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STUDY OF CLINICOPATHOLOGICAL FEATURES AND MANAGEMENT OF ADRENAL TUMOURS IN TERTIARY CARE CENTER

Urology

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ABSTRACT

Adrenal neoplasms range from asymptomatic cysts to fatal carcinomas with a prevalence of 3% to 6%. Benign adrenal tumours dominate and outnumber malignant ones which include pheochromocytoma, adenoma, myelolipoma, and simple cysts. The most common malignant adrenal tumours are adrenocortical carcinoma, neuroblastoma, and metastasis from other organs malignant tumours.1 Considering the variant pathological views of adrenal tumours and their varying clinical symptoms, we evaluated the clinicopathological features of adrenal tumours and its management at King George Hospital/Andhra medical college, Visakhapatnam, a tertiary care center over 3 years period.

KEYWORDS

Adrenal tumors - malignancy - pathology – pheochromocytoma.

INTRODUCTION:

The adrenal glands are retroperitoneal organs located above the kidneys. Adrenal tumours have varied presentations namely symptoms of hyper or hypo function of adrenal gland, functionally silent adrenal tumours and symptoms due to mass of the tumour like pain abdomen, loss of appetite and loss of weight and some are detected incidentally during evaluation of non adrenal diseases (Incidentalomas).2 Increased function of the adrenal cortex creates three main groups of clinical syndromes related to elevated hormone levels: Cushing's syndrome, hyperaldosteronism, and a number of androgenic syndromes. Early diagnosis and management of adrenal tumours has undergone a significant change with the advances in biochemical evaluation, diagnostic imaging techniques, and progress in the field of minimally invasive surgery.3 Appropriate assessment of an adrenal mass is an essential prerequisite prior to its definitive treatment. In view of the various presentations of adrenal tumors, we aimed to evaluate the clinicopathological features of adrenal tumors in a 3 year period for the first time in king George hospital with respect to type, age, sex, side, clinical, pathological, and hormonal symptoms.

Materials and Methods: This is a prospective observational study over 3 years during which 24 patients of adrenal tumours have been studied, out of which 16 patients underwent surgical management (Adrenalectomy) and 8 patients were managed conservatively with serial follow up scans & hormonal evaluations. Descriptive statistical analysis has been carried out in the present study. Quantitative variables were expressed as mean and range, whereas qualitative data were presented as the number of observations with percentages.

Results: In this study, a total of 24 patients were enrolled of which 16 underwent surgery and 8 were conservatively followed with scans and hormonal evaluations. Demographic characteristics of patients along with anatomical side of lesions are presented in Table 1. The mean age at presentation was 35.62 years and the peak incidence of adrenal tumours was seen in 4th decade consisting of 33.33% (8) patients. Our study recorded higher incidence of tumors in female population (70%). Out of the 24 adrenal tumours studied, 10 tumours were of size less than 4 cm and 8 of them were adenomas (table 2). Out of the 16 patients who underwent adrenalectomy, postoperative biopsy showed that 87.50% (14) patients had benign tumours and 12.50% (2) patients had malignant tumours, both were adrenocortical carcinomas. Among 14 cases of benign tumours, 8 were pheochromocytomas, 3 were adrenal adenomas, and 1 case each of ganglioneuroma, paraganglioma & schwannoma (table 3).

Table 1: Demographics and side distribution of lesions

GENDER	MALE	7(29.2%)
	FEMALE	17(70.8%)
AGE (YRS)	10-20	2(8.3%)
	21-30	7(29.2%)
	31-40	8(33.3%)
	41-50	2(8.3%)
	51-60	5(20.8%)
LESION SIDE	LEFT	13(54.2%)
	RIGHT	11(45.8%)

Table 2: SIZE & TYPE OF TUMOUR DISTRIBUTION OF ADRENAL TUMOURS

Tumor type	<4cm	4-6cm	>6cm
Adenoma	8	3	0
Pheochromocytoma	2	3	3
Ganglioneuroma	0	0	1
Paraganglioma	0	1	0
Schwannoma	0	0	1
Adrenocortical carcinoma	0	0	2

Table 3 : TYPE OF HISTOPATHOLOGY OF ADRENAL TUMOURS

Tumor type	Number	Total
Benign (87.5%)	Adrenal adenoma	3
	Pheochromocytoma	8
	Ganglioneuroma	1
	Paraganglioma	1
	Schwannoma	1
Malignant (12.5%)	Adrenocortical carcinoma	2

Thirteen patients (13) patients were asymptomatic and 11 patients were symptomatic. Among the Symptomatic patients, 6 patients had pheochromocytoma, 2 patients had a carcinoma, and adenoma, schwannoma, paraganglioma, an adrenal cyst was seen 1 patient each. Among Asymptomatic patients 9 were adenomas, 2 pheochromocytomas and 1 case each of ganglioneuroma & adrenal cyst (table 4). Of the 11 patients who were symptomatic, hypertension & pain abdomen were the predominant symptoms, followed by headache, symptoms of Cushing's syndrome were seen in one patient, and weight loss was noted in 2 patients (table 5). Open adrenalectomy was performed in 14 patients and 2 underwent laparoscopic adrenalectomy.

