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Original Research Article

Histomorphological and Immunohistochemical Study in Adrenal Masses: A Five-Year Study at a Superspeciality, Tertiary Care Centre

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Abstract

Background: Primary adrenal tumours are comparatively rare in literature and requires a multi-disciplinary approach. A vast majority of these masses are benign, and only a small subset is malignant. Histopathology still remains the gold standard in their diagnosis.

Material & Methods: A five-year study was conducted and included all the adrenal specimens as well as biopsies. In each case brief clinical history, relevant biochemical investigations, hormonal assays and radiological findings were recorded. The findings of H and E sections, special stains and Immunohistochemistry were compiled to arrive at a final diagnosis.

Results: The study was conducted on a total of 70 cases. Majority of cases 53(75.7%) were benign whereas 15 (21.4%) cases were malignant. The age was ranging between 2-70 years. The most common symptom was hypertension followed by muscle weakness and others. VMA was the most common biochemical test done and was elevated in 16 (51.6%) cases of pheochromocytoma and other adrenal masses also.

Conclusion: Adrenal neoplasms although not so common, they are encountered in routine practice, overall, they are amenable to surgical modalities and have good prognosis.

Keywords: Adrenal Tumours, Histopathology, Immunohistochemistry.

Introduction

Primary adrenal tumours are comparatively rare in literature and requires a multi-disciplinary approach. Few researchers have found that in US the incidence of adrenal mass is approximately 5% [1]. However, the definite statistics for adrenal tumours worldwide is not available. These are heterogenous group of benign and malignant neoplasms arise from either cortex or medulla. A vast majority of these masses are benign, and only a small subset is malignant [2]. Among the malignant lesions Adrenal cortical carcinoma is a rare but very aggressive cancer. It affects 1-2 / million/ year and accounts for 0.02 -0.2 % of all cancer deaths [3-5]. Primary adrenal masses encountered in clinical practice are functioning/non-functioning and also most of the masses are nonpalpable even if they are palpable, there size and extent of lesion is not possible. With the advent of imaging

modalities like CT & MRI these masses can be easily detected in patients. Histopathology still remains the gold standard in their diagnosis.

Sometimes these lesions are clinically suspected, but more often they are incidentalomas which represent tumours or tumour-like conditions that a radiologist will initially assess, categorize, and potentially diagnose, thus influencing the trajectory of clinical management. These tumours, in symptomatic as well as in asymptomatic individuals, may be classified in many ways, according to size, anatomic site of origin, or morphologic features [6].

Materials and Methods

A five-year study was conducted and included all the adrenal specimens as well as biopsies received in the Department of pathology at Sher-I -Kashmir Institute of Medical sciences Srinagar, Kashmir.

In each case brief clinical history, relevant biochemical investigations, hormonal assays and radiological findings were recorded. Samples were collected in 10% formalin for routine histopathological examination. After overnight fixation each specimen were grossed thoroughly. Representative bits were taken, subjected to routine processing, embedded in paraffin, stained with routine Haematoxylin and Eosin. Immunohistochemistry was done wherever required. The findings of H and E sections, special stains and Immunohistochemistry were compiled to arrive at a final diagnosis.

Results and Observations

The study was conducted on a total of 70 cases and the main focus was to demonstrate histopathological spectrum and immunohistochemical profile of adrenal tumours. Out of 70 cases of adrenal neoplasms, histopathological spectrum of adrenal masses is shown in table 1.

Table 1

Mass	Frequency	Percentage
Hyperplasia	3	4.3
Adenoma	12	17.1
Carcinoma	2	2.9
Neuroblastoma	3	4.3
Ganglioneuroma	2	2.9
Metastasis	1	1.4
Non-specific	2	2.9
Myelolipoma	14	20.0
Pheochromocytoma	31	44.3

Majority of cases 53(75.7%) were benign whereas 15 (21.4%) cases were malignant. The age was ranging between 2-70 years. Most common symptom was hypertension followed by muscle weakness and others. VMA was the most common biochemical test done and was elevated in 16 (51.6%) cases of pheochromocytoma and other arenal masses also.

Immunohistochemistry panel used included Melan-A, Inhibin, neuron-specific enolase, Pan CK (AE1, AE30), synaptophysin, chromogranin, NSE, S-100 as shown in Table 2.

