Perioperative Blood Transfusion in the Sickle Cell Patient

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Patient Background

- 11 y/o F with severe sleep apnea scheduled for T + A
- PMHx: Obesity, BMI 33, SCA, HTN, Tonsillar hypertrophy
- PSHx: Splenectomy
- NKDA
- Meds: Hydroxyurea, Enalapril, Albuterol PRN
- Labs: ALT: 30, AST: 27, INR: 1.15
- Pre-op TTE: Hyperdynamic LV systolic function. Normal LV wall thickness and cavity. Normal RV. No Pulm Htn
- Polysomnography: Severe OSA, 1460 obstructive apneas, AHI – 175.9, Average O2 sat was 85% not improved on supplemental O2 1L/min

Hospital Course

Intra-op
- Pt pre-oxygenated
- Smooth IV induction with Propofol, Fentanyl
- Airway secured easily with oral RAE ETT
- Smooth intra-op course, VSS, well hydrated, extubated at end of case, and transported to PACU
- Subsequent planned admission to PICU for monitoring of OSA status

Post-op
- POD 1 – Pt restless O/N and non compliant with BIPAP. Intermittent desaturations
- POD 2 – Increasing work of breathing, worsening hypoxia, hypercapnia, new RML opacity on CXR. Started on broad spectrum Abx, Hematology consulted
- POD 3 – Exchange transfusion initiated. Abx continued
- Pt recovers, and is discharged on POD 5
Sickle Cell Anemia

- Most commonly inherited hemoglobinopathy – 1 in 500 AA
- Autosomal Recessive → Substitution of valine for glutamine
- Increased life expectancy → 42% decreased mortality for children < 4 years b/w 1999 – 2002
- Multiple Surgical procedures ranging from:
  - Simple procedure like inguinal hernia repair
  - Cholecystectomy
  - Splenectomy
  - Orthopedic surgeries - Aseptic necrosis

Anesthetic Considerations:
- Pre-op transfusion to HCT of 30%
- Avoiding conditions that could induce sickling - hypothermia, dehydration, hypoxemia

Acute Chest Syndrome

- Second most common cause of hospitalizations → greatest mortality risk
- Multifactorial Etiology – Pulmonary Infarct, Infections, Post Operative, Unknown causes
  - 50% develop ACS while hospitalized
- Diagnosis – New pulmonary infiltrate on CXR involving complete lung segment & ≥ one of the following:
  - Temp > 38.5, Tachypnea, wheezing cough, chest retractions, hypoxemia relative to baseline
- Treatment:
  - Prevention – Adequate intra-op management
  - Respiratory Support, Fluid, Pain Control, Antibiotics, Transfusion
  - Exchange vs. Simple Transfusion

Exchange Transfusion

- Historically preferred management option for SCA pts.
- HbS conc. decreased to 30% while maintaining HCT 30
- More invasive, multiple units of blood, increased risk of transfusion related adverse events

Simple Transfusion

- Pt transfused pre-op to HCT 30
- Less invasive, less exposure to blood products, minimizing adverse events

Current Recommendations

- Simple Transfusion to HCT 30 for intermediate/major surgery
Conclusion

- Sickle Cell Anemia is common
- Preoperative blood transfusion recommendations are still controversial
- The need for an exchange versus simple transfusion needs to be decided on an individual bases taking all co-morbidities into account.

References: