EMERGENCY MANUAL
COGNITIVE AIDS FOR OB
PERIOPERATIVE CRITICAL EVENTS

ACLS
Asystole/PEA..........................1
Bradycardia – Unstable.................2
Tachycardia – Unstable................3
Pulseless VF/VT........................4

CRITICAL EVENTS: NON-ACLS
Amniotic Fluid Embolism................5
Anaphylaxis................................6
Bronchospasm............................7
Difficult airway – Unanticipated.......8
Fire...........................................9
Post-partum Hemorrhage................10
Hypotension............................11
Hypoxia..................................12
Local Anesthetic Toxicity..............13
Malignant Hyperthermia...............14
Myocardial Ischemia....................15
Seizure..................................16
Stroke....................................17
Tachycardia – Stable SVT...............18
Total Spinal Anesthesia...............19
Transfusion Reaction...................20
Venous Air Embolus....................21

Edited by Monica Harbell, MD 5/2016; updated 10/2020
1: Maternal Cardiac Arrest: Asystole/PEA

**Condition:** Non-shockable pulseless cardiac arrest.
**Objective:** Restore pulse, hemodynamic stability

- **Call for help. Code Cart. Batch Page.**
- **Activate Code Blue**
- **Left uterine displacement**
- **CPR** (100-120 chest compressions/min + 10 breaths/min, 5-6cm deep) *
  - Ensure full chest recoil with minimal interruptions. Rotate compressors q2min
  - . Keep EtCO₂ > 10mmHg
- **Decrease/turn off anesthetic**
- **Increase FiO₂ to 100%, high flow**
- **Epinephrine** (1mg IV q3-5min)
- **Check pulse & rhythm** (after every 2 min of CPR; limit check to 10 secs):
  - If no pulse and shockable (VF/VT): GO TO: Maternal Cardiac Arrest – VF/VT Checklist
  - If no pulse and NOT shockable (asystole/PEA):
    - Resume CPR
    - Read out potential causes (H&Ts).***
    - Consider common perioperative DDx: hemorrhage, anesthetic overdose, sepsis or other shock states, auto-PEEP, anaphylaxis, medication error, high spinal, pneumothorax, local anesthetic toxicity, vagal stimulus, pulmonary embolus
    - Restart checklist
  - If pulse:
    - Begin post-resuscitation care
    - Read out potential causes (H&Ts)
    - Prepare for Emergent C-section
    - If no ROSC by 4min, start C-section.**
    - Check ABG

**During CPR:**
- **Circulation** (confirm adequate IV/IO access).
  - Ensure IV access above diaphragm.
  - Assess for hypovolemia. Consider IV fluids wide open.
  - If ETCO₂<10, improve CPR quality
- **Airway** (bag mask ok if ventilation adequate)
- **Breathing** (100% FiO₂)
- **Assign roles for:** Chest compressions, defibrillation, airway, vascular access, documentation, code cart, time keeping. Orders should be explicitly acknowledged and repeated.

**Drug Doses and Treatments:**

- **Epinephrine:** 1mg IV, repeat every 3-5 min
- **Hyperkalemia Treatment:**
  - Calcium gluconate (10mg/kg) or calcium chloride (10mg/kg) IV
  - Sodium Bicarbonate 1-2mEq/kg, slow IV push
  - Insulin 10 Units regular IV with 1-2 amps D50W
- **Toxin Treatments:**
  - **Opioid overdose:** Naloxone 0.04-0.4mg IV, can repeat dosing if response inadequate.
  - **Local Anesthetic overdose:** Intralipid 1.5mL/kg IV bolus, repeat 1-2x for persistent asystole. Start infusion 0.25-0.5mL/kg/min for 30-60min for refractory hypotension.
  - **Magnesium overdose:** Calcium chloride 1g IV or calcium gluconate 10% soln 30mL IV
  - **Beta-blocker overdose:** Glucagon 2-4mg IV push
  - **Calcium channel blocker overdose:** Calcium chloride 1g IV

*See back for differential diagnosis (H&Ts) →

**In patient without an advanced airway:** Cycle of CPR =30 compressions at rate of 100-120/min, followed by 2 breaths. Give 5 cycles of CPR where “CPR x 2 min” is noted. If able to assess, keep ETCO₂ >10 and diastolic BP > 20.

**Goal for uterine hysterotomy by 4 minutes post-arrest and delivery by 5 min post-arrest.

***See back for more Causes of Maternal Cardiac Arrest and H&Ts
Possible Causes of Maternal Cardiac Arrest: H&Ts

- **Hypovolemia**: Give rapid IV fluid bolus. Check Hgb/HCT. Give blood for anemia or massive hemorrhage. Consider relative hypovolemia: Auto-PEEP – disconnect circuit; High spinal; or shock states (e.g. anaphylaxis).
- **Hypoxemia**: Increase FiO2 to 100%, high flow. Confirm connections. Check for b/l breath sounds. Suction ETT and reconfirm placement. Consider CXR. GO TO: Hypoxemia event.
- **Hypothermia**: Active warming by forced air blanket, warm IV fluid, raise room temp. Consider CPB.
- **Hyperthermia**: Consider Malignant Hyperthermia. Call for MH cart. Treat with Dantrolene immediately (2.5mg/kg). GO TO: Malignant Hyperthermia event. MH Hotline (800-644-9737).
- Obtain ABG to rule-out:
  - **Hyperkalemia**: Give CaCl\(_2\) 1g IV, D50 1 amp IV (25g Dextrose) + Regular Insulin 10 units IV. Monitor glucose. Sodium Bicarbonate 1 Amp IV (50mEq).
  - **Hypokalemia**: controlled infusion of potassium & magnesium.
  - **Hypoglycemia**: If ABG delay, check fingerstick. Give D50 1 Amp IV (25g Dextrose). Monitor glucose.
  - **H+ acidosis**: If profound, consider NaHCO\(_3\) 1 Amp IV (50mEq). Consider increasing ventilation rate (but can decrease CPR effectiveness).
  - **Hypocalcemia**: Give CaCl\(_2\) 1g IV

- **Tension Pneumothorax**: Unilateral breath sounds, possibly distended neck veins and deviated trachea (late signs). Perform emergent needle decompression (2\(^{nd}\) intercostal space at mid-clavicular line) followed by chest tube placement. Call for CXR but do not delay treatment.
- **Thrombosis – Coronary**: Consider TTE/TEE to evaluate wall motion abnormalities. Consider emergent coronary revascularization. GO TO: Myocardial Ischemia event.
- **Thrombosis – Pulmonary**: Consider TTE/TEE to evaluate right ventricle. Consider fibrinolytic agents or pulmonary thrombectomy.
- **Toxins (e.g. infusions)**: Consider medication error. Confirm no infusions running and volatile anesthetic off. Consider local anesthetic toxicity event.
- **Tamponade – Cardiac**: Consider TTE/TEE to rule out. Treat with pericardiocentesis.

