## Foreshortening and Lateral Expansion of the Cranium Activated by Gravity (FLAG) procedure

## **Case series**

The aim of Bradford et al. from the University of Virginia Health System was to review the evolution of surgical techniques at the institution and compare patient outcomes. A retrospective review was performed on consecutive patients undergoing correction for craniosynostosis from 2008 to 2018. All patients with a diagnosis of nonsyndromic isolated sagittal craniosynostosis were included and classified into one of 4 groups by the type of surgical correction performed (H-type, FLAG, endoscopic, other). The authors identified 166 consecutive patients with a mean age at time of surgery of 6.7  $\pm$  4.0 months. 91 (54.8%) carried a diagnosis of nonsyndromic sagittal synostosis. 63 patients underwent H-type procedures, 9 underwent FLAG procedures, 5 underwent endoscopic procedures, and 14 were classified as other (distraction or other implant). Perioperatively, the FLAG group had the shortest ICU stay (1.3 days, P < 0.05), postoperative transfusion requirement (42cc pRBC, P < 0.001), and complication rate (0.0%). The endoscopic group had the shortest surgical time at 2.00 hours (p < 0.001). No statistically significant difference in cranial index or revision procedures between the four groups was identified. Overall, the mean length of follow-up was 25.3 months. All procedures had similar results for cranial index with decreased surgical time, transfusion volume, and hospital stay seen in FLAG and endoscopic groups <sup>1</sup>.

Klement et al. presented in 2017 their last 10 years' experience treatment of nonsyndromic single suture craniosynostosis. A retrospective review was performed on patients who underwent open surgical treatment of nonsyndromic craniosynostosis over 10 years. Patient characteristics and clinical outcomes were reviewed. Radiological analysis of intracranial volumes was performed using Amira software. The authors' technique for treatment of sagittal synostosis was the Foreshortening and Lateral Expansion of the Cranium Activated by Gravity (FLAG) procedure. The authors identified 106 patients with a median age of 0.8 years. Sagittal synostosis was most common (n = 65, 61%). Seventeen percent underwent distraction of the cranial vault; the remainder underwent traditional remodeling procedures. The average operative time was 131 minutes, blood loss was 296 mL (30 mL/kg), and intraoperative transfusion was 332 mL (34 mL/kg). There were 2 postoperative complications. Six patients required an additional major operation years later, most commonly for increased intracranial pressure. The authors separately analyzed 50 patients with sagittal synostosis treated with the FLAG procedure. There were no postoperative complications, and only 4 patients required reoperation. The average operative time for the FLAG procedure was 97.3 minutes. Intracranial volume increased by 191.45 mL (28.3-427.5 mL) with 28% average relative cranial vault expansion (4.5%-93.2%). Surgical correction of craniosynostosis using the FLAG technique is safe and effective with minimal morbidity and long standing results. Treatment should involve a structured approach, which minimizes operative times and decreases complication rates<sup>2)</sup>.

## 1)

Bradford PS, Ishaque M, Shaffrey E, Schaeffer CV, Jr JAJ, Syed H, Black J. Evolution of Surgical Management of Sagittal Synostosis - A Single Institution Review. J Craniofac Surg. 2020 Oct 15. doi: 10.1097/SCS.0000000000007194. Epub ahead of print. PMID: 33074976.

## 2)

Klement KA, Adamson KA, Horriat NL, Denny AD. Surgical Treatment of Nonsyndromic Craniosynostosis. J Craniofac Surg. 2017 Oct;28(7):1752-1756. doi: 10.1097/SCS.00000000003950. PMID: 28885444.

From: https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki** 

Permanent link: https://neurosurgerywiki.com/wiki/doku.php?id=flag



Last update: 2024/06/07 02:53