVOID IV START IN THIS AREA:



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.

Trouble Shooting HeartMate II® with Pocket Controllers

When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see changing batteries section on next page)*
- If pump does not restart, change controllers. *(see changing controllers section on next page)*

Alarms: Emergency Procedures

Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.

Changing Batteries

WARNING: At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 1 and 2)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 3)
- Controller will start beeping, flash yellow signals and will read **power disconnect** on the front screen.
- Replace with new battery by lining up **RED** arrows on battery and clip. (Figure 4)
- Slide a new, fully-charged battery (Figure 2) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and yellow flashing will stop.
- Repeat previous steps with the second battery and battery clip.


Figure 1
Not Charged


Figure 2
Fully Charged


Figure 3


Figure 4

Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the **RED** arrows.

- On the back of the replacement controller, rotate down the perc lock so the red tab is fully visible. Repeat this step on the original controller until the red tab is fully visible.
- Disconnect the drive line from the original controller by pressing down on the red tab and gently pulling on the metal end. The pump will stop and an alarm will sound. **Note:** The alarm will continue until the original controller is put to sleep. You can silence the alarm by holding down the silence button. **Getting the replacement controller connected and pump restarted is the first priority.**
- Connect the replacement Controller by aligning the BLACK ARROWS on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the powersource to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

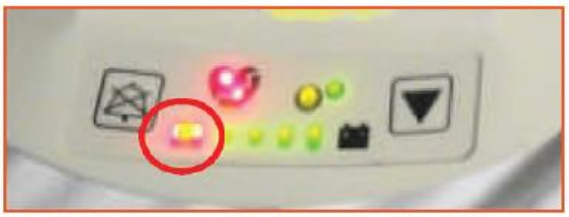
- After the pump restarts, rotate up the perc lock on the new controller so the red tab is fully covered. If unable to engage perc lock to a fully locked position, gently push the driveline into the controller to assure proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.
- Hold down battery symbol for 5 full seconds for complete shutdown of old controller.

Trouble Shooting HeartMate II®

When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see changing batteries section on next page)*
- If pump does not restart, change controllers. *(see changing controllers section on next page)*

Alarms: Emergency Procedures



Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.

Changing Batteries

WARNING: **At least one power lead must be connected to a power source AT ALL TIMES**. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 3 and 4)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 1)
- Controller will start beeping and flashing green signals.
- Replace with new battery by lining up RED arrows on battery and clip. (Figure 2)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the RED arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.

Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.

- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the RED arrows. **ALARMS WILL SOUND-THIS IS OK.**
- Depress the silence alarm button (upside-down bell with circle) until the alarm is silenced on the new, replacement Controller.
- Rotate the perc lock on the replacement controller in the direction of the "unlocked" icon until the perc lock clicks into the fully- unlocked position. Repeat this same step for the original Controller until the perc lock clicks into the unlocked position.

- Disconnect the perc lead/driveline from the original controller by pressing the metal release tab on the connector socket. The pump will stop and an alarm will sound.

Note: The alarm will continue until power is removed from the original Controller. ***Getting the replacement Controller connected and the pump restarted is the first priority.***

- Connect the replacement Controller by aligning the BLACK LINES on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the powersource to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

- After the pump restarts, rotate the perc lock on the new controller in the direction of the "locked" icon until the perc lock clicks into the fully-locked position. If unable to engage perc lock to the locked position, gently push the driveline into the controller to assure a proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.

HeartWare® Ventricular Assist System Emergency Operation

CONTROLLER

BATTERY

ALARM ADAPTER

- **Used to silence the internal NO POWER ALARM.**
- **Should only be used on a controller that is NOT connected to a patient's pump.**
- **Must be inserted into the blue connector of the original controller after a controller exchange BUT before the power sources are disconnected or the NO Power alarm will sound for up to two hours.**

DRIVELINE CONNECTION

To Connect to Controller:

- Align the two red marks and push together. An audible click will be heard confirming proper connection. (Figure A)
- The Driveline Cover must completely cover the Controller's silver driveline connector to protect against static discharge. (Figure B)
- NOTE: an audible click should be heard when connecting the Driveline or Driveline extension to the controller. Failure to use the Driveline Cover may cause an Electrical Fault Alarm.

Figure A

Figure B

TO DISCONNECT A DEPLETED BATTERY

- Make sure there is a fully charged battery available to replace the depleted one.
- Disconnect the depleted battery by turning the connector sleeve counterclockwise until it stops.
- Pull the connector straight out from the controller.

CONNECTING POWER TO CONTROLLER

To Connect a Charged Battery:

- Grasp the cable of the charged battery at the back end of the connector (leaving front end of connector free to rotate)
- Line up the solid white arrow on the connector with the white dot on the Controller.
- Gently push (but DO NOT twist) the battery cable into the Controller until it naturally locks into place; you should hear an audible click.
- Confirm that the battery cable is properly locked on the controller by gently pulling the cable near the controller power connector.
- DO NOT force the battery cable into the controller connector without correct alignment as it may result in damaged connectors .