**Possible Contributing Factors to Maternal Cardiac Arrest (BEAU-CHOPS)**

- **Bleeding/DIC**
- **Embolism**:
  - Coronary, pulmonary, amniotic fluid embolism
- **Anesthetic complications**
  - Airway related, local anesthetic toxicity
- **Uterine atony**
- **Cardiac Disease**
  - MI/ischemia/aortic dissection/cardiomyopathy
- **HTN**
  - preeclampsia/eclampsia
- **Other (H&Ts – see above)**
- **Placenta abruption, previa**
- **Sepsis**
Condition: Hemodynamic instability, persistent bradycardia with pulses.
Objective: Restore hemodynamic stability, adequate perfusion.

• Check for pulse. If NO pulse**, GO TO: Asystole/PEA event.
• Stop surgical stimulation (if laparoscopy, desufflate).
• Give Atropine (0.5-1mg IV; may repeat to 3mg total).
• If myocardial infarction suspected (i.e. ECG changes), treat accordingly
  - (oxygen, nitrates, consider terminating procedure).
• Assess for drug induced causes (e.g. beta-blockers, calcium channel blockers, digoxin).
• If persistent bradycardia, call for pacer and consider repeat dose of atropine, or:
  • Epinephrine (2-10 mcg/min) or Dopamine (2-20mcg/kg/min)
• For pacing:
  1. Place electrodes on chest from trancutaneous pacer.
  2. Place pacing pads on chest per package instructions.
  3. Turn monitor/defibrillator ON, set to PACER mode.
  4. Set PACER RATE (ppm) to 80/min. (Can be adjusted up or down based on clinical response once pacing is established).
  5. Increase milliamperes (mA) of PACER OUTPUT until electrical capture (pacer spikes aligned with QRS complex; threshold normally 65-100mA). Set final mA to 10mA above this level.
  6. Confirm pulse present with capture. **
• Consider expert consultation.

During Resuscitation:
• Circulation (confirm adequate IV or IO access)
  • Left uterine displacement.
  • Consider IV fluids wide open.
  • Consider 12-Lead ECG.
• Airway (assess and secure)
• Breathing (100% FiO2)

Overdose Treatments:
Beta-blocker overdose:
• Glucagon (2-4mg IV push).
Calcium channel blocker overdose:
• Calcium chloride (1g IV).

Secondary Treatments:
• Place arterial line.
• Check ABG, hemoglobin, electrolytes.
• Rule out ischemia: Check EKG, troponins.

** If PEA develops, GO TO: Maternal Cardiac Arrest – Asystole/PEA checklist
3: Tachycardia - Unstable

- **Call for help. Inform team. Batch page. Get Code cart.**
- **Check for Pulse. If NO pulse, GO TO: Asystole/PEA event.** If stable, GO TO: Tachycardia – Stable SVT event.
- **Increase FiO₂ to 100%, high flow.**
- **Left Uterine Displacement.**
- **Decrease/turn off anesthetic.**
- **Confirm adequate ventilation and oxygenation. Consider securing airway.**
- **If unstable, IMMEDIATE SYNCHRONIZED CARDIOVERSION** – biphasic doses.
- **Consider sedation if patient awake.**

<table>
<thead>
<tr>
<th>SVT Rhythm</th>
<th>Biphasic Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow complex, &amp; Regular</td>
<td>50-100 J Synchronized</td>
</tr>
<tr>
<td>Narrow complex &amp; Irregular</td>
<td>120-200 J Synchronized</td>
</tr>
<tr>
<td>Wide complex &amp; Regular</td>
<td>100 J Synchronized</td>
</tr>
<tr>
<td>Wide complex &amp; Irregular</td>
<td>Unsynchronized</td>
</tr>
</tbody>
</table>

- **If unsuccessful cardioversion:** Re-SYNC and increase Joules incrementally for Synchronized Cardioversion.
- **While preparing to cardiovert (do NOT delay), if narrow complex and regular, consider Adenosine 6mg rapid IV push with flush via access closest to heart. May give 2nd dose of 12mg IV.

**During Resuscitation:**
- **Circulation** (confirm adequate IV or IO access)
  - Left uterine displacement.
  - Consider IV fluids wide open.
  - Consider 12-lead ECG.
- **Airway** (assess and secure)
- **Breathing** (100% FiO₂, high flow)

**Synchronized Cardioversion Instructions:**
- **Turn monitor/defibrillator ON.** Set to DEFIB mode.
- **Place electrodes on chest** per package instructions.
- **Press SYNC button** to engage synchronization mode.
- **Look for mark/spike on R-wave** indicating SYNC mode.
  - Adjust SIZE button if necessary until SYNC markers seen with each R-wave.
- **Cardiovert at appropriate energy level,** begin at lower level and progress as needed: “Energy select” buttons → “Charge” button → “Shock” button [Press and hold].

<table>
<thead>
<tr>
<th>Rhythm</th>
<th>Biphasic Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial Fibrillation</td>
<td>120J → SYNC* → 150J → SYNC* → 200J</td>
</tr>
<tr>
<td>Mono-morphic VT</td>
<td>100J → SYNC* → 150J → SYNC* → 200J</td>
</tr>
<tr>
<td>Other SVT, Atrial flutter</td>
<td>50J → SYNC* → 100J → SYNC* → 150J → SYNC* → 200J</td>
</tr>
<tr>
<td>Polymorphic VT and unstable</td>
<td>Treat as VF, GO TO: Maternal Cardiac Arrest – VF/VT Event</td>
</tr>
</tbody>
</table>
4: Maternal Cardiac Arrest: Pulseless VF/VT

Condition: Shockable pulseless cardiac arrest.
Objective: Restore pulse, hemodynamic stability

Top Priority = Early Defibrillation
• Call for help. Batch Page. Code Cart.
• Activate Code Blue
• Left uterine displacement
• Get defibrillator
• CPR (100-120 chest compressions/min, 5-6cm deep + 10 breaths/min) *
  – Ensure full chest recoil with minimal interruptions
  – Keep EtCO₂ > 10mmHg
• Remove fetal monitors
• Shock at 120J Biphasic
• Epinephrine 1mg IV q3-5min
• CPR x 2 min
• Prepare for Emergent C-section
• Check pulse and rhythm (confirm shockable; limit check to 10 sec) **
• Shock at highest setting (200J Biphasic)
• Epinephrine 1mg IV q3-5min
• CPR x 2 min
• If NO return of spontaneous circulation, start C-section***
• Check pulse and rhythm (confirm shockable; limit check to 10 secs) **
• Shock at highest setting
• Amiodarone 300mg IV x1 #
• CPR x 2 min
• Check pulse and rhythm (confirm shockable; limit check to 10 sec)**

During CPR:
• Circulation (confirm adequate IV/IO access).
  • Ensure IV access above diaphragm.
  • Consider IV fluids wide open.
  • If ETCO₂<10, improve CPR quality
• Airway (bag mask ok if ventilation adequate)
• Breathing (100% FiO₂, high flow)
• Assign roles for: Chest compressions, defibrillation, airway, vascular access, documentation, code cart, time keeping.

