

Operating Room Crisis Checklists

>> **Do not remove book from this room** <<

The use of this manual is meant as a guideline and reference. It is not meant to be a substitute for training and experience.

Color code:
Blue – Respiratory
Red – Cardiac
Green - Other
Yellow – Reference

HMFP | APHMFP
Department of Anesthesia, Critical Care
and Pain Medicine

Version 1.0
December 22, 2020

1.	Failed Airway
2.	Hypoxia
3.	Bronchospasm
4.	Pneumothorax
5.	Hemorrhage
6.	Hypotension
7.	Tachycardia – Unstable
8.	Bradycardia – Unstable
9.	Cardiac Arrest –Asystole/PEA
10.	Cardiac Arrest – VF/VT
11.	Myocardial Ischemia
12.	Malignant Hyperthermia
13.	Air Embolism – Venous
14.	Transfusion Reactions
15.	Local Anesthetic Toxicity
16.	Anaphylaxis
17.	Fire
18.	Total Spinal Anesthesia
19.	Appendices - References

1 Failed Airway

Two unsuccessful intubation attempts by airway expert

START

1. Call “Anesthesia STAT” and ask for an airway cart
 - Ask: “Who will be the event manager?”
2. Get difficult airway cart and video laryngoscope
3. Bag mask ventilate with FiO₂ 100%
4. Is ventilation adequate?

State Problem: e.g. “This is a CAN’T INTUBATE CAN’T OXYGENATE emergency!”

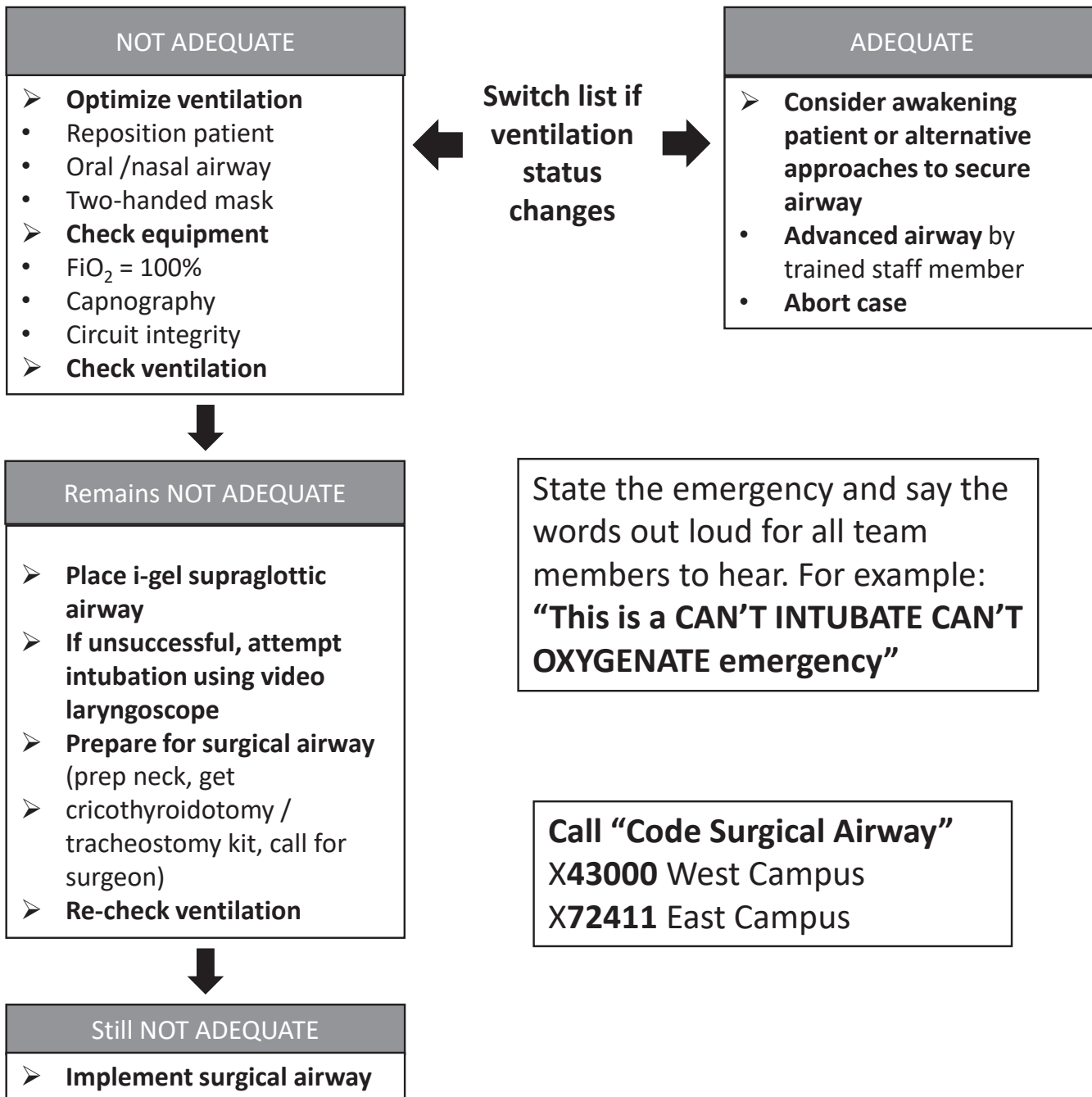
5. Consider “Code Surgical Airway” early. (Page ACS)

Call “Code Surgical Airway”
X43000 West Campus
X72411 East Campus

1 Failed Airway

Two unsuccessful intubation attempts by airway expert

Ventilation



2 Hypoxia

Unexplained oxygen desaturation

START

- 1. Call “Anesthesia STAT” and ask for a code cart**
 - Ask: “Who will be the event manager?”
- 2. Turn FiO₂ to 100% at high gas flows**
 - Confirm inspired FiO₂ = 100% on gas analyzer
 - Confirm presence of end-tidal CO₂ and changes in capnogram morphology
- 3. Hand ventilate to assess compliance**
 - Be aware of patients with ARDS/respiratory failure
- 4. Listen to breath sounds**
- 5. Check**
 - Blood pressure, PIP, pulse
 - ET tube position
 - Pulse oximeter placement
 - Circuit integrity: look for disconnections, kinks, holes
- 6. Consider actions to assess possible breathing issues**
 - Draw arterial blood gas
 - Suction (to clear secretions, mucus plug)
 - Remove circuit and use self-inflating bag valve mask (BVM)
 - Bronchoscopy
 - Consider respiratory therapy consult (RH failure – may require nitric oxide /pharmacy consult)
 - Consider milrinone / espoprostenol (Vleltri)
- 7. Consider causes**
 - Is airway/breathing issue suspected?

2 Hypoxia

Unexplained Oxygen Desaturation

NO Airway issue suspected

Circulation

- Embolism
 - Pulmonary embolus
 - **Air embolism → Go to TAB 13**
- Heart disease
 - Congestive heart failure
 - Coronary heart disease
 - **Myocardial ischemia → Go to TAB 11**
 - Cardiac tamponade
 - Congenital / anatomical defect
- Severe sepsis
- If hypocalcemia associated with **hypotension → Go to TAB 6**

Drugs / Allergy

- Recent drugs given
- Dose error / allergy / anaphylaxis
- Dyes and abnormal hemoglobin (e.g., methemoglobin, methylene blue)

YES! Airway issue is suspected

Airway / Breathing

- Aspiration
- Atelectasis
- **Bronchospasm → Go to TAB 3**
- Hypoventilation
- Laryngospasm
- Obesity / positioning
- **Pneumothorax → Go to TAB 4**
- Pulmonary edema
- Right mainstem intubation
- Ventilator setting, leading to auto-peep

Additional DIAGNOSTIC TESTS

- Fiberoptic bronchoscope
- Chest x-ray
- Lung ultrasound

Reconsider Your Diagnosis

3 Bronchospasm

Increased PIP, wheezing, increased expiratory Time, increased EtCO₂, upsloping capnography tracing

START

1. Call “Anesthesia STAT” and consider a code cart
 - Ask: “Who will be the event manager?”
2. Increase FiO₂ to 100%
3. Change I:E ratio to allow for adequate exhalation
 - Bronchospastic patients who develop sudden hypotension may be air-trapping. Consider temporary circuit disconnect
4. Deepen anesthetic (Sevoflurane or Propofol)
5. Rule out problems with ETT (Mucous plug, mainstem intubation)
6. Give beta-2 agonists via ETT
7. If severe, give epinephrine (10 – 100 mcg IV - may repeat)
 - Or give Epi-Pen (Omniceil)
8. Rule out anaphylaxis: Go to TAB 16
9. Consider ECMO if available: (Page “9-ECMO”)

SUPPLEMENTAL Medications

Beta-2 agonist (albuterol)

