Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(10C):3782-3786 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i10.045

Original Research Article

Adrenal tumours: Five years audit in a tertiary care centre

Dilip Kumar Pal[1], Vipin Chandra[2]
[1]Professor & Head, Department of Urology, Institute of Post Graduate Medical Education & Research, Kolkata-700020
[2]Post-Doctoral trainee, Department of Urology, Institute of Post Graduate Medical Education & Research, Kolkata-700020

***Corresponding author**
Prof. Dilip Kumar Pal
Email: drdkpal@yahoo.co.in

Abstract: Adrenal gland is not handled routinely by the urologist because it is not so common. Surgical indications are not clearly defined. We present here the cases of adrenals who had undergone surgery for various indications in last 5 years and will try to correlate with the mode of detection, its functional status, histopathological (HPE) reports and outcome after surgery.It is a retrospective study. Data of 52 patients were collected who had undergone adrenal surgery either unilateral or bilateral. Various parameters such as gender, age, size of the tumor functional status, histopathology, type of management and outcome have been reviewed. A total of 52 patients of adrenal lesions were studied retrospectively during 2010 to 2015. All cases were admitted in urology department either by outdoor basis or by transfer from endocrinology department. Twenty three patients were male and 29 were female. Mean age of the patient was 32.9 years (01 -62 years). Mean size of tumor was 4.98 cm (2.2 cm to 12.3 cm). For benign tumor mean size was 4.2 cm and for malignant tumor it was 7.28 cm. There were 47 benign cases and 5 malignant cases. One case was of adrenal Ewing's sarcoma (ES) in an 8 year old girl, very rare case. There were 23 of adenoma, 9 cases of myelolipoma, 7 cases of cyst, 5 cases of phaeochromocytoma, 2 cases of teratoma and 1 case of recurrent pituitary microadenoma. Among malignant tumor 4 cases of adreno-cortical carcinoma and 1 case of adrenal ES. There were 15 functional adrenal lesions (28.4%) out of 52 cases. Despite incidentally detected, adrenal lesion need proper evaluation with the help of endocrinologist. Benign conditions get cured after surgery and in malignancy survival depends upon extent of lesion and metastatic status of the tumor.
Keywords: Incidentaloma, teratoma, phaeochromocytoma, myelolipoma, adrenal-cortical carcinoma

INTRODUCTION:

Adrenal lesions can present with asymptomatic incidental detection to wide variation in clinical findings. Early diagnosis and proper evaluation is key for successful outcome. Patients should individualize by radiological imaging and functional assessments. Adrenal lesions detected by imaging studies done for other reason unrelated to adrenal pathology are called adrenal incidentalomas [1]. In this era of widespread use of computed tomography (CT) and magnetic resonance imaging (MRI), adrenal incidentaloma (AI) is becoming an increasingly frequent diagnosis. Once AI is detected, it needs full radiological and functional evaluation. The prevalence of AI based on reports summarizing the result of 25 autopsy studies is about 6 % [2-4]. The mean prevalence of AI using high-resolution Tuscans is about 4% [5-6] as the age advances, prevalence of adrenal incidentaloma increases. The differential diagnosis of the adrenal mass comprises a long list like adenoma, myelolipoma, cyst, lipoma, pheochromocytoma, adrenal carcinoma, adrenal tuberculosis, adrenal hyperplasia and metastatic adrenal deposits [7]. All patients of adrenal lesions should be evaluated for possibility of hyper functioning lesion of adrenal cortex or of adrenal medulla. If adrenal lesions are non-functional then all attempts done to know the nature of the lesion whether it is benign or malignant. Increasing size of the tumor is associated with more chances of malignant lesion [8]. Ultrasonography (USG) is considered sub-optimal for adrenal lesions. The most effective imaging modality for evaluation of an adrenal mass is the contrast enhanced computed tomography (CECT) because of peripherally located fat and it can detect even 1cm of lesion with 100% sensitivity [9]. MRI may be helpful in the diagnosis of phaeochromocytoma, where it can provide better information than CT scan. High signal intensity on T2-weighted MRI is characteristic of pheochromocytoma. Image-guided fine-needle aspiration (FNA) can be done in suspected cases of

metastasis with no primary visible or in a suspected case of Adrenal CA where pheochromocytoma has been ruled out. Adrenal biopsy should be pursued only when limitations of imaging have been reached and when the physician and patient are certain that the result of biopsy will influence the management.

