Severity of Preoperative Anemia In Elective Intracranial Neurosurgical Procedures On Postoperative Outcomes

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Sacred Heart
Medical Center &
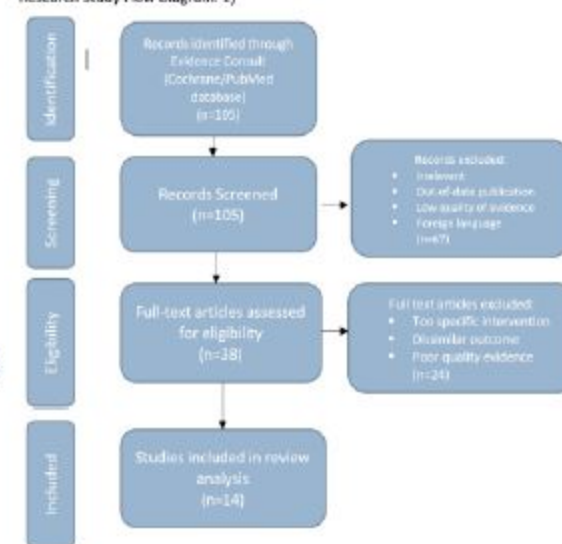Children's Hospital

Background

Anemia is a highly prevalent disease that has been correlated to worsening outcomes. Anemia becomes increasingly concerning in the oxygenation and tissue repair of damaged tissue, such as after surgery, or in highly aerobic tissues, such as the heart and brain. In a wide range of different surgical patients and specialties, preoperative anemia has been associated with worsening outcomes of patient mortality and morbidity. Neurosurgical procedures, including both spine and intracranial, too have been associated with worsening postoperative outcomes related to preoperative anemia.

We seek out to find a dose-dependent relationship between differing preoperative anemia and worsening postoperative outcomes in elective intracranial neurosurgical procedures. Furthermore, we also seek out to find this same relationship as it differs between each procedure type.
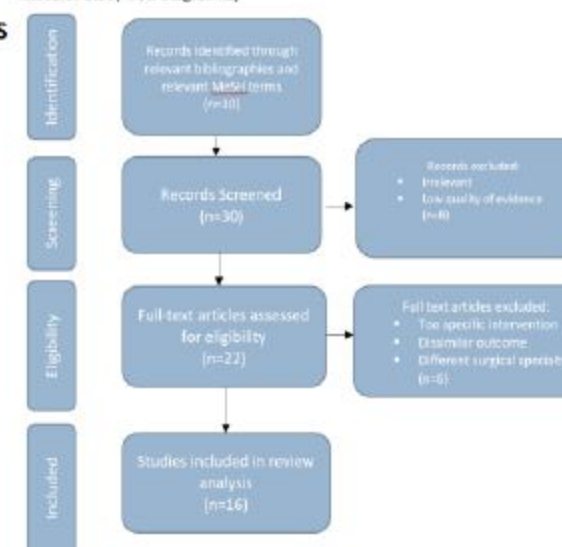
Literature Review

Literature review flow diagram attached to the right. Records were identified through two methods, Cochrane/PubMed review and MeSH headers. Abstracts then screened and assessed for eligibility. Full-test articles were assessed and a total of 30 articles were included in literature review.

Research Study Flow Diagram: 1)

Research Study Flow Diagram: 2)

Table 1: Mock Patient Demographics table with bivariate analysis of significant P value <0.05

Table 2: Mock Univariable/Multivariable Regression table expressing Odds Ratios of primary outcomes in differing anemia levels.

Table 3: Mock Table comparing primary outcomes in anemic levels stratified against procedural type.

Methods

- A retrospective observational study including registry patients from an electronic health record database(PSHMC) of adult patients undergoing elective intracranial neurosurgical procedures from 2015-2019. **Exclusion criteria:** emergent/trauma related procedures, age <18 years, spinal procedures.
- Patients categorized into 4 groups: **no anemia**(<13.0g/dL for men and <12.0g/dL for women), **mild anemia**(Hgb levels of 11.0-13.0 g/dL for men and 11.0-12.0 g/dL for women), **moderate anemia** (Hgb levels of 8.0-11.0 g/dL in men and women), **severe anemia** (Hgb levels of <8.0g/dL in men and women).
- Demographics and study variables undergoing **univariate** analysis, group differences explored using **bivariate** analysis. Confounding variables controlled via a **multivariable regression model**, using a forward-step wise approach, preoperative factors found in the literature or bivariate analysis were included.
- **Stratification** included categorizing anemic levels into different neurosurgical procedures.
- **Sensitivity analysis** performed excluding patients who receive perioperative RBC blood transfusion.
- **Primary outcome** is length of postoperative stay, strengthened by secondary outcomes of length of ICU stay, rate of readmission, and rate of blood transfusion

Expected Contribution

Currently, in the neurosurgical subspecialty, it is unknown what the relationship between differing severity of preoperative anemia is to postsurgical outcomes of to length of hospital and ICU stay, rate of readmission, and perioperative blood transfusion. This study expects to provide observational evidence on the relation between differing anemic levels and postoperative outcomes to inform clinical practice in regard to preoperative and postoperative treatment in patients with anemia.

**disclaimer: Unfortunately due to COVID and related circumstances, we are still gathering and completing the provisioning and collection of the data. This poster will instead break down literature review and future methods and design, including 'mock tables' for presentation purposes.