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**INTRODUCTION:** Pediatric craniofacial procedures are complex and require intensive preoperative, intraoperative, and postoperative care. Transfusions are often required due to both the invasive nature of the procedure as well as the inherently lower blood volume in pediatric patients. We report here our experience with a multidisciplinary Blood Management Team in complex craniofacial surgery.

**OBJECTIVES:** To determine if a Pediatric Blood Management (PBM) program with multimodal approach can reduce transfusion requirements in pediatric patients undergoing craniofacial surgery.

**METHODS:** A collaborative protocol was developed by the PBM team, plastic surgery and anesthesia clinicians in 2016, which involved the pre-operative optimization of hemoglobin levels, the intraoperative use of tranexamic acid and CellSaver™ technology, as well as blood sparing operative techniques. Additionally, patients were preoperatively screened for altered coagulation including hypofibrinogenemia and von Willebrand’s disease. Prospective monitoring of these 17 patients in the intervention arm was collected. Retrospective data on 20 consecutive patients who underwent craniofacial surgery prior to the initiation of the program were used as a control group. The primary endpoint was the transfusion volume of blood products.

**RESULTS:** Groups at baseline were similar in age, weight and reported intraoperative estimated blood loss. Patients post-intervention had a higher mean ASA classification. The rate of transfusion decreased from 80% pre-intervention to 65% post-intervention. Post-intervention, patients received a mean of 106 mL of intraoperative PRBC, while pre-intervention, patients received a mean of 224 mL. (p=0.024). Postoperative hemoglobin measurements were similar, with the control group 10.9 g/dL and the intervention arm 10.5 g/dL (p=0.64). Discharge hemoglobin concentrations also were similar with 9.6 g/dL and 10.6 g/dL in the control and PBM group, respectively (p=0.196). Furthermore, 3 patients were found to have von Willebrand’s disease preoperatively.

**CONCLUSION:** We found that the institution of a Pediatric Blood Management team significantly reduced the transfusion burden of patients undergoing craniofacial procedures, including in complex patients with von Willebrand’s disease. The use of a multimodal approach to hematologic management optimized patients for their procedures and helped minimize exposure to transfusion associated complications.

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**A Craniometric Analysis of Cranial Base Differences in Unicoronal Craniosynostosis**

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**INTRODUCTION:** Craniofacial scoliosis secondary to unicoronal synostosis (UCS) has been widely observed to encompass the vault, the cranial base, and the face. While the basic differences have been recorded, a thorough analysis of the cranial base and intra-cranial craniometric, and volumetric differences have not. We hypothesized that patients with UCS have deviation of the vault, cranial base, and face resulting in significant differences in skull base morphology and segmental cranial vault volume relative to non-affected controls.

**METHODS:** UCS patients with high-resolution pre-operative CT scans were collected from our IRB-approved, prospective, craniofacial registry. Patients with UCS were compared to a trauma registry (without cranial pathology) and positive controls (positional plagiocephaly). Mimics® software was used to compare those with UCS to controls for a series of standardized craniometric angles and distances. A segmented volumetric
analysis of anterior, middle, and posterior cranial fossae was performed, as well.

RESULTS: The study included 18 patients with UCS and 19 controls. The average age at time of scan was 5.7±2.2 months for UCS and 5.7±2.9 months for controls (p=0.988). Overall cranial vault volume did not differ between UCS and controls (p= 0.250). Nearly all angles measured between the synostosed side of UCS and control patients—posterior fossa deflection angle (18.0±5.2 vs. 2.4±2.1, respectively), petrous ridge angle (104.0±5.7 vs. 126.6±4.9, respectively), external acoustic meatus angle (92.3±4.8 vs. 100.3±3.4, respectively), articular fossa angle (82.5±3.8 vs. 89.9±4.0, respectively), and bifrontal angle (152.2±6.9 vs. 143.7±8.3, respectively)—were significantly different (p<0.002). Three volumetric ratios comparing the synostosed side to the contralateral were significantly less than controls: anterior (0.44±0.03 vs. 0.5±0.01, p<0.001), middle (0.45±0.02 vs. 0.5±0.02, p<0.001), and posterior (0.46±0.02 vs. 0.50±0.02, p<0.001). The ratio of total middle volume to total cranial volume was larger in UCS patients vs. controls, but the posterior ratio was smaller: anterior (0.13±0.02 vs. 0.12±0.02, p=0.545), middle (0.50±0.05 vs. 0.42±0.04, p=0.001), and posterior (0.37±0.05 vs. 0.45±0.03, p=0.001).

CONCLUSION: This study provides quantitative evidence of the degree of angulation and torsion of the cranial base in UCS and its profound effect on volumetric differences in the cranial vault, with significant restriction on the synostosed side and compensatory expansion on the non-synostosed side. Future work will focus on the effects of volumetric differences on cerebral architecture and postoperative volumetric changes.

INTRODUCTION: Recently, controversy has intensified about the efficacy and indications for helmet therapy for nonsyostotic plagiocephaly (NSP). NSP is treated primarily for cosmetic reasons, with parent-reported outcomes necessarily replacing patient-reported outcomes. However, outcomes research relies almost entirely on objective measurements. No NSP measurement system has been shown to correlate with parental opinions. In order to address the ongoing controversy about optimal NSP treatment, research must incorporate subjective feedback from parents, the primary stakeholders. The authors hypothesized that the Argenta scale would correlate with parental assessments of severity as it is based off observable, rather than measured, differences.

METHODS: Parents of NSP patients rated their child’s head shape and overall appearance on VAS scales (with one equal to “completely normal” and ten “completely abnormal”) at their initial consultation with the senior author. The senior author filled out identical evaluations as well as completing the Argenta scale.

RESULTS: Twenty-seven parents of NSP patients were included. Their children’s average age was 5.6±2.2 months. Fourteen families were Caucasian (51.9%), five were Hispanic (18.5%), and three were Asian (11.1%). Twenty-one parents reported hearing comments about their child’s head shape from friends or family; the majority of these comments made parents feel worse about their child’s head shape (N=14, 66.7%). Parents rated their child’s head shape 5.10±1.99 and overall appearance 1.97±2.39. Caregiver and surgeon ratings of head shape and overall appearance were not significantly correlated (head shape p=0.054; overall appearance p=0.080). Surgeon rating of head shape abnormality and overall abnormality of appearance correlated with Argenta classification (head shape correlation coefficient=0.590 and p=0.003; overall appearance correlation coefficient=0.642 and p=0.001). However, neither parental ratings of head shape nor overall appearance correlated with Argenta classification (head shape p=0.101; overall appearance p=0.490).

CONCLUSION: Research about treatment of NSP often relies on objective measurements of millimeter differences that may be statistically significant yet of questionable clinical importance. Caregiver ratings of infant head shape and appearance are