

### 795 Trends in Cerebrospinal Fluid Leak Rates Following the Extended Endoscopic Endonasal Approach for Anterior Skull Base Meningioma: A Meta-Analysis Over the Last 20 Years

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**Introduction:** The extended endoscopic approach (EEA) provides direct access for resection of tuberculum sellae (TSM) and olfactory groove meningiomas (OGM) but is associated with cerebrospinal fluid (CSF) leak in up to 25% of patients. To evaluate the impact of improved skull base reconstructive techniques, we assessed published CSF leak percentages in EEA over the last two decades.

**Method:** Random-effects meta-analyses were performed for studies published between 2004-2020. Outcomes assessed were CSF leak, gross total resection, visual improvement, intraoperative arterial injury and 30-day mortality. For the main analyses, publications were pragmatically grouped based on publication year in three categories: 2004-2010, 2011-2015, and 2016-2020.

**Results:** We included 29 studies describing 540 TSM and 115 OGM patients. CSF leak incidence dropped over time from 22% (95% CI: 6-43%) in studies published between 2004 and 2010, to 16% (95% CI: 11-23%) between 2011 and 2015, and 4% (95% CI: 1-9%) between 2016 and 2020. Outcomes of gross total resection, visual improvement, intraoperative arterial injury, and 30-day mortality remained stable over time.

**Conclusions:** We report a noticeable decrease in CSF leak over time, which might be attributed to the development of reconstructive techniques (e.g., hadad bassagasteguy flap, and gasket seal), refined multi-layer repair protocols, and selected lumbar drain usage.