Epinephrine: 10 mcg IV and escalate

Ketamine: 0.2 – 1.0 mg/kg IV

Hydrocortisone: 100 mg IV

Nebulized racemic epinephrine

Reconsider Your Diagnosis

**PAGE
INTENTIONALLY
LEFT BLANK**

4 Pneumothorax

Increased peak inspiratory pressures, tachycardia, hypotension, hypoxemia, decreased or asymmetric breath sounds, hyper-resonance of chest to percussion, tracheal deviation (late sign), increased JVD / CVP, have high index of suspicion for pneumothorax in trauma patients and COPD patients

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Increase FiO₂ to 100%
3. Rule out mainstem intubation
4. Consider ultrasound or STAT CXR
5. Do not delay treatment if hemodynamically unstable
6. Call for immediate chest tube / thoracostomy
 - Call ACS (West X43000, East X72411)

Reconsider Your Diagnosis

**PAGE
INTENTIONALLY
LEFT BLANK**

5 Hemorrhage

Acute massive bleeding

START

1. **Call “Anesthesia STAT” and ask for a code cart**
 - **Ask: “Who will be the event manager?”**
2. **Open IV Fluids and assess adequate IV access**
3. **Turn FiO₂ to 100% and turn down volatile anesthetics**
4. **Call blood bank**
 - Activate massive transfusion protocol (see Appendix A5 Massive Transfusion Protocol)
 - Consider emergency release for blood/product
 - Assign 1 person as primary contact for blood bank
 - Order and give blood products (in 2:1:1 ratio of PRBC/FFP/PLT)
5. **Call for Belmont or rapid infuser**
6. **Discuss management plan** between anesthesia, surgery and nursing teams
7. **Replace products early**
8. **Keep patient warm**
9. **Send labs**
 - CBC, PT/PTT, INR, fibrinogen, lactate, arterial blood gas, ionized calcium, potassium, type and cross

Consider

- Placing arterial line
- Electrolyte disturbances (hypocalcemia and hyperkalemia)
- Damage control surgery (pack, close, resuscitate)
- Reversal of anticoagulation (Go to **TAB 19-A1**)
- Page perfusionist to set up Cell Saver

5 Hemorrhage

Acute massive bleeding

DRUG DOSES and Treatments

HYPOCALCEMIA Treatment

Prevention: Give 500 – 1000 mg Ca gluconate per unit of PRBC or FFP
Give calcium to replace deficit (calcium chloride or calcium gluconate)

Calcium gluconate: 30 mg/kg IV

-or-

Calcium chloride: 10 mg/kg IV

HYPERKALEMIA Treatment

Calcium gluconate: 30 mg/kg IV

-or-

Calcium chloride: 10 mg/kg IV

Insulin: 10 units regular IV with 1 – 2 amps D50 as needed

Sodium bicarbonate if pH <7.2: 1 – 2 mEq/kg slow IV PUSH

SPECIAL Patient Populations

TRAUMA

Tranexamic Acid

- 1000 mg IV over 10 min, followed by 100 mg over the next 8 hours
- Avoid acidosis, hypothermia and coagulopathy

NON-SURGICAL UNCONTROLLED BLEEDING

Despite massive transfusion of FFP, PRBC, platelets and cryo:

- Consider giving Recombinant Factor VIIa: 40 mcg/kg IV
 - PLT should be >100 (**discuss with surgeon**)
 - Surgical bleeding must be controlled
 - **USE WITH CAUTION** in patients at risk for thrombosis
 - **DO NOT USE** when pH is <7.2
- Consider giving KCENTRA (Go to **TAB 19-A1**)

6 Hypotension

Unexplained drop in blood pressure refractory to initial treatment

START

- 1. Call "Anesthesia STAT" and ask for a code cart**
 - **Ask:** "Who will be the event manager?"
- 2. Check....**
 - Pulse
 - Blood pressure
 - Equipment
 - Heart Rate
 - Bradycardia → **TAB 8**
 - Rhythm
 - If VF/VT → **TAB 10**
 - If Asystole/PEA → **TAB 9**
- 3. Run IV fluids wide open**
- 4. Give vasopressors and titrate to response**
 - **MILD:** ephedrine or phenylephrine
 - **SIGNIFICANT/REFRACTORY:** epinephrine bolus, consider infusion
- 5. Turn FiO₂ to 100% and turn down volatile anesthetics**
- 6. Inspect surgical site for bleeding**
 - (If bleeding → **TAB 5**)
- 7. Consider actions**
 - Place patient in Trendelenburg position
 - Obtain additional IV access
 - Place arterial line, check electrolytes
 - TEE?
- 8. Consider Causes**
 - Operative Field**
 - Mechanical or surgical manipulation
 - Insufflation during laparoscopy
 - Retraction
 - Vagal stimulation
 - Vascular compression
 - Unaccounted Blood Loss**
 - Blood in suction canister, bloody sponges, Blood on the floor, internal bleeding
 - Drugs/Allergy**
 - Anaphylaxis → **TAB 16**
 - Recent drugs given
 - Dose error
 - Drugs used on the field
 - Wrong drug
 - Breathing**
 - Increased PEEP
 - Hypoventilation
 - Hypoxia → **TAB 2**
 - Persistent hyperventilation
 - Pneumothorax → **TAB 4**
 - Pulmonary edema
 - Circulation**
 - Air embolism → **TAB 13**
 - Bradycardia → **TAB 8**
 - Tachycardia → **TAB 7**
 - Bone cementing (methylmethacrylate effect)
 - Myocardial Ischemia → **TAB 11**
 - Emboli (pulmonary, fat, septic, amniotic CO₂)
 - Severe sepsis
 - Tamponade
 - Electrolytes
 - Endocrine

6 Hypotension

Unexplained drop in blood pressure refractory to initial treatment

DRUG DOSES and Treatments

- Ephedrine:** 5 – 25 mg IV, repeat as needed
- Phenylephrine:** 80 – 200 mcg IV, repeat as needed
- Epinephrine:** **BOLUS:** 4 – 8 mcg IV
Dilute 1 mg in 10 mL (100 mcg/mL), then 1 cc in 10cc NS (10 mcg/mL)
INFUSION: 0.1 – 1 mcg/kg/min

HYPOCALCEMIA Treatment

Prevention: Give 500 – 1000 mg calcium gluconate per unit of PRBC or FFP
Give calcium to replace deficit (calcium chloride or calcium gluconate)

Calcium gluconate: 30 mg/kg IV

-or-

Calcium chloride: 10 mg/kg IV

Vasopressin: 1 – 2 Unit **BOLUS**
INFUSION: 1 – 4 U/hr

Norepinephrine: **INFUSION:** 8 – 30 mcg/min

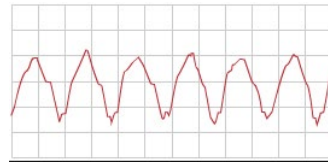
Hydrocortisone: 100 mg IV

Reconsider Your Diagnosis

7 Tachycardia - Unstable



Narrow complex tachycardia



Wide complex tachycardia

Persistent tachycardia with hypotension, ischemic chest pain, altered mental status or shock

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Turn FiO₂ to 100% and turn down volatile anesthetics
3. Analyze rhythm
 - If wide complex, irregular: treat as VF/VT, go to TAB 10
 - Otherwise: prepare for cardioversion
4. Prepare for immediate synchronized cardioversion
 - Sedate all conscious patients unless deteriorating rapidly
 - Turn monitor / defibrillator ON, set to defibrillator mode
 - Place electrodes on chest
 - Engage synchronization mode
 - Look for mark/spike on the R-wave indicating synchronization mode
 - Adjust as necessary until SYNC markers seen with each R-wave
5. Synchronized cardioversion at appropriate energy level
 - Select energy level - use Table 1 on facing page for reference
 - Press charge button
 - Press and hold shock button
 - Check monitor; if tachycardia persists, increase energy level
 - Engage synchronization mode after delivery of each shock
6. Consider expert consultation

7 Tachycardia - Unstable



Narrow complex tachycardia

Persistent tachycardia with hypotension, ischemic chest pain, altered mental status or shock

SYNCHRONIZED CARDIOVERSION energy levels

CONDITION	ENERGY LEVEL (progression in Joules)
Narrow complex, regular	50 – 100 – 150 - 200
Narrow complex, irregular	120 - 150 - 200
Wide Complex, regular	100 - 150 - 200
Wide complex, irregular	Treats as VF/VT: go to TAB 10

Table 1

SYNCHRONIZATION UNSUCCESSFUL

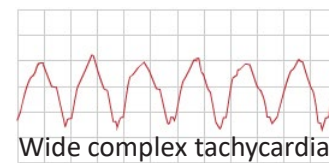
If **cardioversion needed and impossible to synchronize shock**, use high-energy unsynchronized shocks

