Unexpected Impact of Preoperative Anemia in Low-Risk Isolated CABG or Single Valve Surgical Patients: Do Not Overlook These Patients in Anemia Management!

Objective: Preoperative anemia is prevalent in the cardiac surgical population and independently associated with increased risk for short-term and long-term mortality. The purpose of this study was to examine the effect of preoperative hematocrit (Hct) on outcomes in cardiac surgical patients and determine whether the effect is comparable across levels of STS PROM.

Methods: The study sample consisted of adult, nonemergent, isolated CABG or single valve surgical patients in a statewide registry from 2011-2022 (N=29,828). Logistic regressions were used to assess effect of preoperative Hct on STS-defined major morbidity and mortality including a model to assess the interaction of Hct and STS PROM as continuous variables.

Results: The median age was 66 (58–73) yrs, median STS PROM was 1.02% (0.58%–1.99%), and median preoperative Hct was 39.5% (35.8%–42.8%). The sample consisted of 78% isolated CABG (n=23,261), 10% isolated MVRr (n=3,119), 12% isolated AVR (n=3,448), and 29% were female (n=8,646). Multivariable analyses found that higher Hct was associated with reduced risk of STS-defined morbidity/mortality (OR=0.96, P<0.001) and operative mortality (OR=0.95, P<0.001). These effects for Hct persisted even after adjustment for intraoperative blood transfusion. The effect of Hct on probability for morbidity/mortality was similar for male (OR=0.96, P<0.001) and female (OR=0.97, P<0.001) patients in multivariable analyses (Fig 1A). The interaction of Hct and STS PROM was significant for morbidity/mortality (OR=1.01, P<0.001). Figure 1B illustrates the regression equation applied to hypothetical data of an average patient across various levels of Hct and estimated probability for morbidity/mortality as STS PROM risk scores increase (interaction effect). There was a stronger association between Hct levels and morbidity/mortality risk in the lowest STS risk patients compared to the highest STS risk patients.

Conclusions: There were no gender differences of effect of low preoperative Hct on probability of major morbidity or mortality in our patient cohort. A significant interaction between Hct and STS PROM on probability for morbidity/mortality indicates that the reduction in risk associated with increasing preoperative Hct was more impactful at lower STS risk levels. Preoperative anemia management should include low-risk surgical patients for improved outcomes.

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