Table 2

Tumor type	Frequency	Inhibin	Melan -A	Synaptophysin	Chromogranin	Neuron Specific enolase	s-10	Pan K (AE1&AE3)
Pheochromocytoma	23	-	-	+17/23	+16/23	+16/23	+23/23	-
Adenoma	10	+10/10	+7/10	-	-	-	-	-
ACC	2	+	+	-	-	-	-	-
Metastasis	1	-	-	-	-	-	-	+
Neuroblastoma	4	-	-	+3/4	+4/4	+2/4	-	-
Ganglioglioma	1	-	-	-	-	+	+	-

Discussion

In our study, out of 70 cases, pheochromocytoma was the most common adrenal neoplasm followed by myelolipoma, adrenal adenoma, hyperplasia, neuroblastoma, carcinoma, ganglioneuroma, metastasis and some non-specific lesions.

The age group in our study with adrenal masses was ranging between 2 to 70 years. They can occur at any age. We found the mean age for adrenal masses was 31.7 years for adenoma, 48.0 years for hyperplasia, 56.5 years for carcinoma, 5.7 years for neuroblastoma, 29.5 years for ganglioneuroma, 41.0 years for metastasis, 44.7 years for myelolipoma and 39.7 years for pheochromocytoma. Which was comparable to many studies [7-10].

In our study, adenoma, myelolipoma and pheochromocytoma were seen more in females compared to males with equal distribution of adrenal carcinoma in males and females and female preponderance in adenoma and myelolipoma comparable to a few studies [7,11-13]. Adenoma was seen unilaterally with more cases on right side, bilateral hyperplasia was more common compared to unilateral, Pheochromocytoma (fig 1) was more common on right side.

In our study benign lesions were found in 75.7% of cases and malignant in 21.4%. In our study most common presenting clinical features was hypertension in pheochromocytoma, adenoma and carcinoma. Abdominal mass was the most common presenting symptom in case of neuroblastoma and ganglioneuroma. Similar results were observed in some studies conducted [14-16]. We found the adenoma to be well encapsulated and partially encapsulated in equal number of cases, 2 cases of hyperplasia were well encapsulated and 1 was partially encapsulated. 1 case of carcinoma was well encapsulated. 1 case of non-specific lesion was well encapsulated. Out of 3 cases of neuroblastoma and 2 cases were well circumscribed. Both cases of ganglioneuroma were also well circumscribed. On cut section 9 cases of adenoma, 1 case of hyperplasia 1 case of metastasis and 2 cases of non-specific lesions were yellow to golden. 3 cases of adenoma, 2 cases of hyperplasia, 2 cases of neuroblastoma and 2 cases of ganglioneuroma were grey white in appearance. Both the cases of carcinoma were variegated in appearance. The results were consistent with a study conducted [7]. We found, 8 cases of adenoma and 1 case of hyperplasia had mixture of zona fasciculata

(majority) and zona reticularis with normal adjoining adrenal parenchyma. 4 cases of adenoma \had hyperplasia of zona reticularis with a foci of zona fasciculata. 2 cases of adrenal hyperplasia showed all the three hyperplastic zones with nodule formation. Neuroblastoma showed uniform cell population. Ganglioneuroma showed dual cell population comprising of ganglion cells and Schwann cells (fig 2).