Orders should be explicitly acknowledged and repeated.

Defibrillator:
1. Turn defibrillator ON, set to DEFIB mode.
2. Place electrodes on chest per packing instructions.
3. Deliver shock (“Charge” button ➔ “Shock” button)

Drug Doses and additional considerations:
Epinephrine: 1mg IV, repeat every 3-5 min
Amiodarone: 300mg IV/IO once, then consider additional 150mg IV/IO once
#Lidocaine can be given instead of amiodarone for VF/pulseless VT unresponsive to CPR, defibrillation or vasopressor therapy (1.5mg/kg).
Magnesium: consider giving for Torsades de Pointes (loading dose 1-2g IV/IO)
For Magnesium Toxicity: Calcium chloride 10% soln 10mL IV/IO or calcium gluconate 10% soln 30mL IV/IO

*In patient without an advanced airway: Cycle of CPR =30 compressions at rate of 100/min, followed by 2 breaths. Give 5 cycles of CPR where “CPR x 2 min” is noted. If able, keep ETCO₂>10, Diastolic >20
**If Asystole/PEA develops at any point, GO TO Cardiac Arrest: Asystole/PEA checklist.
***If pulse at any point, begin post-resuscitation care.
*** Goal for uterine hysterotomy by 4 minutes post-arrest and delivery by 5 min post-arrest.
5: Sudden Hemodynamic Collapse (Possible Amniotic Fluid Embolism)

- Left uterine displacement.
- Anticipate possible cardiopulmonary arrest and emergent C-section.
- Increase FiO₂ to 100%, high flows.
- Establish large volume IV access (upper body best).
- Support circulation with IV fluid, vasopressors, and inotropes.
- Prepare for emergent intubation.
- When possible, place arterial line. Consider central venous access.
- Anticipate massive hemorrhage and DIC. GO TO: Hemorrhage Checklist
- Consider circulatory support: IABP/ECMO/CPB.

**Condition:** Sudden hemodynamic instability (hypotension, tachycardia, arrhythmias, cardiac arrest) in pregnant or post-partum patient, respiratory distress, decreased SpO₂, Coagulopathy +/- DIC, altered mental status.

**Objective:** Restore normal oxygen saturation and hemodynamic stability.

**Rule out other causes that might present in similar fashion:**
- Eclampsia
- Hemorrhage
- Air embolism
- Aspiration
- Anaphylaxis
- Pulmonary embolism
- Anesthetic overdose
- Sepsis
- Cardiomyopathy/ cardiac valvular abnormality/ MI
- Local anesthetic toxicity
6: Anaphylaxis

**Condition:** Suspected anaphylaxis (consistent hx, rash/hives, hypotension, bronchospasm/wheezing, angioedema, increased PIP, difficulty breathing, hypoxemia).

**Objective:** Restore hemodynamic stability, abort reaction.

- Call for help. Inform team. Code cart.
- Left uterine displacement
- Discontinue/remove potential causative agents
- Increase FiO₂ to 100%
- Decrease anesthetic if hypotensive
- Give Epinephrine IV in escalating doses every 2 min
  - Start 10-100 mcg IV
  - Increase dose every 2 min until clinical improvement noted
  - Consider early epinephrine infusion
- Consider **early intubation** to secure airway prior to angioedema of airway
- IV fluids opened and/or fluid bolus given at high rate?
- If no response: begin IV epinephrine infusion (rate 1-4mcg/min)
- IV access adequate?
- Consider **invasive monitors** (arterial line)

**Common causative agents:**
Neuromuscular blocking agents, latex products (gloves, Foley catheter), chlorahexidine, antibiotics, colloids, blood products, contrast, protamine.

**Drug Doses:**
- **Epinephrine doses:**
  - Start with 10-100mcg IV depending on severity
  - Increase incrementally every 2 min until improvement
  - 300mcg (0.3mL of 1:1,000 concentration) IM if no IV access
- **If cardiac arrest:**
  Give 1mg epinephrine IV, begin ACLS and GO TO: Maternal Cardiac Arrest – Asystole/PEA Checklist or Maternal Cardiac Arrest – VF/VT Checklist.

**Consider and rule out other causes:**
- PE
- MI
- Anesthetic OD
- PTX
- Hemorrhage
- Aspiration

**POST Event** (consider when patient stable):
- Check serum **tryptase level** (useful to guide future management; peaks <60min post-event)
- Check serum **histamine** (peaks <30min post-event)
- If event was moderate/severe, consider keeping patient intubated and sedated.
- Can recur with biphasic response: Consider monitoring for 24 hours post-recovery.
- Refer patient for post-allergy testing.
Condition: Decreased SpO₂, increased peak pressures, wheezing, increased ETCO₂ with upsloping ETCO₂ waveform, decreased TV if pressure control.
Objective: Restore normal oxygen saturation and peak pressures.

- Call for help. Inform team. Code cart?
- Increase FiO₂ to 100%, high flows
- If hypotensive, consider disconnecting patient from circuit to allow for complete exhalation as may be due to air trapping
- Change I:E time to allow for adequate exhalation
- Deepen anesthetic (Sevoflurane is non-irritating)
- Rule out mainstem intubation or kinked ETT. Suction ETT.
- Give inhaled Beta-2 agonist (Albuterol) +/- anticholinergic (Ipratropium)
- If severe, consider Epinephrine (start with 10mcg IV and escalate, monitor for tachycardia and HTN)
- Consider Ketamine (0.2-1mg/kg IV)
- Consider Hydrocortisone (100mg IV)
- Consider Magnesium sulfate (1-2g IV)
- Consider nebulized racemic epinephrine
- Rule out anaphylaxis (hypotension/tachycardia/rash). GO TO: Anaphylaxis checklist
- Consider ABG.
Call for help. Get Difficult Airway cart.

Bag-mask ventilate.

Bag-mask ventilation adequate?*

No

Yes, consider:

Laryngeal Mask Airway (LMA) or other Supraglottic (SG) device

Yes, consider:

• Operation using LMA (+ cricoid). **
• Return to spontaneous ventilation.
• Wake patient up.
• Different laryngoscope blades.***
• BURP maneuver (Backwards Upwards Rightward Pressure)
• Video Assisted laryngoscope.
• LMA-Aintree catheter as conduit.
• Fiberoptic intubation.
• Tracheal introducer (bougie).

LMA/SG ventilation adequate?

Yes, consider:

• Cricothyrotomy (bottom drawer of Anes machine).
• Transtracheal jet ventilation.
• Call ENT Consult 443-0825 for surgical airway. Get Tracheostomy Kit.
• Consider rigid bronchoscope.

If bag mask ventilation and LMA become inadequate

Yes, consider:

If alternatives fail, consider:

• Wake patient up (for awake intubation, doing procedure under regional/local, or cancelling case).
• Other options (i.e. surgery using LMA, face-mask**)
• Surgical airway if unable to abort case.

