Pediatric Critical Events Checklists

Call for help!

Overhead
Code Team
Blood Bank
PICU
Fire

Air Embolism
Anaphylaxis
Bradycardia
Cardiac Arrest
Difficult Airway
Fire: Airway and OR
Hyperkalemia
Hypertension
Hypotension
Hypoxia
Local Anesthetic Toxicity
Loss of Evoked Potentials
Malignant Hyperthermia
Myocardial Ischemia
Tachycardia
Transfusion & Reactions
Trauma

Revised March 28, 2013
Air Embolism

Objective: Restore normal SaO2, hemodynamic stability, and stop source of air entry.

- Call for help. Notify surgeon.
- Increase oxygen to 100%.
- Stop nitrous oxide and volatile agents.
- Find air entry point, stop source, and limit further entry.
  - Flood wound with irrigation
  - Check for open venous lines or air in tubing
  - Turn off all pressurized gas sources (laparoscope, endoscope)
  - Lower surgical site below level of heart (if possible)
  - Perform valsalva on patient using hand ventilation
  - Compress jugular veins intermittently if head or cranial case
  - Left-side down once source controlled
- Consider
  - Vasopressors (epinephrine, norepinephrine)
  - Chest compressions: 100/min; to force air through lock, even if not in cardiac arrest
- Call for transesophageal echocardiography (if available and/or diagnosis unclear).
Anaphylaxis

- **Call for help.**
- **Increase oxygen to 100%**
- Remove suspected trigger(s).
  - If latex is suspected, thoroughly wash area.
- Ensure adequate ventilation/oxygenation.
- Obtain IV access.
- If hypotensive, turn off anesthetic agents.
- Rapidly infuse NS or LR (10-30 ml/kg IV) to restore intravascular volume

- **Epinephrine** (1-10 mcg/kg IV as needed) to restore BP and ↓ mediator release
  - Epinephrine infusion (0.02-0.2 mcg/kg/min) may be required to maintain BP.
- **Adjuvants**
  - Beta-agonists (albuterol 4-10 puffs as needed) for bronchoconstriction
  - Methylprednisolone (2 mg/kg IV, MAX 100 mg) to ↓ mediator release
  - Diphenhydramine (1 mg/kg IV, MAX 50 mg) to ↓ histamine-mediated effects
  - Famotidine (0.25 mg/kg IV) or ranitidine (1 mg/kg IV) to ↓ effects of histamine

- If anaphylactic reaction requires laboratory confirmation, send mast cell tryptase level within 2 hours of event.

**Common causative agents:**
Neuromuscular blockers, latex, chlorhexidine, IV colloids, antibiotics
Bradycardia: Unstable

Bradycardia + heart block, hypotensive with pulses

Age < 30 days: HR < 100
Age > 30 days < 1yr: HR < 80
Age > 1 yr: HR < 60

Call for help and transcutaneous pacer.

Hypoxia is common cause of bradycardia.
  ▪ Ensure pt is not hypoxic. Give 100% oxygen.
  ▪ Go to ‘Hypoxia’ card if hypoxia persists.

Stop surgical stimulation. If laparoscopy, desufflate.

Consider
  □ Epinephrine 2-10 mcg/kg IV
  □ Chest compression if ↓ pulses
  □ Atropine (0.02mg/kg IV) if vagal etiology

Assess for drug-induced causes
  ▪ Beta-blocker overdose: Glucagon 0.05 mg/kg IV, then 0.07 mg/kg/h IV infusion
  ▪ Calcium channel blocker overdose: Calcium chloride 10-20 mg/kg IV or calcium gluconate 50 mg/kg, then glucagon if calcium ineffective.

If PEA develops, start chest compressions. Go to ‘Cardiac Arrest: Asystole, PEA’
Call for help.
Designate team leader, assign roles.

Give 100% oxygen. Turn off all anesthetic gases. Place pt on backboard.

Start chest compressions (100 chest compressions/min + 8 breaths/min)
- Maintain good hand position.
- Maximize ETCO₂ > 10 mm Hg with force/depth of compressions.
- Allow full recoil between compressions.
- Switch with another provider every 2 minutes, if possible.
- Use sudden increase in ETCO₂ for ROSC – do not stop compressions for pulse check.

Epinephrine 10 mcg/kg IV q 3-5 min
Check pulse & rhythm (q 2 min during compressor switch).

No Pulse and Not Shockable: Resume CPR and checklist.

