Commentary

Using a protocol of preoperative autologous blood donation, Masuda and associates have achieved what is expected of contemporary pediatric cardiac programs, namely, the near complete avoidance of homologous blood transfusion in children weighing more than about 12 kg undergoing operations for simple cardiac defects. Their method, however, must be time consuming and anxiety provoking for the child and family, could be an organizational nightmare for higher volume programs, and is not without its own inherent risks. These disadvantages were not analyzed by the authors nor compared with those of other methods of blood conservation.

Similar results with transfusion-free cardiac surgery in this weight range have been achieved in other programs for years by use of lower pump primes (350 mL

for infants in our institution), modified ultrafiltration, and intraoperative autologous donation and by minimizing blood loss while avoiding wastage of shed blood during the operation. These maneuvers are straightforward and ought to be achievable at the authors' institution. Even for higher risk operations, we are generally able to avoid additional, expensive agents such as aprotinin and commercially made fibrin "glue" while minimizing homologous transfusion.

Children who are preoperatively anemic may avoid transfusion by receiving recombinant human erythropoietin and iron. Their application to increase red cell mass before elective operations was approved in the United States in 1996. The safety and efficacy of this approach in children undergoing orthopedic surgery, in children with chronic renal failure, in premature infants with anemia, and in children with cancer have been demonstrated. The availability of an oral form of human erythropoietin strengthens the rationale for using it in children facing cardiac surgery. A prospective study to demonstrate the advantage of human erythropoietin in children undergoing cardiac surgery is sorely needed.

When patients do require a transfusion, a component that satisfies multiple needs, including repletion of red cell mass, serum proteins, and functional platelets, should be used. At our institution, we believe these needs are met by using "fresh whole blood" (obtained less than 72 hours before transfusion), especially in

infants. With this strategy, infants undergoing an operation who do require a transfusion at our institution are exposed to an average of only 1.7 donors.

All cardiac surgeons have the responsibility of applying all reasonable strategies to minimize homologous transfusion. This must be placed in perspective, however, by knowing the actual risks of transfusion in the current era. In fact, the Centers for Disease Control and Prevention have registered only two children in the United States in whom acquired immunodeficiency syndrome has developed as a result of transfusion (for all reasons) in the past 15 years and no cases of transfusion-associated hepatitis C viral infection since 1994. These results are attributable to a national policy of viral screening of blood and to the education of donors. On the other hand, more than two thirds of the world's nations do not have policies to ensure a safe blood supply. Unfortunately, many of these countries have higher prevalence rates of transmittable viruses and yet lack the economic resources to afford expensive pharmacologic means to minimize blood loss during pediatric cardiac surgery. Cardiac programs in these countries may stand to benefit from the policy of multiple autologous donation demonstrated nicely by the authors.

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