Original Research Article

Lesions of sellar and parasellar region: a pathologists view

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Abstract

Introduction: Sellar and parasellar region is an anatomically intricate area. The lesions include a wide variety of conditions ranging from pituitary adenoma to empty sella syndrome, apoplexy, congenital or acquired conditions, craniopharyngioma and meningioma. Most common of them all is pituitary adenoma. **Aims and objectives:**To study the various lesions of sellar and parasellar regions including variants of pituitary adenoma and meningiomaand to compare their squash cytology with histopathology diagnosis. **Material and methods:**Over a period of 3 years all the lesions of sellar and suprasellar region detected clinically and radiologically were studied. **Results:** The most common lesion was pituitary adenoma (50%) followed by meningioma (28.6%) and craniopharyngioma (21.4%). Among pituitary adenoma the commonest type was somatotroph type. **Conclusion:** Both neoplastic and non-neoplastic lesions occur in the sellar and parasellar region. Clinical and pathological correlation will lead to a specific and accurate diagnosis of the seller and parasellar lesions. Squash cytology findings, if interpreted with clinical picture and radio-imaging findings, will help to reach an accurate and rapid diagnosis of rare intracranial tumors.

Keywords: Squash cytology, Sellar, Parasellar, Pituitary adenoma, Meningioma

Introduction

Most of the mass lesions in the Sellar and parasellar region are pituitary adenomas[1]. This region presents with both neoplastic and non-neoplastic lesions. Tumors include lesions like craniopharyng-ioma, meningioma, pilocytic astrocytoma and chordoma[2,3].Since anatomically it is a complex region pre-operative diagnosis using clinical, neurological, radiological and endocrinological entities is very important. Intraoperative squash cytology plays a helpful role in the approach towardsa quick diagnosis[3].

Materials and methods

All lesions in the sellar and parasellar region detected clinically and radiologically were studied over a period of 3 years.The biopsy sample was received in normal saline, squash smearswere prepared and stained with hematoxylin and eosin stain and examined. Rest of the sample was fixed in 10% formalin and embedded. Paraffin section was cut at 3-5um thickness and stained by hematoxylin and eosin. Immunohistochemistry and special stains were carried out whenever necessary. The slides were reviewed by consultant pathologists keeping in mind the clinical, radiological and squash cytology features.

Results

A total of 14 cases were studied, age ranging from 4 years to 70 years. Male to female ratio was 0.4:1. Most common clinical presentations were headache and blurring of vision. Some presented with hirsutism, acromegaly and breast discharge. 10 cases were in the parasellar region and 4 cases in the sellar region. Radiologically most of them were diagnosed as pituitary macroadenoma. Table 1 summarizes all the 14 cases obtained.

Out of 14 cases, 7 were pituitary adenoma, 4 were meningioma and 3 were craniopharyngioma.Pituitary adenoma cases were further subclassified as 4 cases of somatotroph type, 1 case each of gonadotroph type, null cell adenoma with pituitary apoplexy and prolactinoma. Meningioma cases included 1 case each of clear cell meningioma, meningothelial meningioma, ossified metaplastic meningioma and psammomatous meningioma. All 3 cases of craniopharyngioma were adamantinomatous type.Cytology and histopathology diagnosis correlated in all the cases. Though in intraoperative squash smear cytology there is a limitation in subclassification, the definitive diagnosis was done in histopathology.

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Table 1: Table showing Pituitary adenoma cases.

Sl No.	Age	Sex	Clinical presentation	Site	Radiology	Cytology	Histopathology
1	35	Female	Headache- 2 years, hirsutism	Parasellar	Pituitary macroadenoma	Pituitary adenoma	Pituitary adenoma-somatotroph type
2	55	Female	Blurring of vision-6 months, acromegaly	Sellar	Pituitary macroadenoma	Pituitary adenoma	Pituitary adenoma-somatotroph type
3	39	Male	Blurring of vision, headache- 4 years	Parasellar	Pituitary macroadenoma	Pituitary adenoma	Pituitary adenoma-somatotroph type
4	55	Female	Blurring of vision, headache- 4 years	Parasellar	Pituitary macroadenoma	Pituitary adenoma	Pituitary adenoma-gonadotroph type
5	40	Female	Blurring of vision-4 months	Sellar	Pituitary macroadenoma	Pituitary adenoma	Null cell adenoma with pituitary apoplexy
6	65	Male	Breast discharge-6 months	Sellar	Pituitary macroadenoma	Pituitary adenoma	Pituitary adenoma-prolactinoma
7	50	Female	Headache	Sellar	Pituitary adenoma	Pituitary adenoma	Pituitary adenoma-somatotroph

