SUBJECT: Management of Major Bleeding following Trauma Guideline

SUPERSEDES: New **PAGE:** 1 of 2

RECOMMENDATION(S): Dr. Kyle Kalkwarf **APPROVAL: 05/28/2020**

CONCURRENCE(S): Department of Anesthesia **EFFECTIVE: 07/22/2020**

PURPOSE:

To define a multidisciplinary approach and adherence to evidence-based guidance in patients with major blood loss.

GUIDELINE:

When MTP is activated (ABC score $\geq$ 2 or trauma attending gestalt)

- Send ROTEM and T&S immediately (should not delay definitive hemorrhage control)
- Give only whole blood or 1:1:1 to maintain **SBP = 75-85 mmHg**
    - MAP ~ 60mmHg is suggested if presumed severe TBI
    - **Avoid crystalloid, albumin, & hyponatremic fluids (e.g. lactated ringers, ½ NS)**
- Ensure good iv access
    - 2 x 18 gauge or greater (Cordis, RIC, etc.)
    - Upper extremities/IJ/subclavian preferred
- Place arterial line as soon as possible (prep with arms out)
- **Start vasopressin drip (0.04 U/min)**
    - Avoid other vasopressors & inform surgeon if they are being given
- If possible, don't intubate until ready to operate
    - Anticipate a BP drop with induction
    - Use hemodynamically neutral drugs, if possible
- Keep the patient warm (Bair hugger, Belmont, room temp, warm irrigation fluid)
- **Follow up ROTEM (should be back within 5-60 min)**
    - If ROTEM **ML >15% - give 2g TXA**
        - Earlier is better – if more than 3 hours after injury check with the attending trauma surgeon because should only be given if still exsanguinating)
    - IF INTEM CT >= 240 sec or EXTEM CT >= 100, give plasma
    - If FIBTEM A10 <= 10mm, give cryoprecipitate
    - If FIBTEM A10 >= 10mm & EXTEM A10 <= 40mm, give platelets
- Give 3 g calcium gluconate (or 1 g calcium chloride (through CVL)) with each MTP cooler

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- Stop bleeding as soon as possible (tourniquets for extremities, OR for non-compressible torso trauma)
- When massive surgical bleeding has stopped (discussion with surgeon), stop WB or 1:1:1 and correct ROTEM with plasma, platelet, or cryo and keep Hgb >7.
- Tell surgeon if patient's hemodynamics quickly change or if you are having difficult maintain SBP = 75-85 mmHg
- Tell surgeon if using vasopressors other than vasopressin
- Try to wean off vasopressin if bowel anastomosis is being performed

References:

Olldashi F, Kerçi M, Zhurda T, Ruçi K, Banushi A, Traverso MS, Jiménez J, Balbi J, Dellera C, Svampa S, Quintana G. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. The Lancet. 2010;376(9734):23-32.

Schöchl H, Cotton B, Inaba K, Nienaber U, Fischer H, Voelckel W, Solomon C. FIBTEM provides early prediction of massive transfusion in trauma. Critical Care. 2011 Dec 1;15(6):R265.

Crash-2 Collaborators. The importance of early treatment with tranexamic acid in bleeding trauma patients: an exploratory analysis of the CRASH-2 randomised controlled trial. The Lancet. 2011 Mar 26;377(9771):1096-101.

Holcomb JB, Minei KM, Scerbo ML, Radwan ZA, Wade CE, Kozar RA, Gill BS, Albarado R, McNutt MK, Khan S, Adams PR, McCarthy JJ, and Cotton BA. Admission Rapid Thromboelastography Can Replace Conventional Coagulation Tests in the Emergency Department. *Annals of Surgery.* 2012; Volume 00, Number 00, 1-11.

Cotton BA, Harvin JA, Kostousouv V, Minei KM, Radwan ZA, Schochl H, Wade CE, Holcomb JB, and Matijevic N. Hyperfibrinolysis at Admission is an Uncommon but Highly Lethal Event Associated with Schock and Prehospital Fluid Administration. *Journal of Trauma and Acute Care Surgery.* 2012; 73(2): 365-370.

Johansson PI, Stensballe J, Oliveri R, Wade CE, Ostrowski SR, Holcomb JB. How I treat patients with massive hemorrhage. Blood. 2014 Nov 13;124(20):3052-8.

Schreiber, MA, et al. Unpublished data from RCT for giving TXA for severe TBI.