MATERIAL AND METHODS:

This is a retrospective study of 52 cases of adrenal lesions operated in our department in last 5 years with a short follow-up. All cases were admitted either by outdoor evaluation or by referral from endocrinology department for surgery or transferred in from other department like endocrinology or medicine ward. All cases have been evaluated with the help of endocrinology department. All cases were evaluated by USG or computed tomography (CT scan) of the abdomen. When required, MRI and in some cases functional imaging such as MIBG scan and FDG-PET scan had performed. Demographic profile and data on adrenal lesion and associated clinical findings were recorded. Tumor profile and functional status were recorded. What treatment offered to the patient prior to admission for surgery was recorded. Functional assessment done in all cases that include plasma cortisol measurement, dexamethasone suppression test, urinary metanephrine and urinary catecholamines with the help of endocrinology department. One case of adrenal ES was evaluated by fine needle aspiration cytology (FNAC) and immunohistochemistry (IHC). Bilateral lesions were detected in 7 cases out of which 3 cases are of bilateral phaeochromocytoma, one case of pituitary microadenoma which had recurred after surgery, 3 cases of Cushing's disease. Out of bilateral pheochromocytoma cases one case of metachronous phaeochromocytoma who had operated 17 years back for urinary bladder phaeochromocytoma. All patients had undergone surgery, 28 cases by laparoscopic transperitoneal approach and rest 24 cases by open trans-peritoneal approach. In seven cases of bilateral cases bilateral laparoscopic surgery done, in 4 cases in same sitting and in rest three cases in two different sittings. Post-operative follow-up included clinical examination for every 3 months, USG every 6 months and CT scan yearly.

RESULTS:

A total of 52 patients of adrenal cases had undergone surgical management either by open or laparoscopically in last five years in our institute which is a tertiary care centre. Twenty three patients were male and 29 were female. Mean age of the patient was 32.9 years (01-62 years). One year child was operated with the help of pediatric surgeon. Mean size of tumor was 4.98 cm (2.2 cm to 12.3 cm). For benign tumor mean size was 4.2 cm and for malignant tumor it was 7.28 cm. There were 47 benign cases (90.38%) and 5 malignant cases (9.6%). One case was of adrenal Ewing's sarcoma (ES) in an 8 year old girl, very rare case. There were 4 cases of adrenal cortical carcinoma, 9 cases of myelolipoma, 23 of adenoma, 2 cases of teratoma, 7 cases of cyst, 5 cases of phaeochromocytoma and 1 case of recurrent pituitary microadenoma. There were 15 functional adrenal lesions out of 52 total cases (28.4%).

Twenty-two cases (42.3%) were detected incidentally and later evaluated and planned for surgery. Usually AI is rare but as we got referred and evaluated cases of adrenal tumor so this is the data. Seventeen cases (32%) were presented with dull non-colicky mild to moderate intensity pain abdomen (Table-2) Eight cases have cushing's syndrome (15.3%) due to cortisol hyper-secreting adrenal adenoma or hyperplasia. Four cases (7.6%) having hypertension and 1 case (1.9%) present with features of virilization (Table-1)

On collecting records we got 31 cases (59.61%) having tumor size was less than 5 cm and other 20 cases (38.4%) having more than 5 cm. One case has no adrenal tumor but operated for failed surgery of pituitary microadenoma and having features of Cushing's syndrome. Most of the tumors (42.3%cases) were detected incidentally (Table-2) After searching HPE reports 5 cases were of malignancy (9.6%) and benign natures in 47 cases (90.38%)(Table-3). Among benign lesions most common of adenoma (48.9%) and myelolipoma (19.1%). Others includes 7 cases of adrenal cyst, 2 cases of teratoma and 1 case of hyper secreting adrenal cortex due to failed surgery of pituitary microadenoma. Functionally active tumor was in 15 cases (28.84%)

