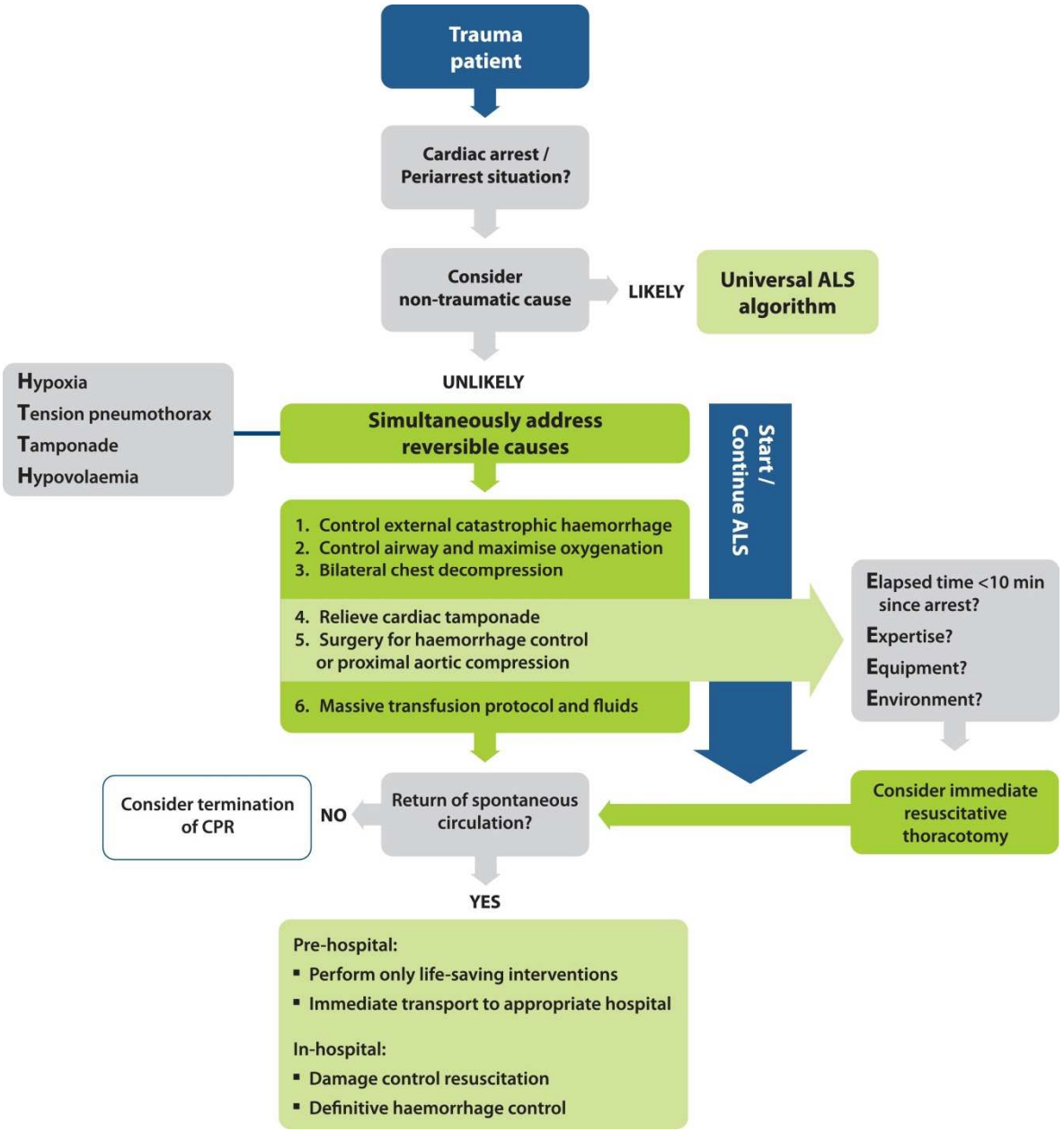