<table>
<thead>
<tr>
<th>Read out H&amp;Ts</th>
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<tbody>
<tr>
<td>Hypovolemia</td>
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<tr>
<td>Hypoxemia</td>
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<tr>
<td>Hydrogen ion (acidosis)</td>
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<tr>
<td>Hyperkalemia</td>
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<tr>
<td>Hypoglycemia</td>
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<tr>
<td>Hypothermia</td>
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<tr>
<td>Tension Pneumothorax</td>
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<tr>
<td>Tamponade (Cardiac)</td>
</tr>
<tr>
<td>Thrombosis</td>
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<tr>
<td>Toxin (anesthetic, β-blocker)</td>
</tr>
<tr>
<td>Trauma (bleeding outside surgical area)</td>
</tr>
</tbody>
</table>

Call for ECMO (if available) if no ROSC after 6 min of CPR.
Notify parents/guardian that cardiac arrest occurred.
Cardiac Arrest: VF/VT

- Call for help and defibrillator.
- Designate team leader / assign roles.
- Give 100% oxygen. Turn off all anesthetic gases. Place pt on backboard.
- Start chest compressions (100 chest compressions/min + 8 breaths/min).
  - Maintain good hand position
  - Maximize ETCO₂ > 10 mm Hg with force/depth of compressions
  - Allow full recoil between compressions – lift hands off chest
- Shock 2-4 joules/kg
- Resume chest compressions x 2 min.
- Epinephrine 10 mcg/kg IV
- Check pulse & rhythm (q2 min during compressor switch)

If shockable rhythm continues:
- Shock 4 joules/kg.
- Resume chest compressions x 2 min.
- Epinephrine 10 mcg/kg IV
- Check pulse & rhythm (q 2 min during compressor switch)
- Shock 4-10 joules/kg, continue chest compressions, and epinephrine 10 mcg/kg every 3-5 min.
- Amiodarone 5 mg/kg bolus; may repeat x 2
- Call for ECMO (if available) after 6 min of CPR
- Notify parents/guardian that cardiac arrest occurred.
Call for help.

**Children/Adolescents**

No midline incision:
Compress with heel of hand on spine and second hand on top

Midline incision:
Compress with heel of each hand under scapula

**Infants**

Compress with encircling technique:
- Thumbs midline if no incision
- Thumbs lateral if incision

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Difficult Airway: After Induction

Unable to intubate or ventilate; oxygen saturation < 90%

- Call for help.
- Increase oxygen to 100%.
- Get airway cart.
- Bag-mask ventilation
- Notify surgeon – may need to stop or cancel surgery. May awaken if surgery not started.
- If unable to mask ventilate, 2-hand if needed:
  - Add oral airway
  - Add nasal airway
  - Add LMA
- Regain spontaneous ventilation, if able; reverse neuromuscular blocker
- Alternative approaches for intubation:
  - Different blade
  - Different operator
  - Re-position head
  - Blind oral
  - Blind nasal
  - Video-laryngoscope
  - Intubating LMA
  - Fiberoptic scope
  - Light wand
  - Elastic bougie
  - Intubating stylet
  - Retrograde intubation

- If still unable to ventilate:
  - Consider possibility of invasive airway in early stage.
  - Emergency non-invasive airway (rigid bronchoscopy)
  - Emergency invasive/surgical airway
Fire: Airway

- Call for help.
- **Stop** all gas flow (O₂, N₂O)
- **Disconnect** breathing circuit.
- Pour saline into airway.
- **Remove** ETT.
- Remove sponges and other flammable materials from airway.

- Re-intubate and re-establish ventilation.
- If intubation difficult, don’t hesitate to obtain surgical airway.

- Consider bronchoscopy to assess for thermal injury, look for tracheal tube fragments, and remove residual material.
- Impound all equipment and supplies for later inspection.

Picture from ECRI: www.ecri.org
OR Fire (non-airway)

- Call for help.
- Protect patient, contain fire.

- If drapes on fire, remove drapes from patient.

- Activate fire alarm.

- Stop medical gases.
- Declare team leader and define roles.

- Make one attempt to extinguish fire.
  - Use fire extinguisher or saline soaked gauze.

- If fire not extinguished on 1st attempt:
  - Remove patient from OR.
  - Confine fire by closing all OR doors.
  - Turn off O₂ gas supply to OR.

