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Changes in clinicopathological profile post Trans-sphenoidal surgery in patients with Pituitary Adenomas: An Institute based study from North East India

Abstract

Introduction: Pituitary adenomas are common intracranial neoplasms. In this study, we report the changes in clinical features and hormone profile in patients of pituitary adenoma following trans-sphenoidal surgery.

Patients and methods: Thirty consecutive cases of pituitary adenoma diagnosed and operated at Bangur Institute of Neurosciences, West Bengal, India were followed up for clinical and hormonal profile resolution following trans-sphenoidal surgery between December 2010 and November 2012. The patient group included 14 female and 16 male patients and the mean age of patients was 35.86 years (range: 14–58 years).

Results: Fifteen (50%) cases were non-functioning adenomas. Among the hormonally active pituitary adenoma, prolactin-producing adenomas were most common (66.67%), followed by growth hormone-producing adenomas (20%) and adrenocorticotrophic hormone-producing adenomas (13.33%). The most common symptom was headache and visual disturbances. Menstrual disturbances and galactorrhea were observed in six and two females respectively out of the 14 females in the study participants. Resolution of symptoms was reported by majority of our patients and hormonal derangement was corrected in 30% of our study subjects.

Conclusion: We report 30 patients with pituitary adenoma who underwent surgery. Resolution of clinical symptoms and endocrine functions was observed in the majority of our patients.

Key words: Clinicopathological profile, Pituitary adenoma, Trans-sphenoidal surgery

Introduction

Pituitary adenomas are responsible for around 10 to 20% of all primary brain tumours. The prevalence of pituitary adenomas has been reported to be around 17%[1] in the general population. Prolactinomas comprise 40- 60% of all adenomas, followed by non-functioning adenomas (28-37%), growth hormone–secreting adenomas (11-13%), and adrenocorticotropic hormone (ACTH) secreting adenomas (1-2%).[1,2] Pituitary adenomas can also be classified on their size as micro (<10 mm diameter) and macroadenomas (>10 mm).[2,3]

Clinically pituitary adenomas may present in primarily three ways, first with syndromes of hormone hypersecretion or deficiency, second with neurological manifestations from the mass effect due to the expansion of the gland and finally as an incidental finding on neuroimaging done for some other indication, in which case they are termed "incidentaloma".[4]The most common hormonal imbalances that these patients present with are hyperprolactinemia, Acromegaly, Cushing disease or hypogonadism. The common neurological manifestations seen in patients with pituitary adenomas are headaches and visual impairment.[5]

Treatment of pituitary adenomas involves reducing clinical symptoms due to hormone imbalance and where clinical symptoms are due to mass effect, reducing the tumour size.[6] Medical management is usually sufficient for the majority of prolactinomas, however, Growth Hormone and ACTH secreting tumours are less amenable to medical management and require surgical intervention. Radiation and radiosurgery are also used to decrease tumour size and improve endocrine functioning, usually in patients with postresection residual adenoma.[2,3,7]

In this study, we evaluated the changes or resolution in clinical symptoms and endocrine profile of patients diagnosed and operated for pituitary adenomas.

Materials and Methods

We included 30 consecutive cases of pituitary adenomas diagnosed at Bangur Institute Of Neuroscience and IPGME&R (Institute of Post Graduate Medical Education & Research) and SSKMH (full form) between Dec 2010 and Nov 2012. We excluded patients with Craniopharyngiomas or Rathke's cleft cysts. All patients underwent clinical and biochemical evaluation and imaging studies to confirm the diagnosis. All patients were followed up for a period of one to three months to monitor the resolution of symptoms and hormone levels. Prolactin, Insulin-like Growth Factor-1, Growth Hormone, Cortisol, TSH, luteinizing hormone (LH), follicle-stimulating hormone (FSH) were measured at the time of diagnosis and after surgery. Institutional Ethical Clearance was taken for the study. Data were analysed using SPSS version 20.

Results

Clinical Features

Thirty patients were assessed during the period of study. The mean age of the patients at the time of diagnosis was 35.86yr (+11.56). There were 16 males and 14 females. All patients were symptomatic at diagnosis. Clinical manifestations both pre and post-operatively are represented in Table 1. The commonest clinical symptoms at the time of diagnosis were generalized headache and visual disturbance in 77.34% of the patients. Significant resolution of symptoms of headache and visual disturbances following the surgical intervention was observed in our patients ($p<0.0001$). In our study 2 women had galactorrhoea and 3 complained of menstrual disturbances suggestive of prolactinoma. Only 3 patients continued to have a headache and visual disturbances and 1 had clinical features suggestive of acromegaly on follow-up.

Endocrine Profile

In our study, 15 out of the 30 patients (50%) pre-operatively had deranged hormone levels. Of these, 10 (66.67%) had raised prolactin levels, 3 (20%) raised Growth Hormone levels and 2 (13.33%) raised cortisol levels. No one had raised TSH or FSH levels. Post-surgery, only 6 patients out the 30 (20%) continued to have a deranged endocrine profile at follow-up, of which 4 (66.67%) had raised prolactin levels and one (16.67%) each had raised GH and Cortisol levels. Table 1 and 2 depicts the frequency of patients with hormonal imbalance both pre and post-surgical intervention. Significant change in IGF levels was observed in the patients after the surgery ($p=0.004$).

