Given the number of services involved in the patients’ care (craniofacial plastic surgeon, neurosurgeon, anesthesiologist, pediatric intensivist, and pediatric hospitalist), a hospital wide systematic approach to preoperative, intraoperative and postoperative management is necessary in order to ensure optimal patient care. Additionally, approximately 50% of children treated in an ICU setting will receive a red-cell transfusion due to identified anemia, yet children whose condition are identified as hemodynamically stable may tolerate the decreased oxygen delivery associated with a moderate degree of anemia and therefore minimize the risks associated with transfusion.

Pre-op:
- Labs/Orders:
  - BMP, CBC, PTT, PT-INR, Alkaline Phosphatase
  - Blood Type and Cross (will need second verification on a different draw)
  - Tranexamic Acid 50mg/mL continuous IV drip at 5mg/kg/hour

Intra-op:
- Tranexamic Acid (TXA)
  - Bolus 10mg/kg IV (up to 50mg/kg), first bolus given at time of surgical prep in the operating room
  - Re-bolus TXA 10mg/kg IV Q2H
  - IV continuous drip 50mg/mL at 5mg/kg/hour
- Transfusion guidelines
  - All transfusions should be discussed with surgeon prior to administering
  - Prior to incision have a split unit and a full unit available in the operating room.
  - In general, most of these cases require a full unit to be transfused. Perhaps the second unit could be split.
  - Bone quality makes a difference.
  - Goal Hemoglobin on the last ABG:
    - Based on hospital guidelines, a lower hemoglobin is acceptable if patients are hemodynamically stable. The ultimate goal of transfusing is to minimize exposure to multiple donors
    - Attempt transfusions at 24 ml/kg or less to avoid the flagging of over-transfusion that occurs at 25 ml/kg.
  - FFP/Platelets
    - Should be considered with massive transfusion (i.e. starting a second full unit in an infant or symptomatic with larger blood loss volumes). Sending coagulation panel may not be helpful due to turnaround time. They may be used later to justify the decision of giving FFP, but do not wait for results if the patient is bleeding abnormally.
• **TEG**
  o This is a helpful tool to use once cryoprecipitate and/or FFP have been started to see efficiency of blood coagulation. The tube required is a 1ml blue top vial. Ensure there is no heparin in the line when drawing the blood for TEG.

**Post-op:**

• **Indications for blood transfusion**
  o Acute blood loss resulting in estimated or anticipated blood loss ≥ 10% of total blood volume and signs and symptoms consistent with inadequate perfusion and oxygenation of vital organs
  o Hemoglobin <5 g/dL
  o Hemoglobin between 5-7 g/dL
    • Hold transfusion and recheck hemoglobin in 24 hours if all of the following are true.
      o Hemodynamically stable (mean arterial pressure (MAPs) not less than 2 SD below normal mean for age and if cardiovascular support (vasopressors/inotropes and fluids) have not been increased in the last two hours)
      o No history of cardiac disease
      o No symptoms of anemic hypoxia (i.e. tachycardia, sustained tachypnea, apnea or bradycardia, hypotension, lactic acidosis)
      o No indications of organ ischemia
      o No potential or ongoing blood loss
      o No risk of complications due to inadequate oxygenation (i.e. cardiac or cerebrovascular insufficiency, pulmonary disease)
  • If any of the above are found to apply contact plastic surgery team and/or neurosurgery team to discuss transfusion.
    o Hemoglobin between 7-10 g/dl:
      • Hold transfusion and no further labs indicated if patient is hemodynamically stable
      • A transfusion may be indicated if the patient has symptoms of anemic hypoxia (e.g. tachycardia, sustained tachypnea, apnea or bradycardia, hypotension, lactic acidosis), indications of organ ischemia, potential or ongoing blood loss, and/or risk of complications due to inadequate oxygenation (i.e. cardiac or cerebrovascular insufficiency, pulmonary disease)

• **Other Medication:**
  o Tranexamic Acid (TXA) IV drip 5mg/kg/hour stop after 4 hours after arrival to PICU

• **Labs:**
  o If hemoglobin >7 g/dL no need for further labs
  o If hemoglobin 5-7 g/dL in hemodynamically stable patient when no postoperative blood products administered recheck hemoglobin in 24 hours
  o If hemoglobin 5-7 g/dL in hemodynamically unstable patient when postoperative blood products administered recheck hemoglobin in 4 hours after transfusion to ensure positive trend
  o If hemoglobin <5 g/dL recheck hemoglobin in 4 hours after transfusion to ensure positive trend
• Transfer to the floor criteria:
  o Vitals stable without sustained hypotension and/or tachycardia
  o Labs stable with hemoglobin >6 and asymptomatic