



Does a Full-Fluid Diet Reduce the Risk of Postoperative CSF Leak After Expanded Endoscopic Endonasal Skull Base Surgery?

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Background

Postoperative cerebrospinal fluid (CSF) leak remains a major complication following expanded endoscopic endonasal skull base surgery. Because transient increases in intracranial pressure may place stress on the reconstruction site, postoperative care protocols often aim to minimize straining during the early healing period. At our institution, patients are commonly maintained on a full-fluid diet for 5–7 days postoperatively as part of a strain-reduction strategy intended to maintain hydration and reduce stool hardness. The effectiveness of this practice in reducing postoperative CSF leak has not been established.

Methods

- This is a retrospective cohort study at a single tertiary center including patients who underwent expanded endoscopic endonasal skull base surgery between November 2018 and August 2025.
- Patients were categorized based on postoperative diet into a full-fluid diet for 7 days versus early advancement to a regular diet.
- The primary outcome was postoperative CSF leak within 30 days postoperatively.
- Postoperative care followed institutional practice and aimed at minimizing strain. Baseline demographic, clinical, and operative factors associated with CSF leak risk were compared between groups, including tumor volume and type, revision surgery, intraoperative leak characteristics, lumbar drain use, reconstruction technique, and post-operative opioid and laxative requirement.
- Due to the low event rate, leak rates were compared using Fisher's exact test with additional restricted analyses in higher-risk cohorts.

Results

- A total of 167 patients were included, of whom 101 received a full-fluid diet and 66 were advanced to a regular diet. Postoperative CSF leak occurred in 2 patients (2.0%) in the full-fluid group and in none of the patients in the regular diet group, with no statistically significant difference between groups (Fisher's exact test, $p = 0.519$).
- In the subgroup of patients with high-flow intraoperative defects ($n = 14$), leaks occurred in 2 of 9 patients (22.2%) in the full-fluid group and in none of 5 patients in the regular diet group (Fisher $p = 0.505$).
- Among patients with any intraoperative CSF leak ($n = 48$), postoperative leak occurred in 1 of 30 patients (3.3%) in the full-fluid group and in none of 18 patients in the regular diet group (Fisher $p = 1.000$).

Discussion

- The physiologic rationale for hydration- and fiber-oriented dietary strategies is supported by evidence that lower water and fiber intake is associated with constipation and harder stool consistency.
- However, in our cohort, postoperative CSF leak was rare and observed leak events occurred exclusively in high-risk cases (high-flow defects and revision surgery), suggesting that surgical risk factors may dominate leak risk relative to diet modification.
- Larger multi-center studies or longer accrual periods are needed to evaluate whether dietary interventions meaningfully reduce straining and influence CSF leak outcomes in at-risk subgroups.

Conclusions

- In this single-center cohort, a 7-day full-fluid diet as part of a postoperative strain-minimization protocol was not associated with a lower incidence of postoperative CSF leak after expanded endoscopic endonasal skull base surgery.
- Interpretation is limited by the low number of CSF leak events and concentration of leaks within high-risk surgical cases.

Variable	Full fluid 7 days (n=103)	Regular diet (n=64)	p-value
Demographics			
Age, mean \pm SD	45.3 \pm 15.6	44.6 \pm 15.4	0.781
Male sex, n (%)	48 (47.5%)	29 (43.9%)	0.65
BMI, mean \pm SD	29.10 \pm 5.99	28.30 \pm 4.75	0.368
Tumor characteristics			
Tumor volume (cm ³), median (IQR)	8.1 (3.2–15.8)	6.4 (2.8–11.7)	0.195
Tumor type, n (%)			0.348
– Craniopharyngeoma	7 (7.6%)	4 (6.5%)	
– Pituitary	68 (73.9%)	52 (83.9%)	
– Meningioma	8 (8.7%)	2 (3.2%)	
– Chordoma	3 (3.3%)	2 (3.2%)	
– Optic glioma	1 (1.6%)	0(0.0%)	
– Malignant tumor	6 (6.5%)	1(1.6%)	

Operative factors	Full fluid 7 days (n=103)	Regular diet (n=64)	p-value
Revision surgery, n (%)	24 (23.8%)	18 (27.3%)	0.609
Intraoperative CSF leak, n (%)	30 (29.7%)	18 (27.3%)	0.734
Lumbar drain used, n (%)	64 (64%)	7 (10.6%)	<0.001
Gasket seal reconstruction, n (%)	18 (17.8%)	3 (4.5%)	0.015

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