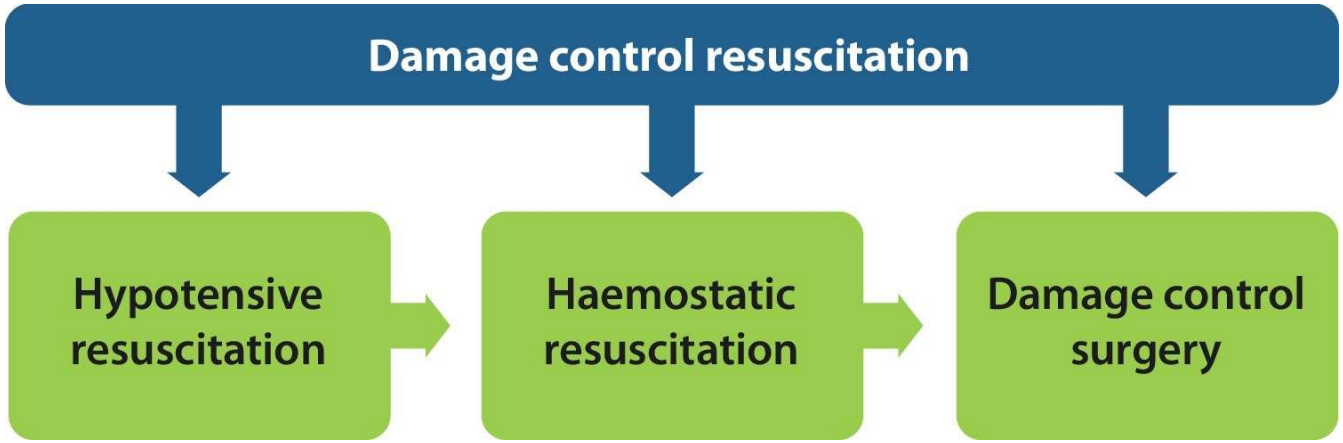
TRAUMA - RESUSCITATION