Defibrillation doses

Follow manufacturer recommendation. *If unknown use highest setting: 360 J*

If **cardiac arrest**, go to:

- **TAB 10** Cardiac Arrest – VF/VT
- **TAB 9** Cardiac Arrest – Asystole/PEA



Wide complex tachycardia

During RESUSCITATION

- Airway:** Assess and secure
- Circulation:** Confirm adequate IV or intraosseous access
Consider IV fluids wide open

Reconsider Your Diagnosis

8 Bradycardia - Unstable

HR < 50 bpm with hypotension, ischemic chest pain, altered mental status or shock

START

1. **Call “Anesthesia STAT” and ask for a code cart**
 - Ask: “Who will be the event manager?”
2. **Turn FiO₂ to 100%**
3. **Stop surgical stimulation**
 - Bradycardia secondary to insufflation: **desufflate**
 - Administer 0.4 mg glycopyrrolate, or 0.4 mg atropine.
4. **Give epinephrine 10 – 50 mcg (may repeat)**
 - Consider epinephrine infusion
5. **If epinephrine ineffective**
 - Transcutaneous pacing
 - Transvenous pacing
6. **Consider:**
 - Turn off volatile anesthetics if patient unstable
 - Calling for expert consultation (cardiology)
 - Assessing for drug-induced causes (e.g. beta-blockers, calcium channel blockers, digoxin)
 - Calling for cardiology consult if myocardial ischemia suspected (e.g. EKG changes)

8 Bradycardia - Unstable

HR < 50 bpm with hypotension, ischemic chest pain, altered mental status or shock

DRUG DOSES and Treatments

Atropine:	0.5 mg IV, may repeat up to 3 mg total
Epinephrine:	2-10 mcg/min IV
Dopamine:	2 – 20 mcg/kg/min IV
Glycopyrrolate:	0.1 mg IV q 2 – 3 min PRN

OVERDOSE treatments

Beta-blocker: Glucagon: 2 - 4 mg IV push

Calcium channel blocker: Calcium chloride: 1 g IV

Digoxin: Digoxin Immune FAB; consult pharmacy for specific dosing

TRANSCUTANEOUS PACING Instruction

1. Place pacing electrodes front and back
2. Connect 3-lead ECG from pacing defibrillator to the patient
3. Turn monitor/defibrillator to **PACER** mode
4. Set **PACER RATE** (ppm) to 80/minute
5. Start at 60 mA of **PACER OUTPUT** and increase until electrical capture
6. Set final current to 10 mA above initial capture level
7. Confirm effective capture: (mechanical pulse, ECG)

During RESUSCITATION

Airway: Assess and secure

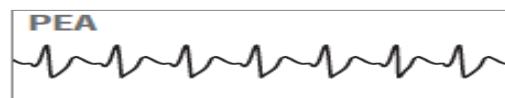
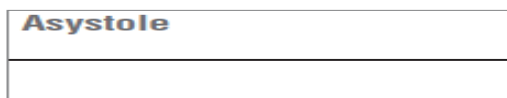
Circulation: Confirm adequate IV or intraosseous access
Consider IV fluids wide open

Critical Changes

If **PEA** develops go to **TAB 9**

Reconsider Your Diagnosis

9 Cardiac Arrest – Asystole/PEA

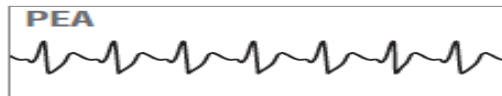
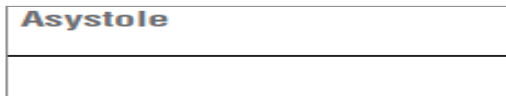


Non-shockable pulseless cardiac arrest – confirm pulse and rhythm

START

1. Call “Anesthesia STAT” and ask for a code cart
 - *Ask: “Who will be the event manager?”*
 - *Say: “The top priority is high quality CPR.”*
2. Put backboard under patient, supine position
3. Turn FiO₂ to 100%
4. Start CPR and assessment cycle
 - **Perform CPR and assessment cycle / consider use of LUCAS device**
 - Greater than 100 (> 100) compressions per minute
 - **Compression depth 2 inches:**
 - Ensure full chest recoil with minimal interruptions
 - **10 breaths/min:** do not overinflate
 - **Give epinephrine**
 - Epinephrine IV every 3 - 5 minutes
 - **Assess every 2 minutes**
 - Check rhythm, if rhythm organized check pulse
 - Change CPR/compression provider
 - Check EtCO₂
 - If: < 10 mmHg, reevaluate CPR technique
 - If: Sudden increase > 40 mmHg, may indicate return of spontaneous circulation. **ROSC.**
 - Draw labs – ABG, electrolytes
 - Consider ultrasound (TTE, TEE)
 - **If asystole/PEA continues**
 - Resume CPR/assessment cycle (restart step 4)
 - Read aloud Hs & Ts (**see list on facing page**)
 - **If VF/VT**
 - Resume CPR → **Go to TAB 10**

9 Cardiac Arrest – Asystole/PEA



Non-shockable pulseless cardiac arrest – confirm pulse and rhythm

DRUG DOSES and Treatments

Epinephrine: 1 mg IV, repeat every 3-5 minutes

TOXIN treatment:

Local anesthetic: Intralipid 100 mL IV bolus (assuming 70 kg weight)
Repeat 1 – 2 times for persistent asystole
Infusion 0.25 – 0.5 mL/kg/min for 30 – 60 → **TAB 15**

Beta-blocker: Glucagon 2 – 4 mg IV push

Calcium channel blocker: Calcium chloride 1 g IV

HYPERKALEMIA treatment:

Calcium gluconate	30 mg/kg IV
Calcium chloride	10 mg/kg IV
Insulin	10 units regular IV with 1 – 2 amps D50W
Sodium bicarbonate if pH < 7.2	1 – 2 mEq/kg slow IV push

Hs & Ts

H+ Ion (Acidosis)	Tamponade (Cardiac)
Hyperkalemia	Tension pneumothorax
Hypothermia	Thrombosis (Pulmonary)
Hypovolemia	Thrombosis (Coronary)
Hypoxia	Toxin (LA, β, Ca Blockers)

During CPR

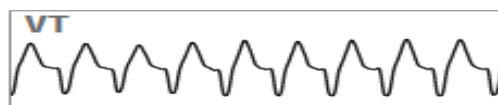
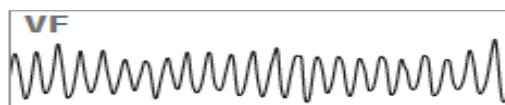
Airway: Assess and secure

Circulation: **Confirm adequate IV or intraosseous access**
Consider IV fluids wide open

Assign roles: Chest compressions, airways, vascular access, documentation, code cart, time keeping, **reader**, medications

Reconsider Your Diagnosis

10 Cardiac Arrest – VF/VT

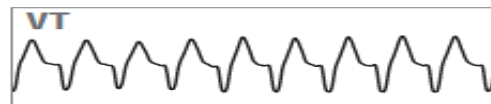
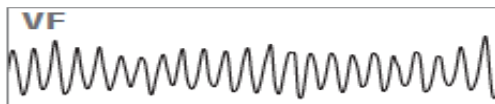


Shockable pulseless cardiac arrest – confirm pulse and rhythm

START

1. Call “Anesthesia STAT” and ask for a code cart
 - *Ask: “Who will be the event manager?”*
 - *Say: “Shock the patient as soon as defibrillator arrives”*
2. Put backboard under patient, supine position
3. Turn FiO₂ to 100%, turn off volatile anesthetics
4. Start CPR and assessment cycle / consider use of LUCAS device
 - Greater than 100 (> 100) compressions per minute
 - **Compression depth 2 inches:**
 - Ensure full chest recoil with minimal interruptions
 - **10 breaths/min:** do not overinflate
 - **Defibrillate**
 - Shock at highest setting – **360 J**
 - Resume CPR immediately after shock
 - **Give epinephrine**
 - Epinephrine IV every 3 – 5 minutes
 - **Consider giving antiarrhythmics for refractory VF/VT**
 - Amiodarone preferred if available
 - **Assess every 2 minutes**
 - Change CPR/compression provider
 - Check EtCO₂
 - If: < 10 mmHg, reevaluate CPR technique
 - If: Sudden increase > 40 mmHg, may indicate return of spontaneous circulation. **ROSC.**
 - Read aloud Hs & Ts (**see list on facing page**)
 - Check rhythm, if rhythm organized check pulse
 - **If VF/VT, resume CPR/defibrillation/assessment cycle**
 - **If asystole/PEA → Go to TAB 9**
 - **Check labs – ABG, electrolytes**