HeartWare® Ventricular Assist System Emergency Operation

STEPS TO EXCHANGE THE CONTROLLER

Step 1: Have the patient sit or lie down.

Step 2: Place the new controller within easy reach.

Step 3: Connect back-up power sources (batteries or AC Power) to the new controller.

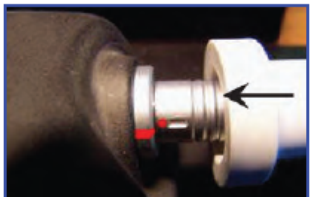
- Confirm that the power cables are properly locked on the controller by gently pulling on the cable near the connector.
- A "Power Disconnect" alarm will activate if a second power source is not connected to the new controller within 20 seconds of controller power up
- A "VAD Stopped" alarm will activate if the pump driveline is not connected to the new controller within 10 seconds - this alarm will resolve once the pump driveline is connected

Step 3

Step 4: Pull back the white driveline cover from the original controller's silver connector.

Step 4

Step 5: Disconnect the driveline from the original controller by pulling the silver connector away from the controller. Do not disconnect by pulling on the driveline cable. A "VAD Stopped" alarm may activate. Don't panic. You can silence the alarm after restarting the pump, which is the priority.



Step 6

Step 6: Connect the driveline to the new controller (align the two red marks and push together). If the "VAD Stopped" alarm was active on the new controller, it will now resolve.

Step 7: The pump should restart. Verify the pump is working (RPM, L/min, Watts).

Step 8: **IF THE PUMP DOES NOT RESTART, CALL FOR MEDICAL ASSISTANCE IMMEDIATELY.**

Step 9: Insert the Alarm Adapter into the blue connector on the original controller.

- Disconnect both power sources from the original controller.
- The controller will be turned off and all alarms silenced.

Step 9

Step 10: Slide the white driveline cover up to cover new controller's silver connector.

Step 11: Contact the VAD Center or Implanting hospital for a new backup controller.

Step 10

Trouble Shooting HeartMate III® with Pocket Controllers

When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see Changing Batteries section on next page)*
- If pump does not restart, change controllers. *(see Changing Controllers section on next page)*

Alarms: Emergency Procedures

Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.

Trouble Shooting HeartMate III®

Changing Batteries

WARNING: At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 1 and 2)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 3)
- Controller will start beeping and flashing yellow signals and will read **POWER DISCONNECT** on the front screen. (Figure 4)
- Replace with new battery by lining up **RED** arrows on battery and clip. Gently tug on battery to ensure connection. If battery is properly secured, the beeping and yellow flashing will stop. (Figure 5)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.

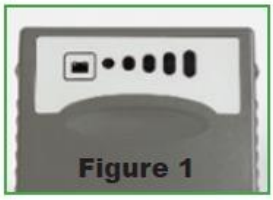


Figure 1


Figure 2


Figure 3

Figure 4


Figure 5

Trouble Shooting HeartMate III® with Pocket Controllers

Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the RED arrows.

- On the back of the replacement controller, rotate down the perc lock so the red tab is fully visible. Repeat this step on the original controller until the red tab is fully visible.

- Disconnect the drive-line from the original controller by pressing down on the red tab and gently pulling on the metal end. The pump will stop and an alarm will sound. **Note:** The alarm will continue until the original controller is put to sleep. You can silence the alarm by pressing the silence button. **Getting the replacement controller connected and pump restarted is the first priority.**

- Connect the replacement Controller by aligning the **BLACK ARROWS** on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the power source to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. DO **NOT** pull the lead.

- After the pump restarts, rotate up the perc lock on the new controller so the red tab is fully covered. If unable to engage perc lock to a fully locked position, gently push the driveline into the controller to assure proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.
- Hold down battery symbol for 5 full seconds for complete shutdown of old controller.

Trouble Shooting HeartMate III® with Pocket Controllers

Modular Cable

The HeartMate 3 has a modular cable connection near the exit site of the driveline (Figure 1). This allows a damaged driveline to be quickly replaced (if damage is external).

- When disconnecting a driveline, **NEVER** use the modular cable connection.
- If this section of the driveline requires replacement, this must be performed at and by the implanting center. Patients are not given a back-up modular cable.
- If the connection is loose, there will be a yellow/green line at the connection showing (Figure 2). If the line is visible, it can be retightened by turning with the arrow in the locked direction. It will ratchet and stop turning once tight.