- Impound all equipment and supplies for later inspection.
Hyperkalemia

Serum K+ > 6 meq/L

Causes:
- Excessive intake: massive or “old” blood transfusion, cardioplegia, “K+ runs”
- Shift of K+ from tissues to plasma: crush injury, burns, succinylcholine, malignant hyperthermia, acidosis
- Inadequate excretion: renal failure

Manifestations:
- Tall peaked T wave, heart block, sine wave, v fib or asystole

Management:
- CALL FOR HELP!
- Stop K+ containing fluids (LR/RBCs) ➔ Switch to NS/washed RBCs
- If hemodynamically unstable: initiate CPR/PALS
- Hyperventilate with 100% Oxygen
- Give: Calcium chloride IV 10 mg/kg
  - Insulin IV/SC 0.1 Unit/kg
  - Dextrose IV 0.25 -1 gram/kg
  - Sodium Bicarbonate IV 1-2 mEq/kg
  - Furosemide IV 0.1 mg/kg
- Dialysis if refractory to treatment
- Activate ECMO (if available) if cardiac arrest > 6 min

Acute Hypertension

- Consider likely cause. Rule out medication error, light anesthesia, and other patient-specific factors.
- Ensure that correct BP cuff size is used with a cuff bladder width approximately 40% of limb circumference.
- 99th %tile for BP is based on patient age and height.

<table>
<thead>
<tr>
<th>Action</th>
<th>Drug (IV Dosing)</th>
<th>Age (yr)</th>
<th>99th %tile systolic range (5th – 95th %tile height)</th>
<th>99th %tile diastolic range (5th – 95th %tile height)</th>
</tr>
</thead>
</table>
| Direct smooth muscle relaxation | **Sodium nitroprusside** 0.5-10 mcg/kg/min  
**Hydralazine** 0.1-0.2 mg/kg (adult dose 5-10 mg) | 1        | 105-114                                           | 61-66                                               |
|                               |                                       | 2        | 109-117                                           | 66-71                                               |
|                               |                                       | 3        | 111-120                                           | 71-75                                               |
| Beta-adrenergic blockade       | **Esmolol** 100-500 mcg/kg over 5 min then 50-200 mcg/kg/min  
**Labetalol** (also α effect) 0.2-1 mg/kg q10 min or 0.4-3 mg/kg/h (adult dose)  
**Propranolol** 10-100 mcg/kg slow push (adult dose 1-5 mg) | 4        | 113-122                                           | 74-79                                               |
|                               |                                       | 5        | 115-123                                           | 77-82                                               |
|                               |                                       | 6        | 116-125                                           | 80-84                                               |
|                               |                                       | 7        | 117-126                                           | 82-86                                               |
|                               |                                       | 8        | 119-127                                           | 83-88                                               |
|                               |                                       | 9        | 120-129                                           | 84-89                                               |
|                               |                                       | 10       | 122-130                                           | 85-90                                               |
|                               |                                       | 11       | 124-132                                           | 86-90                                               |
|                               |                                       | 12       | 126-135                                           | 86-91                                               |

- **Chief Drug**

- **D-1 agonist**

- **Fenoldopam** 0.3-0.5 mcg/kg/min (max. 2.5 mcg/kg/min)
# Hypotension

Systolic BP < 5% tile for age.
For pt > 1yr, 5th % tile = 70mmHg + (2 x age in yrs)

## Causes of Hypotension

<table>
<thead>
<tr>
<th>↓ Preload</th>
<th>↓ Contractility</th>
<th>↓ Afterload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemia, Vasodilation, Impaired venous return, Tamponade, Pulmonary embolism</td>
<td>Negative inotropic drugs (anesthetic agents), Arrhythmias, Hypoxemia, Heart failure (ischemia)</td>
<td>Drug-induced vasodilation, Sepsis, Anaphylaxis, Endocrine crisis</td>
</tr>
</tbody>
</table>

## Treatment of Hypotension

- Inform surgeon and OR nurse
- Ensure oxygenation/ventilation
- Turn off anesthetic agents
- Verify patient is truly hypotensive, check cuff size and position
- Expand circulating blood volume (administer fluids rapidly)
- Trendelenberg position
- Place or replace IV; consider interosseous needle
- Start inotrope infusion (dopamine, epinephrine, milrinone) as needed
- Review ECG for rhythm disturbances or ischemia
- Send ABG, Hb, electrolytes
- Start vasopressor infusion: phenylephrine, norepinephrine
- Follow “Anaphylaxis” Card if appropriate.
- Administer steroids for endocrine crisis
## Hypoxia

