CLINICOPATHOLOGIC ANALYSIS AND SURGICAL OUTCOME OF ADRENAL LESIONS- A SINGLE CENTRE EXPERIENCE

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ABSTRACT

BACKGROUND

Adrenal lesions are uncommon, often present with wide spectrum of manifestations, ranging from silent, benign incidentaloma to functional and rarely highly malignant neoplasm. We present our institutional experience regarding evaluation, management and outcome of adrenal lesions.

MATERIALS AND METHODS

A retrospective study was carried out in patients who had undergone adrenalectomy at our institution from 2009 to 2017.

RESULTS

A total of 41 patients underwent adrenalectomy during this period. Mean patient age was 45.7 years. Slight male (M/F =25/16) and left side (R/L = 17/24) predominance was noted. Silent incidentaloma 21 (52%) was the most common presentation. Similarly, the lesion was biochemically inert in 26 (63.4%) cases. As compared to open adrenalectomy, blood loss ($P=0.02$), analgesic requirement ($P=0.04$) and duration of hospital stay ($P=0.017$) was significantly lesser in laparoscopic group. Histopathological examination revealed a benign lesion in 38 (93.7%) cases. Mean duration of followup was 18.5 months. There was no evidence of recurrence in benign lesions.

CONCLUSION

A diligent evaluation is required in all cases in order to characterise these adrenal lesions. Benign lesions, when excised completely, result in excellent long term outcome. Minimally invasive surgery is preferred because of minimal blood loss, shorter hospital stay and better cosmesis as compared to open methods.

KEYWORDS

Adrenal Lesions, Incidentaloma, Laparoscopic Adrenalectomy.

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BACKGROUND

Adrenal lesions (Solid and cystic) although rare, can present with wide spectrum of manifestations. Prevalence in the autopsy series varies from 3 to 5%.¹ With widespread use of imaging methods (i.e. Ultrasound, Computed Tomography and Magnetic Resonance Imaging), prevalence has gone up to the range of 5-10 %.² The incidence increases with age with a probability of 0.2% in third decade to 7% in eighth decade.³ Most adrenal masses are unilateral, whereas bilateral lesions are noted in 8-15% cases.⁴ Majority of these lesions are silent in nature. Pathologically, mostly are benign, nonfunctioning adrenal adenomas, but sometimes they may become

functional and rarely malignant. A detailed history and physical examination, hormonal evaluation (serum cortisol, urinary metanephrines) and imaging (CT/MRI) is usually required to decide about the line of management. Except in metastatic adrenal masses, preoperative tissue diagnosis is not advocated, as it may lead to tumour spillage. Asymptomatic, small (<5 cm) and non-functional adrenal mass does not require treatment.⁵ Surgical excision is required in symptomatic, large and biochemically functioning tumours. Over the last decade, a significant number of adrenal lesions with varied manifestations were referred to our institution. In this study, we share our experience regarding management and outcome of various adrenal lesions.

MATERIALS AND METHODS

Study design is a case control study (original article). Case records of patients who had undergone surgery for adrenal lesions at Department of Urology, SCB Medical College Hospital from January 2009 to April 2017 were reviewed retrospectively. Data included were basic patient demographics, clinical features, investigations, surgical

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records, histopathologic report and followup outcome. Student's t test was used for continuous variable and Chi square test used for categorical variable. SPSS 20.0 (IBM, Chicago, USA) was used for statistical analysis. P value <0.05 was considered statistically significant.

RESULTS

A total of 41 patients underwent adrenalectomy during this period. Demographics and clinical characteristics of patients are given in Table 1. Out of 41 patients, 21 (52%) were incidentally detected on Ultrasound. Hirsutism was a presenting feature in 3 cases (Figure 1). CT scan of abdomen delineated pure cystic lesion in 12 (29.2%), pure solid lesion in 26 (63.6%) and mixed lesion in 3 (7.3%) cases, respectively (Figure 2). MRI was done only in cases of suspected pheochromocytoma. Hormonal evaluation included serum cortisol and 24-hour urine catecholamine in all cases. Serum potassium and plasma aldosterone level was done in suspected primary hyperaldosteronism. In addition, serum DHEA and 24-hour urine 17-ketosteroids levels were done in virilising adrenal lesions. Majority 26 (63.5%) of adrenal lesions were found to be non-secreting or biochemically inert. The results of biochemical evaluation are given in Table 2.

