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A STUDY OF CLINICAL PRESENTATION AND MANAGEMENT OF PITUITARY TUMORS

Neurosurgery

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ABSTRACT

The study includes 25 cases of pituitary adenomas. Most common age group by pituitary tumors falls between 41-50 years of age. Male: Female incidence of these tumors is 1: 2.12. Most common clinical symptoms in our series are visual disturbances followed by headache. Optic nerve involvement is other common clinical finding presenting in form of decreased vision or loss of vision, field defect or fundus changes. Commonest field defect is bitemporal hemianopia. MRI is the diagnostic investigation of choice in pituitary tumors to define extent, invasion and relationship to major vessels and nerves. Approximately half (44%) of the patients exhibited normal preoperative pituitary function in form of baseline hormone profile. Increased GH level (32%) followed by hyperprolactinemia (20%) are the most common endocrinologic abnormalities. Total/near total removal was done in 21 patients (84%) and subtotal removal done in 4 patients (16%). Adjuvant therapies were given in 5 patients. Two patients were given radiotherapy and 3 were given pharmacotherapy. Post operative complications were CSF leak, diabetes insipidus and meningitis. 20 patients (80%) had improvement in their symptoms including relief from headache, improvement in vision and endocrinal dysfunction. Post operatively visual functions improved in 13 patients (52%) and it remained stationary in 11 (44%) patients. Only one patient (4%) complained of worsening of his visual function and it was improved in follow up period.

KEYWORDS

Adenoma Pituitary Presentation Management

INTRODUCTION:

Pituitary adenomas are account for approximately 10-15% of all intracranial tumors. It's classified as hormone secretary Functional Pituitary Adenoma (FPA) and Non Functional Pituitary Adenoma (NFPA) and clinically non secreting adenomas (NFPA).[1] The clinical manifestations of pituitary adenomas are the result of excess hormone secretion such as acromegaly, hyperprolactinemia, hypercortisolism, and hyperthyroidism and/or due to compression of surrounding structures such as hypopituitarism, headache, visual disturbances and oculomotor palsy.[2] The aim of treatment of pituitary adenomas is reversal of endocrine dysfunction with preservation of normal pituitary function and decompression of surrounding structure in large pituitary tumor. Therapeutic options in patients with pituitary adenoma include surgery, radiotherapy and medical treatment. The choice of appropriate treatment in individual patients rests mainly on tumor type, age and clinical status of the patient. Microsurgical removal is the preferred therapy for all pituitary adenomas, except for prolactinomas, which are usually well controlled with chronic medical therapy with dopamine agonists.[2] The trans-sphenoidal approach usually is preferred because of lower risk of complications, whereas a few adenomas with prevalent suprasellar extension are approached through transcranial route. The trans-sphenoidal midline route represents the standard approach to the pituitary and seller area and is used for more than 95% of surgical indications. It is the least traumatic route to sella turcica, it avoids brain retraction and it provides excellent visualization of pituitary gland and lesions related to that structure. It offers lower morbidity and mortality rates as compared with transcranial procedure [3]. The present study review 25 cases of pituitary tumors.

AIMS AND OBJECTIVES:

(1) To study various clinical and radiological presentation. (2) To study various trans-sphenoidal surgical approaches. (3) To study morbidity and mortality in the transsphenoidal surgical management of these tumors. (4) To study the prognosis in patients operated for these tumors. (5) To study and compare the modalities of management of pituitary tumor such as of surgical resection, radiotherapy and pharmacotherapy.

MATERIAL & METHODS:

This study consists of 25 cases of sellar & suprasellar pituitary tumors treated in Neurosurgery department, Civil Hospital, Ahmedabad from august 2010 to march 2013.

INCLUSION CRITERIA

(1) All seller & suprasellar pituitary tumors treated by transsphenoidal surgery.

EXCLUSION CRITERIA

(1) Conservatively treated sellar & suprasellar lesions.
(2) Cases operated by transcranial route.
(3) Seller, parasellar or suprasellar meningiomas, craniopharyngioma or others were not included in the study.

