Table 4: Use of CSF Diversion

Author (Year)	Study Description	Classification Process / Evidence Class	Conclusions
Dallapiazza R, Bond AE, Grober Y, Louis RG, Payne SC, Oldfield EH, Jane JA Jr (2014)[46]	Retrospective comparison of surgical outcomes following endoscopic vs microscopic resection of Knosp grade 0-2 NFPA	Therapeutic / III	Comparison of the microscopic and endoscopic transsphenoidal cohorts revealed no significant differences in extent of resection or endocrinologic complications. Intraoperative placement of lumbar drains was used more commonly with the microscopic approach (70%) compared to the endoscopic approach (1.7%), although no significant difference in postoperative CSF leakage (12% vs 7%) was observed.
Zhang X, Fei Z, Zhang J, Fu L, Zhang Z, Liu W, Chen Y (1999)[17]	Retrospective assessment of extent of resection following transsphenoidal resection of NFPA with suprasellar extension with use of a lumbar drain catheter for intraoperative saline administration	Therapeutic / III	Gross total removal of adenoma was achieved in 146 of 208 (70%) of patients with NFPA with suprasellar extension using the transsphenoidal approach. Resection of suprasellar tumor was facilitated by injection of 20-80 mL of saline solution and the sella packed with adipose or muscle tissue to prevent CSF leakage. Postoperative complications occurred in 48 (23%) patients, most commonly diabetes insipidus (14%) and CSF leakage (5%). Twenty-seven patients required craniotomy for further tumor resection.

Author (Year)	Study Description	Classification Process / Evidence Class	Conclusions
Saito K, Kuwayama A, Yamamoto N, Sugita K (1995)[65]	Retrospective study of 100 NFPA patients with suprasellar extension evaluating utility of lumbar drain placement and saline/lactated Ringer's injection	Therapeutic / III	Lumbar drain injection of fluid (NS or LR) is helpful in resecting tumors with suprasellar extension in 60/72 adenomas (83%). Adenomas with >30 mm suprasellar extension were much more difficult to remove completely (one exception which was performed in a staged manner).
Wilson CB (1992)[29]	Retrospective analysis of a large series of NFPA following transsphenoidal resection	Therapeutic / III	Postoperative CSF leakage occurred in 23 patients (4.3%) despite lumbar drain placement.
Ebersold MJ, Quast LM, Laws ER Jr, Scheithauer B, Randall RV (1986)[16]	Retrospective analysis of 100 patients with NFPA who underwent surgical resection with median follow-up period of 73 months.	Therapeutic / III	Transsphenoidal surgery was performed in 100 patients with NFPA with use of intraoperative fluoroscopy in all cases. Surgically related mortality was 3%. One postoperative CSF leak required repeat surgery, while 2 patients required permanent CSF diversion for acquired hydrocephalus related to subarachnoid hemorrhage. Among the 72 patients who presented with visual impairment, 53 had improvement and 3 had visual worsening related to the surgery. 84% GTR.