Original Research Article

FREQUENCY OF PITUITARY ADENOMA AMONG THE PATIENTS WITH CHRONIC HEADACHE

ABSTRACT:

Background: Antero-superior, PG lies in vicinity of optic chiasm and antero-inferiorly, it is related with posterior wall of sphenoid bone. PG is consisting of three lobes: Anterior, intermediate and posterior and their secretion are regulated by hypothalamus.

Aims and Objectives: To identify pituitary adenoma in the patients coming with complain of chronic headache.

Materials and Methods: Seven hundred sixty-four patients were included in our study. All the patients with chronic headache with/without decreased vision and visual field defects were included our study. Those patients already diagnosed with any other cause of headache such as uncontrolled blood pressure, tumor or diagnosed case of pituitary adenoma and patient with glaucoma were excluded. Detailed history was taken and ocular examination was done. MRI orbit and brain with contrast was done in all patients.

Results: Out of 764 patients, 32 patients were diagnosed as having pituitary adenoma. Macroadenoma was present in 30 patients and microadenoma in 2 patients. On MRI majority of patients had optic chiasm compression with bitemporal hemianopia.

Conclusion: All the patients with chronic headache with/without visual disturbances and visual field defect must be properly examined and investigated as that will help other researchers to diagnose the Pituitary Adenomas.

Keywords: Chronic headache, vision, visual field defect, pituitary adenoma.

INTRODUCTION:

The hypophysis cerebri or pituitary gland (PG), also known as Master Gland, is an ovoid shaped structure, measuring about 0.8 cm from front to back and 1.2 cm diagonally and weighing about 0.5 kg. [1, 2] The pituitary fossa or Sella turcica of sphenoid bone, a cup shaped depression contains the PG and the fossa is bounded by diaphragma sellae (dura) superiorly. Antero-superior, PG lies in vicinity of optic chiasm and antero-inferiorly, it is related with posterior wall of sphenoid bone. [2, 3]

PG is consisting of three lobes: Anterior, intermediate and posterior and their secretion is regulated by hypothalamus. [4] Anterior pituitary gland (APG) or adenohypophysis secretes growth hormones (GH), adrenocorticotrophic hormone (ACTH), thyroid-stimulating hormone (TSH), follicle-stimulating hormone (FSH) and luteinizing hormone (LH), and produce prolactin (PRL) and their secretion is controlled by hypothalamus through secretion of somatostatin and dopamine. [5, 6] Posterior pituitary gland (PPG) stores and secretes Antidiuretic hormone (ADH) and oxytocin, which are formed in hypothalamus. [7, 8] Pituitary Adenomas (PAs) are compendium of tumors arising from APG and it accounts for 10-25 % of tumors, out of all intracranial tumors. [9, 10] Prevalence of pituitary adenoma is 17% worldwide. PG tumors classification has been given by world health organization (WHO) (Figure no 1). [11] PAs historically has also been defined according to their size i.e., Microadenoma if less than 1 cm or Macroadenoma if equal or more than 1 cm and if size is more than 4 cm it is termed as Giant Pituitary Adenoma. [12] PAs can be categorized into functional and non-functional. Functional Pituitary adenoma (FPAs) includes GH tumors, gonadotropic hormones tumors, prolactinomas, thyroid hormone tumors, adrenocorticotrophic hormone tumors and multihormone tumors. They are treated due to symptoms produced due to excessive hormonal secretions. Whereas in Non- Functional Pituitary adenoma (NFPAs), there is no excessive secretion of hormones, they mainly represent with effect of local pressure such as headache, visual disturbances. [13] Majority of PAs are benign. Patients with PAs comes with complain regarding to tumor endocrine related problems or secondary to tumor space occupying symptoms such chronic headache of varying intensity and gradual blurring or loss of vision. [14] Optic chiasm is damaged by pituitary adenoma due to direct compaction or due to alteration of vascular supply by tumor. Patient presents with chronic headache and visual symptoms such as decreased visual acuity, visual field and color vision defects, primary optic atrophy and third nerve abnormalities. [15] Magnetic Resonance Imaging (MRI) is best diagnostic imaging modality for diagnosis of PAs. [16] For PAs, transsphenoidal surgery in starting, followed by pharmacological treatment if it is not resolved by surgical treatment. Surgical option is considered as first line of treatment option except for prolactinomas for which initial therapy is medical regimen. [17]