No

* Try oral airways, sniff position, ramp, two-handed ventilation. Avoid nasal airways in pregnancy.
** Only if true crash C-section.
*** Limit total DL attempts to 2 in pregnant patients. Smaller ETT recommended (6.0) in pregnancy.
**** Do not attempt nasal intubation in pregnant patients.
### Condition: Signs of fire in OR, in airway, or on patient (smoke, odor, flash)
### Objective: Protect patient, contain fire.

#### Call for help. Inform team.

#### Activate fire alarm/Get fire-extinguisher/Remove source of heat.

### Airway Fire
- Disconnect breathing circuit.
- **Stop flow** of medical gases (oxygen/nitrous oxide).
- **Remove endotracheal tube** (must balance against airway loss).
- Remove flammable material from airway.
- **Pour saline** into patient’s airway or endotracheal tube, if kept in place.

### Non-airway Fire
- **Stop flow** of medical gases (oxygen/nitrous oxide).
- **Remove** drapes and flammable materials from patient.
- **Extinguish fire:**
  - If *electrical equipment* burning (laser, Bovie, anesthesia machine, etc), use **only CO₂ fire extinguisher** (safe in wounds).
  - If *non-electrical*, extinguish with saline and soaked gauze.

**Do not** use alcohol based solutions.

### If Fire Not Extinguished On First Attempt

- Use fire extinguisher (CO₂) to extinguish fire (safe in wounds).

### If Fire Persists

- **Evacuate** patient (per Institutional protocol).
- Close OR door.
- Turn OFF external gas supply to operating room.
- **Alert fire department (Call 911).**

### If Fire Extinguished

- **Re-establish ventilation.** Consider prompt reintubation prior to swelling.
- Avoid oxidizer-rich environment, supplemental O₂ (if possible).
- Consider **bronchoscop** to assess for inhalational injury and remove residual debris.
- Examine ET tube to see if fragments may be left behind.
- Discuss continuation of case with surgeon.

**See back for Fire Prevention Tips ➔**
Airway Fire Prevention

If high risk procedure, including those listed below:
- Discuss fire prevention & management with team during time-out.
- Avoid FiO₂ > 0.3 and avoid N₂O.

For laser surgery of vocal cord or larynx:
- Use laser resistant ETT.
- Make sure ETT cuff is sufficiently deep below vocal cords.
- Fill proximal ETT cuff with methylene blue- tinted saline.
- Ensure laser is in STANDBY when not in active use.
- Surgeon protects ETT cuff with WET gauze.
- Surgeon confirms FiO₂ < 0.3 & no nitrous prior to laser use.

For non-laser surgery in oropharynx:
- Regular PVC ETT may be used.
- Consider packing wet gauze around ETT to minimize oxygen leakage.
- Consider continuous suctioning of operating field inside oropharynx.

Non-airway Fire Prevention

- Team communication at Time-Out if high risk procedure.
- Highest risk in MAC head and neck procedure.
  - Use nasal cannula instead of face mask (if possible).
  - Configure drapes to avoid O₂ build-up, consider active scavenging if required.
  - Use minimum O₂ concentration for adequate SpO₂.
- If high O₂ concentration required, use LMA or ETT.
- Allow complete drying of EtOH skin prep solutions.
- Consider coating patient’s head hair and facial hair with water-soluble surgical lubricating jelly.

Remember: Fuel Source + Oxidizer + Spark = FIRE
10: Post-Partum Hemorrhage

- Call for help. Inform team. Batch page? Code cart?
- Open IV fluids. Get adequate IV access (at least two 18G PIVs)
- Consider Uterotonics:
  - Pitocin 30-40 units IV in 1L
  - Hemabate 0.25mg IM. Consider repeat dose.
  - Methergine 0.2mg IM. Consider repeat dose.
  - Misoprostol 1000mcg PR/buccal
- Consider Trendelenburg or elevate patient’s legs.
- Check Hemacue. Send STAT labs (CBC, PT/PTT/INR, Fibrinogen, Lactate, ABG, Potassium, Calcium)
- Call Blood Bank 476-1404:
  - Activate Massive Transfusion Protocol (via ANES Attending phone call to blood bank)
  - Order blood products
    - RBC/FFP (1:1 ratio)
    - Consider Platelets (if indicated, 1:5 ratio with PRBCs)
    - Consider Cryoprecipitate
- Call for additional Nursing and Anesthesia help. Call for dedicated Anesthesia Tech. Consider GYN surgery consult.
- Consider conversion to GA.
- Use Rapid infuser (or pressure bags).
- Maintain normocalcemia.

Have we considered:
- Additional surgical techniques and/or personnel?
  - Hemostatic agents? Antifibrinolytics (Tranexamic acid 10mg/kg IV, then 1mg/kg/hr)?
  - Bakri balloon (Uterine tamponade)? Uterine packing?
  - B-Lynch suture?
  - Interventional Radiology? (Fellow pager 443-9417)
  - Hysterectomy?
- Damage control surgery (pack, close, resuscitate)?
- ICU postop?

4 T’s DDx for PPH:

<table>
<thead>
<tr>
<th>Tone</th>
<th>Uterine atony</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>Lacerations, hematomas, inversion, rupture</td>
</tr>
<tr>
<td>Tissue</td>
<td>Retained tissue, invasive placenta</td>
</tr>
<tr>
<td>Thrombin</td>
<td>Coagulopathies</td>
</tr>
</tbody>
</table>

**If active bleeding, transfuse based on clinical situation. Do not wait for lab results.**

Other Considerations:
- Stay in contact with Blood Bank periodically if Massive Transfusion Protocol activated to ensure continued delivery of blood products. Identify one person to speak to one person in blood bank for all product requests to avoid duplicates.
- Consider cell salvage. Call Cell Saver (916) 851-5800 for setup.

Hyperkalemia Treatment:
- Calcium gluconate (10mg/kg) or calcium chloride (10mg/kg) IV
- Sodium Bicarbonate 1-2mEq/kg, slow IV push
- Insulin 10 Units regular IV with 1-2 amps D50W

Condition: Acute massive bleeding
>500mL after vaginal delivery, >1000mL after c/s
Objective: Stop bleeding, maintain hemodynamic stability, avoid coagulopathy
**Condition:** Unexplained drop in BP.