Table 2: Table showing Meningioma cases

Sl No.	Age	Sex	Clinical presentation	Site	Radiology	Cytology	Histopathology
1	4	Female	Difficulty in walking and dysarthria	Parasellar	Meningioma/ Nerve sheath tumour	Meningioma	Clear cell meningioma
2	60	Female	Headache, vomiting- 6 months	Parasellar	Parasellar meningioma	Meningioma	Meningothelial meningioma
3	30	Male	Headache- 1 year	Parasellar	Parasellar meningioma	Meningioma	Ossified metaplastic meningioma
4	70	Female	Headache- 1.5 years	Parasellar	Meningioma	Meningioma	Psammomatous meningioma

Table 3: Table showing Craniopharyngioma cases

Sl No.	Age	Sex	Clinical presentation	Site	Radiology	Cytology	Histopathology
1	30	Male	Headache, Blurring of vision-2 years	Parasellar	Craniopharyngioma	Craniopharyngioma	Adamantinomatous craniopharyngioma
2	30	Female	Headache, Blurring of vision-1.5 years	Parasellar	Craniopharyngioma or Rathke's cleft cyst	Craniopharyngioma	Adamantinomatous craniopharyngioma
3	14	Female	Headache, Blurring of vision-1 year	Parasellar	Craniopharyngioma	Craniopharyngioma	Adamantinomatous craniopharyngioma

Table 4: Table showing location of the mass.

Sl No.	Sellar	Parasellar
Pituitary adenoma	4	3
Meningioma	-	4
Craniopharyngioma	-	3

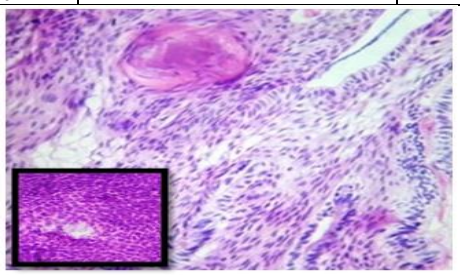

Fig 1: HP, H&E, 40x: Palisading epithelium, wet keratin and stellate reticulum. Adamantinomatous craniopharyngioma.(Inset)Squash cytology, H&E,40x:Monotonous population of cells, wet keratin. Craniopharyngioma.

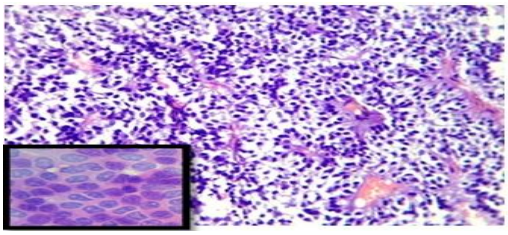

Fig 2: HP, H&E, 40x:Sheets of uniform round cells, eosinophilic cytoplasm, vesicular nuclei, bi- and tri-nucleate cells are also seen. Pituitary adenoma. (Inset) Squash cytology, H&E, 40x:Monotonous round nuclei with salt & pepper chromatin, fragile cytoplasm.

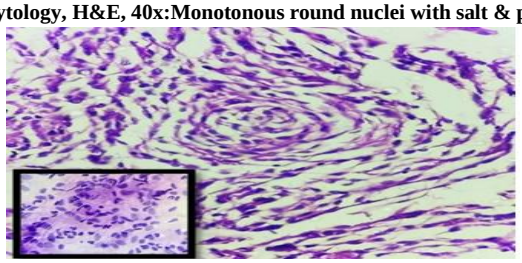

Fig 3: HP, H&E, 40x:Sheets of plump spindle nuclei, whorl pattern, abundant granular cytoplasm. (Inset) Squash cytology, H&E, 40x:Lobules of tumor cells, round to spindle shaped having pleomorphic nuclei, indistinct cell border, intranuclear inclusions.

