Sagittal craniosynostosis outcome

While sagittal craniosynostosis is the most common craniosynostosis, long-term follow-up of these patients is lacking.

Variables that can predict craniosynostosis outcome, including bone thickness, are important for surgical decision-making, yet are incompletely understood. Recent studies have demonstrated relative risks and benefits of surgical techniques for correcting head shape in patients with nonsyndromic sagittal craniosynostosis. The purpose of this study was to characterize the relationships between parietal bone thickness and perioperative outcomes in patients who underwent spring-mediated cranioplasty (SMC) for nonsyndromic sagittal craniosynostosis.

Patients who underwent craniectomy and SMC for nonsyndromic sagittal craniosynostosis at a quaternary pediatric hospital between 2011 and 2021 were included. Parietal bone thickness was determined on patient preoperative CT at 27 suture-related points: at the suture line and at 0.5 cm, 1.0 cm, 1.5 cm, and 2.0 cm from the suture at the anterior parietal, midparietal, and posterior parietal bones. Preoperative skull thickness was compared with intraoperative blood loss, need for intraoperative transfusion, and hospital length of stay (LOS).

Overall, 124 patients with a mean age at surgery ± SD of 3.59 ± 0.87 months and mean parietal bone thickness of 1.83 ± 0.38 mm were included in this study. Estimated blood loss (EBL) and EBL per kilogram were associated with parietal bone thickness 0.5 cm ($\rho = 0.376$, $p < 0.001$ and $\rho = 0.331$, $p = 0.004$; respectively) and 1.0 cm ($\rho = 0.324$, $p = 0.007$ and $\rho = 0.245$, $p = 0.033$; respectively) from the suture line. Patients with a thicker parietal bone 0.5 cm (OR 18.08, $p = 0.007$), 1.0 cm (OR 7.16, $p = 0.031$), and 1.5 cm (OR 7.24, $p = 0.046$) from the suture line were significantly more likely to have undergone transfusion when controlling for age, sex, and race. Additionally, parietal bone thickness was associated with hospital LOS (β 0.575, $p = 0.019$) when controlling for age, sex, and race. Patient age at the time of surgery was not independently associated with these perioperative outcomes.

Parietal bone thickness, but not age at the time of surgery, may predict perioperative outcomes including transfusion, Estimated blood loss (EBL), and length of stay (LOS). The need for transfusion and EBL were most significant for parietal bone thickness 0.5 cm to 1.5 cm from the suture line, within the anticipated area of suturectomy. For patients undergoing craniofacial surgery, the parietal bone thickness may have important implications for anticipating the need for intraoperative transfusion and hospital length of stay (LOS) [1].

The relationship between surgical age and long-term neuropsychological outcomes in sagittal-suture craniosynostosis remains equivocal. Whole-vault cranioplasty and strip craniectomy are performed at various times in individuals with sagittal-suture craniosynostosis.

Surgery before 6 months old results in improved long-term neurological outcomes. Future studies should examine how the technique of surgery impacts these neuropsychological measures [2].

The cephalic index (CI) of modified strip craniectomy (MSC) treated patients improved from a mean of 67.0 to 72.7, with 31% achieving a CI greater than 75 at one year. Calvarial remodeling was significantly more effective at correcting the scaphocephalic deformity. Patients treated with CR improved from a mean CI of 66.7 to 76.1. Sixty-two percent of the patients achieved a CI greater than 75. In both groups, outcomes were stable throughout follow-up with no significant relapse up to 14

years after surgery [3].

Postoperative intracranial hypertension was found in more than 1 in 20 children treated for non syndromic sagittal craniosynostosis by Thomas et al. [4].
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3227159/

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van de Beeten et al., based on their age at referral, patients undergone either frontobiparietal remodeling or an extended strip craniotomy. Data on funduscopy, optical coherence tomography, occipitofrontal head circumference, and presence of vertex bulge on radiography were collected retrospectively.

Univariate analysis showed that extended strip craniotomy, the occurrence of ophthalmic signs, and a smaller occipitofrontal head circumference at last follow-up were related to more frequent headaches ($p = 0.01$, $p = 0.04$, and $p < 0.01$, respectively). On multivariate analysis, only type of surgery and occipitofrontal head circumference at last follow-up remained significant predictors ($p = 0.04$ and $p < 0.01$, respectively).

Although the reported rate of frequent headaches in this study is within the norm reported for the normal population, this study shows that after correction for sagittal craniosynostosis, frequent headaches are independently related to type of surgery and to occipitofrontal head circumference at last follow-up. Headaches in the sagittal craniosynostosis population may be related to papilledema and/or an increased total retinal thickness. Therefore, the authors recommend that occipitofrontal head circumference be routinely measured and that patients be asked about the occurrence and frequency of headaches during their checkup at the clinic.

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, III [5].

Unclassified articles

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