

ORIGINAL ARTICLE

Transnasal Transsphenoidal Surgery for Pituitary Tumours

FAROOQ AZAM, MIAN IFTIKHAR UL HAQ, MUHAMMAD TARIQ SAFI

Mushtaq, Ali Noman, Riaz-ur-Rehman, Mewat Shah

Pak International Medical Science, Khyber Pakhtoonkhawa

ABSTRACT

Objective: To determine the frequency of early post-operatively complications of transnasal transsphenoidal surgery for pituitary adenoma.

Study design: Descriptive study.

Place and Duration of Study: Pak International Medical Science Khyber Pakhtoonkhawa from 1st February 2008 to 31st July 2011.

Material and methods: A total 41 patients with pituitary adenoma fulfilling the inclusion and exclusion criteria were included in this study. All patients were undergone transnasal transsphenoidal surgery. These patients were followed up for early complications of transsphenoidal surgery for one month.

Results: Out of 41 patients, there were 23 (56.09%) males and 18 (43.9%) females. The age of patients ranged from 10 to 70 years. In this study the overall mean age was 44.75 years. Majority of patients fourteen (34.14%) were in the age range of 41 – 50 years, followed by eleven (26.8%) patients in age group of 31 – 40 years, seven (17.07%) patients were in the age range of 51 – 60 years, five (12.1%) in the age range of 61 – 70 years, three (7.31%) in the age group of 21 – 30 years and one (2.4%) in the age group of 10 – 20 years. Early post-operative complications were diabetes insipidus in four (7.31%) patients, CSF leak two (4.87%) patients, meningitis in one (2.43%) patient and epistaxis in one (2.43%) patient.

Conclusions: Surgical complications of Transnasal transsphenoidal surgery are minimal. Transnasal transsphenoidal surgery is a safe and effective treatment for pituitary tumour.

Key words: Transnasal transsphenoidal surgery, Pituitary adenomas.

INTRODUCTION

Pituitary adenomas are normally found in adults with a peak incidence during the fourth to the sixth decade of life. It represent approximately 10% of diagnosed brain neoplasms. Autopsy series suggest that 20% of people may have a pituitary tumor. It means that majority of pituitary tumors are asymptomatic.¹⁻³ Pituitary adenomas are often classified based upon their size at the time of discovery. Tumors larger than 10 mm in any dimension are classified as macroadenomas, whereas tumors smaller than 10 mm are classified as microadenomas.^{4,5}

Surgery, radiotherapy, and pharmacotherapy constitute the present therapeutic options for the mana-

gement of pituitary adenoma. Surgery, which includes transfrontal craniotomy and transsphenoidal surgery, allows removal of the adenoma or reduction of the tumoral mass and is considered the first – line therapy for nonfunctioning adenoma. Transsphenoidal surgery, which is standard treatment and causes less morbidity than transcranial procedures, can be achieved by two approaches i.e Translabial and Transnasal.⁶⁻⁸

Surgical complications following transsphenoidal resection of a pituitary lesion These complications are, diabetes insipidus (7.6 – 19%), anterior pituitary insufficiency (7.2 – 19%), meningitis, cerebrospinal fluid leak (1.5 – 4.2%), hemorrhage into residual tumor bed (0.8 – 2.8%), injury to surrounding structures as optic

chiasm injury (0.5 – 2.4%), frontal lobe injury (0.6 – 1.6%), carotid artery injury (0.4 – 1.4%), death (0.2 – 1.2%) and others.^{1,2,9,10}

MATERIAL AND METHODS

This was a descriptive study conducted at Pak International Medical Science Khyber pakhtoonkhawa from 1st February 2008 to 31st July 2011. The sample technique was non probable purposive and total number of patients were forty one. An informed consent was taken from all patients both male and females within the age range of 10 – 70 years having pituitary adenoma diagnosed on MRI Brain were included in this study. While patients having adenomas encasing internal carotid arteries, active sphenoid sinusitis and suspected vascular aneurysm in sella were excluded from this study. These patients were operated through transnasal transsphenoidal approach and then followed for one month for post-operative complications. The patients demographic details and post-operative complications were entered into a semi structured proforma. Data was analyzed through statistical program SPSS version 16.

RESULTS

Sex Incidence

Out of 41 patients, there were 23 (56%) males and 18 (44%) females (Table 1).

Table 1: Sex Incidence.

Sex	No.	%
Male	23	56
Female	18	44
Total	41	100

Age Incidence

The age of patients ranged from 10 to 70 years. In this study the overall mean age was 44.75 years. Majority of patients fourteen (34.14%) were in the age range of 41-50 years (Table 2).

