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Outcomes Analysis of Minimal Access Cranial Vault Remodeling for Sagittal Craniosynostosis

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Abstract Text:

Total cranial vault remodeling (CVR) for sagittal synostosis has lower recurrence rates and improved esthetic outcomes compared to strip craniectomy. However, CVR techniques typically utilize a coronal incision for calvarial exposure which is accompanied by increased blood loss and hospital stay. **Purpose:** The aim of this study was to evaluate the safety, outcome, and degree of parental satisfaction of minimal access vault remodeling for the management of sagittal synostosis. **Methods:** 18 Patients (15 boys and 3 girls) ages 3.5-18 mo (mean 6.9 mo) with non-syndromic sagittal synostosis were treated with minimal access cranioplasty followed by helmet therapy. Surgical access was via a single 3-4 cm zigzag vertex incision. A lighted retractor and subgaleal dissection allowed safe visualization of strip craniectomy overlying the sagittal sinus. In 13 patients, barrel stave cuts and wedge excisions were made with bone scissors to address associated scaphocephaly, frontal bossing and occipital bathrocephaly. In 5 patients (ages 4.5-18 mo), calvarial bone thickness required barrelstaving with the B5 Midas and rongeurs. Helmet therapy was started 1-3 weeks after surgery and continued for 9.9 ± 4.5 weeks. Omega tracer scans were obtained postoperatively and at completion of helmet treatment. Cranial width, cranial length and cephalic- and symmetry ratios were used as objective measures of headshape. Parents were sent a questionnaire to obtain a subjective assessment of overall outcome. **Results:** Blood loss (270.5 ± 228 ml), transfusion volume (241.4 ± 195.7 ml), procedure duration (3.0 ± 1.7 hrs) and postoperative hospital stay (2.7 ± 0.7 days) compared favorably to national practices. In patients under 5 mo of age (n=9), blood loss and transfusion volumes were lower (162.2 ± 87.5 ml and 156.4 ± 88.1 ml, respectively) and procedure duration shorter (range 1.6 - 5 hrs). No neurological or transfusion-related complications occurred. One patient required re-operation for incomplete posterior release. Both the objective measures and the subjective parental evaluation of change in calvarial shape were excellent. **Conclusions:** Minimal access CVR followed by helmet therapy is safe and efficacious for the correction of calvarial deformities secondary to sagittal synostosis. This procedure is best performed <5 months of age. Compared to traditional CVR, transfusion requirements are lower and hospital stay is shorter. Compared to endoscopic procedures, the approach is simpler and allows for direct visualization and surgical control.

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