

The Transcolumellar Transsphenoidal Approach to Pituitary Tumours: Advantages and Limitations

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Summary

A retrospective review was performed on 11 patients who had undergone the transcolumellar transsphenoidal hypophysectomy in our center. There were eight females and three males with age ranging from 17 to 72 years (mean 50 years). Ten patients had pituitary macroadenomas and one had suprasellar cyst. The mean follow up duration for these 11 patients post surgery was 7.2 months. Complications included two cerebrospinal leaks, one postoperative sphenopalatine bleed, one septal perforation and one patient developed numbness of the tip of the nose. We found that this approach is a preferred alternative technique especially in smaller Oriental noses with lower complication rate and better aesthetic result.

Key Words: Transcolumellar, Transsphenoidal, Pituitary approach, Hypophysectomy

Introduction

Surgical approaches to the sella turcica have evolved with times. From solely a neurosurgical technique previously, the otorhinolaryngologist has now been actively involved in this joint rhino-surgical procedure. In 1907, Schloffer performed the first removal of pituitary tumour using a nasoethmoidal transsphenoidal approach¹. Hirsch described a modified endonasal approach to the pituitary in 1909 and in 1910, Cushing reported the use of the sublabial transsphenoidal approach^{1,2}. The transcolumellar approach, a refinement of the above method was first suggested by McCurdy and colleagues in 1978³.

Providing a direct adequate and quick access to the sella turcica, transseptal approach is the principal method in pituitary surgery⁴. The transseptal approach can be achieved by three techniques namely sublabial transseptal approach, endonasal transseptal approach

and transcolumellar approach. Endonasal transseptal approach with or without alatomy is the most common and the quickest method used to expose the sphenoid sinus. However, this method requires a relatively large external nares to allow transnasal placement of the neurosurgical speculum⁴.

The advantages of the transcolumellar approach include wide linear exposure, midline orientation and a shorter operative distance. The disadvantages are an external incision which may result in a columellar scar or deformity in approximately 2% of patients² and postoperative nasal tip edema which can persist up to three months⁵.

The transcolumellar approach is able to achieve midline access in patients with narrow external nares. A new technique, 'columellotomy modification' has been reported to be useful in noses with narrow nostrils⁶.

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Materials and Methods

The clinical records of patients who underwent the transeptal transphenoidal hypophysectomy via transcolumellar approach from October 1998 to May 2005 at the National University of Malaysia Hospital (HUKM) were reviewed retrospectively.

The patients' demographic data, nature of the tumour and complications of the surgery as well as the duration of the follow-up period were analysed.

All the operations were a joint rhino-surgical procedure performed by the otorhinolaryngologist (senior author) in collaboration with the neurosurgeon.

Operative procedures

The patients were orotracheally intubated and positioned with head slightly extended. The patient's midface was prepared and draped with towels. A bilateral greater palatine block was performed transorally. An oro-pharyngeal pack was placed and both nostrils packed with cotton pledgets soaked in cocaine and adrenaline (1:1000 concentration) for vasoconstriction for a minimum of 15 minutes. Local anaesthesia by using Naropin (Ropivacaine) 2mg/ml and adrenaline 1:80,000 was infiltrated intranasally into both ala, the nasal septum, the columellar, floor of the nasal cavity, the nasal dorsum and the nasal tip. The planned transcolumellar incision was marked with a pen.

The inverted 'V'-shaped or 'z-plasty' columellar incision with marginal incision over the inner side of the ala bilaterally was performed with size 15 blade. The subcutaneous dissection was continued with small curved scissors keeping below the SMAS (superficial muscular aponeurotic system) extending cephalad to the nasion, laterally to the nasolabial folds bilaterally and caudally to the domal portion of the nasal tip. The columellar skin flap was elevated over the nasal skeleton with an Aufrich retractor (Figure 1). The interconnecting ligaments over the medial crura were split exposing the caudal portion of the septal cartilage.

The bilateral mucoperichondrial flap of the cartilaginous septum was elevated. The dissection extends over the perpendicular plate of the ethmoid bone and vomer upward and extends over the nasal crest of the maxillary bone and medial floor of the nose downward. The cartilage was detached posteriorly and inferiorly (chondrotomy) and a swing door quadrangular cartilage created.

