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Full endoscopic neuronavigated decompression of craniocervical junction with duraplasty in Chiari malformation Type I (CM I.): description of a novel treatment

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Background: Open surgery in patients with CM I. is associated with risks such as neurological impairment, CSF leakage, muscle trauma, development of hydrocephalus, wound healing complications and neck pain. The advent of high-end endoscopic equipment enables new strategies in extraordinarily complex areas like craniocervical junction challenging standardized procedures to prove its efficiency.

Research question: Introducing a novel surgical technique and comparison of its safety and clinical benefits against standard open treatment.

Design: Single-center study with follow-up of 3, 6, 12 and 24 weeks with clinical check-up, neurological and radiological examination.

Methods: 3 adult patients with CM I. with or without syringomyelia were treated via full endoscopic surgery with neuronavigation assistance and IOM. Suboccipital craniectomy and C1 laminectomy followed by durotomy and onlay dural patch insertion were performed.

Results: No neurological impairment was recorded after endoscopic treatment. There were also no intraoperative signs of decreasing SEPs, MEPs, or corticobulbar responses. Immediately after decompression, an increase of BAEP amplitude was observed in all patients. Common postoperative symptoms were persistent: headache, retrobulbar pressure, hypesthesia on limbs, ataxia, episodic fever. These symptoms dramatically decreased during the first 12 weeks post-op. We have confirmed a sufficient decompression based on radiological criteria in the whole cohort. Neither wound healing complications, nor CSF leak, or infection occurred during the 24-week follow up.

Discussion: Due to the introduction of a novel surgical method, the duration of this surgery is still incomparably longer than the standard open treatment. On the other hand, no readmissions or reoperations were necessary. Based on the clinical, functional and radiological outcome, our preliminary results suggest safety and good clinical efficacy of full endoscopic management.