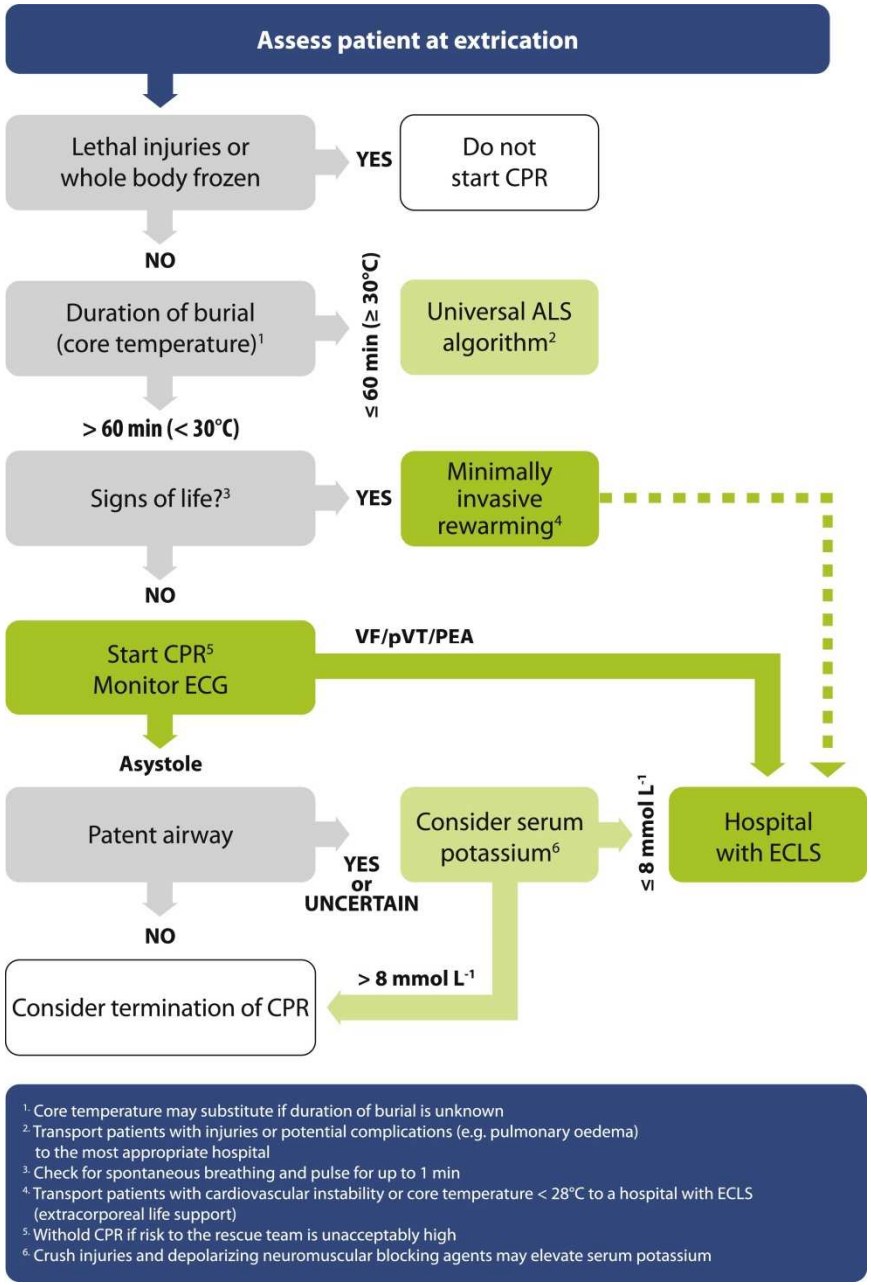
Resuscitation 2015 95, 148-201DOI: (10.1016/j.resuscitation.2015.07.017)