Figure 1

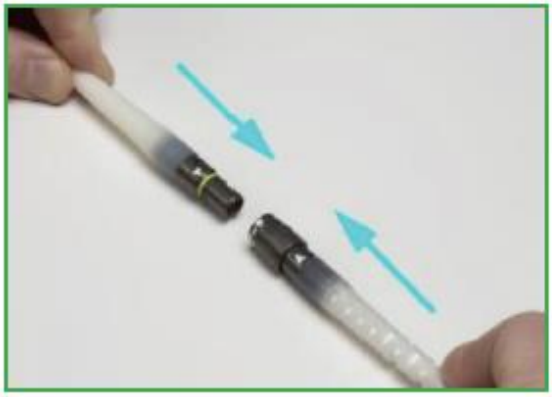


Figure 2

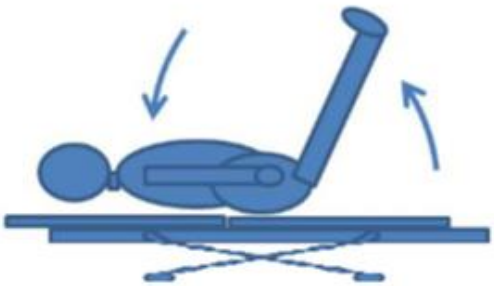
Modified Valsalva Maneuver – 30.110

DEFINITION:
Traditional vagal maneuvers have a low frequency of successfully converting Supraventricular Tachycardia (SVT) to sinus rhythm. However, Modified Valsalva Maneuvers have been repeatedly shown to have a high rate of rapid success in terminating SVT, thereby decreasing the need for administration of medications, IV access, and reducing patient discomfort.

INDICATIONS:
SVT (Regular narrow complex tachycardia- QRS < 0.12 secs)

CONTRAINDICATIONS:
A. Atrial fibrillation or atrial flutter
B. Hemodynamic instability or SBP <90
C. Known aortic stenosis
D. Inability to physically perform procedure due to anatomy

PROCEDURE:
A. Perform 12-lead EKG prior to performing modified-Valsalva maneuver.
B. Record rhythm strip during procedure.
C. Have the patient sit in an upright position.
D. With the assistance of a 10 ml syringe, encourage the patient to strain for a full 15 seconds, trying to push out the plunger by forced expiration.
E. Lay the patient supine and elevate their legs 45° - 90° for 15 seconds.
F. Lay the patient's legs flat for 60 seconds.
G. If the rhythm has changed or there is a significant change in heart rate after maneuver, perform repeat 12-lead EKG.
H. May repeat x 1 if patient has not converted to sinus rhythm.



PEDIATRIC VAGAL MANUVERS:
A. Infants and toddlers: Place ice packs on the face.
B. Pre-school and older: Have child blow on a syringe.

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:

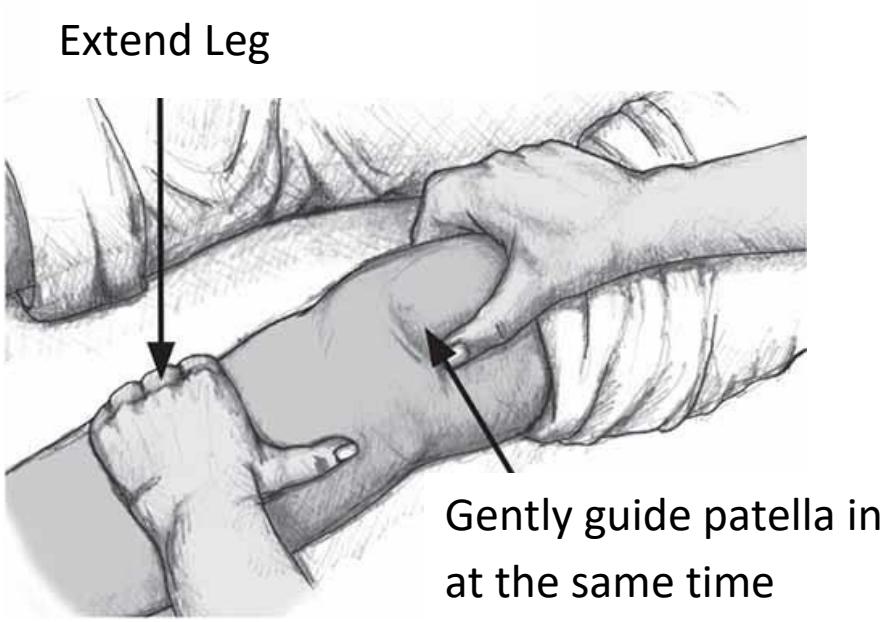
A. Direct traumatic mechanism of injury (impact directly to the knee).
B. Any sign of associated patella fracture (crepitus).
C. Any associated injury to same extremity (femur fracture, tibia/fibula fracture, pelvic fracture).

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.



Patient Restraint – 30.120

PURPOSE:
Physical and chemical restraint is used to protect the safety of patients and responders. Patient restraints should be utilized only when necessary because the patient is exhibiting behavior that presents a danger to themselves and/or others based on an assessment using the Broset checklist.

PROCEDURE:

Physical Restraint Guidelines:

A. Perform the Broset Violence Assessment checklist.

Broset Violence Assessment checklist

Confusion	0 point 1 point
Irritability	0 point 1 point
Boisterousness	0 point 1 point
Verbal Threats	0 point 1 point
Physical Threats	0 point 1 point
Attacks on objects	0 point 1 point

Score 0 = Low risk of violence
Score 1-2 = Moderate risk of violence (preventative measures should be taken)
Score ≥ 3 = High risk of violence (preventative measures are required)

B. Use the minimum level of physical restraints required to accomplish patient care and ensure safe transportation (soft restraints may be sufficient). If law enforcement or additional manpower is needed, call for assistance prior to attempting restraint procedures. Do not endanger yourself or your crew.