Open surgical exploration using midline/subcostal incision was carried out in 29 patients, whereas in 12 patients a transperitoneal laparoscopic adrenalectomy was performed. Normal adrenal gland was preserved in benign, non-functioning cystic lesions. In the rest, complete adrenalectomy was performed. There was no tumour spillage in any cases. Patient characteristics, operative parameters and surgical outcomes between open and laparoscopic adrenalectomy are given in Table 3. Final histopathologic examination revealed benign adrenal pathology in 38 (92.7%) cases and adrenocortical carcinoma was found in 3 (7.3%) cases (Figure 3). Different histopathologic findings are given in Table 4. Patients were followed up at every 3-6 months interval till date. Mean duration of followup was 18.5 (3-62) months. There was no evidence of recurrence in benign lesions. Out of 3 patients with diagnosed adrenocortical carcinoma, 2 died due to distant metastases after mean duration of 6.9 months.

Mean Age $\pm$ SD (yrs.)	45.7 $\pm$ 10.9
Male to Female(M:F) Ratio	25/16
Laterality	
Right	17
Left	24
Mean size of lesion (cm) $\pm$ SD	5.6 $\pm$ 1.1
Clinical Presentation	
Asymptomatic (Incidental finding)	21
Flank Pain	08
Hypertension	05
Hirsutism	03
Muscle Cramp	02
Others	02

Table 1. Demographics and Clinical Characteristics

Non-Functional/Biochemically Inert Lesion	26
Hypercorticism	8
Elevated serum cortisol, 24-hour urine cortisol	
Hyperaldosteronism	2
Hypokalaemia (<3.5 mEq/L)	
Increased plasma aldosterone (>15 ng/dL)	
Pheochromocytoma	4
Elevated 24-hour urine catecholamines	
Hyperandrogenism	3
Elevated DHEA/17 ketosteroids	

Table 2. Biochemical Findings

Characteristics	Open Approach (n=29)	Laparoscopic (n=12)	p value
Mean Operating time(min.) $\pm$ SD	95 $\pm$ 12.45	108 $\pm$ 14.67	0.08
Mean Drop in Hb level (g/dL) $\pm$ SD	1.6 $\pm$ 0.11	0.6 $\pm$ 0.04	0.02
Mean Duration of Hospital stay(days) $\pm$ SD	6.8 $\pm$ 3.47	3.7 $\pm$ 1.5	0.017
Mean Analgesic Requirement(mg) $\pm$ SD	570 $\pm$ 114.67	356 $\pm$ 96.69	0.04
Incidence of Complications	5/29(17.2%)	2/12 (16.7%)	0.56

Table 3. Comparison of Outcomes between Open and Laparoscopic Adrenalectomy

Adenoma	
Non-functioning benign adenoma	19
Aldosterone secreting adenoma (Conn's Syndrome)	02
Pheochromocytoma	04
Adrenocortical carcinoma	03
Cysts	
Epithelial cyst	02
Endothelial cyst	03
Pseudocyst	06
Parasitic cyst	01

Table 4. Results of Histopathologic Examination of Adrenal Lesions

Figure 1. Hirsutism as a Presenting Feature

Cystic Lesion

Solid Lesion (in arrows)

Mixed Heterogeneous Lesion

Figure 2. CT Scan Showing Various Types of Adrenal Lesion

a) Gross Features- Cut Section Shows Nodular Mass with Variegated Appearance

b) Low Power View (H&E x 10)- Capsulated, Highly Cellular

c) High Power View(H&E x 40)- Abnormal Mitotic Figure

Figure 3. Pathological Findings in Adrenocortical Carcinoma

DISCUSSION

The adrenals are paired retroperitoneal glands; secrete various hormones which are critical for a wide variety of physiological functions. Over the last decade, prevalence of adrenal lesions has been increased considerably due to widespread use of imaging techniques. Lesions in adrenal

glands (both solid and cystic) can exhibit wide spectrum of clinical manifestations. Adrenal lesions may present as incidentaloma, or may produce symptoms due to local mass effects (i.e. flank pain, haematuria, and palpable lump) or production of hormones (i.e. hypertension, palpitation, headache, muscle cramps, hirsutism).⁶

