ORIGINAL ARTICLE

Endoscopic Assisted Transseptal Transphenoidal Hypophysectomy

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Summary

Eight patients with pituitary tumors were operated via the transseptal transsphenoidal approach from April to November 2004 at Hospital Ipoh. Seven patients presented with visual disturbances while three also had endocrine abnormalities. The post-operative follow-up period was between six months to a year. There was no mortality in this series. There were no complications related to the approach i.e. nasal or septal related. All patients with visual impairment showed improvement. Only one patient had hormonal irregularities. The endoscopic assisted transseptal approach to the sphenoid sinus for pituitary surgery was found to be easy and without sinonasal or labial complications often found with the sublabial approach.

Key Words: Pituitary Adenoma, Transseptal Transsphenoid Surgery, Endoscopic Hypophysectomy

Introduction

Transsphenoidal hypophysectomy was introduced by Cushing in 1910. It was later replaced by the intracranial approach, which offered better visualization[1]. The intracranial approach, however required brain retraction and was associated with the resultant morbidity. With the introduction of the operative microscope in the 1960s, Hardy[2] used microsurgical techniques to reestablish the transsphenoid route as the standard approach. The sublabial transseptal approach was the common technique in the late 1960s and early 1970s. This approach was often complicated by numbness of the upper lip and teeth, septal peforations, anosmia, breathing problems and crust formation. Because of these problems, surgeons have been seeking an alternative approach. Recently, endoscopic nasal and sinus surgery has become widespread[3,4,5]. Endoscopic assisted transsphenoidal surgery has been found to be useful in overcoming the complications of the sublabial approach.

Materials and Methods

The study was a prospective review of eight consecutive patients with pituitary tumors who were operated on, over the period of eight months, from April to November 2004 at Hospital Ipoh, via the endoscopic assisted transseptal approach. All patients underwent preoperative magnetic resonance imaging (MRI), endocrinological examination and evaluation of the blood investigation by the endocrinologist, neurosurgical and ophthalmological evaluations. These similar evaluations were carried out post-operatively with accordance to the protocol of the respective disciplines followed by an MRI at three months.

Results

There were three men and five women in this series, ranging in age from 23 to 70 years. Four were Chinese with Malays and Indians two each. The majority of the

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patients presented with visual disturbances, predominantly diplopia. (87.5%) (Fig.1)

Pre-operatively it was noted that all patients had Thyroid Stimulating Hormone and T4 that were within normal ranges. One patient had raised levels of Follicular Stimulating Hormone and two patients had reduced levels. Luetinizing Hormone levels were seen to be low in two patients. Prolactin and Cortisol levels were noted raised in one patient each. Post-operatively the Thyroid Stimulating Hormone and T4 levels remained within normal range, however the patient with raised prolactin and cortisol levels saw a marked reduction. The Follicular Stimulating Hormone and Luetinizing Hormone levels were unremarkable.

Pre-operatively there were seven patients who complained of bitemporal hemianopia which was the cause of the diplopia, however post-operatively five had marked improvement to quadrantic hemianopia and two had regained near normal vision. (Table I)

Magnetic Resonance Imaging carried out pre-operatively revealed large pituitary tumors with chiasmatic compression in seven patients, however one patient had no chiasmatic compression. Post-operatively, on repeat MRI that was carried out three months post-operatively it was seen that all eight patients had minimal residual tumor. The pathological classification was as follows: seven cases of macroadenoma and one meningothelial meningioma.

These patients will continue with regular post-operative follow up with the endocrinologist who will monitor their hormonal levels and the neurosurgeon who will monitor their clinical progress as well as carry out radiographic imaging as deemed necessary.

None of the patients complained of rhinal symptoms. There was no instance of nasal discharge, bleeding or cerebrospinal fluid leak. There was no instance of septal perforation. Nasomaxillary sensation was normal.

Discussion

The sublabial transseptal approach provides more working space, however the extensive submucosal dissection is potentially associated with several sinonasal complications such as numbness over the upper lip and teeth, anosmia and nasal perforations[6,7]. The endonasal transseptal approach provides necessary exposure without the above rhinologic complications, thus improving patient satisfaction.