TRAUMA - RESUSCITATION



Resuscitation 2015 95, 148-201DOI: (10.1016/j.resuscitation.2015.07.017)

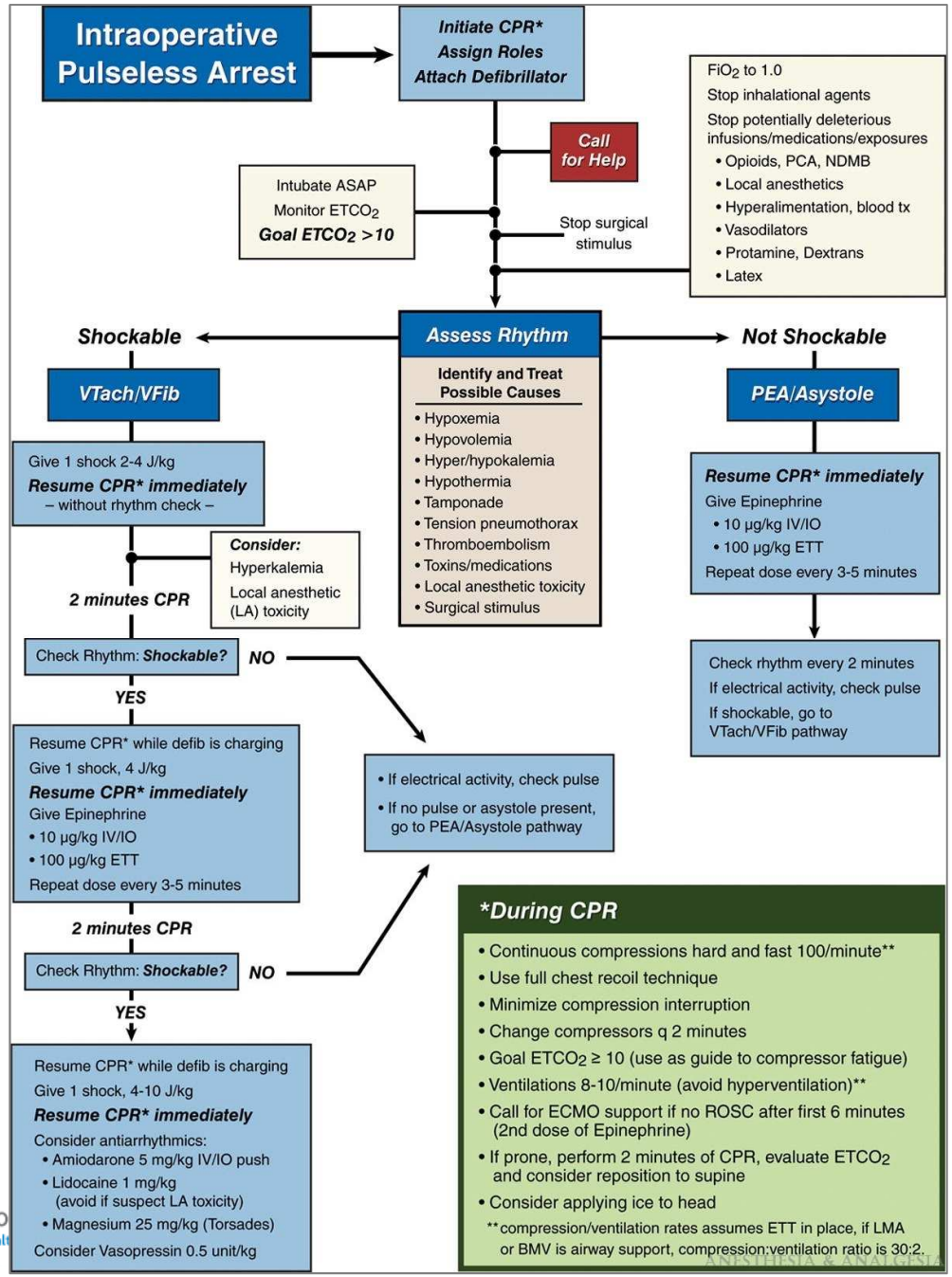
LAWINE



1. Core temperature may substitute if duration of burial is unknown
2. Transport patients with injuries or potential complications (e.g. pulmonary oedema) to the most appropriate hospital
3. Check for spontaneous breathing and pulse for up to 1 min
4. Transport patients with cardiovascular instability or core temperature < 28°C to a hospital with ECLS (extracorporeal life support)
5. Withold CPR if risk to the rescue team is unacceptably high
6. Crush injuries and depolarizing neuromuscular blocking agents may elevate serum potassium

