Massive Transfusion for Coagulopathy and Hemorrhagic Shock

Recommendations

*Level 1: None

*Level 2:

- Administer blood products in a ratio of 1:1 (PRBC:FFP)
- In patients requiring massive transfusion of blood products, minimize crystalloid resuscitation to prevent dilutional coagulopathy.
- Platelet transfusions are indicated in the following situations:
  - Neurosurgical procedures or traumatic brain injury (TBI) with PLT count <100,000
  - Surgical/Obstetric patients with microvascular bleeding and PLT count <50,000
  - Any surgical patient with PLT count <20,000
- FFP (10-15 ml/kg) is indicated in the following situations:
  - Hemorrhage with elevated PT or PTT (>1.5 times normal).
  - Urgent reversal of warfarin therapy
- Cryoprecipitate should be administered in the following situations:
  - Hemorrhage with fibrinogen concentrations <100mg/dL
  - Bleeding patients with von Willebrand’s disease.
- Tranexamic acid should be considered in patients with significant hemorrhage presenting within 3 hours of injury.

*Level 3:

- Consider the Massive Transfusion Protocol (MTP) in the presence of:
  - Systolic blood pressure ≤ 90 mmHg
  - Heart rate ≥ beats per minute
  - Positive focused sonography for trauma (FAST) exam
  - pH ≤ 7.24
- Consider MTP implementation if transfusing 4 or more units of PRBCs over 1 hour or expected to give 10 or more units over 24 hours (more than one total blood volume).
- Maintain platelet counts about 100,000 during times of active hemorrhage.
- Correct moderate and severe hypothermia (<34 degrees C)
  - Place convective-air or aluminum space blankets over the patient.
  - Use humidified mechanical ventilator circuits warmed to 41 degrees C.
  - Use fluid warmers for the infusion of fluids at 42 degrees C.
  - For refractory hypothermia, consider pleural/peritoneal lavage, or arteriovenous rewarming.
- Consider bicarbonate administration when pH < 7.2

EVIDENCE DEFINITIONS

Class I: Prospective randomized controlled trial.

Class II: Prospective clinical study or retrospective analysis of reliable data. Includes observational, cohort, prevalence, or control case studies.

Class III: Retrospective study. Includes database or registry reviews, large series of case reports, expert opinion. Devices are evaluated in terms of their accuracy, reliability, therapeutic potential, or cost effectiveness.

LEVEL OF RECOMMENDATION DEFINITIONS

Level 1: Convincingly justifiable based on available scientific information alone. Usually based on Class I data or strong Class II evidence if randomized testing is inappropriate. Conversely, low quality or contradictory Class I data may be insufficient to support a Level I recommendation.

Level 2: Reasonably justifiable based on available scientific evidence and strongly supported by expert opinion. Usually supported by Class II data on a preponderance of Class III evidence.

Level 3: Supported by available data, but scientific evidence is lacking. Generally supported by Class III data. Useful for educational purposes and in guiding future clinical research.