Early Post-operative Complications

Early post-operative complications were diabetes insipidus in four (7.31%) patients, CSF leak two

(4.87%) patients, meningitis in one (2.43%) patient and epistaxis in one (2.43%) patient (Table 3).

Table 2: Age Incidence.

S. No.	Age Group	Number of Patients	Percentages (%)
1.	10 – 20	1	2.4
2.	21 – 30	3	7.3
3.	31 – 40	11	26.8
4.	41 – 50	14	34.1
5.	51 – 60	7	17
6.	61 – 70	5	12.1

Table 3: Post operative complications.

S. No.	Post-operative Complications	Number of Patients	Percentages (%)
1.	Diabetes insipidus	3	7.31
2.	CSF leak	2	4.87
3.	Meningitis	1	2.43
4.	Epistaxis	1	2.43

DISCUSSION

Pituitary tumors are associated with significant morbidity and mortality due to hormone hypersecretion and mass effects following increased proliferation. The treatment modality depends greatly on the type of pituitary adenoma and presenting symptoms. These tumors can be treated medically, surgically and pituitary radiation therapy. Some patients may need more than one treatment.^{2,4}

Surgical access to the sphenoid, sellar and parasellar has been traditionally done by transcranial and transsphenoidal route. Transsphenoidal approaches can be done by transnasal and sub labial route. Transnasal Transsphenoidal procedure has been increasingly used in the resection of pituitary adenomas for its minimal invasiveness and less morbidity and mortality as compared with transcranial route.^{5,11}

Transsphenoidal surgery is an effective and safe treatment for most patients with pituitary adenoma and could be considered the first – choice therapy in all cases except for prolactinomas responsive to dopamine agonists. It can be performed in patients over the age of 70 without undo significant risks.^{7,8}

In our study age range was from 10 to 70 years. The mean age of presentation was 44.75 years. Majority of patients 34.1% were presented in age group of 41 to 50 years. A study was conducted by Losa M showed mean age of 42.6 ± 1.2 years.¹² Kim MS conducted study in which mean age was 40.2 years.¹³

In this study majority of male 23 (56%) presented with pituitary adenomas compared to the females 18 (43.9%) with a male predominance. Nielsen EH showed male predominance.¹⁴

Shahid K also reported male predominance in his study.¹⁵

It is observed that in various international studies more women are diagnosed with pituitary adenomas. Kim MS conducted study in which 23 (54.8%) women and 19 (45.2%) men.¹³ Another group of patient who has undergone transsphenoidal microsurgery showed that the patient was 59.7% female and 40.3% male.¹⁶ Most probable reasons for this difference is that our females are shy and hesitant to take the medical consultation for their health related problems so lesser number of patient presenting to doctor for treatment. There might be some genetic differences responsible for this gender distribution.

Diabetes Insipidus is a relatively common complication of transsphenoidal surgery but is most often transient. In our study three (7.3%) patients suffered diabetes insipidus. Nemergut EC observed 31% patients having diabetes insipidus post operatively.¹⁷ Kristof RA showed postoperative diabetes insipidus in 38.5% of the patients.¹⁸ Sudhakar N reported that postoperative diabetes insipidus was commonest complication that is 23%.¹⁹ The frequency of diabetes insipidus in our study in contrast to the international research is low; the most probable reason behind it could be that we had not included those cases with extensive parasellar and hypothalamic extension. Secondly due to differences in sample sizes.

In our study post operatively cerebrospinal fluid leak observed in two (4.8%) patients. Gondim JA showed post surgical CSF leak which comprised 3.5%.²⁰ Sudhakar N observed cerebrospinal fluid leak (CSF) in 13% of patients.¹⁹

Meningitis and **epistaxis** were other complications in our study. One patient (2.4%) had meningitis

after surgery. Meningitis is more common in patients who have post operative CSF leak. The total incidence of meningitis after transsphenoidal surgery is 1 – 2%.²¹ The overall complication rate in our study was 17%. Baker F observed overall complications in 26.8% patients.²² The combined risk factors for these complications are the size of the tumor, hypothalamic extension, age of the patient and difference in sample size.

CONCLUSIONS

Surgical complications of Transnasal transsphenoidal surgery are minimal. Transnasal trans-sphenoidal surgery is a safe and effective treatment for pituitary tumour.