<table>
<thead>
<tr>
<th>Hypoxia: All Patients</th>
<th>Hypoxia: Intubated Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Give 100% oxygen</strong></td>
<td><strong>D</strong> Islodged: Check ETT position</td>
</tr>
<tr>
<td>Check:</td>
<td>▪ Mainstem</td>
</tr>
<tr>
<td>✓ Oxygen flow</td>
<td>▪ Not in trachea</td>
</tr>
<tr>
<td>✓ Airway patency</td>
<td><strong>O</strong> Obstructed: Suction ETT</td>
</tr>
<tr>
<td>✓ Breathing circuit connected and patent</td>
<td>▪ Kinked</td>
</tr>
<tr>
<td>✓ Ventilation rate and depth adequate</td>
<td>▪ Mucus plug</td>
</tr>
<tr>
<td>✓ Listen to breath sounds:</td>
<td><strong>P</strong> Neumothorax: Listen to breath sounds</td>
</tr>
<tr>
<td>▪ Wheezing</td>
<td>▪ Decompress with needle</td>
</tr>
<tr>
<td>▪ Crackles</td>
<td><strong>E</strong> Equipment</td>
</tr>
<tr>
<td>▪ Diminished or absent</td>
<td>Check from patient to wall:</td>
</tr>
<tr>
<td>✓ Is pulse oximeter working correctly?</td>
<td>▪ Oxygen flow</td>
</tr>
<tr>
<td>✓ Presence of cardiac shunt</td>
<td>▪ Valves</td>
</tr>
<tr>
<td>✓ Possibility of embolus</td>
<td>▪ CO₂ canister</td>
</tr>
<tr>
<td></td>
<td>▪ Inspect for disconnections and obstructions</td>
</tr>
</tbody>
</table>

↓ SaO₂  ↓ PaO₂
<table>
<thead>
<tr>
<th>Respiratory</th>
<th>Cardiac Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give 100% oxygen</td>
<td><strong>Embolus:</strong> air, blood, fat</td>
</tr>
<tr>
<td>Check:</td>
<td>Actions: See Air Embolism card</td>
</tr>
<tr>
<td>□ Airway patency</td>
<td>□ Inform surgeon</td>
</tr>
<tr>
<td>□ Breathing circuit connections</td>
<td>□ Flood surgical field with saline</td>
</tr>
<tr>
<td>▪ Kinked endotracheal tube</td>
<td>□ Lower surgical site below heart</td>
</tr>
<tr>
<td>□ Breath sounds and chest excursion</td>
<td><strong>Low cardiac output or cardiac arrest</strong></td>
</tr>
<tr>
<td>▪ Bilateral sounds and chest movement</td>
<td>Actions:</td>
</tr>
<tr>
<td>▪ Quality of breath sounds</td>
<td>□ Follow PALS algorithm if cardiac arrest</td>
</tr>
<tr>
<td>▪ Presence of <em>wheezing</em> or crackles</td>
<td>□ Give 100% oxygen</td>
</tr>
<tr>
<td>□ Gas analyzer connections; power on?</td>
<td>□ Support ventilation</td>
</tr>
<tr>
<td>□ Ventilation rate (excessive?)</td>
<td>□ Support blood pressure with IV saline (10-20 mL/kg bolus)</td>
</tr>
<tr>
<td></td>
<td>□ Turn off anesthetic agents</td>
</tr>
</tbody>
</table>
Call for help.

Stop local anesthetic.
Request Intralipid kit.

Secure airway and ventilation
Give 100% oxygen.
Confirm or establish adequate IV access.
Confirm and monitor continuous ECG, BP, and SaO2.

Seizure treatment: midazolam 0.05-0.1 mg/kg IV or propofol 1-2 mg/kg IV. Treat resultant hypoventilation.
Treat hypotension with small doses of epinephrine 1 mcg/kg.
Monitor and correct acidosis, hypercarbia and hyperkalemia.
Avoid vasopressin, calcium channel blockers and beta blockers.
If cardiac instability occurs:
  - Start CPR
  - Start Intralipid therapy (see inset box)
    - Continue chest compressions (lipid must circulate)

Consider alerting nearest cardiopulmonary bypass center and ICU if no ROSC.