A midsize Fahlbush nasal speculum was then inserted between the mucoperichondrial flap and the disarticulated septal cartilage pushed laterally. The perpendicular plate of the ethmoid was resected but the vomer was preserved as a midline guide to the anterior face of the sphenoid. The resected bone are preserved for sellar floor reconstruction. A wide sphenodotomy was performed and the sella identified.

Pituitary tumour excision was then performed by the neurosurgical team. After tumour removal, if a cerebrospinal leak was observed, the dural tear was sealed with a fascial graft using fibrin glue and the sphenoid sinus was packed with fat. The nasal septal cartilage was repositioned to the midline using a 13mm, 4-0 vicryl quilting suture. Care was taken to reposition the cartilage on the anterior nasal spine with a 4-0 vicryl suture.

The medial crura were approximated with 4-0 vicryl. The marginal incisions on the inner side of alar are sutured with 4-0 vicryl and the columellar skin incision approximated with nylon 5-0. The nose was packed with marocel which was removed 24 to 48 hours post surgery in uncomplicated cases. In complicated cases the marocel was removed after 72 hours.

Results

From October 1998 through May 2005, 11 transeptal transphenoidal hypophysectomies via transcolumellar approach were performed at the referral hospital. Eight of the patients were females (73%) and three were males (27%) (Figure 2). The ages of the patients ranged from 17 to 72 years (mean of 50 years) (Figure 3).

Ten patients had pituitary macroadenomas including two recurrent tumours (25%) and one had suprasellar cyst (8%) with obstructive hydrocephalus (Figure 4). In the two cases of recurrent pituitary adenomas, the previous surgery was performed via sublabial transeptal approaches.

The post operative complications of the transcolumellar approach included two cerebrospinal leaks (18%), one postoperative sphenopalatine bleeding (9%), one septal perforation (9%) and one had numbness of the tip of the nose (9%). The other six patients (55%) had no evidence of complications (Table I). The postoperative bleeding were controlled with nasal packing and the septal perforation were managed conservatively since the patient was asymptomatic. Two of the patients had

evidence of cerebrospinal leak few days after the surgery. One of the patient is a case of recurrent pituitary adenoma while the other is a case of supracellar cyst with obstructive hydrocephalus. Both of them had endoscopic repair performed successfully as second stage procedure.

In all patients the transcolumellar scar healed well and the patients were satisfied with the cosmetic results. The patients were followed up in the outpatient clinic for an average duration of 7.2 months.

Discussion

Pituitary surgery has evolved with times. Surgical access to the pituitary tumour can be accomplished through transcranial as well as endonasal approaches. Currently, the transsphenoidal approach for removal of pituitary tumour is widely used and is achieved by the otorhinolaryngologist providing easy access to the sphenoid sinus. The transeptal transsphenoidal approach is the commonly used technique for transsphenoidal access for pituitary tumour removal at our center, as it provides a direct, adequate and quick access to the sella turcica⁴.

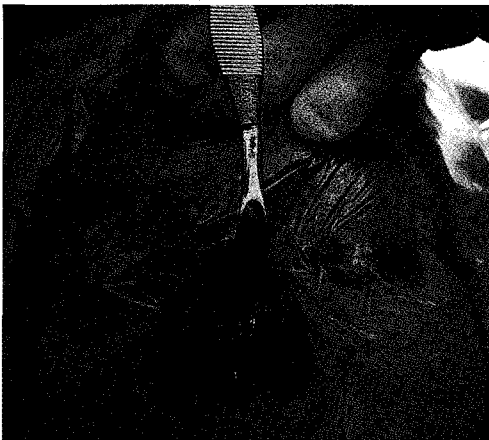


Fig. 1: Transcolumellar approach to pituitary surgery

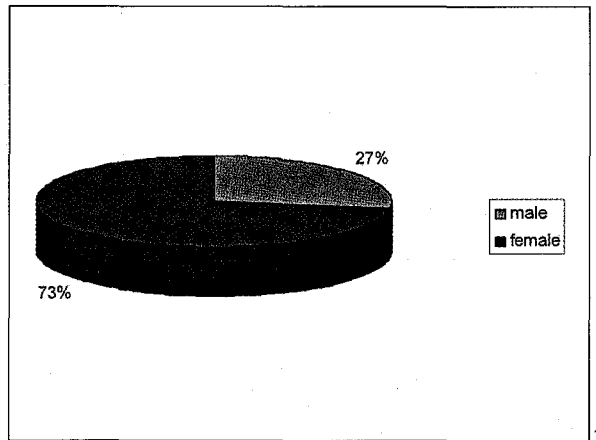


Fig. 2: Gender distribution of pituitary tumours removed via the transcolumellar approach

