

Chronic nasal complication following endoscopic and microscopic direct transnasal transsphenoidal pituitary adenoma surgery

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Aim and background

Intranasal transsphenoidal access to the sella turcica for removing pituitary gland tumors has been known since the beginning of the last century. It can be done either endoscopic or microscopic. Postoperative nasal complications may happen. The purpose of this study was to assess the frequency of chronic oronasal alterations.

Methodology

33 patients who had previously undergone adenectomy with a hypophyseal transsphenoidal approach using either the endoscopic or the direct transnasal microscopic technique; these patients were operated in different neurosurgical units. Assessment of nasal complications after 6 months was done.

Results

33 patients among them 18 patients were done by endoscopy and the other 15 were done by microscopy. No postoperative nasal complications in the endoscopy group 6 months postoperative while it is present in 3 cases of the microscopic group after the same time.

Conclusion

Direct transnasal approach provides safe transsphenoidal access to the sella with a very low rate of nasal complications.

Keywords:

chronic, complication, endoscopic, microscopic, nasal, pituitary, surgery, transsphenoidal

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Introduction

Intranasal transsphenoidal access to the sella turcica for removing pituitary gland tumors has been known since the beginning of the last century.

Hardy [1] popularized the technique, to which was added the surgical microscope and fluoroscopy; it has become the procedure of choice for the surgical treatment of pituitary lesions.

Although safe and effective, transnasal microsurgery of the hypophysis has at times been associated with oronasal complications that affect the sinuses, bone and cartilaginous structures, and teeth. Nasal complications predominate, at a frequency of up to 38% (obstruction and crusting) after the procedure [2,3]. These findings appear to favor the nasal endoscopic approach, which has been associated with fewer local complications [4].

The purpose of this study was to assess the frequency of chronic oronasal alterations in a series comprising 33 patients undergoing direct transnasal microscopic or endoscopic transsphenoidal approach.

Materials and methods

The study sample comprised 33 patients who had previously undergone adenectomy with a hypophyseal transsphenoidal approach using either the endoscopic or the direct transnasal microscopic technique; these patients were operated in different neurosurgical units. Before commencing this study, we obtained the commission hearing approval from the ENT Department and the neurosurgery department, Kasr Al-Ainy Hospital, Cairo University. An inclusion criterion was an interval of more than 6 months between surgery of nonfunctioning pituitary macroadenoma and entry into the study. Patients answered a specific questionnaire for oronasal cavity signs and symptoms and were examined medically by a single otorhinolaryngologist to identify possible oronasal alterations; the examination consisted of nasal inspection, anterior rhinoscopy, and nasal rigid

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30° endoscopy with 10% lidocaine nasal spray anesthesia.

Surgical technique of microscopic transnasal approach

Surgery was performed through the right anterior nares in all cases using the operating microscope and with lateral screening using an image intensifier. The sphenoid sinus was approached through a direct transnasal approach. Under fluoroscopic guidance, a posterior right septotomy was performed with the application of the nasal speculum, followed by coagulation of the mucosa on the face of the sphenoid.

Exposure would then be facilitated using pituitary rongeurs starting from the natural ostium. After gaining access to the sphenoid sinus, its mucosa would be stripped and the sella floor opened. The procedure was performed under radiographic control. At the end of the surgery, fat from the patient was packed in the sphenoid sinus in all cases. After removing the retractor from the right anterior nares, a Killian's retractor would be passed into the left side to reposition the septum.

Surgical technique of endoscopic endonasal approach

The technique used was almost similar to the microscopic technique but without the use of the nasal speculum. Surgery was performed similarly through the right anterior nares wherein the endoscope was directed between the nasal septum medially and the middle turbinate laterally, reaching the natural ostium on the face of the sphenoid. After coagulating the nasal mucosa overlying the right side of the vomer, a posterior right septectomy was performed, which was widened from the left nostril to facilitate the entrance of the surgical instruments from both nostrils. The remaining steps to reach the sellar floor continued as in the microscopic technique.

Results

Thirty-three patients were included in this study. There were 12 male and 21 female patients between 31 and 55 years of age [mean age 41.4 ± 6.6 (years)]. The patients were examined at a mean time of 7.3 months (6–9 months range) postoperatively. Eighteen patients were operated using the endoscopic technique and 15 using the direct transnasal microscopic technique.

Intraoperative cerebrospinal fluid (CSF) leakage occurred in four patients in the microscopic technique group and in three patients in the endoscopic technique group. In both groups, packing of the sphenoid sinus with fat was the only modality in treating this complication. No nasoseptal

flaps or bone reconstruction techniques were used in all cases. None of the cases needed a second surgery for the CSF leak in the early postoperative period.

As regards the group of patients operated using the endoscopic technique, after 6 months postoperatively, there were no cases complaining of nasal obstruction, crustations, anosmia, CSF leak, purulent nasal discharge, and sinusitis. As regards the microscopic group, one patient (6.7%) complained of postoperative anosmia, which persisted to the time of examination. In two patients (13.3%), there was purulent nasal discharge and sinusitis. There were no cases of septal perforation, nasal obstruction, crustations, or CSF leak in the microscopic group.

Discussion

The use of the microscope for pituitary surgery has been established as the gold standard following the work of Hardy [1,2]. However, in the 1990s, the use of the endoscope became increasingly prevalent due to the unparalleled view of the surgical field it afforded. There has been a substantial amount of work conducted recently to compare these two techniques to establish the gold standard.

