

## **Preoperative erythropoietin decreases the incidence of blood transfusion during fronto-orbital advancement surgery in children**

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**Introduction:** Blood loss and transfusion during fronto-orbital advancement (FOA) in small children exposes them to numerous, often life-threatening risks. Attempts at reducing exposure to allogeneic transfusions, using blood conservation techniques such as controlled hypotension and normovolemic hemodilution, have met with mixed results and are not always practical in small infants. Recombinant Human Erythropoietin (RHE), a hormone that stimulates RBC production increases the hematocrit when administered to infants. The purpose of this study was to evaluate whether pre-operative RHE administered to small children prior to craniofacial surgery would reduce transfusion requirements when used in conjunction with other blood conservation techniques.

**Patients & Methods:** A retrospective chart review of all patients undergoing FOA for craniosynostosis by the same plastic surgeon was conducted from January 2002-January 2003. A subgroup of patients (10/19) consented to the preoperative administration of RHE as a blood conservation strategy. These ten patients (epo group) received weekly subcutaneous RHE (600units/kg) and iron supplementation (5mg/kg/day elemental iron). Hematocrit was measured weekly. Oral vitamin K was also given on the night prior to surgery. All patients underwent FOA by one craniofacial surgeon, one of two neurosurgeons, and one of a group of anesthesiologists. Preoperative Hgb/Hct, intra-operative and post-operative complications, hemodynamic variables, and postoperative course were reviewed.

**Results:** Age and weight were not statistically significant between the patients who received RHE and those that did not. Initial Hct prior to receiving RHE was not statistically significant to those who did not receive RHE. Pre- and Post-op Hct in the RHE group was 44.5%/32.5% v. 36.2%/33.2% for the non-RHE group. Patients who received RHE increased their red cell mass within 4 weeks by an average of 28% (Hct 34.9% to 44.5%). Transfusion requirements were lower in the RHE group (4/10) v. the control group (9/9). Total cc of blood products transfused was statically lower 154cc RHE group vs 421cc control (P< 0.03). Hematocrit on the day of discharge was not significantly different between the 2 groups 33.5 v. 33.3. A Hemodilution technique was used in 8/10 RHE patients and none of the controls. Controlled hypotension was used in 9/10 RHE and 6/9 control pts.

**Discussion:** A scheduled trial of pre-operative RHE combined with blood conservation techniques was associated with a decreased need for blood transfusion, thus exposing the patient to fewer risks associated with allogeneic transfusion (infection, immune modulation). In addition, RHE significantly increased red blood cell mass allowing for the safer application of blood conservation techniques including hypervolemic hemodilution, acute normovolemic hemodilution and controlled hypotension. The data collected in this retrospective study suggest that randomized prospective trials using more stringent anesthetic plans are warranted to better evaluate the role of RHE during FOA surgery.

### **References:**

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