American Head and Neck Society - Journal Club

Volume 57, August 2025 – Skull Base Surgery Section

This edition of the Journal Club comes from the AHNS Skull Base Surgery Section and focuses on perioperative management in Skull Base Surgery (primarily endoscopic, but also pertinent for relevant open skull base surgery also). The articles featured present high-quality data on the topic, and we hope the readers find them engaging. Included in this issue are a systematic review on postoperative OSA management, a randomized controlled trial on the use of lumbar drains and their effect on postoperative CSF leak rates, a discussion on venous thromboembolism chemical prophylaxis, an expert practice statement outlining postoperative management principles for endoscopic skull base surgery in cases of intradural pathology and an expert practice statement on skull base reconstruction following endoscopic skull base surgery. We hope you find this journal club enlightening and enjoyable.

Best,
Meghan Turner, MD, FACS / Evan Walgama, MD / Basit Jawad, MD

Table of Contents – ***click the page number to go to the summary and full article link.***

Postoperative Obstructive Sleep Apnea Management Following Endoscopic Pituitary Surgery: A Systematic Review *page 2*

Does lumbar drainage reduce postoperative cerebrospinal fluid leak after endoscopic endonasal skull base surgery? A prospective, randomized controlled trial *page 3*

Venous thromboembolism chemical prophylaxis after skull base surgery *page 4*

American Rhinologic Society expert practice statement part 1: Skull base reconstruction following endoscopic skull base surgery. *page 5*

American Rhinologic Society expert practice statement part 2: Postoperative precautions and management principles following endoscopic skull base surgery *page 6*

Postoperative Obstructive Sleep Apnea Management Following Endoscopic Pituitary Surgery: A Systematic Review

Adwight Risbud, Edward C Kuan, Arthur W Wu, Adam N Mamelak, Dennis M Tang

from World Neurosurgeon, August 2023

Abstract

Objective: There is currently no consensus on the appropriate timing of noninvasive positive pressure ventilation (PPV) resumption in patients with obstructive sleep apnea (OSA) after endoscopic pituitary surgery. We performed a systematic review of the literature to better assess the safety of early PPV use in OSA patients following surgery.

Methods: The study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Databases in English were searched using the keywords: "sleep apnea," "CPAP," "endoscopic," "skull base," "transsphenoidal" and "pituitary surgery." Case reports, editorials, reviews, meta-analyses, unpublished and abstract-only articles were all excluded.

Results: Five retrospective studies were identified, comprising 267 patients with OSA who underwent endoscopic endonasal pituitary surgery. The mean age of patients in four studies (n = 198) was 56.3 years (SD = 8.6) and the most common indication for surgery was pituitary adenoma resection. The timing of PPV resumption following surgery was reported in four studies (n = 130), with 29 patients receiving PPV therapy within two weeks. The pooled rate of postoperative cerebrospinal fluid leak associated with PPV resumption was 4.0% (95% CI: 1.3-6.7%) in three studies (n = 27) and there were no reports of pneumocephalus associated with PPV use in the early postoperative period (<2 weeks).

Conclusions: Early resumption of PPV in OSA patients after endoscopic endonasal pituitary surgery appears relatively safe. However, the current literature is limited. Additional studies with more rigorous outcome reporting are warranted to assess the true safety of re-initiating PPV postoperatively in this population.

Strengths:

- Systematic review of the existing literature with 247 patients
- Pooled analysis of rare complication, which are expected to occur at low rates.
- Current best available evidence
- Excellent jumping off point for future research

Weaknesses:

- Included only 4 studies
- Paucity of available literature

Does lumbar drainage reduce postoperative cerebrospinal fluid leak after endoscopic endonasal skull base surgery? A prospective, randomized controlled trial

Nathan T Zwagerman, Eric W Wang, Samuel S Shin. Yue-Fang Chang, Juan C Fernandez-Miranda, Carl H Snyderman, Paul A Gardner

from the Journal of Neurosurgery, October 2018

Abstract

Objective: Based on a null hypothesis that the use of short-term lumbar drainage (LD) after endoscopic endonasal surgery (EES) for intradural pathology does not prevent postoperative CSF leaks, a trial was conducted to assess the effect of postoperative LD on postoperative CSF leak following standard reconstruction.

Methods: A prospective, randomized controlled trial of lumbar drain placement after endoscopic endonasal skull base surgery was performed from February 2011 to March 2015. All patients had 3-month follow-up data. Surgeons were blinded to which patients would or would not receive the drain until after closure was completed. An a priori power analysis calculation assuming 80% of power, 5% postoperative CSF leak rate in the no-LD group, and 16% in the LD group determined a planned sample size of 186 patients. A routine data and safety check was performed with every 50 patients being recruited to ensure the efficacy of randomization and safety. These interim tests were run by a statistician who was not blinded to the arms they were evaluating. This study accrued 230 consecutive adult patients with skull base pathology who were eligible for endoscopic endonasal resection. Inclusion criteria (high-flow leak) were dural defect greater than 1 cm2 (mandatory), extensive arachnoid dissection, and/or dissection into a ventricle or cistern. Sixty patients were excluded because they did not meet the inclusion criteria. One hundred seventy patients were randomized to either receive or not receive a lumbar drain.

