Craniovertebral Junction Anomaly Case Series

A retrospective study was conducted on 56 cases with irreducible atlantoaxial dislocation (IAAD) who underwent posterior fixation from January 2016 to December 2019. According to with or without cages, patients were divided into two groups, namely the cage group and the autograft group. These two groups were subjected to a comparison with respect to visual analog scale (VAS), Japan Orthopaedic Association (JOA) score, health-related quality of life (HRQoL), American Spinal Injury Association (ASIA) Spinal Cord Injury Grade, atlas-dens interval (ADI), space available for the cord (SAC), cervicomedullary angle (CMA) and fusion rate.

The medical follow-up continued for more than one year. There was no statistical difference in preoperative VAS score, JOA score, SF-12 score, ASIA grade, ADI, SAC and CMA between both groups, and the above indexes were significantly improved after surgery ($p<0.05$). The VAS score and ADI of the cage group were lower than those in the autograft group ($p<0.05$). The JOA score, SF-12 score, SAC and CMA of the cage group were significantly higher than those of the autograft group ($p<0.05$). The fusion rate of the cage group 4-6 months after surgery was higher than that of the autograft group ($p=0.068$). In terms of the ASIA grade, the cage group was higher than the autograft group, with a statistical significance ($p<0.05$).

During the 1-year follow-up, the results of neurological function improvement and atlantoaxial joint reduction were satisfactory. This lateral mass fusion device combined with a 3D printed model may be a technique worthy of clinical promotion [1].

The records of patients with syndromic Craniovertebral Junction Anomaly treated by Muthukumar during the period of 2012-2017 were retrospectively reviewed. Patients in whom intraoperative difficulties and complications were encountered were culled out from the database. Complications were divided into (1) technique related, (2) neural injury, (3) vascular injury, (4) instrumentation pull out/breakage, (5) screw misplacement and, (6) where postoperatively, the surgeon felt an alternate surgical technique could have yielded better results. Four patients with either unexpected intraoperative difficulties or complications or in whom the technique could have been refined were identified. There were 2 patients with proatlas segmentation anomalies and 2 with Morquio syndrome. The first patient had cage migration which necessitated a second procedure during craniovertebral realignment, the second had partial penetration of the screw into the transverse foramen, the third with bipartite atlas underwent a C1-2 fixation without a horizontal cross-connector and, the fourth had screw pull outs from the subaxial cervical spine intraoperatively during an attempted occipitocervical fusion. In children with syndromic CVJ anomalies, the surgeon should be aware of the high risk of intraoperative difficulties and complications. Potential pitfalls and the ways to avoid these complications are discussed [2].

1)
Shi L, Xue D, Wang Y, Chou D, Zhao Y, Zhang S, Zhang M, Wang L, Li P, Liu Y. Efficacy of the Lateral Mass Fusion Device Combined with a Three-dimensional Printed Model in the Treatment of Craniovertebral Junction Abnormalities. World Neurosurg. 2021 Dec 9:S1878-8750(21)01855-6. doi: 10.1016/j.wneu.2021.12.012. Epub ahead of print. PMID: 34896663.
2)
Muthukumar N. Problems in Instrumentation of Syndromic Craniovertebral Junction Anomalies - Case

Reports. Neurospine. 2019 Jun;16(2):277-285. doi: 10.14245/ns.1938176.088. Epub 2019 Jun 30. PubMed PMID: 31261467.