Resuscitation 2015 95, 148-201

Intraoperative CPR



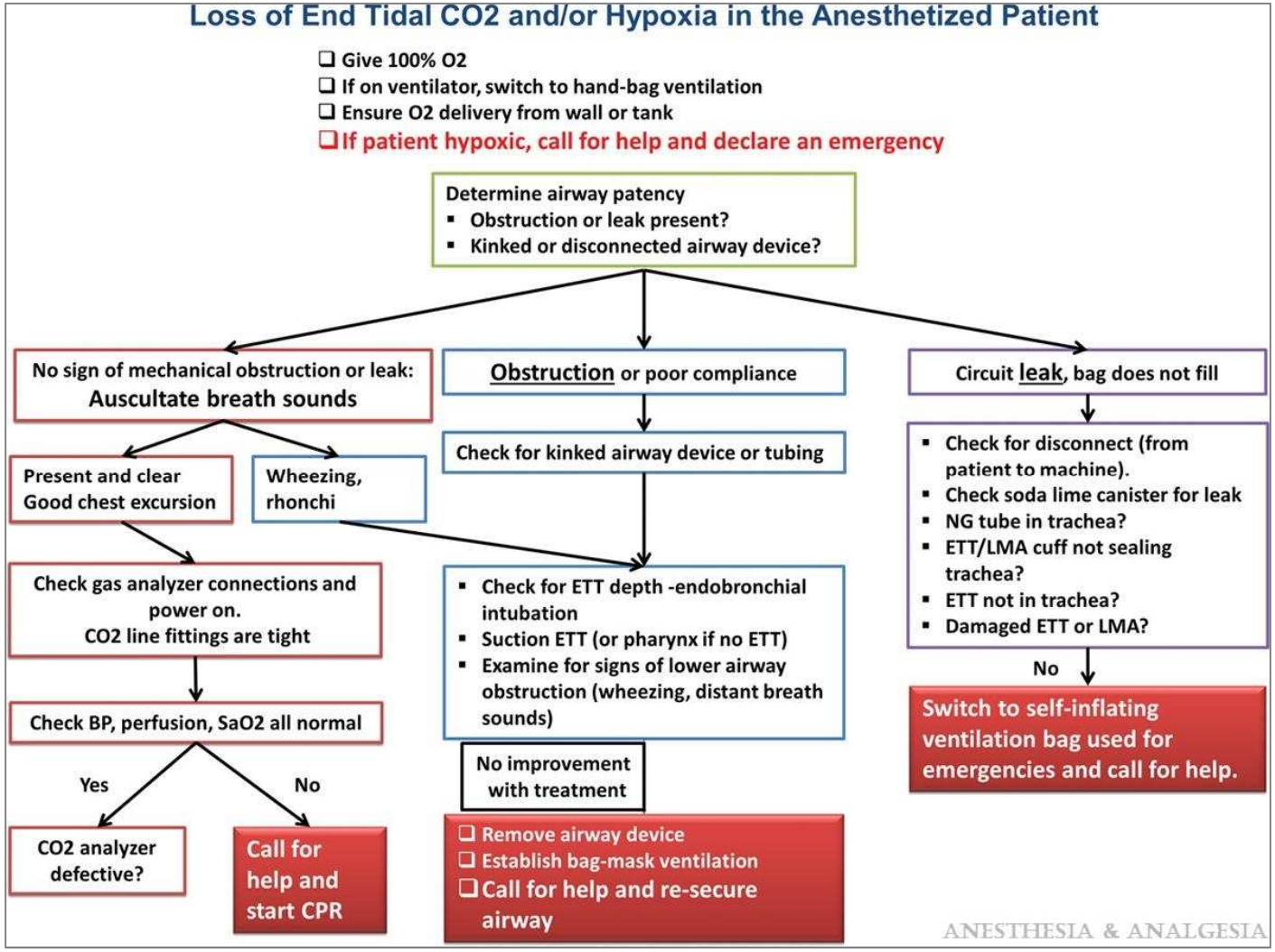
The **American Heart Association pediatric advanced life support algorithm for pulseless arrest/cardiopulmonary resuscitation** (CPR) modified for intraoperative events. ETCO2 = end-tidal CO2; ETT = endotracheal tube; IO = intraosseous; NDMB = nondepolarizing muscular blocker; PCA = patient-controlled analgesia; PEA = pulseless electrical activity; ROSC = return of spontaneous circulation; LMA = laryngeal mask airway; BMV = bag-mask ventilation. Adapted from Schwartz et al.64

Pediatric Perioperative Life Support

Shaffner, Donald H.; Heitmiller, Eugenie S.; Deshpande, Jayant K.

Anesthesia & Analgesia. 117(4):960-979, October 2013.

Intraoperative CPR



Algorithm for management of the loss of end-tidal CO2 (ETCO2) and/or hypoxia in the anesthetized patient.
BP = arterial blood pressure; CPR = cardiopulmonary resuscitation; ETT = endotracheal tube; LMA = laryngeal mask airway; NG = nasogastric; Sao2 = arterial oxygen saturation.

