

A case series of adrenal lesions in a tertiary care hospital

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Abstract

Introduction: Adrenal lesions as such are very rare conditions, which are incidentally detected through an imaging procedure, performed for reasons unrelated to adrenal dysfunction or suspected dysfunction and are known as adrenal incidentalomas.¹ Its prevalence ranges from 1.4% to 2.9% worldwide. We report a series of three cases of adrenal lesions received at our hospital between the years 2011 and 2016.

Case series: In a series of three cases, we found that there was one case of Adrenal cortical adenoma, one case of nodular hyperplasia of adrenal gland and one case of adrenocortical carcinoma. Majority of the tumors were seen in the age group of 20-40 years with male preponderance and only 42.8% were detected coincidentally on imaging.

Conclusion: The three cases are reported here for their rarity of presentation.

Keywords: Adrenal tumours, Adrenal incidentaloma, Adrenocortical carcinomas.

Introduction

Adrenal gland is a bipartite endocrine gland divided into cortex and medulla having different development, structure and function. Cortex is derived from mesoderm and produces steroid hormones. Medulla is of neural crest origin and produces catecholamines. Large sized tumors, functional tumors and malignant tumors have poor prognosis and pose diagnostic challenges. Adrenal lesions as such are very rare conditions, which are accidentally detected through imaging procedures, performed for reasons unrelated to adrenal dysfunction or suspected dysfunction and are known as adrenal incidentalomas. Its prevalence ranges from 1.4% to 2.9% worldwide. In a study by Thomas A et al, the incidence of adrenal masses found on abdominal CT scans was between 0.6% and 1.3% whereas the incidence of these masses on all CT scans, including thoracic, abdominal, and pelvic, was between 0.4% and 4%.¹ We report a series of three cases of adrenal cortical lesions received at our hospital from 2011-2016 for a period of 5 years.

Materials and Methods

The present study was a retrospective study from the year 2011 to the year 2016 of all the adrenal cortical tumours received at our hospital which were found incidentally on radio imaging studies. Results of all the relevant biochemical investigations, hormonal assays and radiological findings were recorded. All the specimens were fixed in 10% formalin for 24 hours. Each specimen was grossed thoroughly. The weight, size, capsule, cut surface and other changes were recorded in the grossing format and analysed. Representative bits were taken, subjected to routine processing, embedded in paraffin, stained with routine hematoxylin and eosin stain. The histopathological sections were studied and the microscopic findings were correlated with the clinical data.

Case Series

The spectrum of adrenal nodular hyperplasia, adrenocortical adenoma and adrenocortical carcinoma are highlighted here.

Case 1: 43/F with complaints of bilateral loin pain, CT imaging of KUB showed enlarged limb of right adrenal gland more than 12mm.

Gross Description: Adrenals weighed 8 grams without fat and outer surface was unremarkable. Cut section showed a diffuse nodularity in the adrenal cortex with varying sizes of nodules; focal areas of congestion noted. No areas of necrosis seen grossly. Cut surface appears yellow diffusely and nodular.

Microscopy: Sections showed fragments of adrenal tissue with hyperplastic zona fasciculata forming irregular nodules admixed with nodules of zona reticularis. Cells are polygonal with lipid rich cytoplasm and regular rounded nuclei. Thin walled sinusoidal blood vessels are seen in the stroma. No evidence of necrosis or mitosis. Based on these findings, a diagnosis of nodular hyperplasia of adrenals was given.

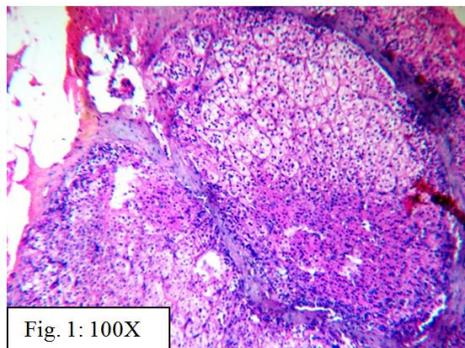


Fig. 1: 100X

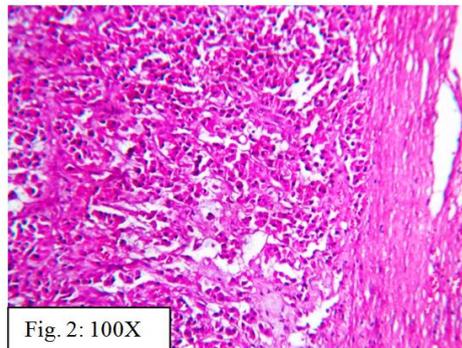


Fig. 2: 100X

Fig. 1: Low power view of nodular hyperplasia – Adrenal gland

Fig. 2: Low power view of adrenal cortical adenoma with an intact capsule in the periphery

Case 2: 28year old male with complaints of headache. On physical examination, blood pressure recorded was 210/110 mmHg. CT scan of KUB shows a homogeneously enhancing ovoid mass in the left adrenal gland of size 5 x 3 cm.

Gross Description: The adrenal gland weighed 25 gms and a yellowish homogenous circumscribed mass of 4x2x1 cm was seen. Cut section shows yellowish with orange spots.

Microscopy: Sections showed adrenal gland parenchyma with an adjacent capsulated neoplasm composed of oval to polygonal cells with abundant eosinophilic cytoplasm and uniform dark staining nuclei arranged in acinar and trabecular pattern in a background of thin fibrous stroma. Focally the cells showed dark eosinophilic granular cytoplasm and focal areas showed cystic degeneration, hyalinization and stromal edema with myxoid areas. No evidence of mitosis or nuclear atypia. Based on the above mentioned features, a diagnosis of adrenocortical adenoma was given.