Table-1: **Clinical Profile of the study cases**

Age	Mean age 32.9 years (1 year -60 year)
Sex	Male-25 (48%), Female-27(52%)
Laterality	Right-32 cases (61.5%), left- 13 cases (25%), and Bilateral disease- 7 cases (13.4%)
Presentation	Incidentally detected- 22 cases (42.3%), Symptomatic-30 cases (57.6%)
Size of the lesion	< 5 cm lesion in 31 cases (59.61%), > 5 cm lesion in 20 cases (38.4%)
HPE findings	Benign nature in 47 cases (90.38%), Malignant in 5 cases (9.6%)
Functional status	Functional tumor in 15 cases (28.84%), non-functional in 37 cases (71.15%)

Table-2: Presentation of adrenal disease

Incidentally detected	22 cases (42.3%)
Pain abdomen	17 cases (32%)
Cushing's syndrome	08 cases (15.3%)
Hypertension	4 cases (7.6%)
Virilization	1 cases (1.9%)

Table-3: Histopathology of cases

Histopathological diagnosis	Total number of cases
Benign	47 cases (90.38%)
Adenoma/hyperplasia	23 cases (48.9%)
Myelolipoma	09 cases (19.1%)
Cyst	07 cases (14.8 %)
Phaeochromocytoma	05 cases (10.6%)
Teratoma	02 cases (4.2%)
Pituitary microadenoma	01 case (2.1%)
Malignant	05 cases (9.6%)
Adreno-cortical carcinoma	04 cases (80%)
Adrenal Ewing's Sarcoma	01 case (20%)

DISCUSSION:

Adrenal disease present with wide variability in clinical presentation from asymptomatic to several non-specific symptom and symptoms due to hyper secreting hormones. There are several differential diagnosis of adrenal mass, such as cortical adenoma (41%), metastasis (19%), adrenocortical carcinoma (10%), myelolipoma (9%), pheochromocytoma (8%) and adrenal cysts [10]. We got filtered cases mostly from endocrinology department, so most of the cases we got was already diagnosed and has indication for surgery. For management of adrenal lesions it is required to know the nature, whether this is a benign or malignant lesion and whether it is functional or not. This is carried out by the proper history, clinical features, radiological examinations and functional assessment of the tumor by different biochemical tests. Most of the adrenal tumors are not functionally active but some borderline cases need assessment for example patients having upper range of plasma cortisol, altered low dose dexamethasone suppression test, altered rhythm of cortisol release, higher range of free plasma and urinary metanephrine need further evaluation [11-13]. Size is an important predictor of malignancy, larger tumor tend to be malignant. A cut-off value of 4cm is suggested, tumor larger than4 cm size having greater chances to be malignant [14]. Candel *et al.;* found that 97% of lesions larger than 3 cm in size were malignant while 87% of lesions smaller than 3 cm [15]. Herrera *et al.;* has reported only 1.5% rate of malignancy in their series of 342 patients and all were more than 5 cm in size [16]. In our study also size appears the important predictor of malignancy. But cystic lesion and adrenal teratoma can be of larger size. All malignant lesions in our study were more than 5 cm. One case of ES was of 12.3 cm and patient presented with abdominal lump and pain abdomen. Case was diagnosed by FNA and immunohistochemistry (IHC).

In our observation, 32 cases are of right side 61.5%, 13 of left side 25% and 7 cases (13.4%) are bilateral. Bilateral tumors may be metastatic disease, congenital adrenal hyperplasia, lymphoma, bilateral adrenal hemorrhage, ACTH dependent Cushing's syndrome, pheochromocytoma and amyloidosis and infection such as tuberculosis and fungal infections. Bilateral cases had undergone surgeries in two sittings.