10 Cardiac Arrest – VF/VT



Shockable pulseless cardiac arrest – confirm pulse and rhythm

DRUG DOSES and Treatments

Epinephrine:	1 mg IV, repeat every 3-5 minutes
ANTIARRHYTHMICS	
Amiodarone:	1 st dose: 300 mg IV/IO 2 nd dose: 150 mg/IV/IO
Magnesium:	1 to 2 grams IV/IO for Torsades de Pointes

DEFIBRILLATION Instructions

1. Place electrodes on chest
2. Turn defibrillator ON, set to DEFIB mode, and increase ENERGY LEVEL; Follow manufacturer recommendation; if unknown use highest setting of **360 J**
3. Deliver shock, press CHARGE, then press SHOCK

Hs & Ts

H+ Ion (Acidosis)	Tamponade (Cardiac)
Hyperkalemia	Tension pneumothorax
Hypothermia	Thrombosis (Pulmonary)
Hypovolemia	Thrombosis (Coronary)
Hypoxia	Toxin (LA, β, Ca Blockers)

During CPR

Airway:	Assess and secure
Circulation:	Confirm adequate IV or intraosseous access Consider IV fluids wide open
Assign roles:	Chest compressions, airways, vascular access, documentation, code cart, time keeping, reader, medications

Reconsider Your Diagnosis

11 Myocardial Ischemia

Depression or elevation of ST segment, arrhythmias, regional wall motion abnormalities

START

1. **Call “Anesthesia STAT” and ask for a code cart**
 - **Ask: “Who will be the event manager?”**
2. **Increase FiO₂ to 100%**
3. **Check mechanical pulse and blood pressure**
4. **Verify ischemia** (expanded or 12 lead EKG)
5. **Treat ischemia**
 - Slow heart rate (consider beta-blockers)
 - Optimize blood pressure
 - Assess volume status
6. **Reassess ischemia** (consider etiology)
7. **Prepare for arrhythmias**, consider placing pads
8. **Consider TTE or TEE** for monitoring volume status and regional wall motion abnormalities
9. **STEMI/CARDIOLOGY Consult – STAT**
10. **Consider** arterial line (ABG, CBC, troponins, electrolytes)
11. **Consider** central venous access
12. **If hemodynamically unstable consider support (IABP, perfusionists)**
13. **Global assessment:** elicit opinions

11 Myocardial Ischemia

Depression or elevation of ST segment, arrhythmias, regional wall motion abnormalities

DRUG DOSES and Treatments

Beta-blocker:	Start with esmolol 10 – 20 mg IV
NTG infusion:	Start at 0.3 mcg/kg/min
Heparin as indicated:	Discuss with surgeon / cardiologist
Aspirin:	160 -325 mg PO/NG – Discuss with surgeon / cardiologist
Narcotic:	Morphine 2 – 4 mg IV
Vasopressin:	1 – 2 unit BOLUS INFUSION: 1 – 4 units/hour
Epinephrine:	BOLUS: 4 – 8 mcg IV <i>Dilute 1 mg in 10 mL (100 mcg/mL), then 1 cc in 10cc NS (10 mcg/mL)</i> INFUSION: 0.1 – 1 mcg/kg/min
Norepinephrine:	INFUSION: 0.02 1 mcg/kg/min

Caveats

Hold beta-blocker for bradycardia or hypotension
Hold NTG for hypotension
If anemic give PRBC
Discuss ASA with surgeon
Treat pain with narcotics

ST Changes

0.5 mm down-sloping ST indicates ischemia
1 – 2 mm down-sloping ST indicates NSTEMI
2 mm elevation of ST indicates ischemia

Reconsider Your Diagnosis

12 Malignant Hyperthermia

In presence of triggering agent: unexplained increase in EtCO₂, unexplained tachycardia / tachypnea, prolonged masseter muscle spasm after succinylcholine. Hyperthermia is a late sign.

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Get Malignant Hyperthermia cart
3. Turn off volatile anesthetics and transition to non-triggering anesthetics
 - **DO NOT** delay treatment to change circuit or CO₂ absorber
 - Charcoal filter on inspiratory and expiratory limb of circuit
 - Ventilate with self-inflating bag valve mask (BVM)
 - **FiO₂ 100%**
 - **Hyperventilate patient** at flows of 10 L/min or more
4. Assign dedicated person to mix **Ryanodex**
5. Terminate procedure if possible
6. Give **Ryanodex**
7. Place arterial line
8. Send labs – ABG, electrolytes, CK, coags, serum and urine myoglobin
9. **Aggressive** fluid resuscitation and **initiate supportive care**:
 - Cool if temperature > 39° C (**Stop if < 38° C**)
 - Lavage open body cavities, cold NG lavage, ice externally
 - Consider **bicarbonate** for suspected metabolic acidosis (pH <7.2)
 - Monitor urine output
 - **Treat hyperkalemia** if suspected
 - Treat dysrhythmias if present
 - **DO NOT** use calcium channel blockers
10. Monitor in ICU for 24 hours
11. MHAUS Emergency 24-hour Hotline – (800) MH-HYPER (644-9737)

12 Malignant Hyperthermia

In presence of triggering agent: unexplained increase in EtCO₂, unexplained tachycardia / tachypnea, prolonged masseter muscle spasm after succinylcholine. Hyperthermia is a late sign.

DRUG DOSES and Treatments

Ryanodex

Reconstitute 250 mg vial with 5 cc sterile water (shake until orange/opaque)

Dose: 2.5 mg/kg = 0.05 mL/kg

70 kg patient 3.5 mL

Bicarbonate: 1 – 2 mEq/kg. Slow IV push

HYPERKALEMIA Treatment:

Calcium gluconate: 30 mg/kg IV

Calcium chloride: 10 mg/kg

Insulin: 10 units IV with 1 – 2 amps D50 IV

TRIGGERING AGENTS

Inhalational Anesthetics

Succinylcholine

DIFFERENTIAL DIAGNOSIS (Consider when using high doses of Ryanodex without resolution of symptoms)

Cardiorespiratory	Iatrogenic	Neurologic	Toxicology
Hypoventilation	Exogenous CO ₂	Meningitis	IV Dye Neurotoxicity
Pheochromocytoma	Overwarming	Intracranial Bleed	Anticholinergic Syndrome
Endocrine	Neuroleptic Malignant Syndrome	Hypoxic Encephalopathy	Cocaine, Amphetamine, Salicylate withdrawal
Thyrotoxicosis	Sepsis	Traumatic Brain Injury	Alcohol withdrawal

Reconsider Your Diagnosis

13 Air Embolism - Venous

Decreased end-tidal CO₂, decreased oxygen saturation, hypotension, precordial doppler (mill-wheel murmur), TEE (bubbles detected in RA/RV)

START

- 1. Call “Anesthesia STAT” and ask for a code cart**
 - Ask: “Who will be the event manager?”
- 2. Turn FiO₂ to 100%**
- 3. Stop source of air entry**
 - Fill wound / surgical field with irrigation
 - Lower surgical site below level of heart, if possible
 - Search for entry point (including open venous lines, CO₂ embolism during laparoscopy)
- 4. Turn off nitrous oxide**
- 5. Consider:**
 - Positioning patient with left side down
 - Continue appropriate monitoring while repositioning
 - Placing bone wax or cement on bone edges (in neurosurgery)
 - Transesophageal echocardiography (TEE) if diagnosis unclear
 - Using EtCO₂ to monitor progression and resolution of embolus or for assessment of adequate cardiac output

13 Air Embolism - Venous

Decreased end-tidal CO₂, decreased oxygen saturation, hypotension, precordial doppler (mill-wheel murmur), TEE (bubbles detected in RA/RV)

SUPPLEMENTAL MONITORS

Precordial Doppler:	Place at left sternal border Listen for “mill-wheel” murmur
TTE or TEE:	Look for air entrained into right side of heart Evaluate for patent foramen ovale

CRITICAL CHANGES

If PEA develops **go to TAB 9**

Reconsider Your Diagnosis

14 Transfusion Reactions

Hemolytic reactions: Fever, back / flank pain, tachycardia, tachypnea, hypotension, dark urine, disseminated intravascular coagulation (DIC)

Febrile reactions: Fever, chills / rigors, headache, vomiting

Anaphylactic reactions: Hypotension, urticaria / hives, wheezing, tachycardia

Hypotensive reactions to Angiotensin Converting Enzyme inhibitors:

Hypotension in reaction to transfusion in patients on ACE inhibitors

START

1. **Call “Anesthesia STAT” and ask for a code cart**
 - Ask: “Who will be the event manager?”
2. **Stop transfusion**
3. **Increase FiO₂ to 100%**
4. **Support** blood pressure with IV fluids and vasoactive medications if needed
5. **Consult BLOOD BANK** if advice needed
6. **If anaphylactic reaction go to TAB 16**
7. **Consider hypotensive reaction to Angiotensin Converting Enzyme inhibitors**
 - Treat with vasopressin bolus / infusion
8. **TRALI or volume overload** if evidence of lung injury (hypoxemia, pulmonary edema)
 - May require post-operative ventilation