**Intralipid Dosing**
- Bolus Intralipid 20% 1.5 mL/kg over 1 min
- Start infusion 0.25 mL/kg/min
- Repeat bolus every 3-5 min up to 3 mL/kg total dose until circulation is restored
- Increase the rate to 0.5 mL/kg/min if BP remains low or declines
- Continue infusion until hemodynamic stability is restored.
- Maximum total Intralipid 20% dose: 10 mL/kg over first 30 min
Loss of Evoked Potentials

- Notify surgeon.
- Turn off inhalation agent/N₂O and switch to propofol/ketamine infusion.
- Turn off or reverse neuromuscular blockers.
- Increase perfusion pressure (MAP > 70 mmHg) using ephedrine (0.2 – 0.3 mg/kg IV) and/or phenylephrine (1-10 mcg/kg IV).
- Check Hb; transfuse RBC (10-15 mL/kg IV) if anemic.
- Ensure normocarbia: ↑ I/E ratio, ↓ PEEP.
- Ensure normothermia.
- Consider wake-up test.
- Consider high-dose steroid for spinal cord injury:
  - Methylprednisolone 30 mg/kg IV over 15 min, then 5.4 mg/kg/h IV infusion.
Malignant Hyperthermia

- Call for help.
- Get Malignant Hyperthermia (MH) Kit.
- Stop procedure if possible
- Stop volatile anesthetic. Transition to non-triggering anesthetic
- Request chilled IV saline.
- **Hyperventilate** pt to reduce CO₂: 2-4 times patient’s minute ventilation
- **Dantrolene 2.5 mg/kg IV every 5 min** until symptoms resolve.
- Assign dedicated person to mix dantrolene (20 mg/vial) with 60 mL sterile water.
- **Bicarbonate 1-2 meq/kg IV** for suspected metabolic acidosis; maintain pH > 7.2.
- **Cool patient** if temperature > 38.5° C.
  - NG lavage with cold water.
  - Apply ice externally.
  - Infuse cold saline intravenously.
  - **Stop cooling if temperature < 38° C.**
- **Hyperkalemia treatment:** (See ‘Hyperkalemia’ card)
  - Ca gluconate 30 mg/kg IV or Ca chloride 10 mg/kg IV;
  - Sodium bicarbonate 1-2 mEq/kg IV;
  - Regular insulin 10 Units IV with 1-2 amps D50 (0.1 units insulin/kg and 1 mL/kg D50)
- **Dysrhythmia treatment:** Standard anti-arrhythmics; do NOT use calcium channel blocker
- Send labs: ABG or VBG, electrolytes, serum CK, serum/urine myoglobin, coagulation
- Place Foley catheter to monitor urine output.
- Call ICU to arrange disposition.
Myocardial Ischemia

Recognition
- ST depression >0.5 mm in any lead
- ST elevation >1 mm (2mm in precordial leads)
- Flattened or inverted T waves
- Arrhythmia: VF, VT, ventricular ectopy, heart block

Treat potential causes
- Severe hypoxemia
- Systemic arterial hypo- or hypertension
- Marked tachycardia
- Severe anemia
- Coronary air embolus
- Cardiogenic shock
- Local anesthetic toxicity

Diagnostic studies
- 12-lead ECG:
  - II, III, aVF for inferior (RCA)
  - V5 for lateral ischemia (LCx)
  - V2, V3 anterior ischemia (LAD)
- Compare to previous ECGs
- Ped Cardiology consult; echocardiography

Treatment
- Improve O₂ Supply
  - 100% oxygen
  - Correct anemia
  - Correct hypotension
- Decrease O₂ Demand
  - Reduce heart rate
  - Correct hypertension
  - Restore sinus rhythm
- Drug therapy
  - Nitroglycerin 0.5-5 mcg/kg/min
  - Consider heparin infusion
    - 10 units/kg bolus, then 10 units/kg/hr
Tachycardia

Diagnosis:
- ST: narrow complex, p waves present before every QRS
- SVT: narrow complex, no p waves or p waves not associated with QRS
- VT: wide complex, polymorphic or monomorphic

Treatment:
If no pulse present, start CPR, go to ‘Cardiac Arrest, VF/VT’ Card

If pulse present:
Narrow Complex
- Vagal maneuvers
- Apply ice to face
- Adenosine 0.1-0.3 mg/kg iv push
  (Max 1st dose 6mg/max 2nd dose 12mg)

Wide Complex
- Synchronized cardioversion at 0.5 -1.0 joules/kg (see table)
- Amiodarone 5 mg/kg IV bolus over 20-60 minutes, or
- Procainamide 15 mg/kg IV bolus over 30-60 minutes, or
- Lidocaine 1 mg/kg IV bolus

<table>
<thead>
<tr>
<th>VT, Wide-complex irregular rhythm</th>
<th>SVT, tachyarrythmias with pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biphasic 2 J/kg, then 4 J/kg for additional shocks</td>
<td>Synchronized cardioversion 0.5-1 J/kg, then 2 J/kg for additional shocks</td>
</tr>
</tbody>
</table>

Read out H&Ts

<table>
<thead>
<tr>
<th>Hypovolemia</th>
<th>Tension</th>
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<tr>
<td>Hypoxemia</td>
<td>pneumothax</td>
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<td>Hydrogen ion (acidosis)</td>
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<td>Toxin</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>Trauma</td>
</tr>
</tbody>
</table>
Call for help.

