Histomorphological Pattern of Sellar and Suprasellar Region Tumor in Tertiary Level Hospital of Bangladesh

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Abstract

Background: Sellar and suprasellar region tumors comprise a wide spectrum of neoplastic and non-neoplastic lesions with overlapping clinical and radiological features. Histopathological evaluation remains the gold standard for accurate diagnosis. The aim of this study was to observe the histomorphological pattern of sellar and suprasellar region tumors in a tertiary level hospital of Bangladesh.

Methods: This cross-sectional observational study was conducted in the Department of Pathology, Dhaka Medical College, from April 2023 to March 2024. A total of 125 radiologically diagnosed sellar and suprasellar lesions were included by purposive sampling. Tissue specimens obtained by biopsy were processed routinely and stained with hematoxylin and eosin for histopathological examination. Data were analyzed using SPSS version 24.0.

Results: Pituitary adenoma was the most common tumor, accounting for 72.8% of cases, followed by craniopharyngioma (12%) and meningioma (6.4%). The mean age of patients was 34±17.2 years, with slight male predominance (53.6%). Most tumors occurred in the 31–40 years age group. Headache was the most common presenting symptom (48.8%), and most tumors measured >4 cm radiologically. Adamantinomatous craniopharyngioma was the predominant subtype, mainly affecting children.

Conclusion: Pituitary adenoma was the predominant sellar and suprasellar tumor in this study. Histopathological examination remains essential for accurate diagnosis and differentiation of these lesions for appropriate management.

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Introduction

Sellar and suprasellar regions contain complex anatomical structures including the pituitary gland, optic chiasm, meninges, blood vessels, and cranial nerves, which give rise to a wide variety of neoplastic and non-neoplastic lesions.[1,2] Pituitary adenoma constitutes the majority of sellar masses, while craniopharyngioma, meningioma, astrocytoma, cystic lesions, inflammatory conditions, and metastatic tumors are comparatively less common.[3] Sellar and suprasellar lesions often present with overlapping clinical and radiological findings, making definitive diagnosis difficult without histopathological examination.[4] Recent WHO classifications have introduced newer concepts regarding pituitary neuroendocrine tumors and craniopharyngioma subtypes, improving understanding of their biological behavior and prognosis.[5] Histomorphological evaluation remains the cornerstone for diagnosis and classification of these lesions and plays an important role in guiding treatment and predicting prognosis.[6] Accurate identification of different sellar and suprasellar lesions is therefore essential for multidisciplinary management and better patient outcomes.[7] Sellar and suprasellar tumors are associated with significant neurological, endocrine, and visual complications. Clinical and radiological findings alone are often insufficient for precise diagnosis because many lesions show similar presentations. Histopathological evaluation is therefore essential for accurate classification, prognostication, and management. There is limited published data regarding the histomorphological spectrum of sellar and suprasellar tumors in Bangladesh. This study may provide baseline information regarding the frequency and pattern of these lesions in our population.[7,8] The aim of this study was to observe the histomorphological pattern of sellar and suprasellar region tumors in a tertiary level hospital of Bangladesh.

Methods

This hospital-based cross-sectional observational study was conducted in the Department of Pathology, Dhaka Medical College, Dhaka, from April 2023 to March 2024. A total of 125 patients with radiologically diagnosed sellar and suprasellar tumors were included by purposive sampling. Patients of all age groups and both sexes who underwent biopsy in the Department of Neurosurgery of Dhaka Medical College Hospital and National Institute of Neurosciences and Hospital were enrolled in the study. Patients with intracranial space occupying lesions outside the sellar and suprasellar region and multifocal CNS lesions were excluded.

Biopsy specimens were fixed in 10% neutral buffered formalin, routinely processed, embedded in paraffin, sectioned at 3–5 µm thickness, and stained with hematoxylin and eosin (H&E). Histopathological diagnoses were established according to the 2021 WHO Classification of Tumours of the Central Nervous System. Immunohistochemistry was performed only in selected diagnostically challenging cases whenever deemed necessary. Difficult and rare cases were reviewed by at least two consultant histopathologists to reach a consensus diagnosis. Recurrent tumors were excluded from the study, and inadequate or poorly preserved biopsy specimens were also excluded from analysis. In this study, the conventional term "pituitary adenoma" has been retained throughout the manuscript to maintain consistency with the existing literature and the original histopathological reports. However, according to the 2022 WHO Classification of Endocrine and Neuroendocrine Tumours, these lesions are currently designated as Pituitary Neuroendocrine Tumors (PitNETs).

Collected data were analyzed using Statistical Package for Social Sciences (SPSS) version 24.0. Quantitative variables were expressed as mean and standard deviation, whereas qualitative variables were presented as frequency and percentage. A p-value of <0.05 was considered statistically significant. Ethical clearance was obtained from the Ethical Review Committee of Dhaka Medical College, and informed written consent was taken from all participants or guardians.