Results: One hundred seventy patients were randomized, with a mean age of 51.6 years (range 19-86 years) and 38% were male. The mean BMI for the entire cohort was 28.1 kg/m2. The experimental cohort with postoperative LD had an 8.2% rate of CSF leak compared to a 21.2% rate in the control group (odds ratio 3.0, 95% confidence interval 1.2-7.6, p = 0.017). In 106 patients in whom defect size was measured intraoperatively, a larger defect was associated with postoperative CSF leak (6.2 vs 2.9 cm2, p = 0.03). No significant difference was identified in BMI between those with (mean 28.4 ± 4.3 kg/m2) and without (mean 28.1 ± 5.6 kg/m2) postoperative CSF leak (p = 0.79). Furthermore, when patients were grouped based on BMI < 25, 25-29.9, and > 30 kg/m2, no difference was noted in the rates of CSF fistula (p = 0.97).

Conclusions: Among patients undergoing intradural EES judged to be at high risk for CSF leak as defined by the study's inclusion criteria, perioperative LD used in the context of vascularized nasoseptal flap closure significantly reduced the rate of postoperative CSF leaks. Clinical trial registration no.: NCT03163134 (clinicaltrials.gov).

Strengths:

- Randomized clinical trial design, providing the highest level of evidence for this topic
- Power analysis performed to suggest that the current study size is acceptable to detect a significant difference in CSF leak.
- Multiple surgeon team accruing patients, which could help with generalizability

Weaknesses:

- Sixty patients were excluded (> 25%)
- Single-institution series, which may limit the generalizability to other centers without similar protocols and skill levels of operating surgeons
- Heterogeneous patient population with respect to pathology and risk of CSF leak at start.

Venous thromboembolism chemical prophylaxis after skull base surgery

Mueez Waqar, Omar Yaseen, Annabel Chadwick, Jing Xian Lee, Ghazn Khan, D. Gareth Evans, Daniel Horner, Archana Jaiswal, Simon Freeman, Rajiv Bhalla, Simon Lloyd, Charlotte Hammerbeck-Ward, Scott A. Rutherford, Andrew T. King, Omar N. Pathmanaban

From Acta Neurochirurgica, April 2024

Abstract

Purpose: There is no guidance surrounding postoperative venous thromboembolism (VTE) prophylaxis using pharmacological agents (chemoprophylaxis) in patients undergoing skull base surgery. The aim of this study was to compare VTE and intracranial haematoma rates after skull base surgery in patients treated with/without chemoprophylaxis.

Methods: Review of prospective quaternary centre database including adults undergoing first-time skull base surgery (2009– 2020). VTE was defined as deep vein thrombosis (DVT) and pulmonary embolism (PE) within 6 months of surgery. Multivariate logistic regression was used to determine factors predictive of postoperative intracranial haematoma/VTE. Propensity score matching (PSM) was used in group comparisons.

Results: One thousand five hundred fifty-one patients were included with a median age of 52 years (range 16–89 years) and female predominance (62%). Postoperative chemoprophylaxis was used in 81% of patients at a median of 1 day postoperatively. There were 12 VTE events (1.2%), and the use of chemoprophylaxis did not negate the risk of VTE entirely ($p>0.99$) and was highest on/after postoperative day 6 (9/12 VTE events). There were 18 intracranial haematomas (0.8%), and after PSM, chemoprophylaxis did not significantly increase the risk of an intracranial haematoma ($p>0.99$). Patients administered chemoprophylaxis from postoperative days 1 and 2 had similar rates of intracranial haematomas ($p=0.60$) and VTE ($p=0.60$), afrmed in PSM.

Conclusion: Postoperative chemoprophylaxis represents a relatively safe strategy in patients undergoing skull base surgery. We advocate a personalised approach to chemoprophylaxis and recommend it on postoperative days 1 or 2 when indicated.

Background: Venous thromboembolism is a potentially fatal postoperative complication. The risk-benefit calculation is uncertain in the case of patients undergoing skull base surgery, where the risk of postoperative hemorrhage is especially serious. Longer operative times and post-operative immobilization may increase risk of VTE in this population. This study excludes routine transsphenoidal pituitary surgeries.

Strengths:

- 1551 patients undergoing skull base surgery at a single-center in the UK.
- 80% of study patients received chemoprophylaxis POD 1, with no significant differences between those receiving POD1 and POD 2.
- Demonstrates safety of chemoprophylaxis in the study population.

Weaknesses:

- No routine postoperative imaging is obtained at the study institution.
- Retrospective data over a period of change in institutional practice.

American Rhinologic Society expert practice statement part 1: Skull base reconstruction following endoscopic skull base surgery

Jennifer E. Douglas MD, Nithin D. Adappa MD, Garret Choby MD, Corinna G. Levine MD, MPH, Mindy R. Rabinowitz MD, Raj Sindwani MD, Eric W. Wang MD, Bradford A. Woodworth MD, Edward C. Kuan MD, MBA

Objective: The purpose of this publication is to provide expert consensus and evidence-based guidance on best practices to optimize outcomes in skull base reconstruction following endoscopic skull base surgery for intradural pathology.