Discussion

Sellar and parasellar region is an anatomically intricate area. The lesions in this region include a variety of benign and malignant lesions [1]. Pituitary adenomas are the commonest lesions in the sella [2]. Non-pituitary lesions include benign lesions like Rathke's cleft cyst,epidermal cyst,arachnoid cyst,pituitary infarct and granulomatous lesions, malignant lesions include meningioma, craniopharyngioma, pilocytic astrocytoma, granular cell tumour, chordoma and metastasis[3]. Metastatic lesions are commonly encountered from breast in women and lung carcinoma in men. However other metastasis includes kidney, gastrointestinal tract, prostate and melanoma [4,5]Collision tumor are noted in this region. Coexistence of two types of tumors like pituitary adenoma and craniopharyngioma are reported[6].These lesions cause symptoms related to mass effect caused on the adjacent structures, including pituitary gland inferiorly, hypothalamus, optic chiasma and 3rd ventricle superiorly, cavernous sinus and internal cerebral artery laterally and mid brain and pons posteriorly. They can also present with endocrinologic symptoms[7].If the lesion measures less than 1 cm it is referred to as micro adenoma and macroadenoma if more than 1 cm[9].The diagnosis of these lesions requires a detailed clinical, endocrinologic, ophthalmic, neurologic and radiological work up. Histopathology is the gold standard for a definitive diagnosis of these lesions[10]In the present study, a total of 14 cases were included. Among them 4 were males and 10 females. The male to female ratio was 0.4:1 with a predilection of female patients. Most common lesion was pituitary adenoma 7(50%) followed by meningioma 4(28.6%) and 3(21.4%) cases of craniopharyngioma. Among the pituitary adenoma cases 4 were of somatotroph type, 1 each of gonadotroph type, null cell adenoma with pituitary apoplexy and prolactinoma [Table 1] [Figure 2].These lesions present with a uniformly enhancing isodense to slightly hyperintense mass[11,12]. In squash cytology there are round to oval cells with salt and pepper chromatin in an eosinophilic matrix. The pathological features are based on the tumor type. They are divided into acidophilic, basophilic and chromophobic according to the cell features. Corticotroph, gonadotroph and thyrotroph types are basophilic, whereas somatotroph and lactotroph type are acidophilc to chromophobic[13]. Similar to the study conducted by Saeger W et al also showed predominance of GH secreting type of pituitary adenoma[3]. Meningiomas are dural based tumors which are said to arise from the meninges. They are isointense to hyperintense lesions in T2 weighted MRI with a dural tail sign[11,14]. In squash cytology thick smears with plump spindled shaped nuclei arranged in a whorls or onion skin pattern. Occasional psammoma bodies are seen. Meningiomas are histopathologically graded into 3 grades by the WHO classification 2016[15,16]. Our study included one case each of clear cell meningioma, meningothelial meningioma, ossified metaplastic meningioma and psammomatous meningioma [Table 2,Figure 3]. EMA showed positivity in a case of clear cell meningioma. Craniopharyngioma is a histologically benign lesion belonging to grade I tumor. They are cystic T1 hyperintense lesions with ring enhancement. Squash cytology shows monotonous cells with wet keratin flakes. Histologically they are o two types adamantinomatous and papillary. They are recognized by the presence of stellate reticulum, wet keratin, ghost cells and palisading epithelium[16]. All the 3 cases of craniopharyngioma were of adamantinomatous type in the present study. [Table 3] [Figure1]. Among sellar and parasellar regions, lesions were common in the parasellar region[Table 4].

Conclusion

An algorithmic approach to differential diagnosis of sellar and parasellar region lesions along with histopathological and immunohistochemical panel can aid in the definitive diagnosis. A very tiny specimen can be used for squash cytology. An accurate and a rapid intraoperative diagnosis can be made.

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