However, both of these techniques are not without their advantages and disadvantages. Endoscopic pituitary surgery is slowly becoming the procedure of choice because of improved visualization of the surgical field, reduced length of stay, and fewer complications. Microscopic pituitary surgery has the advantage of being easily used by a single surgeon and affords a stereoscopic three-dimensional view. Inevitably, when compared with the endoscopic technique, visualization of the surgical field as well as maneuverability is restricted [5,6].

A recent meta-analysis of the endoscopic technique showed it to be a safe and viable procedure when assessing gross tumor removal rates, endocrine function, and complication rates [5]. Long-term results for endoscopic surgery, however, are not yet available despite these promising short-term results. For this reason, microscopic pituitary surgery still has an important role to play in this domain.

The major complications for pituitary surgery include CSF leaks, vascular injury, intracranial injury, endocrine abnormalities, infection, and nasal complications. Complication rates in both methods have been found to be comparable [6]. Otolaryngologists are becoming increasingly involved in the care of this population of

patients because of established familiarity with nasal anatomy and with the endoscope.

In theory, the endoscopic approach has a decreased potential for nasal complications because of limited septal dissection [7]. However, the use of the microscope can be associated with a high incidence of nasal complications depending on the approach used. A literature search revealed that rhinological complications after sublabial transseptal transsphenoidal surgery have ranged as high as 28–35% [8,9]. Nasoseptal perforations have been reported in 1–13% of patients [9], upper lip anesthesia in 5–28%, and postoperative anosmia in 5.5% [8].

There has, however, been less comparison in the literature of the endoscopic endonasal approach with the microscopic endonasal approach to the sella. The first reported method of the direct transnasal approach was by Griffith and Veerapen [10]. Although submucous transseptal approaches to the sphenoid sinus afford the advantage of remaining directly in the midline during the approach to the sella and also confer a slightly better exposure, the reported incidence of nasal complications from such techniques is high.

The first reported series of the direct transnasal approach was by Griffith and Veerapen [10], who in a series of 150 patients showed no septal perforations; two of 150 patients had secondary epistaxis and both were treated conservatively with no other major rhinological complications. Hyposmia was also noticed in 0.5% of patients. In the aforementioned study, only one patient was admitted for a secondary hemorrhage 10 days postoperatively.

A subsequent study of 104 patients using the direct technique by Cooke and Jones [11] reported no septal, sinus, or dental complications, but they had a major complication rate of 5.8%. There followed a series of smaller studies such as those by Tan and Jones [12], which reported no septal perforation and only 0.5% of nasal pain, which resolved after 1 week.

Postoperative sinusitis ranges in its reported incidence. Two series reported incidences of sinusitis of 15 and 9% [13,14]; the frequency ranged from 1 to 4% in most other series [15–17]. In this study, no patients presented with sinusitis in the endoscopic group, but it was present in two patients (13.3%) in the microscopic group.

This complication occurs if there is disruption of the mucociliary flow of mucus out of the sinus cavities

either from obstruction or mucosal injury leading to scarring [18].

In addition, the placement of the nasal speculum usually creates lateral displacement of the middle turbinates. This displacement will lead to compromise to the proper drainage of the frontal, ethmoidal, and maxillary sinus cavities dependent on the proper function of the hiatus semilunaris of the lateral nasal wall. Disruption of the mucosa covering the turbinates, lateral nasal wall, and/or septum may lead to formation of postoperative synecchia, which will also impact the proper drainage of the sinuses. To help prevent this problem, the middle turbinates are to be gently relocated to their normal anatomic position to allow for proper sinus drainage. Earlier removal of the nasal packing and routine use of an oral antibiotic for 7–10 days postoperatively can also help in the reduction of the incidence of this complication [18].

One of the most frustrating complications is septal perforation, which often causes a number of aggravating symptoms, including nasal crusting, pain, bleeding, and/or obstruction. Care in handling the septal mucosa is the best deterrent for avoidance of such a complication. The risk for a permanent septal perforation increases when bilateral tears overlap in the absence of proper intervening cartilage or bony support [19]. In our study, no patients in both groups developed this complication probably because of the direct technique used in both groups with sparing of the septal mucosa; in addition, no nasoseptal flaps reconstructive flaps were used in both groups.

The importance of midline and vertical orientation during dissection toward the sphenoid sinus has been emphasized in the past [20,21]. An undue superior dissection can cause anosmia [13] and can injure the cribriform plate and cause a CSF leak [22]. Vertical orientation is best achieved with televised fluoroscopy [23]. Aggressive superior dissection of the nasal mucosa can avulse the olfactory nerves and leave patients with postoperative anosmia. It is more often encountered in submucosal approaches. Attention to the direction of dissection using anatomical landmarks and radiographic imaging is the best avoidance as recovery is poor once injury has occurred [18].

Sensory receptors for olfaction can be found in the upper nasal cavities at the cribriform plate, the superior and middle turbinates, and the superior nasal septum [24]. In the present study, there was one patient (6.7%) in the microscopic group who complained of postoperative anosmia, which persisted to the date of

examination at 6 months postoperatively. This complication is probably due to unintended superior septotomy with a more superiorly placed speculum. A higher incidence of postoperative impaired olfactory function in microscopic approaches were reported in recent studies but in most of these studies the transseptal approach was evaluated [25,26]. In addition, there were no statistically significance between CSF leakage and olfactory disturbance in both groups [25].

Conclusion

Our findings add weight to those of other authors that a direct transnasal approach provides safe transsphenoidal access to the sella with a very low rate of nasal complications. We would again emphasize the importance of strict adherence to anatomical landmarks and to the role of lateral radiological screening.

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Conflicts of interest

There are no conflicts of interest.

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