Results

Table I shows the demographic and clinical characteristics of the study population. Among 125 patients, males constituted 53.6% and females 46.4%, with a male-to-female ratio of 1.15:1. The majority of patients belonged to the 31–40 years age group (35.2%). The mean age was 34±17.2 years. Headache was the most common presenting symptom (48.8%), followed by nausea and vomiting (20.8%) and mixed symptoms including endocrinopathy (20.8%). Only the principal presenting complaint at the time of admission was analyzed.

Table II demonstrates the histomorphological distribution of sellar and suprasellar tumors. Pituitary adenoma was the most common lesion, accounting for 72.8% of cases, followed by craniopharyngioma (12%) and meningioma (6.4%). Rare lesions included epidermoid cyst, pilocytic astrocytoma, germ cell tumor, Rathke's cleft cyst, chordoma, and metastatic tumor.

Table III shows that most tumors were larger than 4 cm (51.2%) according to MRI findings. The majority of lesions were benign (99.2%), while only one metastatic malignant tumor was identified. Table IV illustrates the histological subtypes of major tumors. Adamantinomatous craniopharyngioma was the predominant subtype (73.3%), whereas papillary craniopharyngioma accounted for 26.7%. Among meningiomas, meningothelial type was the most common subtype (62.5%).

Table V compares radiological and histopathological diagnoses. Pituitary adenoma was diagnosed radiologically in 75.2% cases and histopathologically in 72.8% cases. Craniopharyngioma and meningioma also showed slight differences between MRI and histopathological diagnosis, indicating the importance of histopathological confirmation.

Table I: Demographic and clinical characteristics of the study patients (N=125)

Variables`	Frequency (n)	Percentage (%)
Gender		
Male	67	53.6
Female	58	46.4
Age group (years)		
<20	21	16.8
20–30	16	12.8
31–40	44	35.2
41–50	20	16.0
51–60	17	13.6
>60	7	5.6
Clinical presentation		
Headache	61	48.8
Visual defect	5	4.0
Nausea, vomiting	26	20.8
Cranial nerve palsy	7	5.6
Mixed symptoms	26	20.8

Mean age: 34±17.2 years

Table II: Histomorphological distribution of sellar and suprasellar tumors (N=125)

Histopathological diagnosis	Frequency (n)	Percentage (%)
Pituitary adenoma	91	72.8
• Acidophil adenoma	65	71.4
• Basophil adenoma	10	11.0
• Chromophobe adenoma	16	17.6
Craniopharyngioma	15	12.0
• Adamantinomatous craniopharyngioma	11	8.8
• Papillary craniopharyngioma	4	3.2
Meningioma	8	6.4
• Meningothelial meningioma	5	4.0
• Transitional meningioma	1	0.8
• Microcystic meningioma	1	0.8
• Papillary meningioma	1	0.8
Epidermoid cyst	3	2.4
Pilocytic astrocytoma	3	2.4
Germinoma (germ cell tumor)	2	1.6
Rathke's cleft cyst	1	0.8
Conventional chordoma	1	0.8
Metastatic adenocarcinoma	1	0.8

Table III: Distribution of tumors according to radiological size and biological behavior (N=125)

Variables	Frequency (n)	Percentage (%)
Tumor size (MRI)		
<2 cm	6	4.8
2–4 cm	55	44.0
>4 cm	64	51.2
Histological behavior		
Benign	124	99.2
Malignant	1	0.8

Table IV: Histological subtypes of major tumors

Tumor subtype	Frequency (n)	Percentage (%)
Craniopharyngioma (N=15)		
Adamantinomatous craniopharyngioma	11	73.3
Papillary craniopharyngioma	4	26.7
Meningioma (N=8)		
Meningothelial meningioma	5	62.5
Transitional meningioma	1	12.5
Microcystic meningioma	1	12.5
Papillary meningioma	1	12.5

Table V: Distribution of radiological (MRI) and histopathological diagnoses of sellar and suprasellar lesions (N = 125)

Lesions	MRI diagnosis n (%)	Histopathological diagnosis n (%)
Pituitary adenoma	94 (75.2)	91 (72.8)
Craniopharyngioma	12 (9.6)	15 (12.0)
Meningioma	10 (8.0)	8 (6.4)
Others	9 (7.2)	11 (8.8)

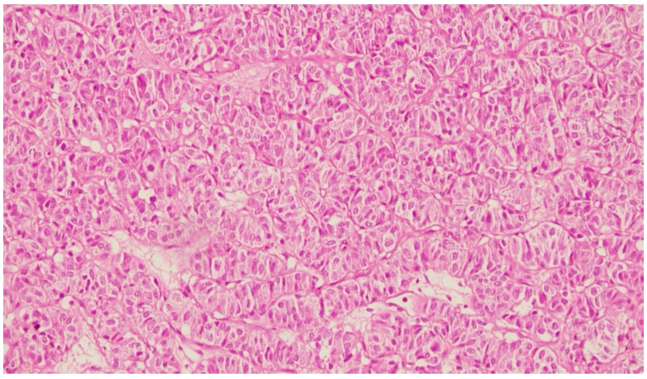

Figure 1. Pituitary adenoma, cells with clear to eosinophilic cytoplasm (H&E× 400X)