All patients were assessed clinically for: Visual symptoms (acuity, field of vision, color vision and fundoscopy), endocrine signs and symptoms, headache and others. Preoperatively in all cases perimetry, hormonal assays, x-ray skull(lateral) and C.T. scan/ MRI (brain and seller region) were done and repeated and reassessed accordingly in postoperative period and in follow up examination. Immediate postoperative outcome (course), complications, postoperative radiotherapy or medical therapy results were assessed. All patients were followed up for various period of time from 3 months to 2 years on out-patient department or by correspondence. Observations were compared with results and findings of various studies.

RESULTS:

Table 1: Age And Sex Incidence Of Pituitary Tumor:

AGE (YR)	PATIENTS (n)	PERCENTAGE	Sex	PATIENTS (n)	PERCENTAGE
0-10	0	0	MALE	8	32
11-20	0	0	FEMALE	17	68
21-30	4	16	TOTAL	25	100
31-40	7	28			
41-50	10	40			
51-60	4	16			
61-70	0	0			
TOTAL	25	100			

Table 1 shows that the maximum numbers of patients were between 41-50 years of age (40%), There was no patient below age of 20 years and above 60 years of age.The Sex incidence shows female preponderance 68% (17/25) were females, males contributing 32 %(8/25).

Table 2: Clinical features of pituitary tumor

Clinical features	Patients (n)	Percentage (%)
Headache	16	64
Vision disturbance	21	84
Vomiting	3	12
Altered sensorium	1	4
Menstrual dysfunction	3	12
Sexual dysfunction	1	4
Acromegaly	8	32

Table 2 shows that the patients presented with symptoms of visual disturbances (84%) of the followed by headache (64%) and acromegaly (32%)

Table 3: Incidence of different types of pituitary tumors:

Type of adenoma	PATIENTS (n)	PERCENTAGE
NFPA(Nonfunctioning)	11	44
GH ADENOMA	8	32
TSH ADENOMA	0	0z
ACTH ADENOMA	1	4
GONADO.ADENOMA	0	0
PROLACTINOMA	5	20
TOTAL	25	100

Table 3 shows that the non functioning pituitary adenomas are most common tumour (44%) followed by GH adenomas (32%) and prolactinomas (20%).

Table 4: Visual dysfunction due to pituitary mass:

Types of visual dysfunction	Patients (n)	Percentage (%)
Decreased vision	21	84
Field change	22	88
Fundus change	4	16
-Papilloedema	2	8
-Optic atrophy	2	8

Table 4 shows that the commonest field defect was visual field change (bitemporal hemianopia). The decreased vision was complained by 84% of cases. Fundus changes were found in 16% (papilloedema (8%) and optic atrophy (8%).

Table 5: Preoperative neuroimaging (CT/MRI) of pituitary tumor:

Extension of mass	N	Percentage(%)
Sellar mass	25	100
Suprasellar extension	24	96
Parasellar extension	6	24

Table 5 shows that the seller mass cases 25(100%) with suprasellar extension in 24 cases (96%) with parasellar extension in 6(24%) cases were noted.

Table 6: Extent of tumor removal of mass:

Extent of surgery	No 0f cases	Percentage(%)
Total	12	48
Near-total	9	36
Subtotal	4	16
Total cases	25	100

Table 6 shows that total/near total removal was done in 21 patients (84%).

Table 7: Complications of surgery pituitary tumor:

Type of complication		No of cases	Percentage (%)
Wound infection		0	0
CSF leak		1	4
Diabetes insipidus	Transient	1	4
	Permanent	0	0
Meningitis		1	4
Vascular/hypo. Injury		0	0
Mortality		0	0

Table 7 shows that the morbidity in 12% of patients in our series, which was in the form of CSF leak, diabetes insipidus and meningitis.

Table 8: Visual outcome post operatively of pituitary tumor:

Result	No of cases	Percentage (%)
Improved	13	52
Stationary	11	44
Worsened	1	4
Total	25	100

Table 8 shows that all patients who had visual dysfunction preoperatively were assessed postoperatively in terms visual acuity and field of vision. 13 patients (52%) having improved visual function and it remained stationary in 11(44%) patients.

