CONCLUSIONS: A combination of TMJ fat grafting, masticatory Botox injection, Kenalog injection, open TMJ arthroplasty, and possible concurrent orthognathic surgery can provide much needed improvement for patients with TMJ disease, while postponing the need for salvage operations like joint replacement. A comprehensive treatment algorithm is presented and discussed.

Optimizing Transfusion-Related Postoperative Outcomes in Craniosynostosis Repair

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BACKGROUND: As cranial vault reconstruction for craniosynostosis is associated with significant blood loss and transfusions, managing intraoperative and postoperative hematologic status is a significant challenge for both plastic surgeons and anesthesiologists. Factors contributing to these challenges include young patient age with low total blood volume (TBV), as well as the difficulty of quantifying intraoperative estimated blood loss (EBL) in real time. However, optimizing intraoperative transfusion management for these cases is critical: blood products are independently associated with an increased risk of overall mortality, postoperative complications, multiorgan failure, and prolonged intensive care unit (ICU) stays. This study aims to evaluate how intraoperative fluid management, including blood transfusion, affects incidence of postoperative complications, and respiratory morbidity.

METHODS: We conducted a retrospective review of prospectively collected data from October 2012 to November 2019 using the Pediatric Craniofacial Surgery Perioperative Registry at Johns Hopkins Hospital. Pediatric patients (<18 years) undergoing open craniosynostosis repair were included. Endoscopic strip craniectomies were excluded. Outcomes of interest included postoperative complication incidence, intraoperative and postoperative respiratory complications, and hospital length of stay (LOS).

RESULTS: Sixty-one patients were included with a median age of 1.2 years (SD = 3.3); 36% were female, 54% Caucasian, and median ASA score was 2. Mean ICU and total hospital LOS were 3.3 and 6 days, respectively. Intraoperatively, mean EBL was 494 ml (SD = 403) and mean EBL/TBV was 0.55 (SD = 0.42). Patients were given an average of 1,412-ml crystalloid fluids for a mean crystalloid/EBL ratio of 5.1:1. On average, 646-ml blood products were given (mean 75% TBV). When controlling for ASA, odds of any postoperative complication were increased over 14-fold by intraoperatively transfusing >85% TBV in blood products compared with <85% (P = 0.028). Increasing %TBV transfused was significantly associated with increased incidence of intraoperative or postoperative respiratory complications, with an odds ratio of 5.2 (P = 0.049). Total and ICU LOS were increased as intraoperative %TBV transfused increased, although these findings did not reach significance (P = 0.08, 0.09). A higher difference between the highest intraoperative and preoperative hemoglobin values was also associated with 1.75 increased odds of postoperative complication (P = 0.03). Increasing the intraoperative crystalloid:EBL ratio was significantly associated with incidence of any postoperative complication (P = 0.04), with a ratio of ≥7:1 associated with an odds ratio of 13.07 (P = 0.05).

Age, gender, surgeon, and specific procedure were not significantly associated with outcome in univariate analysis; crystalloid:blood ratios were not significantly associated with...
complication rates. Intraoperative %TBV transfused was not associated with postoperative transfusion requirements.

**CONCLUSION:** Postoperative morbidity may be optimized by utilizing transfusion and crystalloid thresholds. As transfusing >85% TBV was associated with increased postoperative complications, we advocate for adopting practices that may either decrease transfusion need to below this threshold (eg, antifibrinolytic therapy, bloodless surgical technique) or provide alternative methods to minimize external transfusion (eg, using cell saver). Additionally, maintaining a crystalloid:EBL ratio of <7:1 may also prevent postoperative complications; colloid replacement may be considered if volume needs exceed this ratio. We aim to conduct further interinstitutional research to identify additional optimal infusion and transfusion practices in this patient population.

**Poster** Posterior Cranial Vault Distraction Osteogenesis: Routine Low Occipital Craniotomy Is a Safe Approach That Optimizes Outcomes

**Presenter:** Raquel M. Ulma, DDS, MD

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**OBJECTIVE:** Posterior cranial vault distraction osteogenesis (PVD) is a well-established alternative to traditional posterior vault osteotomy for cranial vault expansion in patients with multisuture craniosynostosis with a narrow cranial base. The benefits of PVD over traditional osteotomy include a more gradual and maximal expansion of both the bone and overlying scalp with decreased rates of relapse. Previously described techniques place the inferior osteotomy above the torcula, which limits a more complete normalization of volume and morphology. In this study, we present a safe low occipital craniotomy extending to the foramen magnum, utilized to restore normal anatomy and improve remediation of the narrow cranial base associated with multisuture craniosynostosis.

**METHODS:** We performed a retrospective chart review of all pediatric patients with multisuture craniosynostosis undergoing PVD surgery at our institution in the years 2012–2019. Extracted data included demographics, perioperative and intraoperative surgical information, and postoperative complications. All included patients underwent preoperative evaluation by neurosurgery, plastic surgery, ophthalmology, and neuropsychiatry. CT and magnetic resonance imaging of the brain and cervical spine with cerebrospinal fluid flow imaging were obtained preoperatively to evaluate bony morphometry, venous sinus position, and potential Chiari malformation.

**RESULTS:** We identified 14 patients undergoing PVD. Thirteen patients had multisuture synostosis. Clinical syndromes included Saethre-Chotzen, Crouzon, and Apert. The average age at time of PVD was 14.2 months (range, 5–93 months). Blood loss averaged 86 ml (range, 20–200 ml); 7 patients required transfusion. No patients had hyponatremia requiring treatment. The average hospital length of stay after surgery was 6.4 days (range, 2–29 days) and all patients completed distraction of 30 mm. Three patients had Chiari malformation before posterior distraction; 2 improved and 1 remained stable postoperatively. Complications included distractor device failure requiring reoperation (1 patient), shunt exposure requiring operation (2 patients), and mild scalp wound infection requiring only local wound care (1 patient). Twelve patients underwent secondary fronto-orbital advancement 8–14 months after the initial posterior vault osteotomy and device placement.

**CONCLUSIONS:** Low occipital craniotomy is a safe and effective technique for PVD. It allows for maximal expansion of the posterior vault, provides superior morphologic outcomes in patients with turribrachycephaly, and can indirectly improve overall facial growth. Other benefits include decreased tension on the scalp closure and a greater potential of decompressing the foramen magnum and associated Chiari Malformations.

**Management of Calcified Cephalohematoma of Infancy: A Single Institution 25-Year Experience**

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**PURPOSE:** Calcified cephalohematoma of infancy is a result of a subperiosteal blood collection, that usually forms