Figure No 1: WHO pituitary tumor classification

Pituitary adenomas	Somatotroph adenoma
	Lactotroph adenoma
	Thyrotroph adenoma
	Corticotroph adenoma
	Gonadotroph adenoma
	Null-cell adenoma
	Plurihormonal and double adenomas
Pituitary carcinoma	
Pituitary blastoma	
Tumors of the posterior pituitary	Pituicytoma
	Granular cell tumor of the sella
	Spindle cell oncocytoma
	Sellar ependymoma
Neuronal and paraneuronal tumors	Gangliocytoma and mixed gangliocytoma-adenom
	Neurocytoma
	Paraganglioma
	Neuroblastoma
Craniopharyngioma	Adamantinomatous craniopharyngioma
	Papillary craniopharyngioma
Mesenchymal and stromal tumors	Meningioma
	Schwannoma
	Chordoma, NOS
	Chondroid chordoma
	"Dedifferentiated" chordoma
	Solitary fibrous tumor/hemangiopericytoma
	Grade 1 SFT/HPC
	Grade 2 SFT/HPC
	Grade 3 SFT/HPC
Hematolymphoid tumors	
Germ cell tumors	Germinoma
	Yolk sac tumor
	Embryonal carcinoma
	Choriocarcinoma
	Teratoma, NOS
	Mature teratoma
	Immature teratoma
	Teratoma with malignant transformation
	Mixed germ cell tumor
Secondary tumors	

MATERIAL AND METHOD:

This was two-year study, conducted from first January 2019 to thirty first December 2020, at Institute of Ophthalmology (IOL) at Liaquat University of Medical Health Sciences (LUMHS). Seven hundred sixty-four patients were enlisted in our study. All the patients with chronic headache with/without decreased vision and/or visual field defects were included in this study. Those patients already diagnosed of any other cause of headache such as raised blood pressure, tumor, or already diagnosed case of pituitary adenoma were excluded from our study and patient with diagnosed case

of glaucoma with glaucomatous cupping were also excluded. Detailed history regarding ocular and systemic symptoms was taken from patients. In all patients, best corrected visual acuity (BCVA) was checked through Log MAR chart, pupillary examination and color vision test was done, intraocular pressure (IOP) was checked with Goldman's tonometer and anterior and posterior segment examination was done through slit lamp with 78 D lens. Visual field testing was done through confrontation test and Haag Streit Octopus Perimeter in all patients. Fundus photography was also done. All patient included in this study had their MRI brain and orbit with contrastdone. Through MRI, location of tumor was categorized as having suprasellar &/ Parasellar extension. Optic chiasm and/or optic nerve compression was noted on MRI. Antero-posterior, craniocaudal and transverse size of tumor was measured on MRI. Whether PAs are functional or non-functional, pituitary hormones were investigated.

RESULTS:

Total number of patients was 764. Out of 764, 32 patients were diagnosed as pituitary adenoma. In 32 patients, Age ranges from 25 years to 62 years and median age is 37.25. (Table 1 and 2) Out of 32 patients, 12 were females and 20 were males. (Table No 3)

Table no 1: Statistical range of Age of study subjects

Age	**Range: 25-62** **Median: 37.25** **SD: 12.87**

Table No 2: Age wise distribution of participants

AGE	MALE	FEMALE
0-20	0	0
21-40	14	10
41-60	2	2
61 and above	4	0
Mean	40.5	27.5

Table No 3: Gender distribution

Male	20
Female	12

Most common symptom in patients diagnosed with pituitary adenoma was headache (100%), blurred or loss of vision (87.5%), nausea and vomiting (43.75%), amenorrhea (15.63%) and gynecomastia (6.25%) in patients. (Table no 4)

Table No 4: Symptoms observed by participants

SYMPTOMS	NUMBER	PERCENTAGE

Headache	32	100 %
Loss of vision	28	87.5 %
Nausea and vomiting	14	43.75 %
Gynecomastia	2	6.25 %
Amenorrhea	3	9.38 %

Optic nerve compression was seen on MRI in 93.75% cases. (Table No 5)

Table No 5: Optic chiasm compression by Pituitary adenoma

OPTIC CHIASM COMPRESSION	NUMBER	PERCENTAGE
Present	30	93.75 %
Absent	2	6.25 %

Supra-seller and para-seller extension of pituitary tumor was also seen on MRI brain and orbit. (Table No 6)