For tumor characterization, USG is sub-optimal but it can detect tumor more than 2 cm and beneficial for follow-up. CECT can detect adrenal lesion of 1 cm with 100 % sensitivity and considered the investigation of choice [9]. Low attenuation tumor (Hounsfield unit [HU] < 10) and homogeneous appearance is suggestive of adrenal adenoma. Malignant tumor show irregular margin and heterogeneous enhancement. A threshold of 10 HU and 24 HU with a 14 minute delay on a CECT scan are used as cut-off values to differentiate between adrenal adenoma and metastasis [17]. MRI with gadolinium enhanced studies has also high sensitivity and specificity. Imaging performed 36-48 hr after injection of meta-iodobenzylguanidine (MIBG) is useful for detection of pheochromocytoma [18]. Positron emission tomography (PET) imaging with 18-F-fluorodeoxyglucose having very high sensitivity and specificity for detecting extra-adrenal metastasis [19]. All adrenal tumors should undergo evaluation for it's over secretion of hormones such as urinary cortisol, low dose dexamethasone suppression test, 24 hr urinary excretion of catecholamines, metanephrine or plasma free metanephrine. Any feature of virilisation should be assessed by serum DHEA, testosterone and 17-beta-hydroxyl estradiol. We got 1 case of virilising adrenal tumor in a 24 year old female. When patients with hypertension and hypokalemia, plasma aldosterone and plasma rennin activity should be measured to exclude Conn's syndrome. In our study we got 4 cases of

Conn's syndrome due to aldosterone hyper-secreting adrenal adenoma.

Fine needle biopsy is not recommend for initial evaluation of adrenal mass but according to National Institute of Health (NIH) CT guided FNA may be helpful in diagnostic evaluation of patients with a history of lung, breast and renal cancer with no other signs of metastasis and a heterogeneous mass in CT with HU more than 20 and pheochromocytoma had been excluded before the FNA to avoid hypertensive crisis. We have done FNA in case of adrenal Ewing's sarcoma. Myelolipoma is a benign condition and large size myelolipoma have risk of internal hemorrhage. We have 9 cases of myelolipoma operated in last 5 years. All cases are cured and on follow up without any recurrence till now. Pheochromocytoma present with headache, palpitation & hypertension and diagnosed by increased catecholamine levels in the serum, increased metanephrine in urine and by detecting chromogranin by IHC. We have 5 cases of pheochromocytoma, evaluated and later transferred to our department by endocrinology department for surgical management. One of the patients was of metachronous pheochromocytoma that was operated 17 yrs back for bladder pheochromocytoma. All patients still on follow-up with no evidence of recurrence. We had 5 cases of malignant adrenal tumor. One case was of adrenal ES and other 4 was of adreno-cortical carcinoma. Adrenocortical carcinoma may be functional with a clinically endocrine syndrome like Cushing's or it may be mixed with features of virilization [20]. Adrenocortical carcinoma have very poor prognosis and it should be differentiated before treatment with other benign lesions like adenoma, pheochromocytoma, or renal cell carcinoma. Our three cases of adreno-cortical carcinoma died due to recurrence and metastatic disease within 1 year of surgery and one patient has lost to follow-up.

Our study period is of 5 years and available follow-up period is not satisfactory to say regarding recurrence and survival of the cases, but available follow-up showing better surgical cure for benign adrenal lesion but poor for malignant one. Obviously malignancy survival depends upon the stage and metastatic status of the disease.

CONCLUSION:

Adrenal tumor needs special attention for its evaluation and management. Benign cases cured by surgery and malignant one need strategic approach. More study with large number of cases and prolonged follow-up required for commenting on survival and follow-up protocol. We got mostly referred cases of significant size and functional tumor.
We got 48.9% cases of adenoma followed by 19.1% myelolipoma and 10.6% pheochromocytoma.

