Transfusion-free calvarial vault reconstruction in a Jehovah’s Witness child with craniosynostosis

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Introduction
Craniofacial reconstruction surgery in the Jehovah’s Witness (JW) patient presents a considerable challenge to the craniofacial team. Traditionally, major elective reconstruction surgery has been avoided in these patients, especially in the pediatric population, because blood loss can be excessive, sometimes exceeding the patient’s circulating blood volume.

Case Description
A 3-year old 12.9 kg male JW child with asthma and severe scaphocephaly (Figures) presented for calvarial vault reconstruction in order to reduce the risk of intracranial hypertension. Two weeks of erythropoietin and iron supplementation was given prior to surgery, yielding an increase in hematocrit (31.9% to 36%). Acute normovolemic hemodilution (ANH) was performed by removing 150 mL of autologous blood (in 50 mL increments), kept in continuous circulation with the patient, with 1:1 replacement with 5% albumin. The post-hemodilution hematocrit was 30%. Antifibrinolytic therapy with e-aminocaproic acid 100 mg/kg bolus prior to incision followed by a 40 mg/kg/hr infusion administered until the end of surgery was utilized in order to minimize blood loss. The autologous blood was transfused back to the patient as needed during the surgery. At the end of the 215 minute operation, the patient was extubated. Postoperative labs included hemoglobin of 8.6 g/dL, Hct 26.8%, PT 15.9 sec, PTT 28.5 sec, INR 1.27, platelets 442, and lactate 0.98 mmol/L. Intraoperative blood loss was calculated to be 250 mL (19 mL/kg). The patient was discharged home on POD# 3 without ever requiring allogeneic transfusion.

Discussion
Various blood conservation techniques have been described at length for both craniofacial surgery and JW patients. There are several reports of bloodless cardiopulmonary bypass and trauma cases in pediatric JW patients, however, to the authors’ knowledge, this is the first reported case of a transfusion-free calvarial vault reconstruction in a JW child. Despite their religious beliefs regarding transfusion, JW patients do not have higher mortality rates after traumatic injury or surgery. Hematocrit of 20% is well tolerated in hemodynamically stable children and mortality only increases with hemoglobin concentrations less than 5 g/dL. While the optimal transfusion trigger remains elusive, several studies suggest that a hemoglobin transfusion threshold of 7 g/dL is likely to be safe for most clinically stable children when using restrictive transfusion practices. Though allogeneic blood transfusion is relatively inexpensive and easy to administer, there are notable life-threatening transfusion-related risks, including immunosuppression and prolonged hospitalization. Therefore, avoiding transfusion and permitting lower hemoglobin levels should be considered in hemodynamically stable patients.

While we recognize that our blood conservation strategy might not be appropriate for every patient undergoing total calvarial vault reconstruction, for major elective surgery in a pediatric Jehovah’s Witness patient in which blood loss is expected to be excessive, an attempt at avoiding transfusion and honoring parents’ religious beliefs is a reasonable approach. The most important consideration should always be patient safety by maintaining stable hemodynamics, end-organ perfusion, and oxygenation of vital organs.

References