Adrenal incidentaloma is defined as an adrenal mass that is >1 cm discovered incidentally on imaging studies in a patient without signs or symptoms of adrenal disease or known malignancy.⁷ The prevalence of adrenal incidentaloma varies according to the age group. In patients younger than 30 years, the prevalence is <1%, which increases to 7% in patients older than 70 years.⁸ CT scan is the mainstay of imaging of the adrenal glands. In addition to identifying the lesion, it also gives information about density, size, calcification, necrosis, local invasion and spread.⁹ Overall prevalence of adrenal incidentaloma on CT scan is 4%.¹⁰ In our series, 21 (52%) patients presented as incidentaloma. Majority of adrenal incidentaloma are benign and biochemically not active. These lesions do not require any further treatment, as studies have shown that when these masses are left alone, they continue to remain small and asymptomatic over years. Objectives of evaluation in patients with adrenal incidentaloma are (i) to rule out functioning adrenal mass and (ii) to differentiate primary from secondary malignancy. Distinguishing the masses helps in pre-operative preparation and perioperative management according to the type of functioning lesion.

Cystic lesions of adrenal gland are rare, accounts for 4-22% among all adrenal lesions.¹¹ First they were reported by Grieselius in 1670. Histologically, these cystic lesions are traditionally classified into 4 types according to the origin. i.e. endothelial cysts (most common), 45%; epithelial cysts, 9%; pseudocyst/haemorrhagic, 39% and parasitic cysts, 7%.^{12,13} The prevalence of cystic adrenal lesions in our series is higher (29.2%) as compared to other reported series. In addition, pseudocyst was the most common adrenal cystic lesion (50%). Basic hormonal work-up is necessary in all cases of adrenal cysts in order to rule out a subclinical functional disease. Factors such as hormonal activity, incidental finding of malignancy and the potential complications, such as haemorrhage, rupture, infection into the cyst should be taken into consideration while managing such adrenal lesions. Adrenocortical carcinomas can be associated with cysts that are benign on imaging; hence extensive sampling of resected tissues has been suggested to rule out malignancy. Neri and Nance reported a 7% incidence of malignancy in their review of over 600 cases of adrenal cysts from the literature.¹⁴

NIH 2002 consensus recommends surgical intervention in large (>5 cm), symptomatic and/or functionally active adrenal lesions.¹⁵ Adrenalectomy can be performed in open, laparoscopic and robotic manner. Laparoscopic adrenalectomy was first described by Gagner et al in 1990.¹⁶ Since then minimally invasive techniques have become established as the primary surgical approach for benign adrenal disease.¹⁷ We have been routinely doing laparoscopic adrenalectomy since last 5 years and open adrenalectomy is reserved only for complicated cases such as large cyst size, invasion of adjacent organs and malignant masses. In a comparison of outcome between open and laparoscopic adrenalectomy, we found blood loss (P=0.02), analgesic

requirement (P=0.04) and duration of hospital stay (P=0.017) were significantly lesser in laparoscopic group.

No definite guidelines exist regarding followup after adrenalectomy. Prognosis is excellent in cases of benign lesions. In our study, out of 38 patients with benign histology, none had recurrence till date. In the case of adrenocortical carcinoma, a strict radiological followup in the post-operative period is required to detect the high rate of locoregional and metastatic recurrence.¹⁸ Imaging of chest, abdomen, and pelvis is recommended at 3-month interval for the first 2 years.¹⁹ Outcome is uniformly poor in adrenocortical carcinoma.²⁰

CONCLUSION

Adrenal lesions are rare, with heterogeneous aetiology and clinical behaviour, often encountered by urologists. A detailed clinical and radiological assessment is essential to identify masses that require surgical treatment for hyperfunction or suspected malignancy. A multidisciplinary team is required for management. In cases of surgical intervention, minimally invasive approach (Laparoscopic/Robotic) is preferred over open method. Outcomes of surgery are excellent in benign lesions whereas a close followup is needed in malignant lesions.

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