**Objective:** Restore hemodynamic stability.

- **Call for help. Inform team. Batch page? Code cart?**
- **Check Equipment/monitors** checked for malfunction (arterial line, BP cuff).
- **Left Uterine Displacement** if obviously gravid uterus.
- **Check Pulses.** If no pulse, start CPR, GO TO: appropriate ACLS events.
- **Give IV fluid bolus** opened? Ensure IV is working.
- **Increase FiO₂ to 100%, high flow.**
- **Surgical field inspected for bleeding?** If bleeding, GO TO: PP Hemorrhage Checklist
- **Have we considered:**
  - Decreasing anesthesia?
  - Patient position? Consider **Trendelenberg** or elevation of patient’s leg.
  - Give **phenylephrine** or **ephedrine** to temporize. If severe refractory hypotension, consider **epinephrine** 10-100mcg and/or **vasopressin** 1-4 units.
  - Additional IV access? Arterial line?
  - Send labs: ABG, Hgb, electrolytes, calcium, lactate, type & cross
- **Have we considered the following causes:**

  **Anesthesia**
  - **Airway:**
    - Unexplained Hypoxia (GO TO: Hypoxia Checklist)
    - Increased PEEP, Auto-PEEP (disconnect circuit)
  - **Breathing:**
    - Hypoventilation
    - Pneumothorax
    - Pulmonary Edema
    - Persistent hyperventilation
  - **Circulation:**
    - Hemorrhage
    - Myocardial ischemia
    - Pulmonary Embolism
    - Air Embolism (GO TO: Air Embolism Checklist)
    - Other emboli (fat, septic, CO₂, amniotic fluid)
    - Anaphylaxis
    - Severe sepsis, adrenal insufficiency
    - Tamponade
    - Bradycardia (GO TO: Bradycardia – Unstable Checklist)
    - Tachycardia (GO TO: Tachycardia – Unstable Checklist)
    - Malignant Hyperthermia (GO TO: Malignant Hyperthermia Checklist)
    - Bone Cementing (Methyl methacrylate effect)
  - **Drugs/allergy:**
    - Recent drugs given/dose error/allergy
    - Anesthetic overdose

**Surgical**
- Retraction
- Vagal stimulation
- Mechanical/surgical manipulation
- Vascular compression
- IVC compression (prone, obese, pregnant or surgical)

**Nursing**
- Other evidence of bleeding:
  - Amount of **blood in suction canister**
  - Number of **bloody sponges**
  - **Blood on the floor**
  - Drugs used on the field (i.e. intravascular injection of local drugs)
12: Hypoxia

**Condition:** Unexplained oxygen desaturation.

**Objective:** Restore oxygenation.

- Call for help. Inform team.
- Check Pulse oximeter placement.
- Increase $\text{FiO}_2$ to 100%, high flow.
- Hand ventilate to assess compliance. Rule out leaks, machine factors.
- Oxygen source checked? Check other monitors, vitals, PIP, ETCO$_2$. Check for pulse.
- Check Circuit for disconnection, kinks, holes.
- End-tidal CO$_2$ confirmed?
- Listen for Breath sounds (bilateral? clear?). Check ETT position.
- Soft suction via ETT (to clear secretions and check obstructions).
- Check ABG. Consider CXR.

**Suspected Airway/Breathing Issue?**

Yes
- Depending on likely diagnosis, consider:
  - Large recruitment breaths. Add PEEP (caution if hypotensive)
  - Bronchodilators (albuterol MDI or nebulizer)
  - Neuromuscular blockade (if indicated)
  - Increase FRC: head up (unless low BP), desufflate
  - Fiberoptic to rule out mainstem intubation or ETT obstruction.
  - Removing circuit and using Ambu-bag
  - Remove ETT and Mask Ventilation/Re-Intubation
  - Consider terminating surgery for refractory hypoxemia.

No
- Consider causes:

**Circulation:**
- Embolism
  - Pulmonary Embolus
  - Air Embolism? (GO TO: Air Embolism Checklist)
  - Other Emboli (e.g. fat, septic, CO$_2$, AFE)
- Heart Disease?
  - Congestive Heart Failure
  - Coronary Artery Disease
  - Myocardial Ischemia
  - Cardiac Tamponade
  - Congenital/anatomic Defect
    - EKG, TEE, Bypass considered?
- Severe sepsis
- If hypoxia associated with hypotension (GO TO: Hypotension Checklist)

**Drugs/allergy:**
- Recent drugs given
  - Drug error/allergy/anaphylaxis

**Airway:**
- Right mainstem intubation
- Bronchospasm
- Ventilator settings, leading to Auto-PEEP

**Breathing:**
- Aspiration
- Atelectasis
- Obesity/positioning
- Pneumothorax
  - CXR. Consider needle decompression, chest tube.
- Hypoventilation
- Pulmonary Edema
- Low FiO$_2$
- V/Q mismatch or shunt, diffusion problem

See back for differential diagnosis →
Hypoxia

Physiological Differential Diagnosis:

- **Low FiO₂**: If gas analyzer states low FiO₂ while on 100% O₂ likely have O₂ failure or pipeline crossover of gases. Disconnect from anesthesia machine, use Ambu bag or Jackson Rees circuit attached to E cylinder of O₂.

- **Hypoventilation**: Check for signs of low minute ventilation:
  - Low TV or RR
  - High or low ETCO₂
  - Poor chest rise
  - Decreased breath sounds
  - Patient bucking ventilator

  **Rule out** or fix equipment and patient causes:
  - Circuit leak
  - Obstructed or kinked ETT
  - High PIP
  - Residual neuromuscular blockade
  - Patient breathing asynchronously with ventilator.

  **Postoperative respiratory failure** common causes:
  - Residual neuromuscular blockade, opioid, anesthetic, laryngospasm (sudden), bronchospasm, pulmonary edema, high spinal, pain.

- **V/Q Mismatch or Shunt**: A-a Gradient Common Causes
  - Mainstem intubation
  - Atelectasis
  - Aspiration
  - Bronchospasm (+?Anaphylaxis)
  - Mucus plug
  - Pleural effusion

  **Consider RARE but Critical:**
  - Pneumothorax
  - Hypotension – any cause of poor perfusion
  - Embolus – Air, blood, fat, AFE

- **Diffusion** abnormality: usually chronic lung disease

- **Methemoglobinemia** (O₂ sat ~85%), COHgb (O₂ Sat often normal): If suspect, check co-oximetry.

- **Increased metabolic O₂ demand**: MH, thyrotoxicosis, sepsis, hyperthermia, neuroleptic malignant syndrome.

- **Artifacts**: Poor waveform (probe malposition, cold extremity, light interference, cauterity), dyes (methylene blue, indigo carmine, blue nail polish). Confirm by ABG.
13: Local Anesthetic Toxicity

**Condition:** Tinnitus, metallic taste, circumoral numbness, altered mental status, seizure, hypotension, bradycardia, ventricular arrhythmias, CV collapse

**Objective:** Restore hemodynamic stability

- Call for help. Inform team. Code cart.
- Call for Intralipid (in Block cart). Alert possible Cardiopulmonary Bypass.
- If pulseless, start CPR.
- Stop local anesthetic injection/infusion.
- If patient unstable, give epinephrine <1mcg/kg. Avoid vasopressin.
- Establish airway – ensure adequate ventilation and oxygenation. Consider endotracheal intubation.
- Treat seizure with benzodiazepines (avoid propofol if hemodynamic instability)
- If signs persist or patient unstable, rapidly give 1.5mL/kg bolus of 20% Intralipid IV (70kg adult gets 100mL over 1 min), then start infusion at 0.25mL/kg/min. May repeat loading dose (max 3 doses or 10mL/kg over first 30 min). May increase infusion rate to 0.5mL/kg/min if persistent hypotension.
- Monitor for hemodynamic instability. Treat hypotension. **GO TO:** appropriate ACLS event depending on arrhythmia with ASRA modifications*.
- If refractory to treatment, consider cardiopulmonary bypass.
- May require prolonged resuscitation.
- Monitor patient post event in ICU.