Wolters Kluwer Health | Lippincott Williams & Wilkins

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Intraoperative CPR

Finding	Causes
Intravascular volume status	
Low preload	Inability to keep up with hemorrhage, inaccurate assessment of volume loss, inadequate IV access for replacement of fluid loss
Volume redistribution	Vasodilation (relative anesthetic overdose, anaphylaxis, sepsis, neurogenic, hypoxia), capillary leak (anaphylaxis, sepsis)
Obstructed venous return	Tamponade, pneumothorax, venous air embolism
Myocardial contractility	
Dysfunction	Anesthetic overdose, metabolic, sepsis, hypoxia
Myopathy	Infectious, idiopathic, chemotherapy
Vascular resistance	
Low vascular resistance	Vasodilation (relative anesthetic overdose, anaphylaxis, sepsis, neurogenic, hypoxia)
High vascular resistance	Pulmonary hypertension, catecholamine excess, medication related
Rate/rhythm	
Metabolic	Hyperkalemia (transfusion, hyperalimentation, iatrogenic, renal failure), malignant hyperthermia, hypocalcemia (transfusion, renal, DiGeorge syndrome)
Hypoxia	Respiratory failure
Ischemia	Williams syndrome (supravalvular aortic stenosis)
Congenital	Prolonged QT (Jervell and Lange-Nielsen, Romano Ward)
Mechanical	Central line related
Pharmacologic	Succinylcholine, neostigmine
Pacemaker failure	Device dysfunction, acidosis, hypoxia

ANESTHESIA & ANALGESIA

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Intraoperative CPR

Finding	Causes (specific examples in parentheses)
Upper airway	
Difficult intubation	Micrognathia (Pierre Robin anomalad), macroglossia (Beckwith-Wiedemann syndrome), mucopolysaccharide deposition (Hunter/Hurler syndromes), blood (bleeding tonsil, trauma)
Obstruction	Tonsil hypertrophy, foreign body, epiglottitis
Laryngospasm	URI, gastric reflux
Laryngeal swelling	Postextubation croup
Equipment problems	Obstruction or leaks in the anesthesia machine, the breathing circuit, or the ETT or tracheostomy tube (kink, plug from mucous or blood), malposition of ETT, leak around tracheostomy tube or ETT, cuff leak
Lower airway	
Bronchospasm	Reactive airway disease
Compression	Mediastinal mass
Parenchymal disease	
BPD/CLD	Prematurity-associated chronic lung disease
Pulmonary edema	Postobstructive, cardiac dysfunction, excessive intravascular volume, capillary dysfunction
Pneumonia	Aspiration, infection
Disordered control	Prematurity, central hypoventilation, recurarization, opioid respiratory depression, ventilator failure
Other	Narcotic-induced rigidity, change in compliance of chest during thoracic surgery

URI = upper respiratory infection; ETT = endotracheal tube; BPD = bronchopulmonary dysplasia; CLD = chronic lung disease.

