

**A CLINICAL EXPERIENCE IN ENDOSCOPIC ENDONASAL
TRANSSPHEOIDAL HYPOPHYSECTOMY IN SKULL BASE
CENTER OF BASRAH****Mustafa Haseeb Atiyah* & Ahmed M Al-Abbasi@**

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Abstract

Endoscopic Endo-nasal Trans-Sphenoidal (EETS) approach is a minimally invasive technique that has gained increased acceptability for removal of sellar and parasellar tumors.

This prospective study was carried out on 50 patients in Basrah skull base center at Al-Sader Teaching Hospital between August 2017 and July 2019. The technique involved a unilateral, endoscopic, endonasal approach to the sella turcica via an anterior sphenoidotomy which is performed as a joint procedure by a consultant otolaryngologist and a consultant neurosurgeon.

The most common presenting symptom for pituitary tumor was; headache which present in 80% (40 patients) of the patients, followed by visual disturbance in 56% (28 patients). Infertility and hemiparesis are the least symptoms 2% for each (one patient).

The MRI study of brain and sellar region showed that forty six patients (92%) was diagnosed as pituitary adenomas and one patient (2%) have Rathke's cyst and another one have meningioma. Tumor location and extension which was assessed by MRI revealed that 70% (35 patients) had tumor located in sella with extension to suprasellar region, where only 2% (one patient) had sellar with supra- and parasellar extension. Eighty percent (40 patients) were virgin cases (not operated before), while only 20% (10 patients) were revised cases (operated before either open or transsphenoidal). We achieved complete resection of the tumor in 82% cases (41 patients). The most common method used for reconstruction of the surgical defect was underlay multilayers which was used in 62% (31 patients), while in 10%, posterior based middle turbinate flaps were used in reconstruction. We noticed that 3 patients (6%) developed significant epistaxis, CSF rhinorrhea in 3 patients (6%), and unfortunately 3 patients (6%) died postoperatively.

In conclusion, this study shows that endoscopic, endonasal, transsphenoidal hypophysectomy is a minimally invasive, effective and safe procedure to remove pituitary tumors.

Key words: Hypophysectomy, Endonasal, Endoscopy, Transsphenoidal.

Introduction

Endoscopic Endo-nasal Trans-Sphenoidal (EETS) technique has gained increased satisfactoriness for elimination of sellar and para-sellar tumors¹. Griffith² first described the endonasal approach for removal of pituitary lesions in 1987 as a modification of Hirsch's original approach. Jho et al³ have subsequently popularized the technique.

Feasibility of technique with good surgical and functional outcome has made it popular among ENT and neurosurgeons over the last two decades⁴. Preference of

EETS over the conventional trans-septal and sub-labial approaches resulted from improved visualization and illumination of operative fields and low incidence of related morbidity⁵. Availability of wide angled scopes and high definition cameras allow much better control during surgery and hence significantly better results⁶. This technique has been developed under minimally invasive surgical strategies for patients with pituitary tumors, which eliminates the use of transsphenoid retraction^{7,8}. The endoscope represents one of the latest

innovations because of its ability to have a wider panoramic view⁹ through a narrow surgical corridor and its ability to provide angled ‘close up view’ to detect eventual tumor remnants¹⁰.

Patients and methods

A prospective study was carried out from August 2017 to June 2019 at Basrah skull base center in Al-Sader Teaching Hospital which included 50 patients as shown in table I. A detailed history, clinical examination and investigations were performed according to a pre-designed questionnaire to inquire about information related to age, gender, residence, occupation, and symptomatology.

All patients scheduled for pituitary surgery underwent radiological evaluation (CT scan of nose and PNS and MRI of brain), endocrine assessment by endocrinologist, visual field tests pre- and postoperatively by ophthalmologist. Preoperative and postoperative nasal endoscopic examination was also a part of routine assessment done by ENT surgeon. All patient were evaluated by neurosurgeon for full neurological examination pre and postoperatively.

Endoscopic endonasal transsphenoidal surgery took place under general orotracheal anesthesia, the oropharyngeal region being well packed with a gauze

roll to prevent postoperative blood and fluid aspiration. Intraoperative antibiotic treatment was with an intravenous third generation cephalosporin. The patient was positioned to be supine with slight elevation of the head.

