Transfusion Requirements in Anemic Patients undergoing Cardiac Surgery

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ABSTRACT
Cardiac surgery is one of the largest consumer of blood and blood products in medicine. The transfusion rate in cardiac surgery accounts to almost 40-90%. Although lifesaving, it still increases the risk of allergic reactions, risk of transmission of infection, increased morbidity and mortality. The aim of this study was to find out causes of anaemia and requirement of blood or blood products in cardiac surgical patients.

Keywords: Anaemia, Blood transfusion.


INTRODUCTION
Preoperative anemia [hemoglobin (Hb)<12 gm%] has been associated with exposure to red blood cell (RBC) transfusion in cardiac surgical patients.1 We examined the correlation between preoperative HB and incidence of blood and blood product transfusion in the perioperative period in cardiac surgical patients in Trent Cardiac Centre, Nottingham, from April 2009 to June 2009. This study was designed to demonstrate that low preoperative HB increases the chance for blood transfusion. This is proved by using chi-square test.

MATERIALS AND METHODS
This retrospective observational study examined 160 patients over 3 months from April 9 to June 9 undergoing cardiac surgeries. The patients were divided into two groups:
1. Group I: Patients with Hb>12 gm%
2. Group II: Patients with Hb<12 gm%

The analysis also involved:
• Correlation of low preoperative HB and incidence of blood transfusion
• Preoperative HB and length of stay in cardiac intensive care unit (CICU)/hospital
• Investigations carried out to find the cause for anemia and treatment.

RESULTS
Blood Transfusion
There were 160 patients in this cohort. A total of 33% (n = 53) of all patients received blood transfusion. In group II, 72% (n = 21 of 29) of patients received blood transfusion. In group I, only 24% (n = 32) of patients received blood in the perioperative period. This was statistically very significant (p<0.001, chi-square test).

Blood Product Transfusion
It was observed that low preoperative HB increases the likelihood of receiving blood product transfusion as compared with patients with normal HB, as shown by chi-square test (p = 0.006).

Length of Stay
We noticed that the length of stay in the CICU is increased in group II as compared with group I, although it is not statistically significant. About 62% of patients stayed for more than 3 days in group II in the ICU compared with 50% in group I (Graph 1).

Investigations
Out of 160 patients, 26 patients were investigated preoperatively, of which 14 patients were in group II, 12 were in group I. Most of these patients had gastrointestinal diseases causing anemia. However, all of them did not have anemia, and many of these patients were treated with either proton pump inhibitors or iron (FeSO₄), and few received blood transfusion.

DISCUSSION
In the United Kingdom, about half of the patients undergoing cardiac surgery receive blood transfusion.
Transfusion has been associated with increased HB concentration and oxygen delivery. The proportion of patients receiving blood transfusion is high because of blood loss and severe anemia, which is associated with increased morbidity and mortality. Therefore, preoperative strategies should be able to detect and treat anemia, prevent excessive blood loss, and define optimal transfusion algorithm. The optimization of preoperative HB is important; hence, preoperative iron and erythropoietin therapy have been recommended. Iron deficiency has been shown to be responsible for preoperative anemia, followed by the presence of chronic kidney disease. Preoperative iron supplementation 3 to 5 weeks before surgery is recommended in patients with iron deficiency anemia, as it is beneficial compared with the risk of blood transfusion and its complications. The role of preoperative erythropoietin has not been proven in cardiac surgery due to increased incidence of thromboembolic complications.

**CONCLUSION**

We observed that patients with low HB are at increased risk of blood transfusion. However, it is also observed that all the patients with low HB were not investigated and treated preoperatively.

**RECOMMENDATIONS**

- It is important to actively investigate and treat preoperative anemia.
- In case of an emergency, consider treatment with intravenous iron, consult hematology.
- In elective cases, consider oral iron therapy and postpone surgery until anemia is corrected.

**REFERENCES**