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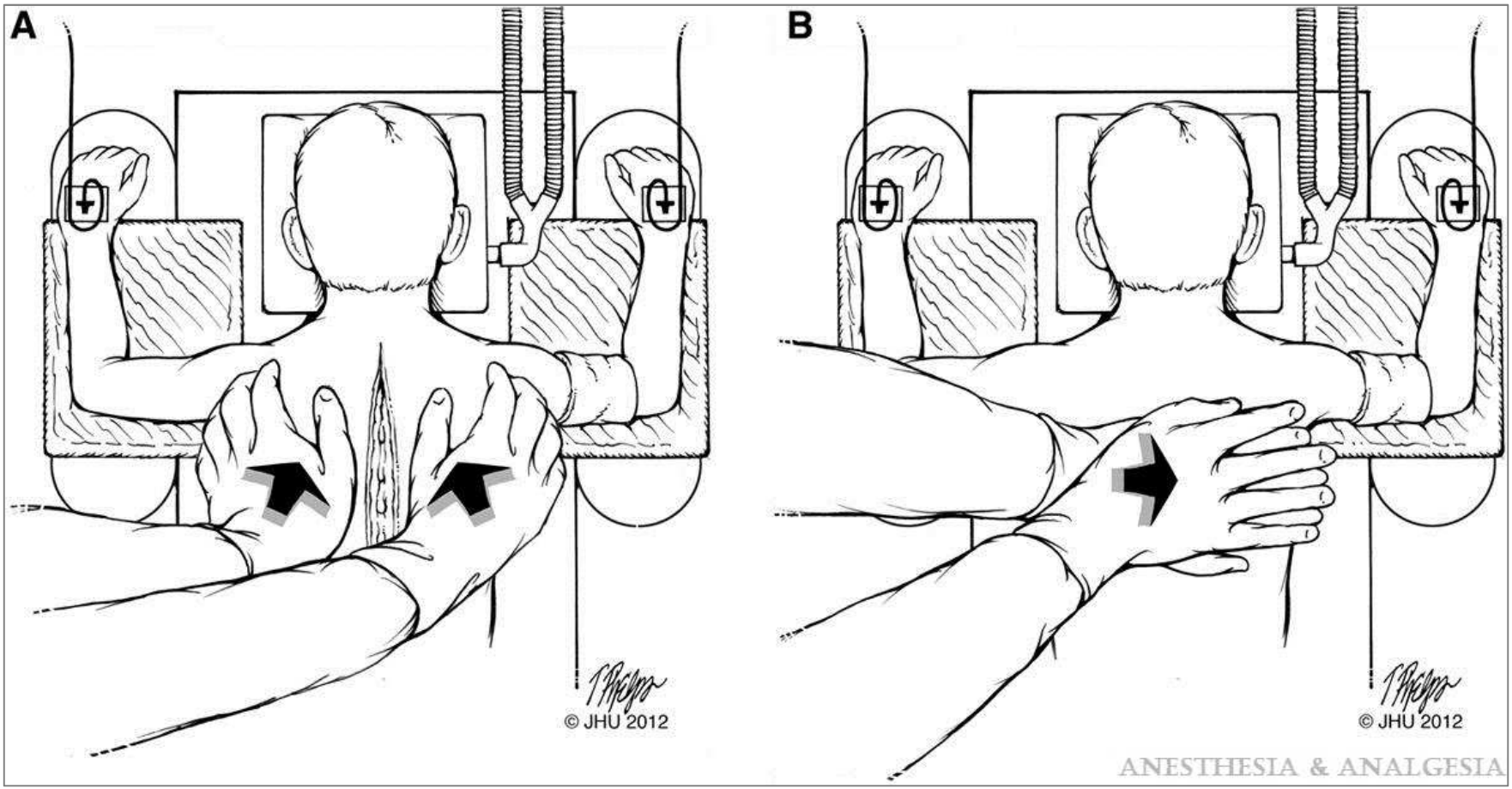

Prone chest compressions with a midline posterior incision. B, Prone chest compressions with no midline incision.

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Intraoperative CPR

Role	Responsibilities	Team member
Leader	Assigns roles. Directs resuscitation. Monitors performance.	Anesthesiologist most familiar with patient and course
Airway	Prepares equipment and O_2. Performs airway and gastric intubation. Ventilates patient.	Second anesthesiologist
Compressor	Delivers chest compressions. Need at least 2 to rotate every 2 min.	Surgeon or scrub nurse if sterility needed
Access	Obtains intravascular or intraosseous access. Administers fluid and medications.	Surgeon or anesthesiologist (access) Nurse or anesthesiologist (medications)
Monitor	Operates monitors and defibrillator. Performs pulse checks. Performs rhythm analysis.	Surgeon or scrub nurse if sterility needed
Recorder	Records resuscitative efforts. Compares efforts to goals on resuscitation list. Reviews record as needed by Leader and team.	Circulating nurse

ANESTHESIA & ANALGESIA

Roles and Responsibilities During an Intraoperative Arrest

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