C. Do not place restraints in such a way as to preclude evaluation of the patient's medical status or interfere with management of the airway.

Physical Restraint Procedure:

A. Place patient face up on long backboard or gurney, NOT PRONE. Closely monitor the patient's respiratory status.
B. Secure ALL extremities to backboard or gurney. Try to restrain lower extremities first using restraints around both ankles. Next, restrain the patient's arms at his/her sides.
C. If necessary, utilize cervical spine precautions (tape, foam bags, etc.) to control violent head or body movements.

D. If patient is on backboard, secure the backboard onto gurney for transport using additional straps if necessary. Remember to secure additional straps to the upper part of the gurney to avoid restricting the wheel carriage.
E. Evaluate the patient's respiratory and cardiac status continually. Monitor SpO_2 if possible.
F. DO NOT tighten chest straps to the point that they restrict breathing.

Pharmacological Sedation Guidelines:

Sedative agents may be needed to restrain the violently combative patient. These patients may include alcohol and/or substance abuse patients, intoxicated patients, and restless and combative head-injury patients.

Pharmacological Sedation Procedure:

A. Obtain initial Richmond Agitation Sedation Score (RASS).

Richmond Agitation Sedation Scale (RASS)

Score	Term	Description
+4	Combative	Overtly combative and violent; immediate danger to EMS
+3	Very agitated	Aggressive; verbally and physically uncooperative towards EMS
+2	Agitated	Frequent non-purposeful movement; agitated when touched or moved
+1	Restless	Anxious but movements not aggressive or dangerous to EMS or self
0	Alert and calm	
-1	Drowsy	Not fully alert, but has sustained awakening (eye opening/eye contact) to voice (≥ 10 seconds)
-2	Light Sedation	Briefly awakens with eye contact to voice (< 10 seconds)
-3	Moderate sedation	Movement or eye opening to voice (but no eye contact)
-4	Deep sedation	No response to voice but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

B. Evaluate the personnel needed to safely restrain the patient.
C. If patient is cooperative, consider offering olanzapine ODT 10 mg oral dissolving tablet.
D. If immediate threat (RASS +3 or +4):
    1. Administer midazolam (2.5 - 5 mg IV, IO or 5-10 mg IM) **PLUS** ziprasidone (10-20 mg IM) **or** haloperidol (5-10 mg IV/IM) **or** droperidol (2.5 – 5 mg IV/IO or 5 – 10 mg IM)
    2. Titrate midazolam 1-2 mg IV, IO as needed every 5 minutes to control agitation.

E. If RASS is +2, attempt to determine if the patient's agitation is related to substance abuse, alcohol withdrawal, or medical or psychiatric problem.
F. If agitation is likely due to a psychiatric disorder or unknown, administer medications in following sequence:

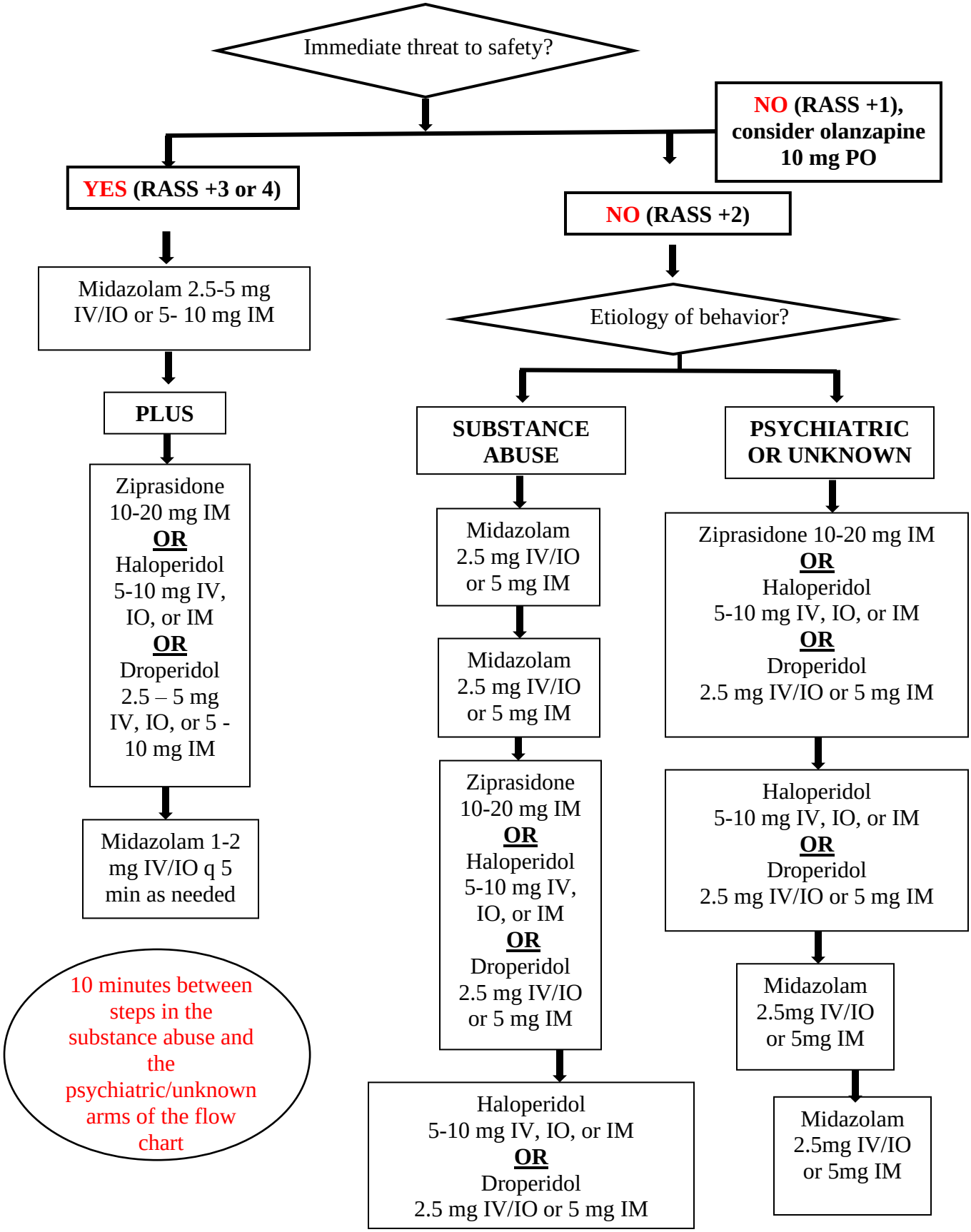
	Drug	*Initial Dose*	*Repeat Dose in 10 min*	*Maximum Dose*
	Antipsychotic			
	Ziprasidone	10 - 20 mg IM	none	20 mg IM
			OR	
	Haloperidol	5 – 10 mg IV, IO, or IM	5 – 10 mg IV, IO, or IM	20 mg IV or IM
			OR	
	Droperidol	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO, or 5 mg IM	5 mg IV/IO or 10 mg IM
	Benzodiazepine*	***(see H below)***		
	Midazolam	2.5 mg IV or 5 mg IM	2.5 mg IV or 5 mg IM	5 mg IV or 10 mg IM

G. If agitation is likely substance abuse (especially stimulants), withdrawal, or postictal state, administer medications in following sequence:

	Drug	*Initial Dose*	*Repeat Dose in 10 min*	*Maximum Dose*
	Benzodiazepine			
	Midazolam	2.5 mg IV or 5 mg IM	2.5 mg IV or 5 mg IM	5 mg IV or 10 mg IM
	Antipsychotic*	***(see H below)***		
	Ziprasidone	10 - 20 mg IM	none	20 mg IM
			OR	
	Haloperidol	5 – 10 mg IV, IO, or IM	5 – 10 mg IV or IM	20 mg IV, IO, or IM
			OR	
	Droperidol	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO or 5 mg IM

H. Consider and treat medical causes of combativeness (hypoxia, head injury, hypoglycemia).
I. If 10 minutes after administration of the second dose (total of 20 minutes) the patient remains combative, move to next drug class as outlined above (e.g. antipsychotic to benzodiazepine or benzodiazepine to antipsychotic).
J. Asses vital signs in first 5 minutes and at least every 10 minutes and before each additional medication, if possible.
K. If patient shows signs of acute dystonic reaction after receiving ziprasidone, droperidol, or haloperidol, give diphenhydramine 1 mg/kg IV or IM to a maximum of 50 mg.
L. Monitor patient's ECG and obtain 12-lead if possible.
M. If RASS is +1, consider olanzapine 10 mg PO.
N. Repeat RASS score every 10 minutes and at patient hand-off to hospital. Goal is RASS score of 0 to -1.

Patient Restraint Flow Chart



NOTES & PRECAUTIONS:

A. All patients who receive IV, IO, or IM pharmacological sedation must be fully monitored if possible, with cardiac monitor, SpO_2 and $EtCO_2$.
B. Side effects of haloperidol and droperidol may include hypotension, tachycardia, and acute dystonic reactions.
C. Haloperidol, droperidol, and ziprasidone may induce Torsades de Pointes in patients with history of prolonged QT or patients taking QT-prolonging drugs. Monitor patient's ECG, if possible. If prolonged QT is present (> 500 msec.), contact OLMC.
D. Haloperidol, droperidol, or ziprasidone are preferred for patients with known psychiatric disorders. Midazolam is preferred for patients who are known or suspected to be under the influence of stimulants or other intoxicants, who are in withdrawal, or who are postictal.