Table 4: COMPARISON OF SYMPTOMATIC & ASYMPTOMATIC GROUPS

	Symptomatic	Asymptomatic
Adenoma	1	9

Pheochromocytoma	6	2
Adrenocortical carcinoma	2	0
Ganglioneuroma	0	1
Schwannoma	1	0
Paraganglioma	1	0
Cyst	0	1
Total	11	13

Table 5: CLINICAL PRESENTATION IN SYMPTOMATIC ADRENAL TUMOURS

Clinical feature	Number
Hypertension	8
Abdominal pain	6
Headache	5
Cushing syndrome	1
Weight loss	2

DISCUSSION:

In an attempt to fill the available knowledge gap in epidemiology, presentation of adrenal tumors and different management options, we reported clinicopathological features of adrenal tumors in a tertiary care hospital between 2016 and 2019. Although, the differential diagnosis of an adrenal mass is extensive, non-secreting cortical adenomas account for majority of tumors (41%), others' being metastases (19%), adrenocortical carcinoma (10%), myelolipoma (9%), pheochromocytoma (8%), benign lesions like adrenal cysts forming the remainder.4 In our series too, maximum were adenomas (41.6%). The optimal management of an adrenal tumor is aimed at identifying the malignant tumors from the benign lesions and the functioning from the non-functioning tumors. This is carried out by evaluation of the clinicopathological features, biochemical tests, and anatomical features demonstrated on CT or magnetic resonance imaging (MRI) scan. Most adrenal tumors are non-hypersecreting however, the following endocrine features may suggest subclinical hypercortisolism: High borderline free cortisol excretion, impaired cortisol rhythm, partial cortisol suppression with dexamethasone, low plasma adrenocorticotrophic hormone (ACTH), and unresponsiveness to corticotrophin releasing hormone.[5,6]

Size of the lesion also gives an indication of its etiology, the chances of malignancy being higher in larger tumors. A reasonable accepted cut-off value is 4 cm, beyond, which strong suspicion of malignancy should be entertained.7 In the present study most of the lesions are benign tumours, therefore the mean size of the tumour is less compared to other studies. In a study by Giordano et al.,118 patients were followed-up for an average of 3 years, an increase in the size of adrenal masses was noted in only 7 patients and a decrease in size occurred in 2 patients when the initial average size of tumors was 2.22 cm. Another significant correlation, which can be deduced is that there was no malignant tumor in a series of 118 patients, the average size being smaller than 4 cm.8 In CECT scan perinephric fat allows better visualization of the gland and 1 cm size lesion can be detected with 100% sensitivity. Benign tumors appear as smooth homogenous masses of low density with little contrast enhancement. A homogenous mass with a low attenuation value (<10 Hounsfield units [HU]) on a CT scan is likely to be a benign adenoma. Malignant lesions appear to be larger with irregular margins and heterogeneous density. MRI has high sensitivity and specificity. Dynamic gadolinium enhanced studies give more reliance to MRI scans.[9]

All patients must undergo systematic hormonal assessment after a complete history and clinical examination. Hormonal evaluation includes morning and midnight plasma cortisol measurements, 1 mg overnight dexamethasone suppression test, 24 h urinary excretion of catecholamines, metanephrines or plasma free metanephrines. Favia et al. have suggested the following tests to be conducted in all patients of incidentalomas: (1) Baseline plasma cortisol levels; (2) plasma aldosterone and plasma rennin activity (3) serum DHEA-S concentration; and (4) 24 h urinary epinephrine and nor-epinephrine. In the present study, 14 (58%) were metabolically silent and 10 (42%) were seen to be metabolically active, out of which 8 cases were pheochromocytomas, 1 case of aldosterone secreting tumor and another was cortisol producing type.[3]

The world-wide annual incidence of adrenocortical carcinoma is 1 per million and accounts for 0.2% of all cancer related deaths.10 Adrenocortical carcinoma may be functional with a clinically endocrine syndrome like Cushing's or it may be mixed syndrome as Cushing's with virilization. Virilization is due to dehydroepiandrosterone and dehydroepiandrosterone sulfate rather than testosterone.11 Adrenocortical carcinoma and neuroblastoma are two most common histological types of malignancies identified. We encountered two cases of adrenocortical carcinomas. The involvement of adjacent organs, renal vein or inferior vena cava (IVC) is frequent in adrenocortical carcinoma and represents a poor prognostic feature. The feasibility and efficacy of complete resection for adrenocortical carcinoma extending into these organs is questionable but can be associated with prolonged survival.12

Limitations of The Present study :

As adrenal tumours are rare, study duration has to be more for better interpretation of findings and for better follow up. Special & IHC staining will give more information on subtypes of adrenal tumours.

Conclusion: Highest incidence of adrenal tumors was noted in the fourth decade with increased incidence in females compared to males with the ratio being 2.4:1. Asymptomatic patients were more in number than symptomatic patients in our study. Benign tumors outnumbered malignant tumors with pheochromocytomas and adenomas being more common in our study.

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