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A Clinico-Pathological Study Of The Lesions In Sellar And Parasellar Regions In A Tertiary Care Hospital

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Abstract

Introduction: The Sellar region is a complex area. Around 30 different lesions occur in and around the pituitary gland and they approximately represent 10 to 15% of all brain tumors and have similar symptoms like visual field defects to complete blindness. CT and MRI can identify whether the lesion is cystic, solid, or necrotic but it never replaces the histopathological identification of the lesion. Therefore, the aim is to correlate the clinical, radiological, endocrinological & histopathological findings of the lesions.

Materials And Methods: This study includes a total of 73 cases in 2 years. The specimens were processed according to the standard institutional protocols.

Results: These lesions are more common in middle-aged individuals with slight male preponderance. Out of 73 cases, the most common are pituitary adenomas, 38 cases; craniopharyngioma, 19 cases; meningiomas, 5 cases and vascular malformations, 2 cases. Three cases of pituitary adenoma, two cases each of glioma; vascular malformation, and one each of craniopharyngioma, chordoma, reactive gliosis, and solitary fibrous tumour were not correlated radiologically.

Conclusion: This study highlights the need for a multidisciplinary approach in the sellar region and yields better results for selecting the surgical approach and type of surgery.

Keywords: parasellar, sellar, pituitary adenoma, craniopharyngioma meningioma

Introduction

The Sellar region is a complex area with many structures located in close proximity. Around 30 different lesions occur in and around the pituitary gland; they can arise from the pituitary gland or adjacent structures (cranial nerves, meninges, arteries, third ventricle, hypothalamus, etc.).

Any lesion involving any of these structures, including hydrocephalus of the 3rd ventricle, will cause pressure over these structures and present clinically with almost identical symptoms like visual field defects to start with and finally complete blindness.

There are certain clues by imageology, like a child with pressure symptoms, a plain X-ray skull, and a lateral view showing suprasellar calcification with the possibility of craniopharyngioma. CT and MRI identify the lesion whether cystic, solid, or necrotic, the involvement of the bone, and possible pathology. But these advancements in imageology can never replace the histopathological identification of the lesion; hence, histopathology is the gold standard.

In a complex area, including many different anatomical structures like the pituitary gland, cranial nerves II & III, cavernous sinus, bones adjoining and

floor of the third ventricle in addition to vestigial or developmental remnants like Rathke's pouch, makes the possible pathological diagnosis difficult and poses a challenge for the pathologist and clinicians too.

The pathologist facing such a situation should be equipped with the information regarding the possible lesions and use discretion in guiding the surgeon preoperatively with differential diagnosis.

Tumors of the sellar region and pituitary gland represent approximately 10 to 15% of all brain tumors, and pituitary adenomas represent the third most common primary intracranial tumor [1].

The present study evaluates histopathological findings in sellar, parasellar and suprasellar lesions. It correlates clinically and radiologically with the incidence of the various lesions and their age and sex distribution in the study population.

Materials And Methods:

It is a descriptive study for a period of 2 years conducted after obtaining institutional ethical clearance.

A total of 73 biopsies were received, and the clinical, radiological, or endocrinological findings lesions were reviewed.

The specimens received after the surgery are fixed in 10% Neutral buffer formalin and processed by automation. Multiple serial sections of 4-5 microns thickness were taken, stained with H&E and special stains like PAS if needed.

Results & Discussion:

Among 73 cases, the youngest patient was 16 months old female child, while the eldest was a 72- year-old female. The maximum number of patients was in the 21 to 40 years age group (19%) with slight male preponderance, comparable to Tomar V et al. [2].

Our study's most common lesion in adults correlates with Tomar V et al.,[2] and Rak B et al., [3]

pituitary adenoma as the most common tumor and craniopharyngioma as 2nd most common. The Gliomas, as 3rd most common in the present study, correlated with Tomar V et al. [2]. The most common lesion in children was Glioma accounting for 2 cases and

Three cases of pituitary adenoma are discordant with MRI diagnosis, and the radiological diagnosis was craniopharyngioma. A single case of Craniopharyngioma contradicts MRI diagnosis and is reported radiologically as a Colloid cyst. A single case of Chordoma is discordant with MRI diagnosis and is reported radiologically as Pituitary macroadenoma. Two cases of Vascular malformation are contrary to MRI diagnosis and reported as Rathke's cleft cyst with hemorrhage. Two cases of Glioma are discordant with MRI diagnosis and they are reported as pituitary adenoma. A single case of Solitary fibrous tumor is inconsistent with MRI diagnosis, it is reported as pituitary adenoma.

Compared with Hui P et al. [4] study, lesions such as craniopharyngioma, meningioma, epidermoid cyst, and few glioma cases correlate. Chordoma and the Solitary fibrous tumor do not correlate with MRI findings.