Address for Correspondence:

Dr. Mian Iftikhar ul Haq

Mian House # E – 67, Street # 4, Nasir Bagh Road

Canal Town University Road, Peshawar

Email: driftikharazeemi@hotmail.com

Cell No: +92-91-3219032948

REFERENCES

1. Murad MH, Fernández – Balsells MM et al. Outcomes of surgical treatment for nonfunctioning pituitary adenomas: a systematic review and meta – analysis. Clin Endocrinol 2010 Dec; 73: 777-91.
2. Shahlaie K, McLaughlin N, Kassam AB, Kelly DF. The role of outcomes data for assessing the expertise of a pituitary surgeon. Curr Opin Endocrinol Diabetes Obes 2010; 17: 369-76.
3. Ausiello JC, Bruce JN, Freda PU. Postoperative assessment of the patient after transsphenoidal pituitary surgery. Pituitary 2008; 11: 391-401.
4. Dehdashti AR, Ganna A, Karabatsou K, Gentili F. Pure endoscopic endonasal approach for pituitary adenomas: early surgical results in 200 patients and comparison with previous microsurgical series. Neurosurgery 2008; 62: 1006-15.
5. Higgins TS, Courtemanche C, Karakla D et al. Analysis of transnasal endoscopic versus transseptal microscopic approach for excision of pituitary tumors. Am J Rhinol 2008; 22: 649-52.
6. Buchfelder M, Schlaffer S. Surgical treatment of pituitary tumours. Best Pract Res Clin Endocrinol Metab 2009; 23: 677-92.
7. Zhang Y, Wang Z, Liu Y, et al. Endoscopic transsphenoidal treatment of pituitary adenomas. Neurol Res 2008; 30: 581-6.
8. Buchfelder M, Kreutzer J. Transcranial surgery for pituitary adenomas. Pituitary 2008; 11: 375-84.

9. Fatemi N, Dusick JR, de Paiva et al. The endonasal microscopic approach for pituitary adenomas and other parasellar tumors: a 10 – year experience. *Neurosurgery* 2008; 63: 244-56.
10. Cappabianca P, Cavallo LM, de Divitiis O et al. Endoscopic pituitary surgery. *Pituitary* 2008; 11: 385-90.
11. Zhou WG, Yang ZQ. Complications of transsphenoidal surgery for sellar region: intracranial vessel injury. *Chin Med J* 2009; 122: 1154-6.
12. Losa M, Gioia L, Picozzi P, Franzin A, Valle M, Giovanelli M, et al. The role of stereotactic radiotherapy in patients with growth hormone-secreting pituitary adenoma. *J Clin Endocrinol Metab* 2008; 93: 2546-52.
13. Sangeetha SR, Singh N, Vender JR, Dhandapani KM. Suberoylanilide hydroxamic acid (SAHA) induces growth arrest and apoptosis in pituitary adenoma cells. *Endocrine* 2009; 35: 389-96.
14. Nielsen EH, Lindholm J, Bjerre P, Christiansen JS, Hagen C, Juul S, et al. Frequent occurrence of pituitary apoplexy in patients with non-functioning pituitary adenoma. *Clin Endocrinol (Oxf)* 2006; 64: 319-22.
15. Shahid K, Iqbal N. HRCT of pituitary fossa correlation of clinical and CT findings. *Ann King Edward Med Coll* 2007; 13: 48-50.
16. Mortini P, Losa M, Barzaghi R, Boari N, Giovanelli M. Results of transsphenoidal surgery in a large series of patients with pituitary adenoma. *Neurosurgery* 2005; 56: 1222-33.
17. Nemergut EC. Perioperative management of patient undergoing transsphenoidal pituitary surgery. *Anesth Analg* 2005; 101: 1170-81.
18. Kristoe RA, Rother M, Neuloh G, Klingmaller D. Incidence, clinical manifestations, and course of water and electrolyte metabolism disturbances following transsphenoidal pituitary adenoma surgery: a prospective observational study. *J Neurosurg* 2009; 111: 555-62.
19. Sudhakar N, Ray A, Vafidis JA. Complications after transsphenoidal surgery: our experience and a review of literature. *Br J Neurosurg* 2004; 18: 507-12.
20. Gondim JA, Schops M, de Almeida JP, de Albuquerque LA, Gomes E, Ferraz T, et al. Endoscopic endonasal transsphenoidal surgery: surgical results of 228 pituitary adenomas treated in a pituitary center. *Pituitary* 2010; 13: 68-77.
21. Bernal S, Alobid I, Mullol J, Trobat F, Prekel M. Closure of CSF leaks prevents ascending bacterial meningitis. 2005; 43: 277-81.
22. Baker F, Klibanski A, Swearingen B. transsphenoidal surgery for pituitary tumors in United States, 1996-2000: mortality, morbidity, and effects of hospital and surgeon volume. *J Clin Endocrinol Metabol* 2003; 88: 4709-19.