DISCUSSION:

AGE AND SEX DISTRIBUTION: The majority of patients were in the 4th to 6th decade of their life. Similar age distribution patterns were seen in series by Minderman et al[110] [3] who found peak incidence between fourth to sixth decade of life. Sex incidence shows female preponderance in our series (M: F- 1:2.12). Similar sex incidence ratios shown in Kazumora et al [4] (M: F- 3:4) series of 42 patients. As it is a random study sometimes correlation cannot established. Table 8 shows the clinical manifestations as mass effect is nearly comparable to other reference series. The endocrinopathy is variable all referred series ranging from 42 % to 86%. In our series only 40% cases had endocrinopathy this can be explained as randomized study.

Table 9: Comparison of clinical manifestations:

Series Name	Mass effect	Endocrinopathy
Present series	84%	40%
THAPER et al[5]	73%	86%
THOMAS et al[6]	86%	56%
K H HO et al[7]	78%	42%

INCIDENSE OF DIFFERENT TUMOURS ACCORDING TO PATHOLOGY: 44% of tumors of pituitary The difference of functioning and nonfunctioning pituitary adenoma was observed between our series and others series can be explained on basis of less no of case in our series.

Table 10: Comparison of functioning and non functioning pituitary Adenoma

Series	Non Functioning Pitutary Adenoma Adenoma	Prolactinomas and remaining others	Total
Present study	44%	56%	25
Robert y. Osmura et al[8]	31.5%	69.5%	375
Erfourth et al[9],	78.8%	21%	328
Zarger et al[10]	58.6%	42.4%	75
Pietro et al[11]	33.2%	66.8%	1140

MANAGEMENT OF PITUITARY TUMORS: In our series we perform CT and MRI in all cases, MRI is the investigation of choice for these tumors, showing extra sellar extension, mass effects and CT for erosion. The patients in our study were subjected to surgery either total or near total excision of tumors was done in 84% while in remaining 16% a subtotal excision was done. On analyzing the data subtotal excision was done due to extensive parasellar and suprasellar extension of tumor and the adherence of same to vital neurovascular structures. In study of Xue-fei Shou[12] et al total resection was done in 84.5% and subtotal/partial resection done in 15.5%. In study of Amin b Kassam[13] the figure was 93% for total resection and 7% for subtotal resection. We included only the cases operated through the transsphenoidal route in our study and this is the preferred treatment now a day. Thomson et al [6] in a series of 104 cases of pituitary adenomas used the transnasal transsphenoidal route in 84 of patients, while various other transcranial approaches in remaining 20. Similar preference to transnasal routes is preferred by Tyrrnel J Blake et al [14] ,Sethi DS et al [15] and Shiman et al[16] It can be said surgeon's personal preference and experience, availability of infrastructure and tumor extension into neighboring areas dictates the choice of surgical procedure with more and more surgeons favoring endoscopic Transsphenoidal techniques if not contraindicated. 70% show improvement in visual function in Salmi et al [17] series. 46% of patients in series by Shone et al [18] had visual improvement following surgery. The figures were 52% in our series and were in form of increased visual acuity and improvement of field vision as compared to pre operative status. Visual acuity was decreased in 1 patient postoperatively which improved in follow up examination. Visual acuity was improved in totally/near totally resected group and remains stationary/worsens mainly in subtotal/near total resection group. Visual outcomes shown are of immediate postoperative period and initial follow up. We require long follow up for more encouraging results.

Table 11: Visual outcomes compared to other series:

SERIES	IMPROVED (%)	STATIONARY (%)	WORSENED (%)
PRESENT SERIES	52	44	4
SALMI et al[17]	70	17	12
SHONE et al[18]	46	17	4
EBERSOLD et al[19]	74	21	4
BEVAN et al[129(20)]	61	12	0
MARAZUELA et al[21]	33	43	0

Overall postoperative remission in our series was achieved in 78.5% of

patients: 76.9% with macroadenoma and 100% with microadenoma. Tumor size significantly influence surgical outcome. Patients diagnosed with microadenoma had greater chance for remission after surgery. Tumor type did not significantly influence surgical outcome.