Imaging Findings

Imaging was suggestive of pituitary macroadenoma in 26 patients and microadenoma in the remaining 4 patients. 4 patients had normal sella while the remaining 26 had enlarged sella, as revealed on X-ray (Table 2).

Symptoms at diagnosis	Frequency (Before Surgery)	Frequency (Post-surgery)	P value
Clinical symptoms at diagnosis in all patients N=30			
Headache	22 (77.34%)	3 (10%)	P<0.0001
Visual disturbances	22 (77.34%)	3 (10%)	P<0.0001
Cushingoid features	02(6.67%)	0	P=0.149
Clinical features suggestive of Acromegaly	03 (10%)	01(3.33%)	P=0.298
Clinical Symptoms in females N=14			
Galactorrhoea	02 (14.28%)	0	P=0.141
Menstrual dysfunction	06(42.85%)	1(7.14%)	P=0.044
Patients with elevated hormone levels	**(N=30)**	**(N=30)**	**P value**
Prolactin	10 (33.33%)	4 (13.33%)	P=0.067
Insulin like Growth Factor -1, GH	3 (10%)	1 (3.33%)	P=0.298
8AM Cortisol	2 (6.67%)	1(3.33%)	P=0.55
Mean Hormone levels before and after surgery	**Mean levels Pre surgery (SD)**	**Mean levels Post Surgery (SD)**	**P value**
IGF -1(ng/ml)	249.13 (163.36)	173.33 (106.46)	T=3.96,p=0.0004
8AM Cortisol(mcg/dl)	32.53(93.50)	13.38(18.53)	T=1.19,p=0.23
Prolactin ng/ml	60.23 (170)	18.91 (17.29)	T=1.44,p=0.15
LH(U/L)	3.16(2.03)	3.07(1.77)	T=0.77,p=0.44

Table 1: Clinical Manifestations Before and After Surgery

Characteristics	Number of Patients
Pituitary Adenoma (Types)	
Endocrine inactive	15 (50%)
Prolactinoma	10 (33.33%)
GH secreting	3 (10%)
ACTH secreting	2 (6.67%)
TSH secreting	0
Tumour Size	
Microadenoma	4 (13.33%)
Macroadenoma	26(86.67%)
Other clinical features	
Headache	22 (77.34%)
Visual disturbances	22 (77.34%)
Cushingoid features	2(6.67%)
Clinical features suggestive of Acromegaly	3 (10%)
Diabetes Insipidus present	2 (6.67%)
Radiological characteristic of sella	
Normal Sella	4 (13.33%)
Enlarged Sella	26(86.67%)
Post-operative Radiotherapy	10 (33.34%)

Table 2: Patient and tumors characteristics in 30 patients who underwent Trans-sphenoidal excision of pituitary adenoma

Discussion

In our study, the mean age at the time of diagnosis was 35.9+/- 11.6 years (range 14 to 58 years). 60% of our patients were in the age group of 21-40 years. Similar findings were reported from Northeast India, where the age of patients diagnosed with pituitary adenomas ranged from 21-58 yrs.[8] Minderman and Wilson reported pituitary adenomas to be commoner in females than males and rarely below 20 year of age.[9] McDowell et al observed that incidence of pituitary adenoma increased with age, till 80 years of age.[10] Females seem to be affected at younger age and male when they grow old. In our study, males were more commonly affected. We found only 3 patients with age younger than 20 years.

In our study, headache and visual disturbance were the commonest clinical presentation, seen in 77% of patients. Studies from India and other countries too have

reported a similar finding, where headache and visual disturbances were the predominant symptoms in these patients.[2,8,10,11] Resolution of symptoms was observed in the majority of our patients and a significantly lower percentage ($p<0.0001$) of them continued to have visual disturbances and headache post trans-sphenoidal surgery for pituitary adenoma. Similar findings were reported from Oregon, USA and also from Japan.[12,13]

In our study, 50% of the adenomas were non-functioning (NFPA). In those that caused clinically significant and detectable hormone levels, prolactin producing adenomas were commonest, followed by GH-producing adenomas and ACTH-producing adenomas. Bhuyan et al from Northeast India and Grupetta et al from Malta and Fatemi et al from the USA reported similar findings.[8,14]

Resolution of symptoms and correction of the deranged hormonal profile was observed in the majority of our patients. While preoperatively 15(50%) of our patients had deranged hormone levels, post-operatively this figure dropped to 6 (20%), hence 30% had improved hormonal levels. Fatemi et al studied hormonal function in 455 patients who underwent TSS for pituitary adenoma.[15] 49% of them had improved hormonal function post-surgery, while hyperprolactinemia resolved in 73% of the patients. In our study 10 patients had hyperprolactinemia pre-surgery while only 4 continued to have it post-surgery, thus resolution of hyperprolactinemia was observed in 60% of our patients. Studies from other countries on post-surgery hormonal changes have also drawn similar conclusions.[16,17]

Conclusion

We report 30 patients with pituitary adenoma who underwent surgery. Resolution of clinical symptoms and endocrine functions were observed in the majority of our patients.

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