Case 3: 38 year old male with complaints of pain in abdomen for 1 year, CT scan showed heterogeneous mass of 13 x 8 cm with areas of hemorrhage.

Gross Description: Adrenal glands weighed 40gms. A well circumscribed mass measuring 13x10x7cm was noted. External surface showed fibro fatty capsule with nodularity and areas of haemorrhage. Cut surface showed a haemorrhagic friable mass with reddish yellow areas in the periphery.

Microscopy: Section showed a cellular neoplasm composed of round to oval and spindle shaped cells with hyperchromatic and pleomorphic nuclei arranged in sheets, nests, trabeculae and in a perivascular pattern. Some cells show clear cytoplasm, others show dense granular cytoplasm. Mitotic figures are more than 5 per 50 high power fields. Stroma showed sinusoidal blood vessels, areas of necrosis, haemorrhage and hyalinization, based on the findings the diagnosis was given as Adrenocortical Carcinoma.

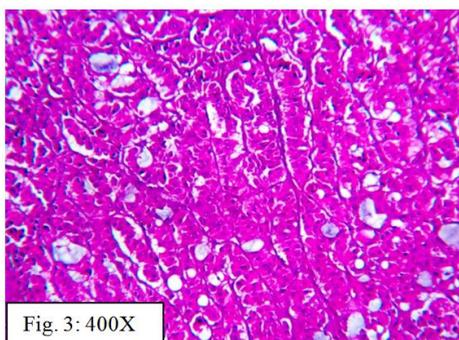


Fig. 3: 400X

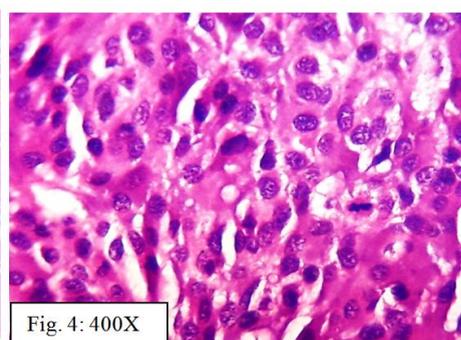


Fig. 4: 400X

Fig. 3: High power view of adrenal cortical adenoma

Fig. 4: High power view of adrenocortical carcinoma with mitotic figures

Discussion

An adrenal gland tumour is a benign or malignant neoplasm which has varied presentations and distinct clinical features, specific for each neoplasm. They are very rarely diagnosed due to the non-functional behaviour and at most found during a radiological examination for other diseases.

In our study the mean age of the patients was 36.3 years and mean size of the tumours was around 7 cm. Benign tumours were comparatively smaller than malignant ones. Size of the lesion also gives an indication of its etiology, the chances of malignancy being higher in larger tumors. In a study by Giordano et

al., there was no malignant tumours in a series of 118 patients, the average size being smaller than 4 cm.²

In USA, adrenal masses were found incidentally when computed tomography (CT) scans or magnetic resonance imaging (MRI) is done for other reasons. In a study of 61,054 abdominal CT scans performed from 1985 to 1990, an incidental adrenal tumour (incidentaloma >1 cm) was detected in 259 patients (0.4 percent of all CT scans).

The world-wide annual incidence of adrenocortical carcinoma is 1 per million and accounts for 0.2% of all cancer related deaths.^{3,4}

From a practical perspective, the most useful criteria to separate adenomas from carcinomas include tumour size, presence of necrosis, mitotic activity including atypical mitoses, invasive growth and high nuclear grade. Capsular invasion may be difficult to recognize because the expanding capsule may be a pre-existing adrenal capsule. Invasion of adjacent soft tissue, kidney or liver is definitive sign of malignancy.

Special studies may be useful in confirming the nature of the malignant tissue. Ultrastructural studies may show the distinct features of adrenocortical carcinoma which includes abundant smooth endoplasmic reticulum and mitochondria with prominent tubular or vesicular cristae.

Immunohistochemical studies that are most useful in identification of adrenal cortical carcinoma include melan A, inhibin- α and calretinin.⁵ Stains for cytokeratin are usually weakly positive, whereas vimentin is strongly positive. Synaptophysin is usually weakly positive in these tumors. Chromogranin is consistently negative.⁶

A marker for adrenal cortical cells, Ad4BP/SP-1, is relatively restricted in its distribution and may be useful in the diagnosis of adrenal cortical tissues. This protein is a transcription factor that is needed for embryonic development of adrenal cortical cells.

Molecular studies have characterized various genes that are differentially expressed in normal and benign compared with malignant adrenal cortical tumors. The phenotypes of Ki-67-negative, p53-negative, mdm-2-positive, cyclin-D1-negative, Bcl-2-negative, p21-negative and p27-positive cells were found in 83% of normal adrenal tissues, but only in 3% of malignant tumors.¹³ Giordano and colleagues performed microarray analysis of adrenal cortical tumors and reported upregulation of IGF2 in 10% of adrenal cortical carcinomas (90.9%).^{7,8}

Proliferation in related genes such as *TOP2A* and *Ki-67* was also upregulated in carcinomas. Velazquez-Fernandez et al performed expression profiling of seven patients with adrenal cortical carcinomas and 13 cases with adenomas and reported upregulation of ubiquitin-related genes (*USP4* and *UFDIL*) and insulin-like growth factor-related genes (*IGF2*, *IGF2R*, *IGFBP3* and *IGFBP6*). A cytokine gene (*CXCL10*) and cadherin 2 gene (*CDH2*)

were downregulated in carcinomas compared with adenomas.⁹

Prompt diagnosis and treatment of these tumours is essential as these tumours may secrete hormones and may have a grave clinical course. Primary adrenal tumours are very rare as such. In these three case reports, two were found incidentally on CT scanning.

Conclusion

The three cases are reported here for their rarity of presentation.

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