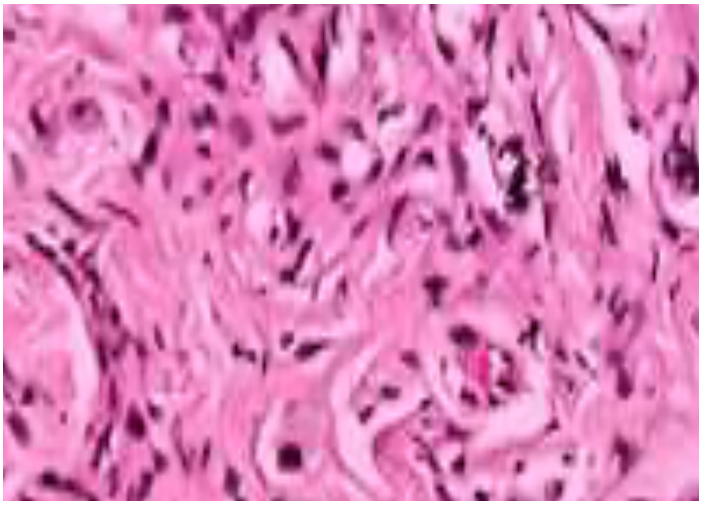

Figure 1

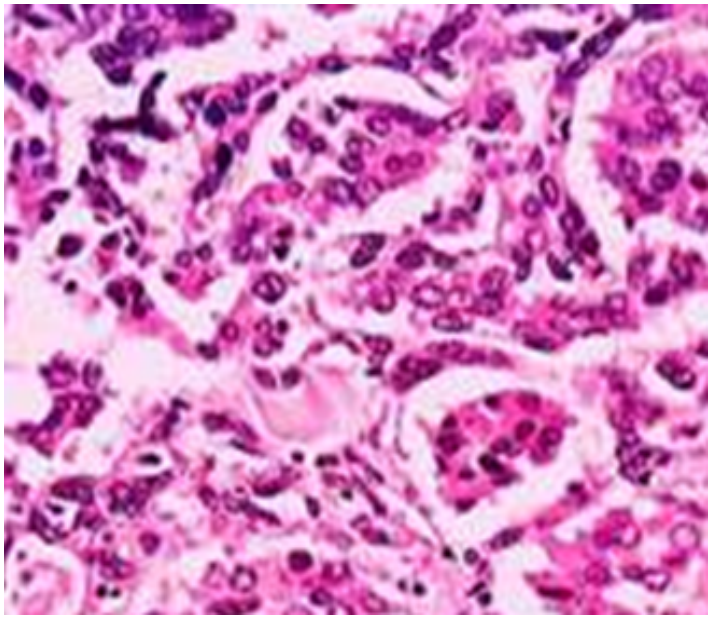

Figure 2

Metastasis had a small cell morphology. The study in case of carcinoma found Individual cells with fine granular eosinophilic cytoplasm and centrally placed large nuclei with prominent nucleoli (fig 3)

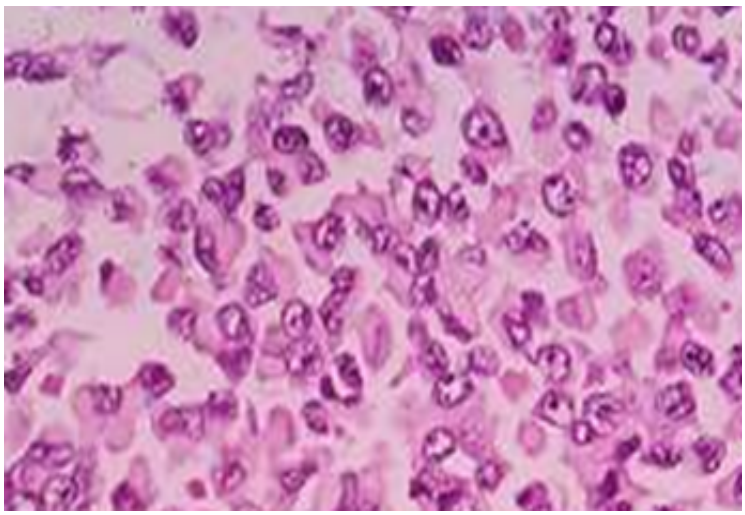

Figure 3

Extensive haemorrhage and necrosis were noted with ≥5 mitotic figures/high power field with atypical mitotic figures amongst them. These findings were consistent with some studies [7]. out of 31 cases, Zellballen pattern was seen in 23 cases, solid pattern in 7 cases and 1 case had alveolar pattern. Capsular invasion was seen in 2 cases and vascular invasion was seen in 3 cases. Confluent necrosis was seen in 14 cases and haemorrhage was present in 18 cases. Mitosis was present in 13 cases.

Conclusion

To conclude, we encountered 70 cases of adrenal masses including almost one from each category of WHO classification. Majority of tumour were seen in the age group of 20 – 40 years with female preponderance. Pheochromocytoma was the commonest tumour encountered. Adrenal neoplasms although not so common, they are encountered in routine practice, overall, they are amenable to surgical modalities and have good prognosis.

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