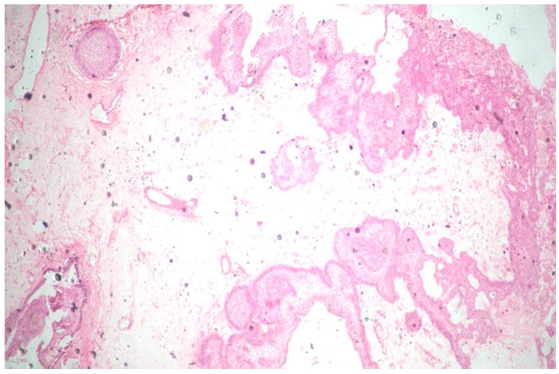

Figure 2. Adamantinomatous CP, (H&E × 100X)

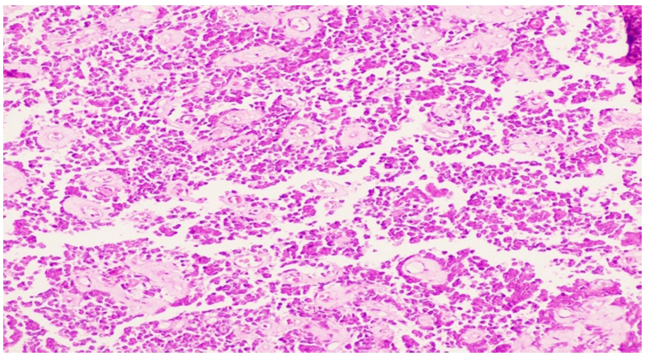

Figure 3. Papillary Meningoma composed of papillae lined by meningothelial cells, (H&E× 400)

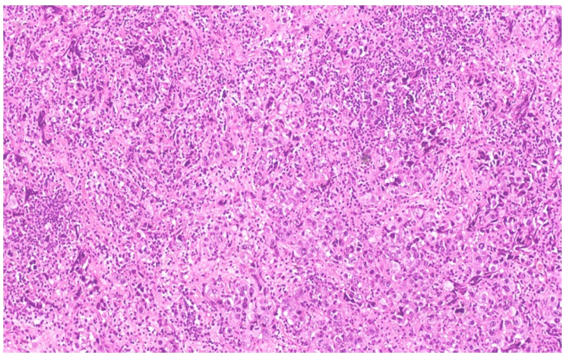

Figure 4. Germ cells tumour, (H&E × 400)

Discussion

The present study was conducted to evaluate the histomorphological spectrum of sellar and suprasellar tumors in a tertiary level hospital of Bangladesh. Pituitary adenoma was identified as the most common lesion, accounting for 72.8% of cases, followed by craniopharyngioma and meningioma. Similar findings were reported by Tomar et al.,[7] Kleinschmidt-DeMasters et al.,[8] and Hamilton et al.,[10] who observed pituitary adenoma as the predominant sellar region tumor.

The majority of patients in this study belonged to the 31–40 years age group, with a mean age of 34±17.2 years. Comparable age distribution was reported by Prakash et al.[11] Male predominance was observed in the present study, which is also consistent with previous studies.[7,11]Headache was the most common presenting complaint, followed by visual disturbances and endocrinological symptoms. Similar observations were documented by Emanuelli et al.[6]

Pituitary adenoma constituted nearly three-fourths of all lesions in the present study, reflecting their well-recognized predominance among sellar masses. Their high frequency may be attributed to the abundance of adenohypophyseal endocrine cells and the relatively indolent biological behavior of these tumors, allowing gradual enlargement before diagnosis. Similar observations have been reported in studies from India, Bangladesh, and other regional countries.[12]

More than half of the tumors measured over 4 cm on MRI. This likely reflects delayed presentation, limited access to specialized neurosurgical services, and the slow-growing nature of many sellar tumors, allowing lesions to reach considerable size before producing neurological or endocrine symptoms that prompt medical attention.

Minor discrepancies between MRI and histopathological diagnoses were observed because several sellar lesions share overlapping radiological characteristics, particularly cystic lesions, meningiomas, and craniopharyngiomas. Histopathological examination therefore remains the definitive diagnostic modality for accurate classification. Accurate pathological diagnosis directly influences surgical planning, postoperative management, endocrine follow-up, and long-term prognosis.

This study has several limitations. It was a single-center study employing purposive sampling, which may limit the generalizability of the findings. The relatively small sample size restricted subgroup analyses of uncommon tumors. Immunohistochemistry and molecular diagnostic techniques were not routinely available for all cases, preventing detailed subclassification of some lesions. Furthermore, referral bias may have resulted in a higher proportion of surgically managed lesions than is present in the general population.

Conclusion

Pituitary adenoma was the most common sellar and suprasellar tumor in this study, followed by craniopharyngioma and meningioma. Histopathological examination remains essential for accurate diagnosis and proper management of sellar and suprasellar lesions.

Recommendations

Further multicenter studies with larger sample sizes are recommended to better evaluate the histomorphological spectrum of sellar and suprasellar tumors in Bangladesh.

Conflict of Interest

The authors declare that there is no conflict of interest regarding this study.

Acknowledgment

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