PEDIATRIC DOSING:

Midazolam:

0.1 mg/kg IV/IO to a max single dose 5 mg or
0.2 mg/kg IM/IN to a max single dose of 10 mg*

*Call OLMC for additional midazolam or other medications

Pelvic Immobilization – 30.132

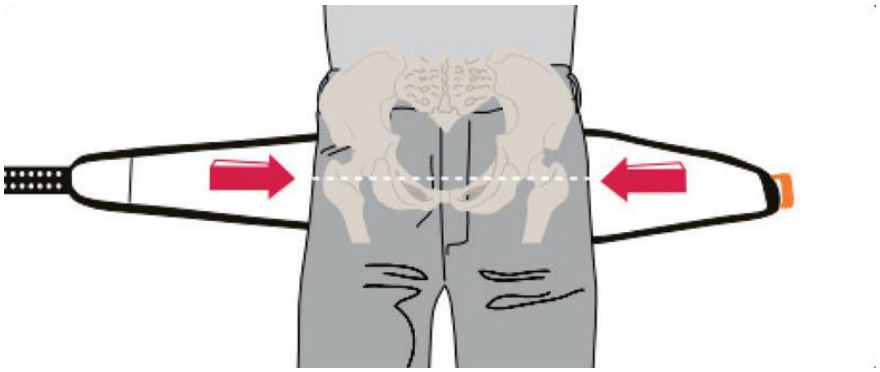
PURPOSE:
The initial reduction of an unstable pelvic fracture (to lessen ongoing internal bleeding and to ease the pain by splinting the fracture) using either a specifically applied sheet or another approved device.

INDICATIONS:

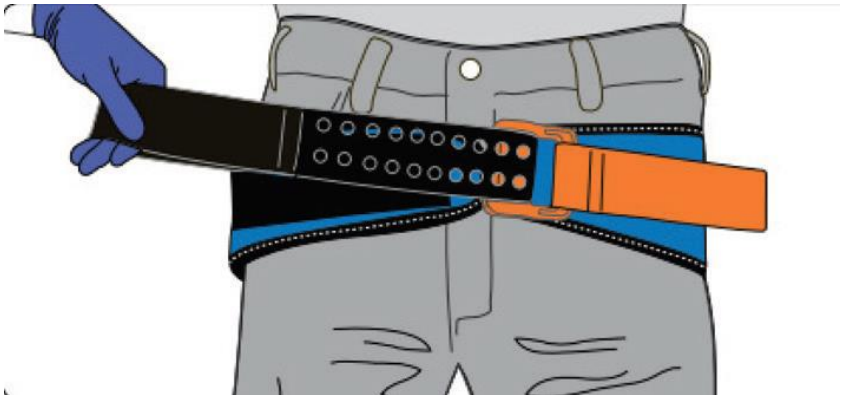
A. To be applied in all trauma patients who have appropriate mechanism(s) of injury and who present with pelvic instability.
B. Consider pelvic wrap in trauma patients who have appropriate mechanism(s) of injury and who are in shock.

PELVIC SLING PROCEDURE:

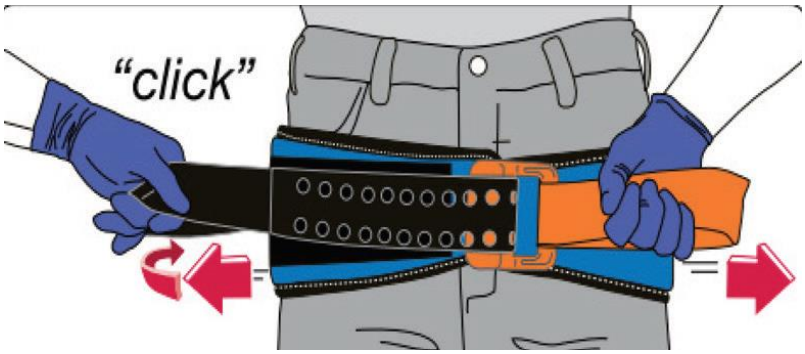
A. Remove objects from patient's pocket or pelvic area. Place SAM® Pelvic Sling gray side up beneath patient at level of trochanters (hips).



B. Place BLACK STRAP through buckle and pull completely through.

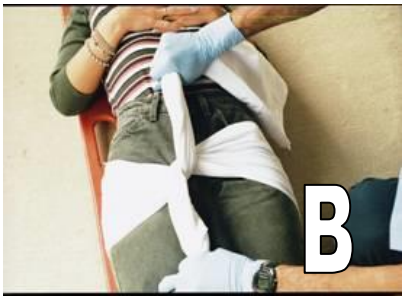


C. Hold ORANGE STRAP and pull BLACK STRAP in opposite direction until you hear and feel the buckle click. Maintain tension and immediately press BLACK STRAP onto surface of SAM® Pelvic Sling to secure.