Notify Blood Bank immediately of massive transfusion need.

- RBC : FFP : Platelets = 1:1:1
- Use un-cross matched O negative blood until cross-matched blood available
- Give cryoprecipitate to maintain fibrinogen > 100

Obtain additional vascular access if needed.

Send labs q 30 min

- Type & Cross
- CBC, platelets, PT/PTT/INR, fibrinogen
- ABG, Na, K, Ca, lactate.

Warm the room

Blood product administration

- Use 140 micron filter for all products
- Use a blood warmer for RBC and FFP transfusion (not for platelets).
- Rapid transfuser pumps may be used when increased flow is needed.

Monitoring for hypothermia, hypocalcemia, electrolyte, blood gas, and acid-base disturbances.

Consider rFactor VIIa for refractory hemorrhage if above measures are corrected.

Terminate the massive transfusion protocol once bleeding is under control.

Maintain:
- HCT > 21% or HB > 7
- Platelet Count > 50,000 (>100k brain injury)
- INR < 1.5 (< 1.3 brain injury)
- Fibrinogen > 100
Transfusion Reactions

For All Reactions
- Call for help.
- **Stop** transfusion.
- Disconnect donor product and IV tubing.
- Infuse normal saline through clean tubing.
- Examine blood product ID; determine correct pt.
- Send product to Blood Bank.
- Document per Institutional Policy

**Non-Hemolytic** - ↓BP, bronchospasm, pulmonary edema, fever, rash
- Stop Transfusion
- Send blood to blood bank
- Treat fever
- Observe for signs of hemolysis

**Hemolytic** - Hgbemia, Hgburia, DIC, ↓BP, ↑HR, bronchospasm

- Furosemide 0.1 mg/kg
- Mannitol 0.5 grams/kg (2 mL/kg of 25% mannitol)
- Dopamine (2-4 mcg/kg/min)
- Maintain urine output at least 1-2 mL/kg/h.
- Prepare for cardiovascular instability.
- Send blood and urine sample to laboratory.

**Anaphylactic** - Erythema, urticaria, angioedema, bronchospasm, tachycardia, shock
- **Stop transfusion**
- Support airway and circulation as necessary.
- Epinephrine 10 mcg/kg IV
- Diphenhydramine 1 mg/kg IV
- Hydrocortisone 2-5 mg/kg
- Maintain intravascular volume.
Prior to pt arrival to OR:
- Assemble team and assign roles.
- Estimate weight and prepare emergency drugs.
- Gather equipment:
  - airway supplies
  - invasive monitors
  - fluid warmer
  - rapid infusion device
  - code cart with programmed defibrillator
- Type and cross blood products.

On pt arrival to OR:
- Maintain c-spine precautions for transport.
- Secure/confirm airway (aspiration risk, unstable c-spine).
- Ensure adequate ventilation (maintain PIP <20 cmH₂O).
- Obtain/confirm large-bore IV access (central or interosseus if peripheral unsuccessful).
- Assess circulation
- Persistent tachycardia, delayed cap refill, decreased pulse pressure = hypovolemia.
  - Bolus 20 mL/kg LR or NS (repeat x2) and/or 10 mL/kg RBCs or 20 mL/kg whole blood
- Place invasive monitors.
- Maintain normothermia.
- Rapidly treat associated conditions (acidosis, electrolyte disturbances).
- Continuously assess for secondary injury (ongoing blood loss)
Secure airway if GCS < 9, respiratory distress, hemodynamic instability, or elevated ICP.

Maintain pCO₂ 30-35 mmHg and pO₂ >60mmHg.

Maintain cerebral perfusion pressure.
  - (MAP – ICP) > 40 mmHg and systolic BP >5th percentile for age (see ‘Hypotension’ card)
  - Use CVP in place of ICP if no ICP monitor available.

Treat elevated ICP with:
  - Hyperventilation
  - Propofol or etomidate
  - Mannitol (1g/kg)
  - Hypertonic saline (3% via central venous catheter; 4mL/kg)

Maintain normoglycemia.
  - Avoid glucose-containing solutions if hyperglycemic.