Transfusion triggers in cardiac surgery: Does the Transfusion Requirements in Cardiac Surgery III trial answer the question?

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Central Message

With the recent publication of the TRICS II and III trial, have we laid to rest the appropriate trigger for a PRBC transfusion? The following editorial by Drs Levy and Steiner suggest that the question is still up in the air.

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Ever since the Transfusion Requirements in Critical Care trial in 1999,¹ there has been an effort to adjust downward the hemoglobin level trigger for a transfusion. This gained traction in the field of cardiac surgery when *JAMA* published in their October 2010 issue the results of the Transfusion Requirements After Cardiac Surgery trial,² a randomized controlled trial (RCT) comparing a hemoglobin transfusion trigger of 8 g/dL to a trigger of 10 g/dL in patients undergoing cardiac surgery. No difference was found. In that same issue was an impressive article by Bennett-Guerrero and colleagues³ showing the wide range of patients (8% to 93%) receiving packed red blood cell transfusions in coronary bypass surgery in the close to 800 Society of Thoracic Surgeons reporting institutions in the country at that time. An accompanying editorial⁴ suggested that this discrepancy in behavior represented an opportunity for our specialty, intimating that the Transfusion Requirements After Cardiac Surgery trial, which provided evidence that a hemoglobin level of 8 g/dL was as good as 10 g/dL, should help standardize cardiac surgeons' transfusion behavior. In fact, it called for transfusion behavior to become a publically reported quality metric.

Recognizing our drain on hospital blood supplies, the cost of transfusions, and their potential for harm, many of us jumped on the bandwagon, adopting 8 g/dL as the new 10 g/dL hemoglobin transfusion trigger.

The problem was the Transfusion Indication Threshold Reduction 2 (TITRe2) trial of 2015,⁵ an RCT that compared a transfusion trigger of 7.5 g/dL hemoglobin versus 9.0 g/dL hemoglobin in 2000 elective cardiac procedures. The authors found a higher 30- and 90-day mortality in the restrictive-threshold group, as well as a trend toward more infection/ischemic events. That stunning result caused many of us to forego our prior zealotry, acknowledging that despite the favorable results of a restrictive transfusion policy in critical care,¹ hip surgery,⁶ and gastrointestinal

bleeding,⁷ patients undergoing cardiac surgery might not be generalizable.

Then, during the past year, publication of results of the Transfusion Requirements in Cardiac Surgery II and III trials^{8,9} rejuvenated the zealotry of our restrictive brethren. These most recent RCTs involved more than 5000 patients undergoing cardiac surgery, sicker as a group than seen in TITRe2, with a protocol involving intraoperative as well as postoperative care (unlike TITRe2), comparing 7.5 g/dL hemoglobin with 9.5 g/dL hemoglobin in the operating room/intensive care unit and 8.5 g/dL hemoglobin on the floor. The study failed to find any difference between groups regarding mortality or combined myocardial infarction, stroke, and renal failure. Furthermore, the Transfusion Requirements in Cardiac Surgery III trial addressed what many believe to be an association of lower discharge hemoglobin levels with postdischarge complications requiring readmissions¹⁰; they found no such association.

Not knowing what to do with this new-found data, we asked 2 experts outside our field to help us shed what light there might be on this conundrum.

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