Table 12: Remission compared to other series:

TUMOR	PRESENT SERIES	AMIN KASSAM et al[122]	IVAN KRULJAC et al[131]
GH ADENOMA	87.5	92	71.4
TSH ADENOMA	0	0	0
ACTH ADENOMA	100	100	100
GONADO.ADENOMA	0	0	0
PROLACTINOMA	60	60	90.2
TOTAL	78.5	85	84.9

COMPLICATIONS COMPARED TO OTHER SERIES:

We had 0% mortality and 12% morbidity in our series. Series by Thaper et al[(5)] report mortality rate of 15 and morbidity of 15% Morbidity was in form of CSF leaks, diabetes insipidus, wound infection etc. DI occurs in 4% of cases which is usually transient in nature. This occurs mainly in the patients in which total/neartotal removal of tumor was done. This may simply reflect the extreme sensitivity of the hypothalamic-neurohypophyseal unit to local alterations in blood flow, edema, and traction on the pituitary stalk. Permanent disturbance of antidiuretic hormone (ADH) secretion is due to direct damage to the neurohypophyseal unit and depends much more on the original size and location of the tumor and the extent of surgical resection. Postoperative CSF leak was seen in 4% of cases, which can be managed by conservative means like lumbar drain. Reexploration required in cases not heals by conservative means. Visual deterioration occurs in 1 patient in our series but it was transient and improved in follow up period. Damage to optic nerves and chiasm can also occur from direct surgical damage, hemorrhage or ischemia. Many patients have preoperative compromise of visual function, making them more vulnerable to further damage. As in our patient vision was already compromised due to apoplexy. Difference in percentage of complications might be due to small sample size in our series.

Table 13: Comparison of surgical complications:

Series	CSF leak (%)	Infection/ meningitis (%)	DI (%)	Visual deteriorati on (%)	Mortality (%)
OUR SERIES	4	4	4	4	0
GUIOT & DEROME et al[(22)]	1.3	0.5			1.4
WILSON & DEMPSEY et al[(23)]	6.4	2		1.2	0
LAW et al[(24)]	1.5	0.6		0.5	0.5
PIETRO MORTINI et al[(25)]	0.3	0.1		1	0.3
XUE-FEI SHOU et al[(26)]	3.8	0.6	1.5	0.87	0.35

The surgery remains mainstay for neurologically compromised patients and this is well established by available literature and present studies. Hormone replacement drugs like desmopressin, etc. are economical burden for majority of our patients and may be in near future more synthetic and cheaper versions will be available, concomitant conditions like diabetes mellitus (both pre operative and post operative). Diabetes insipidus, ophthalmic dysfunction and gonadal dysfunction adds further burden to management of such cases through there are silver lines on horizon for these availability to manage these conditions.

CONCLUSION:

The pituitary constitutes a unique class of neoplasia that in concept and in practice differs fundamentally from other tumors of intracranial origin. The most important difference is related to the double edged clinical problem posed by these tumors characterized by endocrine concern and complicated by the oncological issues. The diagnostic and the therapeutic imperatives that accompany these tumors are necessarily unique, reflecting the duality of the clinical problem. The diagnosis of these tumors is generally uncomplicated because of their unique clinical presentation involving visual apparatus and pituitary-hypothalamic axis. Many different imaging modalities for assessment of this area but for the most part the introduction and widespread use of MRI is now accepted as imaging procedure of choice in the evaluation of these tumors. Transsphenoidal surgery is the primary treatment of choice for this class of tumors. The surgical objectives involve the elimination of mass effect, preservation and restoration of pituitary functions. Although gross total removal remains an intuitive and frequently achievable surgical goal for many tumors and should be attempted in the extent that it is safely possible it is neither a realistic expectation nor an absolute necessity. The aggressive surgical resection undertaken when attempting cure must be balanced by understanding the potential surgical morbidity. Preservation of function of pituitary stalk, optic apparatus and hypothalamus is essential in attaining desirable postoperative result. Subtotal resected tumors should be considered adjuvant therapy (Radiotherapy or Pharmacotherapy) on case-by-case basis. Careful follow up and optimization of pituitary hormone is important in long-term survival of the patients of pituitary tumors. In addition to biochemical improvement, most patient experience prompt and sometimes dramatic relief from acromegaly symptoms. Headache and arthtralgias disappears rapidly, and regression of soft tissue swelling, parasthesia and hyperhydrosis is fairly uniform occurrence.

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