PELVIC WRAP PROCEDURE:

A. Fold the sheet smoothly lengthwise to about 9 inches wide (do not roll) and apply underneath the pelvis, centered on the greater trochanters. Assure the patient's pockets are empty (if applicable) to avoid placing pressure on the objects into the patient.
B. Tighten the sheet around the pelvis and adjust the tension to try to return the pelvis to normal anatomical position.
C. Secure using a knot or clamps if available.



NOTES & PRECAUTIONS:

A. Always re-check the position of the sheet (in terms of up and down). You should still be able to feel the anterior superior iliac spines after placement. If not, the sheet may be too high on the pelvis and must be repositioned.
B. If the pelvis is unstable on initial exam, do not repeat the exam.
C. Blood loss in a pelvic fracture can be significant. Monitor closely and treat per Shock Protocol.
D. Consider placing prior to extrication from a vehicle if feasible.
E. The pelvic sling/wrap is contraindicated for suspected isolated hip fractures (i.e. ground level falls).

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:

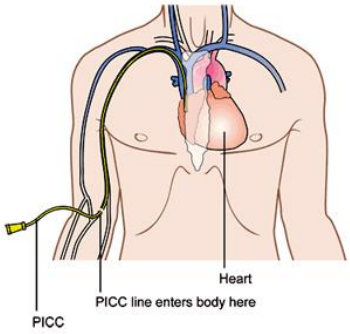
A. Use clean gloves and maintain sterility as much as possible.
B. If there is a needleless type port on the distal end of the catheter, perform the following: *(figure 1)*
    1. Scrub the port with an alcohol pad for at least 15 seconds and allow to dry for at least 5 seconds.
    2. Attach a 10 ml 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.



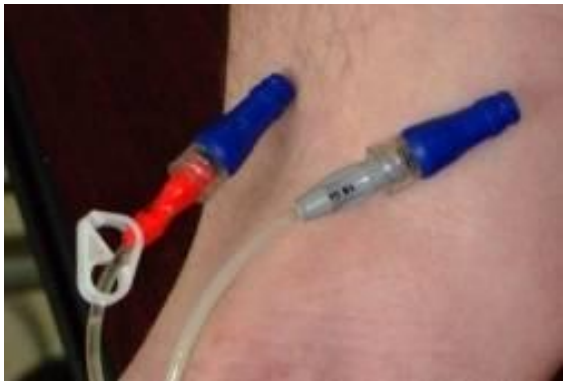


Figure 1- Needleless port

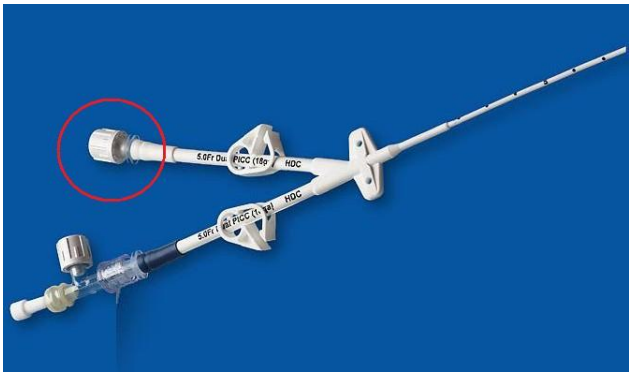


Figure 2 – Non-needleless type port with cap

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 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 5cm H_2O and bag per usual.
C. Increase PEEP by 5cm 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 5cm 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. Cut side and top attachments at loop to remove face mask. Some helmets will need a cutting tool to “release” the top of the facemask from the helmet.
   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. The release mechanism can be activated by pressing it down with a pen or tip of a screwdriver. Athletic trainers and coaching staff are familiar with this and can provide assistance.

C. **General equipment removal guidelines:**
   1. If the athlete has neck pain, numbness or tingling, extremity weakness, or is unconscious, the helmet and shoulder pads should not be removed on the field of play.
   2. If access to the airway is compromised, removal of the helmet and shoulder pads may be initiated.
   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. Release cheek pad snaps.
   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. Log rolling is the preferred method for movement as crews are most familiar with this technique and understand the importance of moving the patient as a unit and maintaining inline alignment of the head, neck, and spine.
2. The lift technique is an alternative method that could be used for smaller patients, but it is manpower intensive. If lifting, remember to lift as a unit. Slide backboard into place from feet.
3. The person at head initiates commands and oversees proper placement and techniques.
4. Position three responders on each side of body; one at shoulders, one at hips, and one at legs.
5. One other person is in charge of the backboard and slides it into place.
6. If the helmet is not resting on board, padding can be added to fill space.
7. Fasten straps and tape helmet to board.
8. Chinstrap remains in place unless it interferes with airway.
9. Recheck sensory and motor nerve vitals for changes and document.

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 not indicated in the vigorous infant born with meconium stained fluid, whatever the consistency. Simply use a bulb syringe or large bore catheter to clear secretions from the mouth and nose as needed.

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. Assess the skin where the barb was removed. The skin should be cauterized from the electrical current. Dress the wound to prevent infection.
I. 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.
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.