Key Topics Addressed:

- Use of free mucosal grafts versus vascularized pedicled nasoseptal flaps
- Use of autologous versus synthetic grafts
- The role of lumbar drains, dural sealants and nasal packing.

Methodology: This expert practice statement was developed using the modified Delphi process. Five statements were developed, four of which reached a consensus, and one reached near consensus.

Expert Practice Statements (as written by the authors)

1. “Vascularized pedicled nasoseptal flaps: Vascularized pedicled NSF should be used in the primary reconstruction of large defects with high-flow CSF leak. They remain an option for reconstructing low-flow leaks.” Strong Consensus.

2. “Autologous and/or synthetic grafts: When utilized as inlay grafts during multilayer skull base reconstruction, autologous and synthetic graft material offer similar rates of successful skull base reconstruction, and overall acceptable donor site morbidity for autologous graft harvest.” Near Consensus.

3. “Lumbar drains: The routine use of lumbar drain placement for sellar and suprasellar defects is not recommended but may be an option for certain high-flow CSF leaks in this location, especially in patients with risk factors for postoperative CSF leak. Postoperative lumbar drainage may be considered following ESBS resulting in large anterior or posterior cranial fossa skull base defects, or in patients with risk factors for postoperative CSF leak.” Consensus.

4. “Tissue Sealants: Tissue sealants have consistently demonstrated increased burst pressure in vitro. They are an option for providing additional support for skull base reconstruction, but there is not sufficient evidence to suggest improved outcomes.” Consensus.

5. “Nasal packing: Absorbable and non-absorbable nasal packing appear to have acceptable safety profiles. They are an option for providing additional support for skull base reconstruction, especially for extended endonasal approaches.” Consensus.

Strength:

- This study provides an up-to-date review of recent literature, including systematic reviews and meta-analyses to certain high yield concepts.

Weakness:

- This expert consensus statement did not comment on other factors that may directly/indirectly impact patient outcomes: pain and nausea management, activity restrictions, diet/nutritional status, antibiotic prophylaxis, amongst others.
- There is a paucity of high quality blinded randomized controlled trials within current literature.

American Rhinologic Society expert practice statement part 2: Postoperative precautions and management principles following endoscopic skull base surgery

Jennifer E. Douglas MD, Nithin D. Adappa MD, Garret Choby MD, Corinna G. Levine MD, MPH, Mindy R. Rabinowitz MD, Raj Sindwani MD, Eric W. Wang MD, Bradford A. Woodworth MD, Edward C. Kuan MD, MBA

From the International Forum of Allergy & Rhinology, July 2024

Objective: The purpose of this publication is to provide expert consensus and evidence-based guidance on best practices for postoperative care following endoscopic skull base surgery

involving intradural pathology. This is especially important due to our limited high-quality literature on this subject and varying clinical practices.

Key Topics Addressed:

- Post operative nasal care
- Mobilization and activity levels
- Safe timing of air travel
- CPAP usage in patients with OSA

Methodology

- Developed using modified Delphi process
- Four statements developed, all of which reached a consensus

Expert Practice Statements (as written by the authors)

1. Nasal hygiene: Early use of nasal sprays after ESBS is safe, with experts initiating therapy as soon as immediately to 72 h postoperatively. Nasal saline irrigations can be started once the concern of immediate postoperative CSF leak has resolved (expert median 14 days postoperatively), or when non-dissolvable packing is removed. Judicious nasal debridement can be performed safely without risk of postoperative CSF leak.
2. Activity level: Depending on the defect size and location, and intraoperative CSF leak flow rate, maneuvers that promote ICP shifts (e.g., straining, Valsalva, heavy lifting, strenuous activities, nose blowing) should be avoided for 3–6 weeks. Head of bed elevation may decrease ICP shifts transmitted to the repair site. Activity limitations (i.e., bedrest) must be balanced with the risk of VTE associated with prolonged immobilization.
3. Resumption of positive airway pressure: consider positional interventions (e.g., head of bed elevation), close cardiopulmonary monitoring, and decreased opioid use for OSA patients in the postoperative setting. Until further clinical studies are performed to confirm its safety after ESBS and various repairs, PAP should be withheld for at least 2–6 weeks, depending on the defect size and location, in the presence of an intraoperative CSF leak. If the patient's OSA severity requires immediate use of PAP postoperatively (e.g., severe OSA, use of bilevel positive pressure), a nasoseptal flap may be used with PAP resumed immediately and the patient monitored closely.
4. Barotrauma: Depending on degree of CSF leak, patients with successful skull base repair without clinical evidence of CSF leak can participate in air travel without restriction after 2–4 weeks if deemed appropriate by their surgeon.

Strengths

- Up to date review of recent literature, including systematic reviews and meta-analyses.
- Expert opinion of multiple surgical subspecialists provides insight into best practices in post operative care in ESBS.

Weaknesses

- Practices remain heterogenous requiring nuanced interpretation of data.
- There is a paucity of high quality blinded randomized controlled trials within current literature.