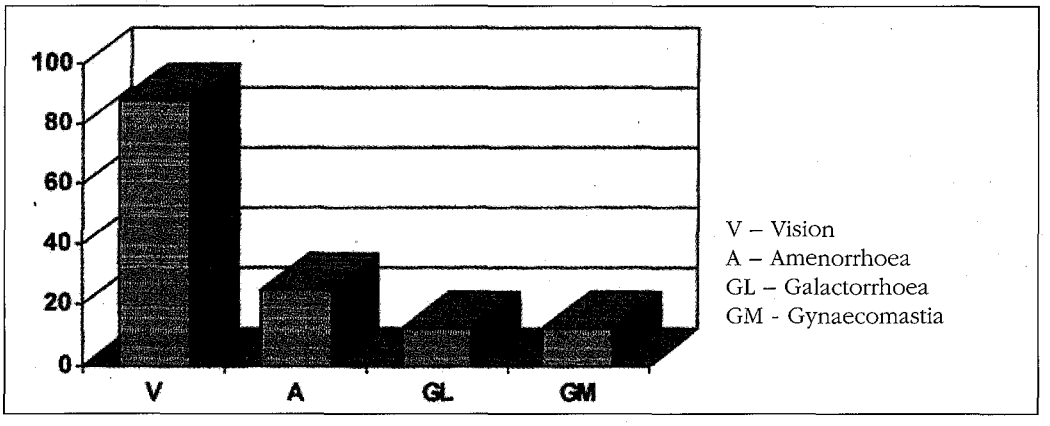

Fig. 1: Presenting symptoms

Table I: Visual assessment pre and post-operative

Patients	Pre-Operative	Post-Operative
Bitemporal Hemianopia	7	Nil
Quadrantic Hemianopia	Nil	5
Near normal Vision	Nil	2

The surgical steps to this technique involve infiltration of the septum with local anaesthetic, adrenalins in dilution of (I:80,000). Then a hemitransfixation incision is made on the caudal end of the septum and subperichondrial blunt dissection is carried out to develop a septal submucosal tunnel. The dissection is continued using a Killian nasal speculum and a Freer's elevator. The entire nasal septum is exposed back to the perpendicular plate of the ethmoid, which forms the bony part of the septum. A longer nasal speculum is introduced, and the blunt dissection is continued till the rostrom is visualized. Next, the self-retracting Cushing-Landolt pituitary speculum is inserted and is opened gently. The anterior wall of the sphenoid is opened widely using a drill. The intrasphenoidal mucosa and the septa are removed. The sellar wall is identified and the sellar floor is opened widely by using both a drill and a Kerrison punch. Once within the sella and the tumor is visualized, a 0 degree rigid endoscope 4-mm in diameter is introduced for better visualization. Here, the neurosurgeon will continue the procedure of excising the tumor. The removal of the tumor is carried out using ring curettes, grasping forceps, and dissectors. After the removal and completion of hemostasis, the inspection of the intrasellar space is carried out using a rigid endoscope 4-mm in diameter with 0- and 30-degree lenses. The empty sella is now packed with fat harvested from the abdomen and thus the septum as well as the perichondrium is replaced and approximated using Vicryl 4/0. This is followed with an anterior nasal packing using two soft standard Merocel nasal dressings.

Post-operatively the patient is given adequate pain relief as well antibiotic coverage and the nasal pack is removed after 48 hours.

The most important difference between the microscope and the endoscope are the width of view and depth of perception. Although, the microscope provides a more easily perceived three dimensional spaces, the viewable surgical field is restricted by line of sight. By contrast, the endoscope provides a more panoramic view but the surgeon must conseptualize the depth. The endoscope has been found to be a highly efficient tool for use in narrow surgical fields. In microsurgery of the pituitary gland, it provides excellent fields of vision of the natural ostium of the sphenoid bone and enables opening of the sphenoid sinus in a very simple and accurate manner. In addition, by using angled endoscopes, intrasellar inspection can be performed. This allows for more complete tumor removal. Should there be inadvertent cerebro-spinal fluid leak, the endoscope allows for immediate identification and repair.

The disadvantages of the endoscope include its lack of binocular vision and the fact that it does not allow the surgeon freedom of both hands (because one hand is holding the endoscope). However, the sublabial approach still has its use in extended skull base approaches as it allows for a wider working space[8].

Conclusion

Endoscopic techniques allow for a fast and accurate approach to the sphenoid sinus. Nasal operative morbidity is minimized by this technique. Angled endoscopes can be used for intrasellar inspection outside the line of sight thus allowing wider tumor resection.

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