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:

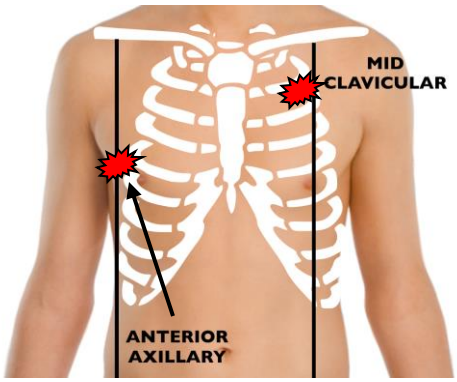
A. High clinical suspicion and;
B. Progressive respiratory distress and;
C. Shock symptoms with low or rapidly decreasing blood pressure.

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

A. Decreased or absent breath sounds.
B. Consistent history (i.e., 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 30mA 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 *un*comfortable, administer midazolam 2.5 - 5 mg slow IV/IO push or if no IV, 5 mg IM/IN.
F. If patient still complains of pain, repeat dose of midazolam once and contact OLMC.
G. 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.
H. 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. Give midazolam 0.1 mg/kg IV/IO to a max of 5 mg. (May repeat once after 5 minutes.) If more needed, call OLMC.
B. Use anterior/posterior pad placement first for patients less than 1 year.
C. Begin pacing at smallest mA output.
D. Increase current in increments of 10 mA while observing monitor for evidence of electrical capture.
E. Confirm mechanical capture by checking pulses and BP.
F. 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.

XSTAT– 30.200

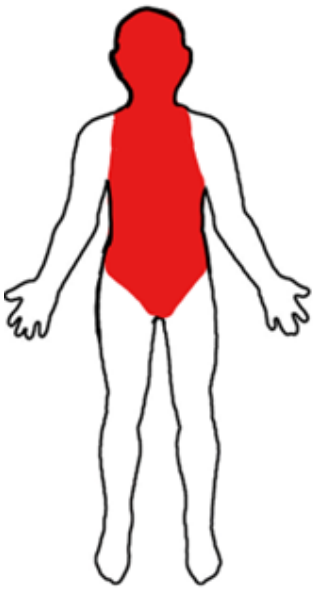
DEFINITION:
The XSTAT is a first-in-kind expanding dressing approved for internal use. A syringe-like applicator applies compressed mini-sponges deep into a wound. Upon contact with blood, the sponges expand to 10-12 times their compressed volume within approximately 20 seconds compressing the wound to stop bleeding.

INDICATIONS:
XSTAT is for the control of severe, life-threatening bleeding from junctional wounds in the groin or axilla that are not amenable to tourniquet applications in adults and adolescents. It should only be used for patients at high risk for immediate life-threatening bleeding from hemodynamically significant, non-compressible junctional wounds.

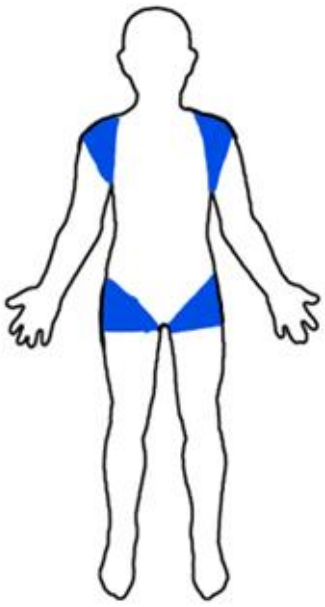
CONTRAINDICATIONS:
XSTAT is not indicated for use in the:

A. Thorax
B. Pleural cavity
C. Mediastinum
D. Abdomen
E. Retroperitoneal space
F. Sacral space above the inguinal ligament
G. Tissue above the clavicle

Contraindicated areas:



Approved areas:



SIZES:

XSTAT comes in two sizes:

PROCEDURE:

A. Open the package and remove the applicator.
B. Insert applicator into wound track as close to bleeding source as possible.
C. Insert plunger into applicator, push plunger firmly to deploy sponges.
D. If resistance met, pull back slightly on applicator to create additional packing space then continue to depress.
E. Use additional applicators as needed to completely pack wound.
F. Cover wound with a proper dressing.
G. If bleeding persists, apply manual direct pressure until bleeding is stopped.

NOTES & PRECAUTIONS:

A. Tourniquets are still the first line treatment for extremity wounds distal to a junction.
B. A radiopaque marker is embedded into each of the mini-sponges to make them detectable by X-Ray.
C. Never attempt to remove the mini-sponges from the wound. They must be removed by a surgeon after achieving proximal and distal vascular control.
D. The manufacturer includes a Casualty Card inside the XSTAT package.
    1. Instructions to the surgeon for removing the sponges from the wound are included on the back of the card.
    2. Record the use of XSTAT on the card and forward these instructions to the medical treatment facility.
E. Segments of the applicator tip may break away during application and be left in the wound.
    1. After injecting the mini-sponges, check the applicator tip for missing segments
    2. Do not attempt to retrieve missing segments from the wound
    3. Record the number of lost segments on the Casualty Card.