**Drugs to AVOID during Local Anesthetic Toxicity:**
- Propofol
- Vasopressin
- Calcium channel blocker
- Beta blocker
- Local anesthetic

**ASRA Modifications to ACLS when treating Local Anesthetic Toxicity:**
- Reduce Epinephrine doses to <1mcg/kg IV.
- AVOID: Vasopressin, calcium channel blockers, beta blockers, and local anesthetics.

**Intralipid Dosing:**
- **Bolus 1.5mL/kg** (lean body mass) IV over 1 min (~100mL in 70kg patient)
- **Continuous infusion 0.25mL/kg/min** (~18mL/min)
- Repeat bolus once or twice for persistent cardiovascular collapse
- Double infusion rate to 0.5mL/kg/min if BP remains low
- **Continue infusion for at least 10 minutes** after attaining circulatory stability
- Recommended upper limit: 10mL/kg over first 30 min
14: Malignant Hyperthermia

**Condition:** Unexpected, unexplained increase in end-tidal CO$_2$; prolonged masseter muscle spasm after succinylcholine; unexpected, unexplained tachycardia, tachypnea, mixed acidosis

**Objective:** Restore normal hemodynamic parameters, metabolic function, temperature.

- Call for help. Inform team.
- Stop volatile anesthetics and succinylcholine, transition to non-triggering anesthetic.
  - Don’t delay treatment to change circuit or CO$_2$ absorber.
  - Request chilled IV saline.
- Increase FiO$_2$ 100%, high flow 10L/min.
- Increase minute ventilation: 10L/min or more (2-4x patient’s minute ventilation)
- Give Dantrolene 2.5mg/kg IV bolus!
- Call MH hotline: 1-800-644-9737
- Halt procedure. If emergent, continue with non-triggering anesthetic.
- Give Bicarbonate for metabolic acidosis.
  - Maintain pH > 7.2.
- Cool patient if temp > 38.5°C
  - Lavage open body cavities.
  - NG lavage with cold water.
  - Apply ice externally.
  - Cold saline infused intravenously.
  **Stop cooling if temp < 38°C.**
- Hyperkalemia treated if suspected?
- Dysrhythmias treated if present?
  - Standard antiarrhythmics are ok; don’t use Calcium Channel Blockers.
- Send Labs: ABG, VBG, electrolytes, serum CK, serum/urine myoglobin, PT/PTT, lactic acid.
- Place Foley catheter. Monitor urine output. Goal 2mL/kg/h.
- Arrange ICU bed. Mechanical ventilation usually required.
- Continue Dantrolene 1mg/kg q4-6 hrs for 24-36 hours. Observe closely for 24 hours.

**Signs of MH:**

**EARLY:**
- Increased ETCO$_2$
- Tachycardia
- Tachypnea
- Mixed Acidosis
- Masseter spasm/trismus
- Sudden cardiac arrest in young person due to hyperkalemia

**May be LATER:**
- Hyperthermia
- Muscle rigidity
- Myoglobinuria
- Arrhythmia
- Cardiac Arrest

**Drug Doses and Treatments:**

**Dantrolene:**
- Dilute 250mg in 5mL sterile water.
- 2.5mg/kg IV q5min until symptoms subside.
- May require up to 30mg/kg.

**Sodium Bicarbonate:**
- 1-2mEq/kg for suspected metabolic acidosis (may give even if blood gas values not available).

**Hyperkalemia Treatment:**
- Hyperventilation
- Calcium chloride (10mg/kg) IV or Calcium gluconate (30mg/kg)
- Sodium bicarbonate 1-2mEq/kg, slow IV push.
- Regular Insulin 10 Units IV with 1 amp D50 (25g Dextrose) – monitor glucose.

**Differential Diagnosis:**
- Light anesthesia
- Hypoventilation
- Insufflation of CO$_2$
- Over-heating (external)
- Hypoxemia
- Thyroid storm
- Pheochromocytoma
- Neuroleptic Malignant Syndrome (NMS)
- Serotonin Syndrome
15: Myocardial Ischemia

- Call for help. Inform team. Code cart. Call Hospitalist and MB Adult ICU team.
- Increase FiO₂ to 100%, high flows.
- Verify ischemia with expanded monitor view, 12-lead EKG.
- Treat hypotension or hypertension.
- Beta-blocker to slow heart rate. Hold for bradycardia or hypotension.
- Aspirin 325mg chewed PO or 600mg PR or NG/OG.
- If Acute Coronary Syndrome, call Cardiology consult and Hospitalist, who will activate STEMI pager.
  - Consider Cath Lab
  - Call for STAT URGENT Critical Care Transport from American Medical Response*.
- Treat pain with narcotics (fentanyl or morphine).
- Consider nitroglycerin 0.4mg sublingual and/or infusion (start at 0.2mcg/kg/min, titrate to relief of chest pain and hemodynamic stability; hold until hypotension treated).
- Check ABG, CBC, Troponin. Consider arterial line if hypotensive.
- If anemic, treat with packed RBCs.
- Consider TTE for monitoring volume status and regional wall motion abnormalities.
- Be prepared for arrhythmias and have Code Cart at bedside.

**Cardiology Consult**: Check www.Amion.com (login: ucsf) for MB Cardiology Consult.

**MB Hospitalist**: 415-502-1235; 443-0093
**Rapid Response/Resource Nurse**: 415-502-0562; 443-FAST (3278)
MB Adult ICU Attending: 502-1232
MB Adult ICU NP: 502-1231
American Medical Response ambulance service: 1-800-955-8825
Transfer Center: 353-1937 or 353-9166
For Cath Lab Activation call: M-L back line operator: 353-4008
M-L Cardiology service resident pager (for transfers to 10ICU): 443-QRST

If ST Elevation MI, call Cardiology Consult and Hospitalist STAT.
Patient may need to be transferred to SFGH for nearest Cath lab. Call Resource Nurse.

**Goal**: STEMI to PCI (symptom-to-balloon) time of 90 minutes.
Stenting and antiplatelet therapy are not contraindications during pregnancy.