14 Transfusion Reactions

Hemolytic reactions: Fever, back / flank pain, tachycardia, tachypnea, hypotension, dark urine, disseminated intravascular coagulation (DIC)

Febrile reactions: Fever, chills / rigors, headache, vomiting

Anaphylactic reactions: Hypotension, urticaria / hives, wheezing, tachycardia

Hypotensive reactions to Angiotensin Converting Enzyme inhibitors:

Hypotension in reaction to transfusion in patients on ACE inhibitors

DRUG DOSES and Treatments

Epinephrine: **BOLUS:** 10 – 100 mcg IV
Repeat as needed
Dilute 1 mg in 10 mL (100 mcg/mL), then 1 cc in 10cc NS (10 mcg/mL)

Vasopressin: **BOLUS:** 1 – 2 units IV
INFUSION: 1 – 4 U/hr

Diphenhydramine: 25 – 50 mg IV

H2 Blockers: Famotidine: 20 mg IV

Hydrocortisone: 100 mg IV

Albuterol: 2 – 5 mg nebulized or mini-dose inhaler

Reconsider Your Diagnosis

15 Local Anesthetic Toxicity

Tinnitus, metallic taste, altered mental status, fasciculations, seizures, hypotension, bradycardia, ventricular arrhythmias, cardiovascular collapse

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Turn FiO₂ to 100% and turn down volatile anesthetics – stop local anesthetic
3. Call for Intralipid kit – (Omniceil under Lipid Emulsion)
4. Give Intralipid according to dosing on facing page
5. Treat seizure activity with benzodiazepines
6. Monitor for hemodynamic instability – treat hypotension
 - Consider CPR if needed
7. Variable arrhythmias:
 - Consider reducing epinephrine doses (< 1 mcg/kg)
 - Avoid vasopressin, calcium channel blockers, beta-blocker, and local anesthetics
8. If refractory to treatment, alert personnel for potential cardiopulmonary bypass
9. Prolonged resuscitation is expected
10. Monitor the patient post event in the ICU

15 Local Anesthetic Toxicity

Tinnitus, metallic taste, altered mental status, fasciculations, seizures, hypotension, bradycardia, ventricular arrhythmias, cardiovascular collapse

DRUG DOSES and Treatments

Intralipid: **Rapidly give:** 1.5 mL/kg **BOLUS** of 20% Intralipid IV
INFUSION: 0.25 mL/kg/min
May increase to **maximum** of 0.5 mL/kg/min

Note: Continue for at least 10 minutes after obtaining circulatory stability

SUPPLEMENTAL Drugs:

Epinephrine: **BOLUS:** 10 – 100 mcg IV
Repeat as needed

Dilute 1 mg in 10 mL (100 mcg/mL), then 1 cc in 10cc NS (10 mcg/mL)

Vasopressin: **BOLUS:** 1 – 2 units IV
INFUSION: 1 – 4 U/hr

Norepinephrine: **INFUSION:** 8 – 30 mcg/min

Reconsider Your Diagnosis

16 Anaphylaxis

Hypotension, bronchospasm, high peak-airway pressures, decrease or lack of breath sounds, tachycardia, urticaria

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Open IV fluids and/or give large fluid bolus
3. Remove potential causative agents
4. Turn FiO₂ to 100%
5. Give epinephrine bolus (may be repeated)
 - Epi-pens are available in **OMNICELLS**– consider as first line
 - Dosing 300 mcg IM
 - Epinephrine 10 – 100 mcg IV
 - Start epinephrine infusion as needed
6. Establish/secure airway – potential airway edema
7. Consider:
 - Turning off volatile anesthetics if patient remains unstable
 - Vasopressin for patients with continued hypotension despite repeated doses of epinephrine
 - Diphenhydramine, H2 blockers, hydrocortisone
 - Tryptase level: (yellow top tube) Check within first hour, repeat at 4 hours and at 18–24 hours post reaction
 - Histamine levels (rises within 10 minutes)
 - Terminate procedure
8. ICU admission for 24 hours post event

16 Anaphylaxis

Hypotension, bronchospasm, high peak-airway pressures, decrease or lack of breath sounds, tachycardia, urticaria

DRUG DOSES and Treatments

Epinephrine:	BOLUS: 10 – 100 mcg IV Repeat as needed <i>Dilute 1 mg in 10 mL (100 mcg/mL), then 1 cc in 10cc NS (10 mcg/mL)</i>
Vasopressin:	BOLUS: 1 – 2 units IV INFUSION: 1 – 4 U/hr
Diphenhydramine:	25 – 50 mg IV
H2 Blockers:	Famotidine: 20 mg IV
Hydrocortisone:	100 mg IV
Albuterol:	2 – 5 mg nebulized or mini-dose inhaler

Common CAUSATIVE Agents

Neuromuscular blocking agents	Antibiotics
Latex products	IV contrast dye
Chlorhexidine surgical scrub	

Reconsider Your Diagnosis

17 Fire

Evidence of fire (smoke, odor, flash) on patient or drapes, in patient's airway, or in room

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Get fire extinguisher to have as needed
3. Activate R.A.C.E. management of fire emergency
 - **R:** Move patients and assist visitors or impaired employees away from immediate danger
 - **A:** Alert others: Activate manual pull station
 Call front desk of OR
 - **C:** Confine: Close doors and windows
 Contain smoke
 Turn off oxygen where appropriate
 - **E:** Extinguish fire with appropriate fire extinguisher

Additional fire information in **Appendix A7**

- Assessing OR Fire Risk
- Fire Reaction Details

17 Fire

Evidence of fire (smoke, odor, flash) on patient or drapes, in patient's airway, or in room

AIRWAY Fire

ATTEMPT TO EXTINGUISH FIRE

- Shut off medical gases
- Disconnect ventilator
- Remove endotracheal tube
- Remove flammable material from airway
- Pour saline into airway

After fire extinguished

- Re-establish ventilation using Bag valve mask (BVM) with room air
- Confirm no secondary fire
- Check surgical field, drapes and towels
- Assess airway for injury or foreign body
- Assess ETT integrity (fragments may be left in airway)
- Consider bronchoscopy, airway humidification, bronchodilators
- **Assess patient status and devise ongoing management plan**
- **Save involved materials/devices for review**

NON-AIRWAY Fire

ATTEMPT TO EXTINGUISH FIRE

First Attempt

- Avoid N₂O and minimize FiO₂
- Remove drapes / all flammable materials from patients
- Extinguish burning materials with saline or saline-soaked gauze
- Use fire extinguisher if appropriate. If equipment fire use fire extinguisher.

DO NOT USE

- Alcohol-based solutions
- Any liquid on or in energized electrical equipment (laser, electro-surgical unit (ESU), anesthesia machine, etc.)

Fire PERSISTS after 1 attempt

- Use fire extinguisher (safe in wounds)

Fire STILL PERSISTS

- Evacuate patient
- Close OR door
- Turn OFF gas supply to room

After fire extinguished

- Maintain airway / FiO₂ to 100%
- Assess patient for injury at site of fire, and for inhalational injury if not intubated
- Confirm no secondary fire
- Check surgical field, drapes and towels
- **Assess patient status and devise ongoing management plan**
- **Save involved materials/devices for review**

18 Total Spinal Anesthesia

After Neuraxial Anesthesia Block: Unexpected rapid rise in sensory blockade, numbness or weakness in upper extremities (hand grip weak), dyspnea, bradycardia, hypotension (or nausea/vomiting), loss of consciousness, apnea, cardiac arrest

START

1. Call “Anesthesia STAT” and ask for a code cart
 - Ask: “Who will be the event manager?”
2. Increase FiO₂ to 100%
3. Give IV fluid bolus
4. Stop epidural infusion if present
5. If cardiac arrest: Start CPR
 - If VT/VF → Go to TAB 10
 - If asystole / PEA → Go to TAB 9
 - Support **ventilation** and intubate if necessary
6. Treat significant **bradycardia or hypotension**
 - **Severe bradycardia:** epinephrine 10 – 100 mcg IV, increase as needed (**FIRST CHOICE**) → Go to TAB 8
 - **Mild bradycardia:** ephedrine 5 – 10 mg, atropine 0.5 – 1 mg IV
 - **Hypotension** → Go to TAB 6
7. If **parturient/pregnant:** Left uterine displacement, call OB and neonatology, prepare for possible emergent C-section, monitor fetal heart rate
8. Consider sedation to prevent awareness

