Multi-Center Red Blood Cell Transfusion Protocol

Hypothesis:
Virginia Cardiac Services Quality Initiative (VCSQI) is a voluntary consortium of 17 hospitals and 13 cardiac surgical practices providing open-heart surgery in the Commonwealth of Virginia. This group performs over 99 percent of Virginia's open-heart procedures. The group has convened since 1996, comparing data and exchanging information to improve the quality of surgical care and contain costs. A collaborative effort of this magnitude could dramatically influence blood product usage by adopting specific evidence-based guidelines.

Background and Significance:
Cardiac surgery accounts for 20% of blood transfused within the United States.[1] Today 30-65% of patients undergoing cardiac surgery receive a blood transfusion [2-3] and often receive more than one unit. The risk of virus transmission from transfusion is radically decreased since the 1990's therefore the focus upon transfusion risks is shifting. Red cell function (ability to carry and release oxygen), immune modulation, transfusion related acute lung injury, cytokine generation, allergic reaction and ABO incompatibility have become the risks of transfusion.[4-8] Today an emerging literature is noting that blood transfusions are associated with worse outcome, longer hospital and ICU stays, decreased post-operative quality of life and even increased mortality after heart surgery out to 60 months.[4-9] A recent survey of Canadian heart surgeons and anesthesiologists found their transfusion trigger was higher in elderly (age>75yo) and in those patients with depressed myocardial function or recent MI.[2,3] Recent work in microcirculation shows that banked blood does not increase critical oxygen delivery and may well decrease it, and even though arterial blood gases are improved, the current practice of transfusing older more ill patients at a higher transfusion trigger could be unwise. Hébert et al performed a randomized trial of transfusion at two different triggers in critically ill medical ICU patients. In hospital deaths were reduced 25% by transfusing less or at a more anemic trigger.[10] MIs were decreased 75% and pulmonary dysfunction was reduced by 50% in patients who received less blood. An aggressive education approach at our single center has led to the development of a consensus and blood conservation approach for our cardiac patients. We have lowered our transfusion triggers as well as adopted a 9-12 point program to conserve the patient's own blood. Our transfusion utilization has dropped from before the program, 70% of all patients transfused, to now 12-22%. From our program, morbidity and mortality are not worse and, in several respects, improved. It is clear from the gathering literature that transfusion of banked blood to heart surgery patients is institution specific, in terms of triggers invoked and that science with regards to the "best" practice is sorely lacking. There is also increasing evidence that transfusions during cardiac surgery in women leads to even worse outcomes than in men. Women tend to be transfused more perhaps due to lower circulating blood volumes.

Transfusion Triggers:

On Pump RBC transfusion for Hgb < 6.0 or HCT <18 + One objective criteria for tissue hypoperfusion.

- Low SVO2
- Elevated Lactate
- Elevated base deficit, Low HCO3

Post Op (ICU and Step Down Units) RBC transfusion for Hgb < 7.0 or HCT <21 + One objective criteria .

- Elevated O2 need
- Hypotension
- End Organ dysfunction
- Ongoing Bleeding

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