Table No 6: Tumor extension

TUMOR EXTENSION	NUMBER	PERCENTAGE
Suprasellar	30	93.75 %
Parasellar	28	87.5 %

Out of 32 patients, diagnosed with Pituitary adenoma, 30 were macroadenoma and 2 were microadenoma. (Table no 7)

Table No 7: Type of pituitary adenoma

TYPE OF PITUITARY ADENOMA	n(%)
Macroadenoma	30 (93.75%)
Microadenoma	2 (6.25%)

Visual field defects were recorded on Haag Streit Octopus.Bitemporal hemianopia (visual field defect type 1) was seen in 23 patients, temporal hemianopia in one eye with complete visual field loss in fellow eye is seen in 3 patients (visual field defect type 2). In two patient lower temporal defects were seen (visual field defect type 3).In 2 patients, temporal hemianopia was seen in one eye and lower temporal defect was seen in fellow eye (type 4 visual field defect). (Table No 8)

Table no 8: Visual field defects observed among the participants

TYPES OF VISUAL FIELD DEFECTS	n(%)
Type 1	23 (71.87%)
Type 2	3 (9.38%)
Type 3	2 (3.12%)
Type 4	2 (3.12%)
Normal	2 (3.12%)

Tumor size is depicted in table No 9.

Table No 9: Tumor Size among the study subjects

TUMOR SIZE	ANTERO-POSTERIOR	CRANIOCAUDAL	TRANSVERSE
Range	1.5-5 cm	1.5-4.8 cm	1.9-4 cm
Median	2.93 cm	5.48 cm	2.75 cm
SD	1.4	2.48	1.97

All patients presented with visual loss of variable degree. (Table No 10) Most of patients presented with vision of 6/36 or less (34.38%).

Table No 10: Visual Acuity observed among the study subjects

VISUAL ACUITY	RIGHT EYE	LEFT EYE
6/9 or 6/6	3 (9.38%)	0
6/12	1 (3.12%)	6 (18.75%)
6/18	2 (6.25%)	0
6/24	1 (3.12%)	5 (15.63%)
6/36	11 (34.38%)	11 (34.38%)
6/60	11 (34.38%)	4 (12.5%)
Less than 6/60	3 (9.38%)	6 (18.75%)

DISCUSSION:

About 15 % of brain tumors are pituitary tumors. They grow, enlarge and compresses the optic chiasm fibers superiorly which causes visual field defects particularly bitemporal hemianopia, gradual visual loss, color abnormalities and optic disc atrophy. Thus, major indication of pituitary gland tumor surgery is visual problems. [18-20] In the current study, median age was 37.25 years, ranging from 25 years to 62 years, which is quite similar to age of presentation seen in other studies such as study done by Setyowati R. which showed patients were between the age of 29-65 years. [21] *Mansour AA et al.,* reported median age of 38.2 years ±15. [22] In our study, there was male predominance of 68.75%. This can be due to fact that patients reported to us were mainly due to headache and decreased vision rather than any hormonal issue secondary to macroadenoma, similar to study conducted by Rehman L. which showed 63.5% patients were males. [23]. Headache and visual

disturbance are reported to be most common symptom in patients having pituitary adenoma. In general population, prevalence of headache is about 50% and in patients having pituitary adenoma it ranges from 37.5-70%. All patients, with complain of chronic headache of varying intensity were included in this study. Rehman L. also reported headache and visual disturbance to be present in 87.3% and 88.8% of patients respectively, in his study. [23-26] Visual field defects associated with pituitary adenoma ranges from 37-96%. [27] *Lee JP et al.,* reported that 74 % of patients had visual field defect due to pituitary adenoma, out of which temporal visual field defect was commonly present in 56% cases. [28] In our study, visual field defect was present in 93.75% of patients with bitemporal visual field defect was commonly present in 71.87 %. In our study, suprasellar and Parasellar extension was seen in 93.75 % and 87.5% cases respectively causing optic chiasm compression. Suprasellar and Parasellar extension was common as macroadenoma was common in our study. Gupta K. also reported that majority of macroadenoma's had supra sellar extension (72.7%). [29] Limitation of our study was that number of patients was less. The patients were sent to neurosurgical department for evaluation and treatment but the follow-up regarding management was difficult and cannot be done.

CONCLUSION:

Pituitary adenoma is one of the common causes of headache. Patients with pituitary adenoma particularly do not have ocular symptoms initially. So chronic headache is considered as major symptom for its diagnosis particularly when there is macroadenoma as it occurs in our study.

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