Appendix Table of Contents

Contact Phone Numbers – HELP and Consults

A1 Rapid Reversal of Antiplatelet and/or Target-Specific Oral Anticoagulants

A2 Delayed Emergence

A3 Amniotic Fluid Embolism

A4 Crisis Resource Management

A5 Massive Transfusion Protocol

A6 Surgical Safety Checklist

A7 Assessing Operating Room Fire Risk

Operating Room Fire Guidelines

A8 Fall in Operating Room Guidelines

A9 Instructions for Prevalon MATS / HoverJack System

A10 Lucas 3 Quick Reference Guide

Acknowledgements

Contact Phone Numbers - HELP

	EAST Campus	WEST Campus
FROM OUTSIDE	(617) 66X-XXXX	(617) 75X-XXXX
BLOOD BANK	74480	43300
STAT LAB	75227	43230
PACU	73905 Feldberg	42800
FRONT DESK	72411	43000

STAT Help at night (West): ICU attending

- 1) Open paging system or Anesthesia Intranet
- 2) Type "ICU" into 'On-Call Schedule Search'
- 3) Find "ICU Attending On Call All Units" – these are all Anesthesia attendings except one (ER intensivist)

-May also find Anesthesia Fellow/residents under ICU Fellow or 'On Call'
TSICU/SICU Residents

Other: Late 3 attending (**see Qgenda**) - keep in mind this person is home call
If still need further help: Consider Heart/Transplant Team

Help at night (East): East Attending or OB Team

-Open Anesthesia Intranet -> Overnight tab -> East Attending and OB
Attending/Residents

OB Front Desk

Contact Phone Numbers - CONSULTS

Cardiology consult: (i.e. acute coronary syndrome)

- 1) Open paging system -> type "cardiology daytime" -> Page the consult fellow or consult attending for questions/consults

Pacemaker/ICD:

- 1) Open paging system -> type "EP" -> click "view on call now" -> page EP consult fellow between hours of 8 AM to 5 PM
- 2) If after 5 PM -> type "cardiology off-hours" -> Page the Fellow (first option)
-One cardiology fellow is in house overnight to answer questions and provide assistance

Hint: If you know about these patients the day before, please page the EP fellow or cards consult fellow to let them know when/where you want them to meet the patient (i.e. preoperative holding 30-45 min before procedure starts)

Suspected PE:

- 1) Open paging system -> type "MASCOT" -> this gets on call cardiology fellow who will evaluate and contact Cards, Pulmonary, IR, Vascular, Heme/Onc, etc.

Suspected inpatient stroke:

- 1) Call (617) 632-1212 and ask for STROKE STAT
- 2) Open paging system -> type "STROKE" for 'Stroke Fellow or Attending'

Perfusion

- 1) 9- **ECMO** (Cardiologist)

Surgical Airway Consult

- 1) ACS Call West **X43000**, East **X42111**

A1 Rapid Reversal of Antiplatelet and/or Target-Specific Oral Anticoagulants

Surgical-trauma patients with life threatening hemorrhage and/or intracranial hemorrhage

START

Antiplatelet Agents

- Aspirin
- Clopidogrel (Plavix)
- Prasugrel (Effient)
- Ticagrelor (Brilinta)
- Ticlopidine (Ticlid)
- Cilostazol (Pletal)

One apheresis platelet pack

Consider additional platelets if bleeding persists

Consider desmopressin (DDAVP) 0.3 mcg/kg IV over 15 min in 50 mL NS

Direct Thrombin Inhibitors

- Dabigatran (Pradaxa)
 - Bivalirudin (Angiomax)
 - Agatroban
- PT may not be sensitive, PTT prolonged by high doses, INR can be falsely elevated

Based on TEG results, consider 2 units **FFP** ASAP

Consider DDAVP (desmopressin) 0.3 mcg/kg IV over 15 min in 50 mL NS

Based on TEG results, consider Tranexamic Acid (**TXA**)

Load: 1 gram (over 10 min)

Infusion: 125 mg/hr x 8 hours

For Pradaxa there is an agent specific reversal agent – PRAXBIND (consult pharmacy)

Factor Xa Inhibitors

- Rivaroxaban (Xarelto)
 - Apixaban (Eliquis)
- PT prolonged in a concentration-dependent manner; may not be sensitive

Consider prothrombin complex concentrate (4-factor Kcentra) 50 units/kg (maximum 5000 units) IV x 1 **DO NOT REPEAT**

Laboratory Studies

PT/INR, Fibrinogen, PTT, Hemoglobin, Platelet Type and Cross
Consider Rapid TEG

A1 Rapid Reversal of Antiplatelet and/or Target-Specific Oral Anticoagulants

Surgical-trauma patients with life threatening hemorrhage and/or intracranial hemorrhage

START

Vitamin K Dependent Reversal

PT/INR, Fibrinogen/PTT

Trauma: Hgb, PLT, Type and Cross

INR < 1.4

INR > 1.4 – 1.9

INR > 1.9

Reversal Adequate

INR < 1.4

- Admit to ICU
- Vitamin K 10 mg IV x 1 dose STAT
- Give 2 units FFP ASAP
- If platelet <60 give 1 apheresis platelet pack
- If fibrinogen <100mg/dL give 10 u cryoprecipitate or 2u additional FFP
- Repeat INR Q6h x 24h or until adequately reversed

- Admit to ICU
- Vitamin K 10 mg IV x 1
- Give 2 units FFP
- Prothrombin complex concentrate (4-factor) (Kcentra)
- INR 2-4: 25 units/kg (Max 2500u)
- INR 4-6: 35 units/kg (Max 3500u)
- INR >6: 50 units/kg (Max 5000u)
- **DO NOT REPEAT**
- Consider platelet transfusion
- Repeat INR Q 2 hours until < 1.4
- Consider TEG

INR > 1.4

INR > 1.9

Consider more FFP if clinically indicated

A2 Delayed Emergence

Failure to return to normal consciousness in a timely fashion

START

- 1. Confirm** all anesthetic agents (IV/inhalational) **are OFF**
- 2. Check for residual muscle relaxation**
 - Verify NMB reversal, TOF status.
- 3. Consider:**
 - Take patient to PACU/ICU intubated
 - NMB reversal with sugammadex (high dose vs. low dose)
 - Opioid reversal: Naloxone
 - Benzodiazepine reversal: Flumazenil
 - Scopolamine reversal: Physostigmine (potential cholinergic crisis, including severe bradycardia responsive to atropine)
- 4. Call for help**
- 5. Neuro Exam**
 - **Look for focal neurologic deficits** (pupils, asymmetric movement, gagging, etc.)
 - Suspect stroke (abnormal exam) obtain stat head CT
- 6. Check for medications swap or dosing error**
- 7. Labs:** ABG, electrolytes, glucose, temperature

A2 Delayed Emergence

Failure to return to normal consciousness in a timely fashion

Rule Out Other Causes

Hypoxemia	Hypermagnesemia
Hypercarbia	Hyponatremia
Hypothermia	Hypoglycemia
Medication error	

DRUG DOSES and Treatments

Narcan (Naloxone):	40 mcg IV (Max 400 mcg)
Flumazenil:	0.2 mg IV (Max 1 mg)
Physostigmine:	1 mg IV
Sugammadex doses:	4 mg/kg if TOF 1-2 post tetanic stimulation
	2 mg/kg if TOF 2 twitches
	16 mg/kg immediate reversal of rocuronium after induction

A3 Amniotic Fluid Embolism

Respiratory distress, decreased SaO₂, cardiovascular collapse, coagulopathy, disseminated intravascular coagulopathy (DIC), seizures

START

1. **Call “Anesthesia STAT” and ask for a code cart**
 - *Ask: “Who will be the event manager?”*
2. **Turn FiO₂ to 100%**
3. **Cardiopulmonary arrest and C-section**
 - Plan emergent delivery
 - Consider TTE or TEE
 - Support ventilation
4. **Place patient in left uterine displacement (LUD)**
5. **Establish large volume IV access**
6. **Prepare for emergent intubation**
7. **When possible place arterial line**
8. **Support circulation**
 - IV fluids, vasopressors and inotropes
9. **Anticipate massive hemorrhage and DIC**
10. **Consider circulatory support (Page 9-ECMO)**

A3 Amniotic Fluid Embolism

Respiratory distress, decreased SaO₂, cardiovascular collapse, coagulopathy, disseminated intravascular coagulopathy (DIC), seizures

Rule Out Other Causes

Eclampsia	Hemorrhage
Air embolism	Aspiration
Anaphylaxis	Pulmonary embolism
Anesthetic overdose	Sepsis
Cardiomyopathy/MI	Local anesthetic toxicity
Total spinal	

A4 Crisis Resource Management

Call "Anesthesia Stat"



Designate the event manager and other roles



State the diagnosis and plan out loud



- 1. Primary Diagnosis Group Statement**
 - Airway (Failed, Difficult, etc.) ,
 - Respiratory (Hypoxia, pneumothorax, etc.)
 - Cardiac (Ischemia, VF/VT, etc.)
- 2. Critical abnormality noted**
- 3. Relevant medical or surgical history**
- 4. Initial treatment initiated**



