Trauma Anesthesia Guidelines at UCH

The University of Colorado Hospital (UCH) is a level II trauma center. Successfully managing the trauma patient requires a coordinated plan with the surgical and anesthesia teams, operating room nurses and technicians. Management of these patients is similar to managing other surgical patients with potential for large intraoperative blood loss, fluid shifts and coexisting diseases. In addition, these patients may have multiple acute injuries that require multiple surgical teams to coordinate care. Damage Control Resuscitation is a coordinated effort with Damage Control Surgery. For Level I/II trauma centers anesthesiology services must be available in-house 24 hours a day, available within 30 minutes for emergency operations and for managing airway problems. The attending anesthesiologist must be present for all operations. The following are guidelines for anesthesia management:

A. Preoperative Management

1. Trauma Room selection and setup is coordinated with the OR Charge Nurse. The anesthesia technicians (8-5912) will setup the equipment. Check the room at the beginning of each call shift.
   a. Level One rapid infuser in room with disposables in place but not engaged or flushed with crystalloid.
   b. Belmont rapid infuser available with disposables in place but not in room unless requested by the attending.
   c. Central venous catheters in various sizes including 9Fr introducer (Cordis) x 2 and 7/9 Fr triple lumen kits along with transducer setup and flushed for CVP monitoring.
   d. Arterial line transducer setup and flushed with normal saline and 20g arterial catheter kits available.
   e. 5 Fr central venous catheter kit in room for surgical to place femoral arterial line if indicated.
   f. Large bore intravenous catheters in 14/16g sizes available in addition to a Rapid Infusion Catheter (RIC).
   g. Video laryngoscope with a variety of blades.
   h. Ultrasound plugged in.
   i. Basic airway management devices ready including laryngoscope and blades, oral and nasal airways, endotracheal tubes with stylet and intubating stylet.
   j. Syringes for induction agents, muscle relaxants and emergency drugs available. Consider vasoactive infusions and call pharmacy early with requests.

2. The anesthesia charge (8-5920) is notified of a trauma patient planned for the OR by the surgical senior resident or surgical trauma team attending. The OR charge nurse (8-3512) will also coordinate with the anesthesia charge.
3. Ensure type and cross is completed. Massive Transfusion Policy is initiated if the patient likely will require 10U PRBCs in 12 hours, greater than 4u PRBCs in 4 hours, has active bleeding or hemodynamic instability (see protocol) (Blood Bank 8-4444). Use emergency release (uncrossmatched Type O) PRBCs if crossmatched PRBCs are not ready then switch to crossmatched PRBCs when available (as guided by UCH Blood Bank policy).

4. Anticipate the possibility of multiple injuries detected in the primary and secondary patient surveys. These may include unstable cervical spine, multiple skeletal fractures, pneumothorax or flail chest, cardiac contusion or tamponade, CNS trauma, major vascular damage and soft tissue organ damage causing massive hemorrhage. Communication with the surgical team is key to coordinating resuscitation efforts.

B. Intraoperative Management


2. Standard ASA monitors in addition to arterial catheter. Monitor CVP if indicated.

3. Adequate intravenous access includes two large bore peripheral catheters obtained before central venous access (this is the usual scenario unless peripheral catheters are difficult to obtain). Then consider the need for 9Fr central venous catheter for massive fluid and blood product administration.

4. If greater than 4 units over 4 hours or 10u PRBC in 12 hours is anticipated or other indicators (ongoing hemodynamic instability with uncontrolled bleeding), use Massive Transfusion Policy and early use of 1:1:1 ratio of PRBCs:FFP:Plts per policy (note platelets are a pooled 10 pack for each 10 u of PRBCs).

5. Per Massive Transfusion Policy, administration of cryoprecipitate and rFVIIa may be considered in the patient with continued, active bleeding. TXA may also be considered at this juncture (see below). Deactivate MTP when bleeding is controlled.

6. Consider use of other procoagulants and adjuncts such as, Kcentra, Amicar, and DDAVP based on comorbidities, INR and TEG results after the MTP has been deactivated (see below).

7. Goals of management and resuscitation include SBP >90mmHg, Hgb between 6-10 depending on patient’s coexisting diseases, normothermia with T 36-38C, INR <1.5 (TEG results best if available), base deficit < 6
and pH >7.2. Frequent use of TEG and ABGs are recommended to guide resuscitation.

8. Early and frequent correction of hypocalcemia is recommended with frequent ABG monitoring every 30-45 minutes.

9. Avoid the use of albumin in the setting of Traumatic Brain Injury (TBI).

10. Consider use of norepinephrine and/or vasopressin for hypotension refractory to fluid, blood product and acid/base optimization. Follow CVP and continue to consider other multiple injuries noted in A.4. above that may cause refractory hypotension.

11. Use of THAM as a buffering agent or a sodium bicarbonate infusion may be indicated for pH < 7.2 that is unresponsive to fluid and blood product administration.

12. Consider the use of TXA, recombinant factor VIIa or Kcentra in the massive trauma patient.
   a. TXA should only be used within the first 3 hours after injury in adult patients with severe shock (SBP < 75 mmHg) with known predictors of or TEG confirmed fibrinolysis. Give 1000mg of TXA IV over 10 minutes with another 1000mg IV over 8 hours.
   b. Recombinant factor VIIa (100mcg/kg) is unlikely to be beneficial in the civilian trauma patient but may be considered if TXA is ineffective.
   c. Use of Prothrombin Complex Concentrate (Kcentra) may provide a complete correction of factor deficiency coagulopathy as guided by INR values. Dosage of Kcentra is recommended 25 U/kg IV (INR 2-4), 35 U/kg (INR 4-6) and 50 U/kg (INR >6). The use of these adjuvants will be the decision of the surgical and anesthesia teams. While these have not been proven to improve overall patient outcomes, they may reduce the amount of blood product administration.

C. Postoperative management
   1. Contact SICU resident and faculty to facilitate a seamless handoff of patient care from the operating room to the ICU. Prior to transfer to the SICU/BTU ensure that ETT, CVC and arterial catheters are secure especially if placed outside of the OR prior to emergency surgery.
   2. Same management goals as intraoperative above for continued resuscitation and anticipation of return to the OR.
   3. Consider multimodal analgesia for pain control in anticipation of extubation after patient is stabilized in the ICU.
References