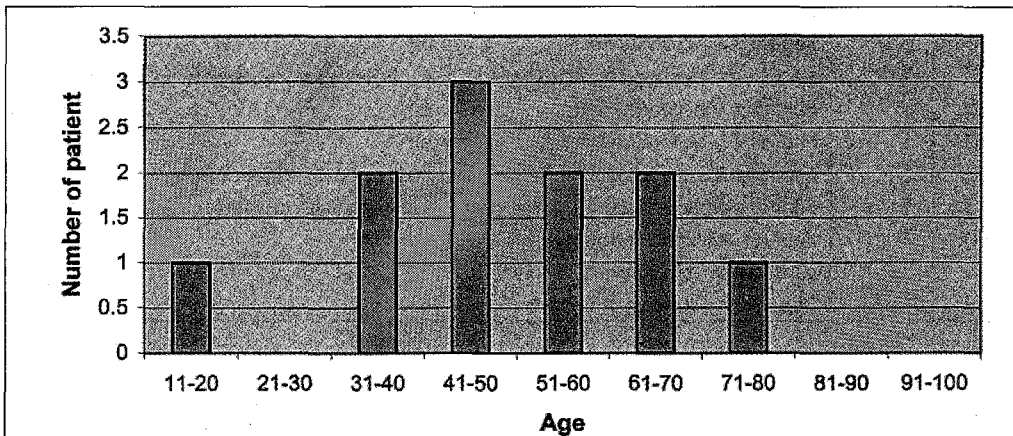


Fig. 3: Age distribution of pituitary tumours removed via the transcolumellar approach

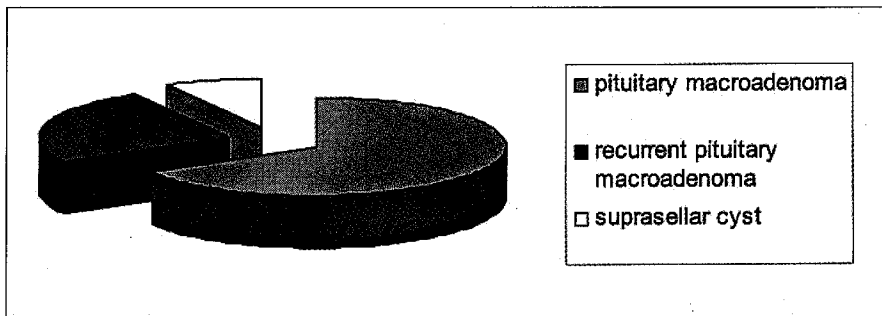


Fig. 4: Type of pituitary tumour removed via the transcolumellar approach

Table I: Intra and post-operative complications of pituitary tumours removed via the transcolumellar approach

| Complication | Number | Percentage |
|-------------------------|--------|------------|
| Numbness of the tip | 1 | 9% |
| Septal perforation | 1 | 9% |
| Post operative bleeding | 1 | 9% |
| CSF leaks | 2 | 18% |

Table II: Demographic data of patients of pituitary tumours removed via transcolumellar approach

| Patient | Age | Gender | Diagnosis | Complication | Follow-up (mth) |
|---------|-----|--------|---|-------------------------------------|-----------------|
| CSW | 46 | M | Pituitary Macroedema | nil | 12 |
| TYT | 56 | F | Pituitary Macroedema | Septal perforation | 4 |
| MSM | 17 | F | Suprasellar Cyst with obstructive hydrocephalus | Post-operative evidence of CSF leak | 17 |
| ML | 36 | M | Pituitary Macroedema | nil | 3 |
| LSH | 33 | F | Recurrent Pituitary Macroedema | Post-operative evidence of CSF leak | 12 |
| LS | 60 | F | Pituitary Macroedema | nil | 3 |
| SJH | 70 | F | Pituitary Macroadenoma | nil | 3 |
| TKC | 72 | M | Pituitary Macroadenoma | Post-operative bleeding | 5 |
| YSW | 43 | F | Pituitary Macroadenoma | Numbness of nasal tip | 12 |
| NSW | 70 | F | Pituitary Macroadenoma with suprasellar extension | nil | 4 |
| KSS | 43 | F | Recurrent pituitary adenoma | nil | 4 |

The transeptal transphenoidal approach can be achieved by three techniques, namely via the sublabial transeptal approach, endonasal transeptal approach with or without alotomy and the transcolumellar approach. Each carries its own advantages and limitations.