Conflict of interest: none

REFERENCES:

1. Cohn K, Gottesman L, Brennan M. Adrenocortical carcinoma. Surgery. 1986 Dec; 100(6):1170-7.
2. Young Jr WF. The incidentally discovered adrenal mass. New England Journal of Medicine. 2007 Feb 8; 356(6):601-10.
3. Mansmann G, Lau J, Balk E, Rothberg M, Miyachi Y, Bornstein SR. The clinically in apparent adrenal mass: Update in diagnosis and management. Endocr Rev 2004; 25: 309-40.
4. Kloos RT, Gross MD, Francis IR, Korobkin M, Shapiro B. Incidentally discovered adrenal masses*. Endocrine Reviews. 1995 Aug; 16(4):460-84.
5. Barzon L, Sonino N, Fallo F, Palu G, Boscaro M. Prevalence and natural history of adrenal incidentalomas. European Journal of Endocrinology. 2003 Oct 1; 149(4):273-85.
6. Bovio S, Cataldi A, Reimondo G, Sperone P, Novello S, Berruti A, Borasio P, Fava C, Dogliotti L, Scagliotti GV, Angeli A. Prevalence of adrenal incidentaloma in a contemporary computerized tomography series. Journal of endocrinological investigation. 2006 Apr 1; 29(4):298-302.
7. Cook DM. Adrenal mass. Endocrinol Metab Clin North Am 1997; 26:829-52.
8. Aron D, Terzolo M, Cawood TJ. Adrenal incidentalomas. Best Pract Res Clin Endocrinol Metab 2012; 26: 69-82.
9. Khanna S, Priya R, Bhartiya SK, Basu S, Shukla VK. Adrenal tumors: An experience of 10 years in a single surgical unit. Indian journal of cancer. 2015 Jul 1; 52(3):475.
10. Aron DC. The adrenal incidentaloma: disease of modern technology and public health problem. Reviews in endocrine & metabolic disorders. 2001 Aug 21; 2(3):335-42.
11. Reincke M, Nieke JO, Krestin GP, Saeger WO, Allolio BR, Winkelmann WE. Preclinical Cushing's syndrome in adrenal" incidentalomas": comparison with adrenal Cushing's syndrome. The Journal of Clinical Endocrinology & Metabolism. 1992 Sep; 75(3):826-32.
12. Sasao T, Itoh N, Sato Y, Takahashi A, Tsukamoto T. Subclinical Cushing syndrome due to adrenocorticotropic hormone-independent macronodular adrenocortical hyperplasia: changes in plasma cortisol levels during long-term follow-up. Urology. 2000 Jan 31; 55(1):145.
13. Barzon L, Fallo F, Sonino N, Daniele O, Boscaro M. Adrenocortical carcinoma: experience in 45 patients. Oncology. 1997 Jul 1; 54(6):490-6.
14. Libe R, Dall'Asta C, Barbetta L, Baccarelli A, Beck-Peccoz P, Ambrosi B. Long-term follow-up study of patients with adrenal incidentalomas.

European Journal of Endocrinology. 2002 Oct 1; 147(4):489-94.
15. Herrera MF, Grant CS, van Heerden JA, Sheedy PF, Ilstrup DM. Incidentally discovered adrenal tumors: an institutional perspective. Surgery. 1991 Dec 1; 110(6):1014-21.
16. Candel AG, Gattuso P, Reyes CV, Prinz RA, Castelli MJ. Fine-needle aspiration biopsy of adrenal masses in patients with extraadrenal malignancy. Surgery. 1993 Dec; 114(6):1132-6.
17. Porcaro AB, Novella G, Ficarra V, Curti P, Antoniolli SZ, Suangwoua HS, Malossini G. Adrenal incidentalomas: surgical treatment in 28 patients and update of the literature. International urology and nephrology. 2001 Sep 1; 32(3):295-302.
18. Dackiw AP, Lee JE, Gagel RF, Evans DB. Adrenal cortical carcinoma. World journal of surgery. 2001 Jul 1; 25(7):914-26.
19. Sasao T, Itoh N, Sato Y, Takahashi A, Tsukamoto T. Subclinical Cushing syndrome due to adrenocorticotropic hormone-independent macronodular adrenocortical hyperplasia: changes in plasma cortisol levels during long-term follow-up. Urology. 2000 Jan 31; 55(1):145.
20. Gaujoux S, Brennan MF. Recommendation for standardized surgical management of primary adrenocortical carcinoma. Surgery. 2012 Jul 31; 152(1):123-32.
21. Lipstell MB, Hertz R, Ross GT. Clinical and pathophysiological aspects of adrenal carcinoma. Am J Med 1966; 41: 572-80.