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Hinbrain translocation in patients with hindbrain hernia - Chiari I malformation, after foramen magnum decompression

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Introduction: In some children with isolated hindbrain hernia-Chiari I malformation who had cranio-vertebral decompression, it was noticed in postoperative imaging that the cerebellum had moved upwards, in comparison to preoperative imaging. The aim of this study was to measure any movement-translocation of hindbrain structures in children with Chiari I malformation, following cranio-vertebral decompression.

Methods: The pre and post operative MR scans of 5 children were studied with image analysis software. On a mid-sagittal image, a line connecting the tuberculum sellae and the dorsum sellae was used as a fixed reference line. Two other lines perpendicular to this reference were drawn to measure the position of the fastigium (sf line) and the inferior pontine sulcus (sp line). The length of these lines was measured and compared on pre- and post-operative scans. Paired t – test was used to compare the mean values of the lengths.

Results: The mean age of the patients was 10.8 years and the median time for the examined post operative scan was 13 weeks. The mean preoperative length of the sella – fastigium line (sf) was 5.24 mm (95% CI 2.01-8.45) and the mean postoperative was 3.02 mm (95% CI 0.53 - 5.5). The postoperative mean was significantly lower (p= 0.007) confirming the elevation of the fastigium level. The mean preoperative length of the sella – inferior pontine sulcus line (sp) was 22 mm (95% CI 15.4-28.6) and the mean post operative was 20.8 mm (95% CI 16.2-25.4). The difference was not significant (p= 0,183).

Conclusion: These preliminary results strongly suggest that there is an upward cerebellsr translocation after cranio-vertebral decompression in children with Chiari I malformation. This may indicate that the Chiari I malformation is not a true malformation but a reversible deformity. This needs further evaluation in a larger group of patients.