Request input
Verbal review every five minutes



Avoid fixations and critical errors in thinking

Reconsider Your Diagnosis

A5 Massive Transfusion Protocol

- 1. Call Blood Bank West X43300, East X74480**
 - *Inform technician of following information*
 - *Your name and Attending requesting the MTP*
 - *Patient name, gender, MRN, location*

- 2. Cooler released to transport with component pick-up slip, or patient label. (Must have name and MRN)**

- 1. Cooler preparation**
 - *Automatically prepared and issued every 20 minutes*
 - *First Cooler: 4 u PRBCs, 2 u FFP*
 - *All Subsequent Cooler: 4 u PRBCs, 2 u FFP, 1 dose platelets*
 - *Every 4th cooler: Cryoprecipitate prepared and issued*

- 2. Coolers will be prepared until a call is received to stop MTP**

- 3. Hourly tests will be requested by blood bank**
 1. PT, PTT, CBC, fibrinogen
 2. Consider TEG

- 4. Complete an Emergency Release Form for emergency release products**

- 5. Return all unused products to Blood Bank (within 12 hours)**

A6 Surgical Safety Checklist

Surgical Safety Checklist

SIGN IN	
Prior to induction of anesthesia BRIEFING MAY BE ROLLING OR IN STEPS	
WHO	WHAT TO DO
1) Fire Risk Assessment:	
CIRCULATOR:	Fire Risk Assessment Questions: 1. What are the energy sources? 2. Is the incision above the alcohol prep? 3. Alcohol-based prep? 4. Alcohol-based prep?
CIRCULATOR:	Determine Fire Risk: Standard vs High
ANESTHESIA PROVIDER:	Collaborate with circulator if any concerns
2) Prior to Patient's entry into OR: Discuss & create plan for:	
CIRCULATOR:	Are there additional fire safety concerns, special airway needs, a risk of hypothermia or need for blood products?
ANESTHESIA PROVIDER:	Responds with needs if any
3) Upon entry into OR – confirm patient's identity:	
CIRCULATOR:	Reads patient's name, DOB & MRN
ANESTHESIA PROVIDER:	Reviews ID band
4) Prior to induction:	
ALL:	Confirm allergies
CIRCULATOR:	Confirms procedure with: • Anesthesia • Consent
SURGEON*:	State the name of procedure including site and side
PATIENT, IF POSSIBLE:	Advises procedure to be done
ALL:	Verifies marking if applicable
SURGEON*:	Verifies patient's position/need for positioning equipment
ALL:	Any other concerns are addressed

KEY:

SIGN IN

SURGEON*
Surgeon or designee participating in case

TIME OUT

Surgeon or designee authorized to begin procedure

SIGN OUT

Procedure completed
Attending surgeon.
Task may not be delegated.

TIME OUT		
Before Skin Incision ALL MEMBERS OF THE TEAM STOP INTRODUCE SELVES AND PARTICIPATE		
WHO	WHAT TO SAY	WHAT TO DO
CIRCULATOR:	Ready to do Time-out	IN as computer with consent in hand.
ALL:	Yes	Stop activities. Turn radios off other devices off.
CIRCULATOR:	Patient's name, MRN & DOB	See MRN name and MRN on computer screen & the consent.
ANESTHESIA PROVIDER:	Team Time-MINUTE: 15 SECS. (OR 30/242 - identify was confirmed upon entry into OR)	Re-confirm patient's identity
SURGEON:	Confirms patient's name	
CIRCULATOR:	Allergies	View allergies on PIMS screen.
ANESTHESIA PROVIDER:	Lists allergies or declares none	
SURGEON:	Verbally affirms	
CIRCULATOR:	Antibiotics	
ANESTHESIA PROVIDER:	Name of antibiotic and time completed	Verify documentation in AIMS and time of next dose.
SURGEON:	Verbally affirms	
CIRCULATOR:	Name primary specialties to participate fire risk. Are there any other fire prevention considerations?	Follow OR Fire Risk Assessment.
ALL:	Respond as needed.	
CIRCULATOR:	OUT marks/labels. Decide name of need given or state not applicable, and if applicable, what have been applied and are activated or state not applicable.	
CIRCULATOR:	Verification of Procedure	Review consent for accuracy.
SURGEON:	Name of procedure including site and side.	
CIRCULATOR:	Site marking	
SURGEON:	Affirms location of mark or state not applicable.	ALL visualize the mark, ALL verbalize the mark if marking removed during prep process.
CIRCULATOR:	Position	
SURGEON:	Affirms that the patient is in the correct position.	
CIRCULATOR:	Position and time-out to be performed. (If time has been requested are present or declares the plan to secure them.	Call team to official position, solve the assistance in solving the named discrepancy.
SURGEON:	Are all of the requested implants and additional personnel requested in the room or in progress?	
SCORB:	Name implants, instruments or personnel that have been requested are present or declares the plan to use additional items.	
CIRCULATOR:	Please confirm the radiological images.	
SURGEON:	Images present and displayed correctly and patient's name and MRN have been verified.	
CIRCULATOR:	Verify medications on the field	
SCORB:	States medications on the field, if any	
CIRCULATOR:	Is there anything else we need to disclose?	Records comments if any.
ALL:	Respond as needed (may include special precautions).	

NEW!

SIGN OUT / DEBRIEF	
Before Patient leaves OR VALIDATE AND PREPARE FOR HANDOFF	
WHO	WHAT TO DO
SURGEON**:	Initiates Debrief
SURGEON**:	Completes elements of the Brief Op note
SURGEON**:	States surgeon concerns
SURGEON**:	Asks if there are Nursing concerns
CIRCULATOR:	States concerns
SURGEON**:	Asks if there are Anesthesia concerns
ANESTHESIA PROVIDER:	States concerns

FIRE RISK ASSESSMENT

Risk levels and Prevention Strategies:
Refer to Fire Risk Assessment poster

Educate Yourself and Your Team

Head, Face, Neck, Upper Chest Surgery



Beth Israel Lahey Health
Beth Israel Deaconess Medical Center

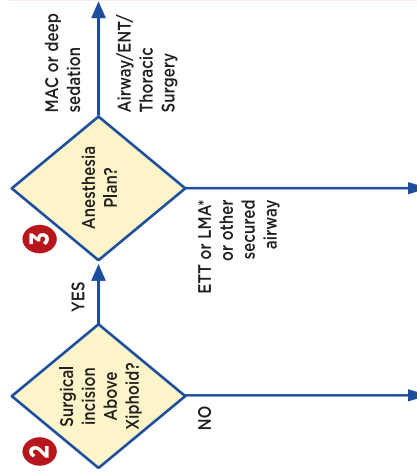
**PAGE
INTENTIONALLY
LEFT BLANK**

A7 Assessing Operating Room Fire Risk

Assess the OR Fire Risk:

FIRE RISK ASSESSMENT AND ACTION

1 Nurse prompts anesthetist to start



STANDARD FIRE RISK SCRIPT and ACTION PLAN

- Circulating nurse states risk.
Staff follows action plan:
- Observe alcohol-based prep drying times
 - Confirmed prep dry > 3 min
 - Ensure pooling of solutions has not occurred or has been corrected
 - Holster ESU pencils
 - Shutter fiber-optic light sources and ensure active sources are not unattended on drapes

*LMA may have significant airway leaks and enrich oxygen levels under drapes - use with caution

See It. Say It. Do it.

Fire Safety is Everyone's Responsibility.

HIGH FIRE RISK SCRIPT and ACTION PLAN

Anesthesia Provider States:

- Airway status and fire risk
- Mitigating steps taken (as defined in algorithm)

Surgery Provider States:

- Energy source to be used
- Holster or secure active electrode
- Points of procedure where risks are highest: (i.e., near airway, using energy source)
- Shutter light sources

Nursing Provider States:

- Alcohol-based prep used
- Size appropriate applicator used
- Confirmed prep dry > 3 min
- Pooling has not occurred or has been corrected
- Saline on field
- Where fire extinguisher is mounted in the room

Team verifies all actions are being taken to minimize risk

A7 Operating Room Fire Guidelines

Evidence of fire (smoke, odor, flash) on patient or drapes, in patient's airway, or in room

