Less is More? Quantitative Comparison of Endoscopic-Assisted Techniques in the Management of Sagittal Synostosis

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Purpose: Endoscopic-assisted techniques are well described as a valid option for the early release of patients with sagittal synostosis.[1-3] However, there exists a wide variation in the operative approaches that have been employed, ranging from simple suturectomy (SS) to more extensive variations that include osteotomies and barrel-staving (BS). The morbidity inherent to increasingly invasive procedures calls into question the relative efficacy of these techniques.[4,5] The purpose of this study was to compare the quantitative outcomes of patients undergoing two different endoscopically-assisted techniques in the treatment of sagittal synostosis.

Methods: A retrospective review was conducted of a consecutive series of patients undergoing endoscopically-assisted treatment of sagittal synostosis at two different institutions from March 2008 to August 2014. Demographic and operative data were collected, and postoperative outcomes were analyzed using quantitative imaging data acquired from the orthotic manufacturer treating patients from both institutions. Final cephalic index (CI) and follow-up period were defined by the last scan obtained by the orthotic manufacturer.

Results: A total of 73 patients underwent endoscopically-assisted treatment of sagittal synostosis. There were 34 patients in whom SS alone was performed, and 39 patients that had suturectomy with BS. The average age at operation was 3.2 months and 2.7 months for SS and BS, respectively. Patients undergoing SS had a mean anesthetic duration of 177.2 minutes and operative time of 77.6 minutes, compared to 195 minutes and 111 minutes for BS. The average postoperative length of stay was 1.2 days for SS and 1.4 days for BS. In SS, preoperative CI was 72.6 and immediate postoperative CI was 73.8, compared to 71.0 and 73.6 for BS. The CI at 12 months postoperatively was 80.6 for SS and 80.3 for BS. Final CI was 80.4 for SS and 79.6 for BS, with a mean follow-up period for 13.2 months for SS and 19.4 months for BS patients.

Conclusions: Both endoscopically-assisted simple suturectomy and suturectomy with barrel-staving produce good outcomes. However, the addition of barrel staves does not seem to improve the results, and therefore may not be warranted in the treatment of sagittal synostosis.

References:

1. Jimenez DF, Barone CM. Endoscopic technique for sagittal synostosis. *Childs Nerv Syst*. 2012 Sep;28(9):1333-9.

2. Wong RK, Emelin JK, Meltzer HS, et al. Nonsyndromic craniosynostosis: the Rady Children's Hospital approach. J Craniofac Surg. 2012 Nov;23(7 Suppl 1):2061-5.

3. Ridgway EB, Berry-Candelario J, Grondin RT, et al. The management of sagittal synostosis using endoscopic suturectomy and postoperative helmet therapy. *J Neurosurg Pediatr*. 2011 Jun;7(6):620-6.

4. Jenkins GH, Smith NR, McNeely PD. Pancraniosynostosis following endoscope-assisted strip craniectomy and helmet orthosis for sagittal suture craniosynostosis in a nonsyndromic patient. J *Neurosurg Pediatr*. 2013 Jul;12(1):77-9.

5. Sinner B, Becke K, Engelhard K. General anaesthetics and the developing brain: an overview. *Anaesthesia*. 2014 Sep;69(9):1009-22.