The sublabial approach is the most popular one, was first introduced by Cushing in 1910. With this approach, wide midline exposure through the sphenoid is achieved regardless of the size of the nose. There is minimal postoperative nasal deformity and no external scar⁷. The disadvantages with the sublabial approach include limitation of exposure from the overhanging upper lip, hypoesthesia of the upper gum, retraction of the columella due to resection of anterior nasal spine causing tip depression⁸ and difficulties with dentures and feeding for two to three weeks post-surgery^{9,10,11}. There is also possibility of oral contamination of the wound and potential dental complications⁷.

The endonasal approach with or without lateral alotomy gives good exposure and direct access to the sphenoid, avoiding the access through the oral cavity⁷. This technique minimizes operating site morbidity through limited septo-mucoperichondrial-periosteal elevation. By this approach, the tip of the speculum can be oriented slightly lower as compared to the sublabial approach. Therefore, the sphenoid sinus can be entered from its lower portion avoiding the vital structures which lie more towards the upper portion¹². It is also associated with shorter operative time and hospitalization¹¹. However, this method requires expertise with the use of an endoscope and a relatively large nose to allow the placement of endoscope and surgical instruments^{9,13}. In the Oriental races (Chinese and Malays) who have small nostrils, it is difficult to simultaneously introduce the 4-mm endoscope and surgical instruments, making the surgical manipulation more difficult and increasing the risk of intra-operative complications. This approach is more suitable for the well projected Caucasian and Indian noses.

Trancolumellar approach is a refinement of the sublabial transeptal approach. It provides wide midline access to the sphenoid with shorter operating distances without manipulations of the upper lip, maxillary crest or anterior nasal spine. It provides wider exposure with good inclination to the sphenoid, comfortably accommodating the Fahlbusch speculum and maintaining the midline nasal anatomy^{2,7}. This

approach makes it possible to approach the sellar floor solely through the nasal cavity and makes the surgical corridor totally above the nasal crest of the maxilla, thus involving upper part of the nasal septum. This eliminates the need for resection of the pyriform aperture and the anterior nasal spine which was no longer an obstacle in the surgical corridor^{5,9}. It avoids a mucoperichondrial dissection of the nasal cavity floor and reduced the incidence of mucosal tears during the subperichondrial dissection at the junction between the septal cartilage and nasal crest of maxilla. By this approach, the tip of Fahlbusch speculum is oriented toward the inferior aspect of the sphenoid sinus. Thus, the vital structures such as the cavernous sinus and the optic chiasm which are oriented more toward the superior portion of the pituitary fossa can be avoided¹².

Furthermore, this techniques avoid the contamination from the oral cavity and bleeding from the sublabial sulcus^{2,10}. Finally, the transcolumellar approach has also the advantage in that it can simultaneously allow for the correction of nasal deformities such as the correction of dorsal hump and tipplasty⁸.

The disadvantages of the transcolumellar approach is the obvious post-operative columellar scar, reported in approximately 2% of patients², and the swelling and stiffness of the nasal tip which is dependent on the individual skin thickness. The nasal tip edema and the woody feel of the nose usually resolve within three months¹⁴. Damage to the columellar segment of the alar cartilage can result in deformity of the nasal tip contour⁹. Other complications reported are septal perforation in 19-21%, cerebrospinal fluid rhinorrhoea in 4% and postoperative bleeding in 4%².

The main problems with the transcolumellar approach are the columellar scar and the nasal tip oedema¹⁰. However, in our series, none of the patients who had undergone transcolumellar transsphenoidal hypophysectomy had these complaints. Six patients (55%) had no evidence of complications and the other five patients (45%) had evidence of complications (Figure 4). Out of the five patients, only one patient complained of numbness of the nasal tip (9%) which resolved within two months. One patient had evidence of septal perforation (9%) which can be associated with any of transeptal approaches². One patient had post operative sphenopalatine bleeding and two patients had cerebrospinal fluid leak, which can result from any approach described. Both of them had endoscopic repair performed successfully as second stage procedure.

Conclusion

In conclusion, the transcolumellar approach is a preferred alternative in transphenoidal hypophysectomy in the smaller Oriental noses. It

provides an excellent and rapid access to the sphenoid sinus and sella turcica. This approach is widely accepted by patients for its lower complications rate and better aesthetic result.

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