The surgery has four stages (nasal stage, sphenoid stage and reconstruction done by otolaryngologist, while sellar stage by neurosurgeon). Surgery commenced with endoscopic identification of the middle and superior turbinates. The middle turbinate and the sphenoid ostium lead the surgeon to the sphenoid sinus. Enlargement of the sphenoid ostium was the next step followed by identification of the sphenoid sinus. The same procedure was performed through the other nostril, that is, a ‘binostril approach’. After enlargement of both sphenoid ostia and removal of sphenoid septum or septa, identification of the structures in the sella region was done. The neurosurgeon now takes the work and completes the sellar stage with tumor removal. After complete removal of tumor, reconstruction stage done by otolaryngologist by various types depends on the state of surgical defect. Sphenoid pack and bilateral anterior nasal pack was put, patient monitored in ICU for the first 24hrs. Nasal pack removed after 48 hrs , and sphenoid pack after 5 days. Analgesia and antibiotics were routinely prescribed for the patients postoperatively.

Table I. Demographic characteristics

	Gender				Total	
	Male		Female			
	Frequency	%	Frequency	%	Frequency	%
1-10 years	0	0	1	2 %	1	2 %
11-20 years	6	12 %	1	2%	7	14 %
21-30 years	1	2%	10	20%	11	22 %
31-40 years	6	12 %	7	14%	13	26 %
41-50 years	5	10%	9	18%	14	28 %
above 50 years	3	6%	1	2%	4	8 %
Total	21	42 %	29	58%	50	100 %

Results

The most common presenting symptoms for the patients enrolled in this study was; headache which was present in 80% (40 patients), while infertility and hemiparesis were the least symptoms 2% for each (one patient) as shown in figure 1.

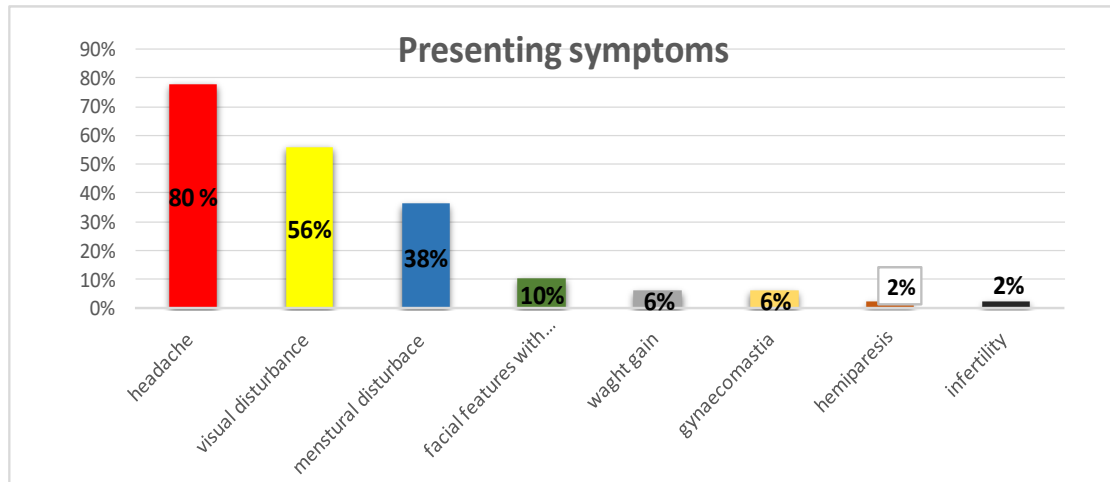


Figure 1: Clinical presentation of patients

Tables II & III shows the diagnostic characteristics and the location of pituitary tumor detected by MRI preoperatively. Forty six patients (92%) diagnosed as pituitary adenomas. One patient have Rathke's cyst and another one have meningioma. We operate on 80% (40 patients) virgin cases and achieved 82% complete surgical resection of tumor in all the cases.

Table II: The MRI characteristics of the tumors

Type	Frequency	%
Pituitary adenoma	42	84 %
Pituitary adenoma with apoplexy	4	8 %
Craniopharyngiomas	2	4 %
Rathke's cyst	1	2 %
Meningioma	1	2 %
Total	50	100 %

Table III: The location of the tumors

Location of the tumor	Frequency	%
Sella	11	22 %
Sellar with suprasellar extension	35	70 %
Sellar with parasellar extension	3	6 %
Sellar with supra- and parasellar extension	1	2 %
Total	50	100 %

Different methods with various materials for skull base repair was used as showed in table IV. The most common method used is underlay multilayers which used in 62% (31 patients), while in 10% posterior based middle turbinate flap were used in reconstruction. The mean duration period of follow up was 3 to 12 months. We found

that 3 patients (6%) developed significant epistaxis, 3 patients (6%) CSF rhinorrhea, and unfortunately 2 patients (4%) died postoperatively.

