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Key Words: Transfusion, elderly, cardiac surgery

EDITORIAL COMMENTARY

Does the “retrospectroscope” help define best practices in transfusion?

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See related article on pages 209-14.

In the past several years, there has been an almost irresistible push by cardiac surgeons, anesthesiologists, critical care physicians, and blood bank personnel to lower the number of transfusions of whole blood and blood products for patients undergoing cardiac surgery. A mechanism for achieving this goal has been to adjust one indication for transfusion from a serum hemoglobin of less than 10 g/dL to less than 7 g/dL.¹ Because of the lack of hard evidence to support this recommendation, the variation in hospital practice in the United States has been extraordinary, ranging from 5% adoption to more than 90% among patients undergoing coronary artery bypass grafting surgery.² There have

been many attempts to test the effects of this change, including the study by Ad and colleagues³ in this issue of the *Journal*.

With a retrospective analysis of 1898 consecutive patients undergoing nonemergency cardiac surgery between 2007 and 2013, Ad and colleagues³ sought to ascertain the transfusion status of these patients and to find out the effect of transfusion on 222 patients aged 75 or older. This project was driven by evidence that older patients require more transfusions. Their hospital had instituted a rigorous blood conservation protocol, as recommended by the Society of Thoracic Surgeons guideline; how would this change effect outcomes? Because the groups were unequal in size, and the older patients were at significantly greater risk, Ad and colleagues³ were obliged to use propensity-matching analysis to balance the groups and studied patients older and younger than 75 years.

They found that older age predicted postoperative blood transfusion, longer hospital stay, and poorer survival, even with the new more restrictive blood conservation protocol. It would seem logical that the new protocol failed to reduce blood use in the older group, and this may have led to poorer survival. We must, however, take a closer look at

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the blood conservation protocol (Figure 1 in the article of Ad and colleagues³) and other study design features to understand why Ad and colleagues³ concluded that more study is needed to develop sophisticated transfusion protocols to optimize perioperative care in the elderly population.

The transfusion trigger for postoperative patients at the hospital of Ad and colleagues³ specified transfusion for a hemoglobin concentration of less than 7 g/dL or a hematocrit less than 21% and at least 1 of the following: hypotension, end-organ dysfunction, elevated lactate, increased oxygen requirement, or ongoing bleeding. With elderly patients undergoing cardiac surgery, if one has to wait until the hemoglobin is less than 7 g/dL to transfuse for the other indications listed, the horse may well be out of the barn. It has been emphasized for years that elderly patients tolerate complications especially poorly. All the indications listed previously define a complication. Ad and colleagues³ emphasize that the surgical team can override the protocol; however, the description of the study design does not give us the information regarding either how often this occurred or the specific indication for the transfusion. This would have given essential information to judge the effect of the new protocol on elderly patients.

One feature of the study particularly caught my attention. In the article's central figure, the predicted probability for blood transfusion line in the elderly group crossed the younger age group line at almost exactly the mean preoperative hematocrit of the older group (38%). To me, this would indicate that a worthwhile intervention would be to treat the elderly patients with hematocrits less than 40% at home for several weeks before surgery with iron and erythropoietin to improve their chances for uncomplicated surgery.

With regard to survival, there is no information in the article indicating when the deaths occurred. If a significant number occurred within 90 days of surgery, the occurrence could be linked to the complications listed previously. This

feature was not in the study design. So is there any evidence in the literature to support the call of Ad and colleagues³ for better protocols?

A recent publication by Murphy and associates⁴ reported a multicenter, randomized trial of 2007 patients undergoing nonemergency cardiac surgery in the United Kingdom. Patients with a postoperative hemoglobin concentration of less than 9 g/dL were randomly assigned to a restrictive transfusion threshold (hemoglobin >7.5 g/dL) or a liberal threshold (>9 g/dL). Primary outcomes studied were serious infections or sepsis or an ischemic event. Patients were followed up for 90 days, and health care costs were estimated for this period. Murphy and associates⁴ concluded that a restrictive protocol was not superior to a liberal transfusion threshold after surgery. In addition, the mortality in the restrictive group was almost twice that in the liberal group. There was no significant difference in outcome related to age.

I believe that the differences between retrospective and a randomized prospective studies should prompt surgeons in this country to band together in regional groups or insist that our national societies fund multicenter studies on transfusion indications and results. At the least, we should have discussions and debates to define the optimization of transfusion practice in this country.

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