*Critical Care Transport from AMR on a “STAT URGENT” basis. If AMR cannot guarantee arrival of a Critical Care Transport ambulance within 30 minutes, then AMR will offer appropriate contingency transport options such as ALS, or BLS-level transport.
**Seizure**

**Condition:** sudden shaking, tonic-clonic movements, tongue biting, bowel or bladder incontinence  
**Objective:** stop seizure activity, prevent maternal hypoxia, manage hypertension, prevent recurrence of seizures

- **Call for help. Batch Page. Code cart?**
- **Assess C-A-B (Circulation, Airway, Breathing) and vitals**
- **Left Uterine Displacement / Lateral position to minimize aspiration risk**
- **If eclampsia, give Magnesium* (IV or IM) & Treat HTN (SBP>160 or DBP >110)**
- **Supplemental O₂ / Obtain IV access**
- **If not eclampsia, Activate Code Blue**
  - **Call Rapid Response RN 502-0562 and MB Hospitalist 502-1235**
- **If seizure persists, give benzodiazepine (midazolam 2mg IV or ativan 1mg IV)**
- **If concern for local anesthetic toxicity, do NOT bolus propofol. GO TO: Local Anesthetic Toxicity Checklist**
- **Consult Neurology 443-COMA**
- **Check glucose:**
  - Treat hypoglycemia with D50.
  - Treat hyperglycemia with insulin if blood glucose >200.
- **Assess fetal heart rate**
- **For persistent seizures, consider:**
  - **Fosphenytoin** 15-20mg/kg IV (no faster than 150mg/min bolus, then 100-150mg/min infusion)
  - **Propofol** (2-3mg/kg IV bolus, followed by up to 75 mcg/kg/min infusion)
  - **Phenobarbital** (15 mg/kg IV)
- **Check electrolytes (Sodium)**
- **If the patient is pregnant, discuss delivery urgency with OB**
- **Consider ICU for further monitoring**

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**Rapid Response/Resource Nurse:** 502-0562, 443-FAST (3278)  
**MB Hospitalist:** 502-1235, 443-0093  
**Neurology Consult:** 443-COMA (2662)  
**MB Adult ICU NP:** 502-1231

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**Magnesium Dosing:***
- If patient is receiving prophylactic Magnesium Sulfate, give 2gm IV bolus over 3-5 min. Otherwise, give 4gm-6gm IV loading dose over 15-20 minutes.
- If the patient does not have an IV, give Magnesium Sulfate 5gm IM (buttock).

---

**Seizure Differential:**
- Eclampsia  
- Epilepsy  
- Local Anesthetic Systemic Toxicity  
- Stroke / Transient ischemic attack  
- Posterior reversible encephalopathy syndrome (PRES)  
- Subarachnoid hemorrhage  
- Convulsive syncope  
See back of this page for larger differential

---

Neuromuscular Blocking Agents do not stop seizure activity in the brain, but may help facilitate intubation.
Seizure Differential:

- Eclampsia
- Epilepsy
- Local Anesthetic Toxicity
- Stroke / Transient ischemic attack
- Posterior reversible encephalopathy syndrome (PRES)
- Subarachnoid hemorrhage
- Convulsive syncope
- Encephalitis
- Pseudoseizure
- Hypoglycemia

- Delirium, dementia
- Delirium Tremens
- Migraine
- Sleep disorder, parasomnia (night terrors, sleepwalking)
- Essential tremor
- Restless Leg Syndrome
- Anticholinergic toxicity
- Paroxysmal movement disorder (acute dystonic reaction, non-epileptic myoclonus, propofol or etomidate induced myoclonus)
17: Stroke

- **Call for help. Code Blue. Batch Page.**
- **Get Code Cart**
- **Call Rapid Response RN 502-0562 and MB Hospitalist 502-1235**
- Rapid response RN will contact MB ICU team
- If concern for acute stroke, Hospitalist will call **Neurology Consult 443-COMA.**
- Hospitalist will order **STAT NCHCT.**
- Supplemental O₂
- Continuous EKG monitoring for ischemia or atrial fibrillation
- Monitor BP and only treat after discussion with Neurology
- Check glucose.
  - Treat hypoglycemia with D50.
  - Treat hyperglycemia with insulin if blood glucose >200.
- Treat fever with acetaminophen
- If GCS<8, consider intubation*

**If the patient is PREGNANT:**
- Hospitalist will consult MB Adult ICU team for admission to MB Adult ICU.
- **Neuro IR** is available at MB for embolectomy.

**Condition:** sudden numbness, weakness, dizziness, confusion, severe headache or trouble with speaking vision, coordination

**Objective:** timely evaluation and treatment of acute stroke, possible emergent transfer to Moffitt for thrombolysis +/- embolectomy

The window for possible thrombolysis is **within 3 hours** of symptom onset (4.5 hours in some special cases).

**Important Numbers:**
- **Rapid Response/Resource Nurse:** 502-0562, 443-FAST (3278)
- **MB Hospitalist:** 502-1235, 443-0093
- **Neurology Consult:** 443-COMA (2662)
- **MB Adult ICU Attending:** 502-1232
- **MB Adult ICU NP:** 502-1231
- **Central Patient Placement RN:** 353-1937
- **Transfer Center:** 353-1937 or 353-9166
- **Birth Center Triage:** 476-7788
- **MB ED Charge Nurse:** 476-9609
- **MB Pediatric ED:** 502-0635

*For GCS score, see back of page →

**If the patient is NOT PREGNANT:**
- If stroke is likely and thrombolysis indicated, transfer immediately to Moffitt-Long Neuro ICU:
  - Rapid Response RN will arrange transport through Transfer Center via **ACLS/CCT unit.**
  - If ACLS/CCT unit is **not available within 30 minutes, then BLS unit** can be utilized, but a ACLS-trained RN or provider must accompany patient to Moffitt-Long.
- If stroke is likely and thrombolysis is NOT indicated, Hospitalist will consult MB Adult ICU team for admission to MB Adult ICU.
## Glasgow Coma Score (GCS) = E + V + M

<table>
<thead>
<tr>
<th>Eye Opening (E)</th>
<th>Verbal Response (V)</th>
<th>Motor Response (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 = Spontaneous</td>
<td>5 = Normal conversation</td>
<td>6 = Normal</td>
</tr>
<tr>
<td>3 = To voice</td>
<td>4 = Disoriented conversation</td>
<td>5 = Localizes to pain</td>
</tr>
<tr>
<td>2 = To pain</td>
<td>3 = words, but not coherent</td>
<td>4 = Withdraws to pain</td>
</tr>
<tr>
<td>1 = None</td>
<td>2 = No words; only sounds</td>
<td>3 = Decorticate posture</td>
</tr>
<tr>
<td></td>
<td>1 = None</td>
<td>2 = Decerebrate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = None</td>
</tr>
</tbody>
</table>
### Hemodynamic stability (SBP>80), tachycardia with pulses.

**Objective:** Restore hemodynamic stability, adequate perfusion.

#### Signs of UNSTABLE:
- SBP < 80
- BP “low” for patient
- Rapid BP decrease
- Acute ischemia

#### Sinus Tachycardia is NOT SVT:
- Sinus Tachycardia may be compensatory; search for and treat underlying causes.
- More likely SVT than sinus if any of following:
  - Rate > 150
  - Irregular
  - Sudden onset

### 18: Tachycardia – Stable SVT

- Call for help. Inform team. Get Code cart.
- Check for Pulse. If **NO pulse**, GO TO: PEA event.
- If **Unstable** (at any point), GO TO: SVT-Unstable event. Prepare for Synchronized Cardioversion
- **Increase FiO₂ to 100%**, high flow.
- Left Uterine Displacement.
- Confirm adequate ventilation, oxygenation.
- Consider 12 lead EKG, print rhythm strip, then treat per rhythm (see below).
- If still **STABLE SVT**, consider Arterial line, send ABG & electrolytes.