In Pituitary adenoma, out of 38 cases, 24 cases were males, and 14 were females, so the gender ratio was 1.7:1, slightly more significant than the Johnsen et al. [5] study, the gender ratio was about 1.4:1.

In the present study, the age range of adamantinomatous craniopharyngioma was from 16-46 years, which correlates with Nielsen EH et al. [6]. The age range in papillary craniopharyngioma was from 40-58 years in the present study, which is similar to Crotty TB et al. [7] study.

Meningioma, out of 5 cases, four were female, and one was male. Johnsen et al., [5] also reported a higher incidence of meningiomas in female patients (10 out of 14).

Chordoma is a rare malignant tumor of bone with notochordal differentiation [8]. In the present study of 73 cases, 1 case was Chordoma, which is similar in incidence to Tomar V et al.,[2].

Optic pathway gliomas (OPGs) are low-grade neoplasms that predominantly occur in the pediatric population during the first decade of life. According to Deng S et al., [9] sellar gliomas are rare, and constitute less than 2% of all CNS gliomas. In the present study, 3 cases were gliomas: pilomyxoid astrocytoma, oligoastrocytoma, and low-grade glioma.

Epidermoid and dermoid cysts are rare intracranial tumors [10] that can occur anywhere in the cranial

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cavity. Epidermoid cyst arises from misplaced rests of ectodermal cells [11] and often arises from paramedian location, in contrast to midline dermoid cyst [12]. In the present study, an Epidermoid cyst accounts for 1 case, presents as a suprasellar tumor in a middle-aged female.

Rathke's cleft cysts, accounts for one case. They are nonneoplastic remnants of Rathke's pouch; depending on where the failure of embryonic regression occurs, they are typically located in the sellar and suprasellar region [13].

The solitary fibrous tumor (SFT) is a relatively uncommon benign mesenchymal tumor [14]. In the present study it accounts for one case. Although SFT is a benign tumor, a higher rate of disease progression and recurrences are reported by Chen H et al., [15] mandating vigilant postoperative monitoring.

In the present study, Vascular malformations (capillary hemangioma) account for one and present as a sellar space-occupying lesion in a 40-year-old male. Capillary hemangioma is a benign vascular tumor, and they are common in children. They rarely occur in the central nervous system and very rare in the sellar region, and very few cases were reported [16]. Capillary hemangiomas are easily misdiagnosed on imaging, especially in the sellar region [16].

Arachnoid Cyst, are developmental anomalies that occur anywhere in the central nervous system. They account for 1% of all intracranial space-occupying lesions [17].

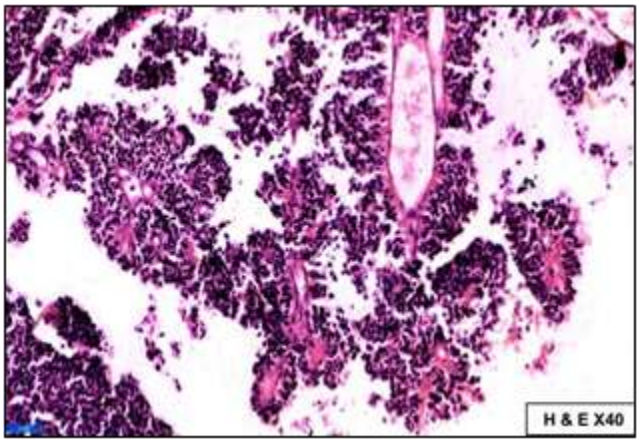
CNS germ cell tumors predominantly arise along the midline axis; most commonly, it occurs in the pineal gland, followed by the suprasellar region [18]. In the sellar region, it accounts for 0.15%

[19].

Granular Cell Tumor, Pituicytoma, and Spindle Cell Oncocytoma of Neurohypophysis: These three tumors are rare WHO grade I, sellar masses. Both clinically and by imaging, they mimic non-functioning pituitary adenoma. They are derived from normal posterior gland pituicytes and share nuclear expression of TTF-1 with the normal posterior gland [20,21].

