Cerebrospinal Fluid Leak after Transsphenoidal Surgery for Pituitary Adenoma

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Abstract

Objective: To evaluate the incidence, risk factors, prevention and management of Cerebrospinal Fluid (CSF) leak after transsphenoidal surgery for pituitary adenoma.

Methods: This study included 40 patients with pituitary adenomas, they were operated upon in neurosurgery department at Cairo University Hospitals from July 2013 to June 2015. With emphasis on CSF leak either intraoperatively or postoperatively.

Results: The median age of presentation in this study was 33 years. There were 21 females (52.5%) and 19 males (47.5%). Intraoperative CSF leak developed in 7 cases (17.5%). 3 cases of them developed early (within 7 days) postoperative CSF rhinorrhea. 1 case developed late (after 30 days) CSF. Rhinorrhea lumbar drain was effective in treating 2 out of the 3 patients with early CSF leak. 1 case with early CSF leak and the case with late CSF leak needed surgical repair.

Conclusion: When intraoperative CSF leak develops sellar reconstruction with fat graft is important in preventing CSF leak. Lumbar drain decrease the incidence of leak and is an effective way for management.

Key Words: Cerebrospinal fluid (CSF) – Transsphenoidal surgery – Pituitary adenoma.

Introduction

TRANS sphenoid approach is the approach of choice in treating pituitary adenoma because of lower incidence of complications. It may be done either endoscopically, microscopically or endoscopically assisted microscopic [1].

CSF leak is the main non-endocrine complication of trans sphenoid surgery. It may be noted intraoperatively. Most cases of postoperative leak occur in the first 7 days. However, it may occur several days or weeks after surgery. The risk of CSF leak postoperatively ranges from 2% to 13% [2].

Tear in the arachnoid may occur either by the tumor itself or as a complication of surgery [3].

Direct closure with a combination of autologous fat, local bone, and/or synthetic grafts remains the standard of care for leaks encountered at the time of surgery as well as postoperatively. The use of vascularized nasoseptal flap increased the capacity to correct even large openings in the sellar dura [4].

CSF leak may lead to tension pneumocephaly, prolonged hospitalization and meningitis, which may be life threatening [5].

Most cases respond well to conservative treatment and heals spontaneously within 7-10 days. If no response to conservative treatment, surgery is a good option [6].

Patients and Methods

This study included 40 patients with pituitary adenomas, they were operated upon in Neurosurgery Department at Cairo University Hospitals from July 2013 to June 2015.

Inclusion criteria:

- Pituitary adenoma with good general condition and fit for general anesthesia.

Exclusion criteria:

- Recurrent pituitary adenoma.
- Surgically unfit patients.
- Non pneumatization of the sphenoid sinus.
**Peri-operative assessment:** Was done including complete visual assessment, hormonal assessment and neuroimaging studies (CT scan nose and paranasal sinuses and MRI SELLA with contrast).

Surgical trans sphenoid approaches either endonasal submucosal microscopic or endonasal endoscopic transsphenoidal surgery.

In case of intraoperative CSF leak, the sellar cavity is filled with fat taken from the abdomen (half of it in the sella and the other half in the sphenoid sinus) followed by surgicell. The aim of such repair is to guarantee a water tight closure, reduce the dead space, and prevent the descent of the chiasm into the sellar cavity. Fibrin glues can be placed within the sella and the sphenoid sinus to help obliterate any dead space that might allow leak of the fluid. Nonetheless, over packing must be avoided to prevent compression of the optic system. Lumbar drain may be used in cases with obvious CSF leak for 3-5 days postoperatively. It will reduce the hydrostatic pressure exerted on the patch and promote sealing of the leak.

Postoperative CSF leak is treated with conservative measures for 7-10 days using antibiotics, and lumbar drain. This obviously depends on the severity of the leak. While small leaks can undoubtedly be managed in this manner, large leaks that do not entirely stop after external drainage would best be managed by reoperation.

**Results**

The median age of presentation in this study was 33 years. There was 21 females (52.5%) and 19 males (47.5%).

Intraoperative CSF leak developed in 7 cases (17.5%). When proper sellar reconstruction was done and lumbar drain inserted, no postoperative leak occurred.

3 cases developed early (within 7 days) postoperative CSF rhinorrhea (none of them had a prophylactic lumbar drain and all were giant adenomas).

Lumbar drain (together with other conservative measures include cautioning patients not to blow their nose and avoid sneezing, coughing, or any activities that stimulate straining, bed rest, with elevation of the head of bed at 30° for several days, is also beneficial) was effective in treating 2 out of the 3 patients with early CSF leak.

- 1 case developed late (after 30 days) CSF rhinorrhea for which conservative measures were ineffective.
- 1 case with early CSF leak and the case with late CSF leak needed surgical repair.

**Discussion**

Intraoperative CSF leak developed in 7 cases (17.5%). With reported range in many series around 20% [2,3,5,7].

3 cases (7.5%) developed early (within 7 days) postoperative CSF rhinorrhea. This doesn’t equivalent to what Shahinian et al., in 2001 [8] have reported. Shahinian et al., in 2001 [8]; reported two cases of CSF leak among the 1st 10 operations, while in the last 65 operations, this appeared only in two cases. Other studies report the incidence of CSF leak ranges from 1-4%.

Reconstruction of the sellar floor is very important especially if CSF leak occurred intraoperatively. Variety of methods of reconstruction are used. Fat and bone or nasoseptal flap for larger defects are the most commonly used [9-11].

Most cases heal spontaneously with conservative measures (2/3 cases). Kerr et al., in 2005 had almost the same results with most of cases responding to conservative measures [8].

1 case developed late (after 30 days) CSF rhinorrhea. It was Cushing disease and may be related to the original disease itself with disturbed steroid level.

1 case with early CSF leak and the case with late CSF leak needed surgical repair.

**Conclusion:**

Meticulous reconstruction of the sellar floor, particularly for large tumors. Is the most important factor in preventing postoperative CSF leak. Prophylactic use of lumbar drain is beneficial in prevention and treatment of postoperative CSF leak. Surgical repair should be considered for patients with late CSF leak or failed conservative measures.

**References**


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المختص العربي

اشتكاء السائل النخاعي من أهم المضاعفات الغير هرمونية لعمليات استئصال الغدة النخامية عن طريق الأنف.

يمكن تقدير احتمالات حدوث انشكاب السائل النخاعي عن طريق تركيب قناعي وأيضا تستخدم في علاج معظم الحالات.

القلق الدقيق المحكمة للسرع التركيز يقلل من احتمالات حدوث انشكاب السائل النخاعي.

معظم حالات انشكاب السائل النخاعي تسبّب للعلاج الدوائي.