### Stable SVT Rhythm

<table>
<thead>
<tr>
<th>Rhythm</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| **Narrow complex & Regular** | 1. To convert: **Adenosine 6mg** IV push with flush. May give 2nd dose: 12mg IV  
2. If NOT converted, may Rate Control. Choose Beta Blocker or Calcium Channel Blocker:  
  **Beta Blocker:**  
  - **Esmolol**: Start 0.5mg/kg IV over 1 min. May repeat after 1 min. May start infusion 50mcg/kg/min.  
  - **Metoprolol**: Start 1-2.5mg IV. May repeat or double after 2.5 min.  
  **Calcium Channel Blocker:**  
  - **Diltiazem**: 5-10mg IV over 2 min. May repeat after 5 min.  
  3. **Amiodarone**: 150mg IV SLOWLY over 10 min. May repeat x1. Start infusion 1mg/min for 1st 6 hours. |
| **Narrow complex & Irregular** | 1. Choose Beta Blocker or Calcium Channel Blocker:  
  **Beta Blocker:**  
  - **Esmolol**: Start 0.5mg/kg IV over 1 min. May repeat after 1 min. May start infusion 50mcg/kg/min.  
  - **Metoprolol**: Start 1-2.5mg IV. May repeat or double after 2.5 min.  
  **Calcium Channel Blocker:**  
  - **Diltiazem**: 5-10mg IV over 2 min. May repeat after 5 min.  
  2. **Amiodarone**: 150mg IV SLOWLY over 10 min. May repeat x1. Start infusion 1mg/min for 1st 6 hours. |
| **Wide complex & Regular** | **Amiodarone**: 150mg IV SLOWLY over 10 min. May repeat x1. Start infusion 1mg/min for 1st 6 hours. May consider Procainamide or Sotalol. |
| **Wide complex & Irregular** (likely Polymorphic VT) | Prepare to **Defibrillate** and GO TO: VT/VF event |
19: Total Spinal Anesthesia

**Condition:** Unexpected rapid rise in sensory blockade, numbness/weakness in upper extremities, dyspnea, bradycardia, hypotension, nausea/vomiting, loss of consciousness, apnea, cardiac arrest.

**Objective:** Restore hemodynamic stability. Ensure adequate oxygenation/ventilation.

- Left Uterine Displacement.
- If Cardiac Arrest, start CPR, immediate epinephrine, GO TO: PEA event.
- Support ventilation and intubate if necessary.
- If significant bradycardia, treat with immediate epinephrine (start 10-100mcg, increase as needed, GO TO appropriate ACLS event).
- If mild bradycardia, consider atropine (0.5-1mg), but progress quickly to epinephrine if needed.
- Give IV fluid bolus.
- Monitor fetal heart rate.
- Prepare for possible emergent C-section.
transfusion reactions

condition:
thrombotic reaction (tachycardia, tachypnea, hypotension, oozing – DIC?, dark urine), febrile reaction (fever), anaphylactic reaction (tachycardia, wheezing, urticaria/hives, hypotension).

objective: restore hemodynamic stability.

- call for help. inform team. code cart?
- stop transfusion.
- support BP with IV fluids and vasoactive medications if needed.
- if anaphylactic reaction, GO TO: anaphylaxis checklist.
- if mild reaction, consider antihistamine and antipyretic.
- for hemolytic reaction, place foley. maintain urine output with IV fluids, diuretics, renal dose dopamine.
- monitor for and treat DIC if hemolytic reaction.
- monitor for TRALI (lung injury) and treat accordingly, may require post operative ventilation.
- notify Blood Bank (476-1404) of reaction. they will need further samples. if need consult advice, page Blood Bank Fellow.

signs of transfusion reactions:
- hemolytic:
  - tachycardia
  - tachypnea
  - hypotension
  - oozing – DIC?
  - dark urine
- febrile: fever
- anaphylactic:
  - tachycardia
  - wheezing
  - urticaria/hives
  - hypotension
21: Venous Air Embolism

**Condition:** Decreased end-tidal CO₂ and SpO₂, decreased BP, dyspnea, respiratory distress, coughing, rise in CVP.

**Objective:** Restore normal oxygen saturation and hemodynamic stability and stop source of air entry.

- Call for help. Inform team. Call for Code Cart?
- Left uterine displacement.
- FiO₂ increased to 100%?
- Nitrous Oxide anesthetic stopped?
- Decrease anesthetic level if hypotension.
- **Source of air entry stopped?**
  - Surgical site lowered below level of heart, if possible?
  - Wound filled with irrigation?
  - Entry point searched for (including open venous lines)?
  - Intermittent jugular venous compression considered if head or cranial case?
- Give Fluid bolus to increase CVP.
- Fetal well-being?
- Consider Transesophageal echocardiography (if available; to assess air and RV function).
- Give epinephrine (start 10-100mcg) to maintain CO.
- Start CPR if BP catastrophically low

If cardiac arrest:
Give 1mg epinephrine IV, begin ACLS and GO TO: Maternal Cardiac Arrest – Asystole/PEA Checklist or Maternal Cardiac Arrest – VF/VT Checklist.

Consider hyperbaric O₂ therapy (requires transfer to St. Francis Medical Center).

Have we considered:
- Left side down once source controlled?
- Aspiration of air from central line?
- Vasopressors (e.g. dobutamine, norepinephrine)?
- Chest compressions (100/min; to force air through lock, even if not in cardiac arrest)?
- Termination of surgical procedure if able?
# IMPORTANT MISSION BAY PHONE NUMBERS

<table>
<thead>
<tr>
<th>Department</th>
<th>Phone Number</th>
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<tbody>
<tr>
<td><strong>Rapid Response/Resource Nurse</strong></td>
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<td><strong>Blood Bank</strong></td>
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<td><strong>Lab</strong></td>
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<td><strong>IR (pager 443-9417)</strong></td>
<td>476-0266</td>
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<td><strong>Material Services</strong></td>
<td>514-3570</td>
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<td><strong>Pharmacy</strong></td>
<td>514-2100</td>
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<td><strong>Needlestick Hotline</strong></td>
<td>353-STIC (7842)</td>
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<tr>
<td><strong>L&amp;D Front Desk</strong></td>
<td>476-7670</td>
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<td><strong>Pedi OR Front Desk</strong></td>
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<tr>
<td><strong>OB Anesthesia Resident Office</strong></td>
<td>514-4943</td>
</tr>
<tr>
<td><strong>OB Resident Workroom</strong></td>
<td>476-7088</td>
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<td><strong>OB Anes Fellow/Attg Office</strong></td>
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**Voalte Phones**

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<td><strong>OB ANES Fellow</strong></td>
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<td><strong>OB ANES Resident</strong></td>
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<td><strong>Adult E1 Attending</strong></td>
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<td><strong>Pedi E1 Attending</strong></td>
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<td><strong>E1 Pain Resident</strong></td>
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