Figures:

"Figure 1: Section shows tumor cells arranged predominantly in papillary and pseudorosette pattern. Pituitary Adenoma"



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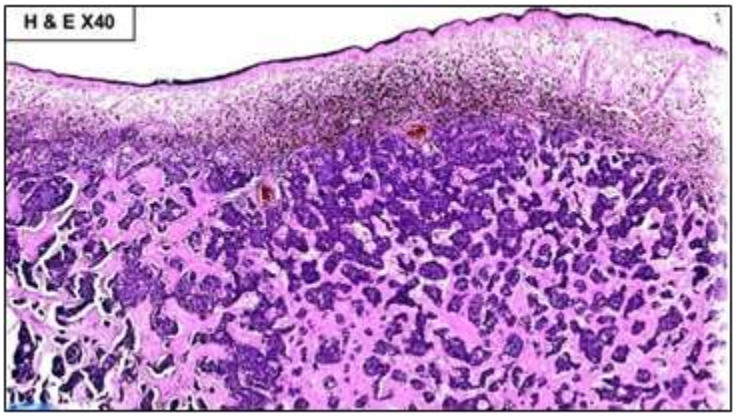
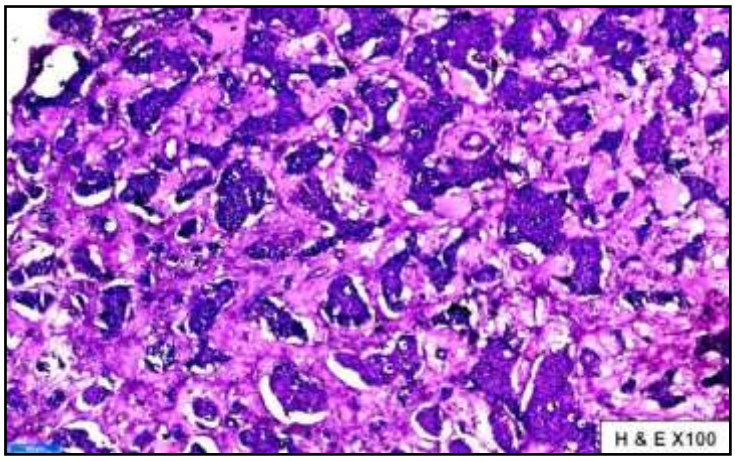
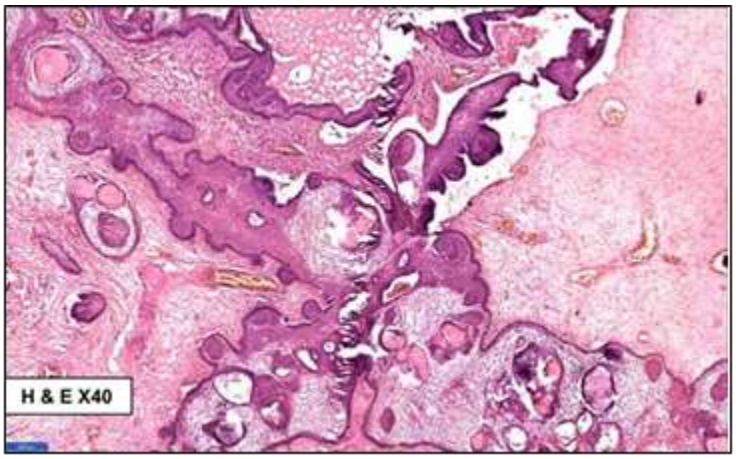
"Figure 2: Section shows tumor component arranged in sheets and islands and invading into the nasal mucosa. Pituitary Adenoma"



"Figure 3: Pituitary Adenoma – PAS"



"Figure 4: Craniopharyngioma Adamantinomatous (WHO-I)"



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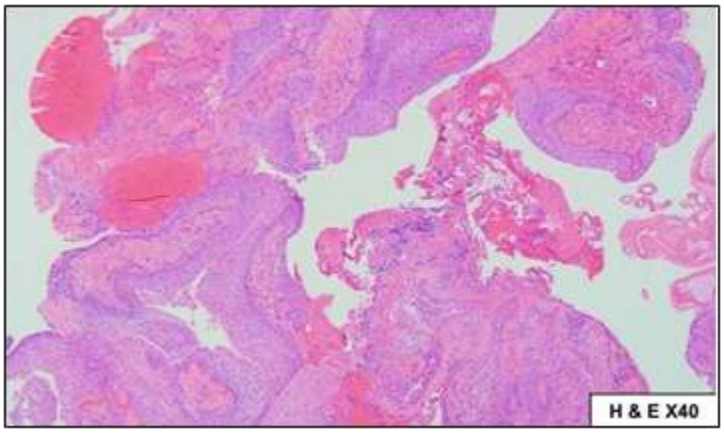
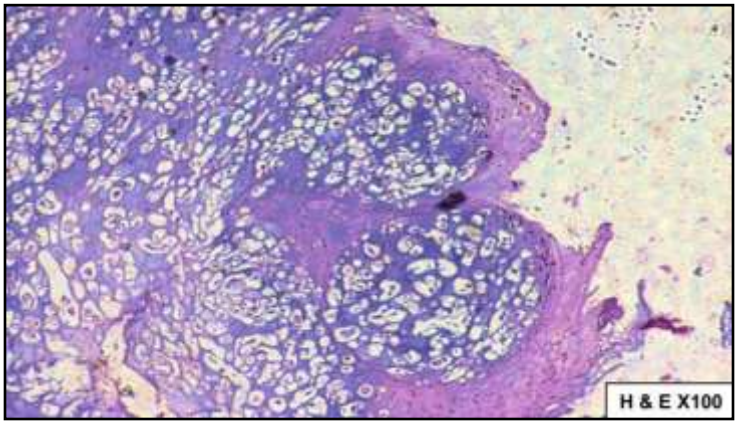
"Figure 5: Section shows fragments of tissue bits lined by squamous epithelium with the central fibrovascular core. Papillary Craniopharyngioma (WHO-I)"