Table IV: Types of repair

Repair types	Frequency	Percentage
Underlay multilayers	31	62 %
Underlay multilayers with septal flap and fat	14	28 %
Middle turbinate flap	5	10%
Total	50	100%

Discussion

Pituitary tumors are the most commonly encountered intracranial neoplasms, while most recent series estimate the prevalence of clinically apparent pituitary lesions to comprise approximately 10-15 % of all intracranial lesions¹¹. Many surgical approaches to sella are used, but the endoscopic trans-sphenoidal approach become a standard procedure to access sella and pituitary region^{4,12}.

Traditionally, pituitary surgery comes under the realm of neurosurgeon but introduction of EETS approach to sella has made Otorhinolaryngologist an active partner in surgical management¹⁰.

The most common presenting symptoms for patient with pituitary tumors in our study was headache in 80% (40 patients), followed by visual disturbance 56% (28 patients), and the least on was infertility 2% (one patient). This results is comparable with Hanuman et al¹³, Yildirim et al¹⁴ and not match with Singh et al¹⁵ in which visual disturbance is the most common presenting symptoms followed by headache in his review. The acceptable explanation for occurrence of headache and visual disturbance in pituitary tumors is, they are mostly due to mass effect of tumor to surrounding structures.

In our study, 82% (41 patients) underwent complete tumor resection while 18% (9 patients) were incomplete. This may be due to learning curve as in early cases, with improve surgical skills and with increasing experience the tumor resection become complete and inability

to access tumor in those patients has wide intracranial extensions. These results are encouraging and much higher than those with Jho et al¹⁶ (70%), Singh et al¹⁵ (64%), Hanuman et al¹³ (64%), and nearly same as S Kumar et al¹⁷ (86%), but less than Varshney et al¹⁰ (90%), and Dehdashti et al¹⁸ (90%) as they used image guided endoscopy (neuronavigation) during the procedure which improve visualization and decrease complications.

Different types of reconstruction for skull base surgical defect were used. The most common type is multilayers repair in 62% (31 patients), multilayer with septal flap and fat used in 28% (14 patients) when large defect of sella seen after tumor removed and CSF leak occur. In 5 patients (10%) we use posterior based middle turbinate flap for repair.

The complication rate in this study is comparable to previous studies indicating low complication rate for EETS which make it as safe procedure in comparable to other approaches. The most common encountered one was CSF leak found in 6% (3 patients). These results are lower than other study of Kumar et al¹⁷ (11%), Hanuman et al¹³ (12%), Singh et al¹⁵ (8%), and higher than Varshney et al¹⁰ (3.5%), Jho et al¹⁶ (4%), and Cappabianca et al¹⁹ (2%). These results are unrelated to type of closure of skull base defect. Among these three patients, one patient needed another surgical intervention to seal the leak, the remaining resolved on conservative

measures. Epistaxis is also encountered in 6% (3 patients), this results match with Cappabianca et al¹⁹, Cavallo et al²⁰, but more than Kumar et al¹⁷(0.7%). Diabetes incipidus found in 2% (one patient). this result is comparable to Dehdashti et al¹⁸, Charalampaki et al²¹ and much lower than Varshney et al¹⁰(7%) and Singh et al¹⁵(8%). The mortality rate was 4% (2 patients) in our study, they died during the first week postoperatively. First one died in the 3rd postoperative day in ICU due to sever pneumocephalus, second one died in 5th postoperative day due to meningitis. These results are higher than

other studies, Dehdashti et al¹⁸, Charalampaki et al²¹ and Varshney et al¹⁰, which showed no mortality in their studies.

Conclusion:

The frequency of pituitary tumors varies greatly according to age and gender. The various tumor types have their peak occurrence in distinctly different age groups and differ greatly in their female-to-male ratios. The EETH is safe, effective and has a low complication rate. Postoperative assessment showed encouraging symptomatic improvement and significant hormonal normalization.

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