START

Responsible Person	Action	Responsible Person	Action
Anesthesia Provider	<ol style="list-style-type: none"> 1. Take charge of surgical team effort 2. Stop flow of oxygen, if feasible, until fire is under control 	R: RESCUE Floor Marshall/Resource Nurse	<ol style="list-style-type: none"> 1. Notify Manager and Director 2. Pull fire alarm 3. Inform other occupied O.R. personnel of the situation; alert them of possible evacuation. 4. If needed Identify location for evacuation
At the same time... Circulator	<ol style="list-style-type: none"> 1. Activate Anesthesia STAT 2. Notify Floor Marshall 3. Direct incoming staff to secure additional supplies and to ready CO₂ fire extinguisher 	Rescue: Anesthesia Provider	<ol style="list-style-type: none"> 1. Inform circulator when to close oxygen shut-off valve. 2. Determine the need for evacuation. 3. Disconnect breathing circuit from the patient and turn off the oxygen flow.
At the same time... Surgeon	<ol style="list-style-type: none"> 1. Remove burning material from the patient and throw it on the floor away from the patient's head. This involves the following immediate and coordinated actions: <ol style="list-style-type: none"> a. AP releases the drape from the IV pole b. Scrub person pushes the mayo stand out of the way c. Circulating nurse disconnects any cords 2. Assess patient for injury, and if any: 3. Care for patient's injuries. 	Rescue: Anesthesia Tech	<ol style="list-style-type: none"> 1. Assist anesthesia provider with ventilating patient during evacuation. 2. Obtain necessary monitoring equipment, oxygen tank(s) and any additional equipment needed to evacuate the patient.
Scrub	Pour saline on the drape	Rescue: Surgeon, circulating nurse, scrub and assisting personnel	<ol style="list-style-type: none"> 1. Disconnect the patient from all of the surgical equipment, i.e., cautery, drapes, insufflator, boot machine, etc. 2. Cover the patient's open wound with a steri- drape or sterile towel(s). 3. Move patient on the O.R. bed to the designated area (empty O.R. or the PACU).
Floor Marshall / Resource Nurse/ Designee	<ol style="list-style-type: none"> 1. Pull fire alarm 2. In collaboration with anesthesia, turn off oxygen valve outside of room 3. Direct personnel to close all doors, unplug electrical devices involved, obtain extinguisher 4. Assign a person at the entrance of the O.R. to direct Code Red Team 5. Dial 2-1212 and report fire in (exact location: West, Feldberg, Shapiro) O.R. # ____. 	A: ALARM Floor Marshall/Resource Nurse	<ol style="list-style-type: none"> 1. Activate RED emergency call light (West campus only) 2. Dial 2-1212 and report fire in (exact location: West, Feldberg, Shapiro) O.R. # ____.
Code Red Team	Will respond immediately at this time	C: CONTAIN Floor Marshall/Resource Nurse	Keep the involved O.R. doors closed.
		E: EXTINGUISH Code Red Team (Should have arrived by the time...)	<ol style="list-style-type: none"> 1. Code Red Team will use extinguisher to put out the fire and implement fire containment strategies. 2. Water sprinkler in the room will start automatically when the temperature reaches 140 degrees F.

A8 Fall in Operating Room Guidelines

START

1. Assess and stabilize patient

- *Check patient's breathing, pulse and blood pressure*
- *Ensure standard monitors are functional*
- *Check for injury such as cuts, scrapes and bruises*
- *Consider cervical /head trauma (consider c-collar and back-board)*
- *Stabilize patient in situ*

2. Call for help with patient management / movement

- *Do not attempt to lift /move patient without assistance*

3. Utilize Prevalon MATS/ HoverJack System to raise patient to bed

- See next page

4. Consider transfer to Emergency Department for clinical evaluation of trauma s/p fall

A9 Prevalon MATS/HoverJack System Guide

1. Place Prevalon MAT transfer mattress underneath patient using log-roll technique.
2. Inflate Prevalon MAT using air supply
3. Pull inflated Prevalon MAT on top of deflated Hoverjack
 - Assure patient is properly centered on HoverJack mat
 - Using buckles, secure safety straps around patient
4. Deflate Prevalon MAT by turning off air supply
5. Inflate Hoverjack System
 - Plug in air supply to valve #1 at patient's feet
 - Once fully inflated remove air hose, valve will maintain pressure
 - **ALWAYS INFLATE FROM THE BOTTOM**
 - Inflate other chambers using valve #2, valve #3 and valve #4 in exact succession
6. Position bed next to inflated HoverJack.
 - Re-inflate Prevalon MAT and transfer patient to stretcher or bed
 - Transfer using the orange handles located on side of MAT
 - Remove safety strap that is around patient from HoverJack
 - **Ensure team members stay at side of patient**
7. If it necessary to lower patient to floor (e.g. CPR) release air by opening uppermost red deflate valve first. Then release others in sequence.

A10 Lucas 3 Quick Reference Guide



Manual positioning of the Suction Cup



**Rescuer 1
(LUCAS device operator)**

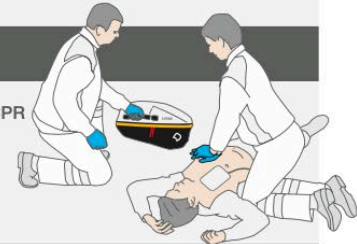
Rescuer 2

1. Power on the LUCAS device



- Push ON/OFF to start self-test and power up the LUCAS device
- The device will be ready and in the ADJUST mode

- Provide manual CPR

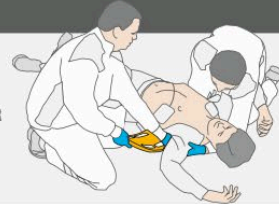


2. Place the LUCAS BACK PLATE

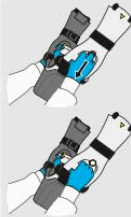


- Pause manual CPR briefly
- Put the BACK PLATE under the patient, immediately below the armpits

- Assist BACK PLATE placement
- Resume manual CPR



3. Attach the UPPER PART



- Pull the RELEASE RINGS once to open CLAW LOCKS. Then let go of the rings
- Stop manual CPR briefly while attaching the UPPER PART to the BACK PLATE. Listen for "CLICK" sound
- Pull up once to assure attachment

- Continue manual CPR as long as possible
- Help to attach the UPPER PART

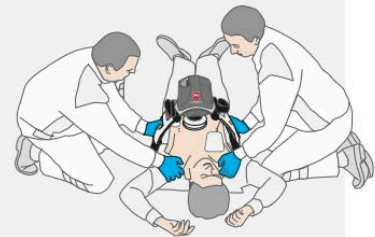


4. Push down SUCTION CUP. Adjust position if needed.



- Push down the SUCTION CUP
- The lower edge of SUCTION CUP should be immediately above the end of the sternum
- Adjust if necessary (stay in ADJUST mode)

- Assist

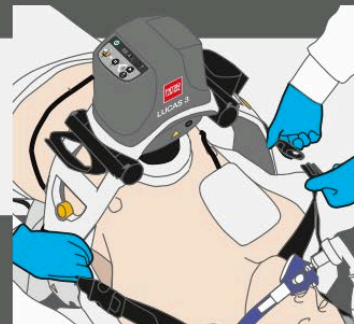


5. Lock position. Start compressions.



- Push PAUSE to lock START POSITION
- Push ACTIVE (continuous) or ACTIVE (30:2) to start compressions

- Assist



**Attach stabilization strap.
Follow CPR protocols.**

The LUCAS 3 device is for use as an adjunct to manual CPR when effective manual CPR is not possible (e.g., transport, extended CPR, fatigue, insufficient personnel). Refer to the Instructions For Use for complete directions for use, indications, contraindications, warnings, precautions and potential adverse events.

Physio-Control is now part of Stryker.

©2017 Physio-Control, Inc. Redmond, WA, USA
GDR 3328215_B [USA] Rx Only

www.physio-control.com/LUCAS

stryker

Acknowledgements

Please contact Dr. Richard Pollard and the QSI team at BIDMC with questions and/or clarifications regarding this book

This manual was inspired by and modified based on the following sources:

American Heart Association: Advanced Cardiac Life Support Training

Ariadne Labs. OR Crisis Checklists. Brigham & Women's Hospital, Harvard T H Chan School of Public Health, Boston, MA

Stanford Anesthesia Cognitive Aid Group. Emergency Manual: Cognitive aids for perioperative clinical events. Creative Commons BY-NC-ND

1.	Failed Airway
2.	Hypoxia
3.	Bronchospasm
4.	Pneumothorax
5.	Hemorrhage
6.	Hypotension
7.	Tachycardia – Unstable
8.	Bradycardia – Unstable
9.	Cardiac Arrest –Asystole/PEA
10.	Cardiac Arrest – VF/VT
11.	Myocardial Ischemia
12.	Malignant Hyperthermia
13.	Air Embolism – Venous
14.	Transfusion Reactions
15.	Local Anesthetic Toxicity
16.	Anaphylaxis
17.	Fire
18.	Total Spinal Anesthesia
19.	Appendices - References

Operating Room Crisis Checklists

>> **Do not remove book from this room** <<

The use of this manual is meant as a guideline and reference. It is not meant to be a substitute for training and experience.

Color code:
 Blue – Respiratory
 Red – Cardiac
 Green - Other
 Yellow - Reference

HMFP | APHMFP
**Department of Anesthesia, Critical Care
 and Pain Medicine**