"Figure 6: Section shows the tumor cells arrange in lobules against the myxoid background. The tumor cells are large (Physaliferous cells) with vacuolated bubbly cytoplasm and vesicular nuclei. Chordoma NOS"



"Figure 7: Distribution of lesions in sellar, parasellar, and suprasellar regions"

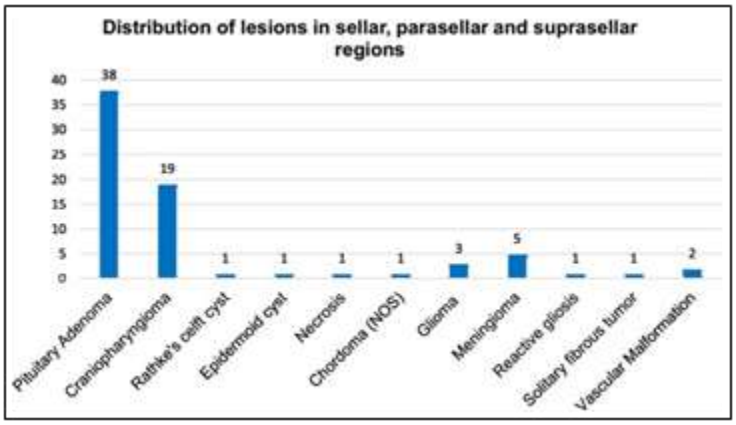


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Table 1: Age Distribution"

Age Distribution in years	No. of Cases (n=73)	Percentage
0-10	3	4
11-20	7	10
21-30	14	19
31-40	14	19
41-50	12	16
51-60	13	18
61-70	8	11
71-80	2	3

"Table 2: Sex Distribution"

Sex	No. of cases (n=73)	Percentage
Males	37	51
Females	36	49

"Table 2: Distribution of lesions in sellar, parasellar, and suprasellar regions"

Tumors	Adults	Children	No. of Cases	Percentage
Pituitary Adenoma	38	0	38	52
Craniopharyngioma	19	0	19	26
Rathke's cleft cyst	1	0	1	1
Epidermoid cyst	1	0	1	1
Necrosis	1	0	1	1
Chordoma (NOS)	1	0	1	1
Glioma	1	2	3	4
Meningioma	5	0	5	7
Reactive gliosis	1	0	1	1
Solitary fibrous tumor	1	0	1	1
Vascular Malformation	2	0	2	3

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"Table 3: Correlation between Histopathological diagnosis and Magnetic resonance imaging diagnosis"

	Histopathology	Radiology	No Correlation
Pituitary Adenoma	38	35	3
Craniopharyngioma	19	18	1
Glioma	3	1	2
Meningioma	5	5	0
Chordoma	1	0	1
Solitary Fibrous Tumor	1	0	1
Vascular Malformation	2	0	2
Reactive gliosis	1	0	1
Epidermoid cyst	1	1	0
Rathke's cleft cyst	1	1	0

Conclusion: A total of 73 biopsies were received over two years. Sellar, parasellar, and suprasellar lesions are most common in the third decade of life, affected most commonly in males than females, with a male to female ratio being 1.02:1. The symptoms of raised intracranial pressure like headache and visual disturbances were the most common complaints in patients with sellar, parasellar, and suprasellar lesions.

The most common lesion detected was pituitary adenoma comprising 38 (52%) out of 73 cases. Pituitary adenomas were most common in the second and third decades of life. They are more common in males than females (male to female ratio 1.7:1). The next most common tumor detected was craniopharyngioma (19), followed by meningioma (5) and glioma (3).

In the present study, the most common lesions such as pituitary adenoma and craniopharyngiomas, correlated with radiological findings in majority of the cases. The uncommon lesions in most patients do not correlate with radiological and clinical findings. It highlights the need for a multidisciplinary approach in the sellar region and the pathologist should be aware of various lesions in this area that may mimic both clinically and radiologically. Clinical, radiological, and pathological pre-operative discussions will yield better results for selecting the surgical approach and type of surgery.

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