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Original Research Article.

Laparoscopic Adrenalectomy: 7-Year Experience in a Tertiary Hospital in Bangladesh

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ABSTRACT

Background: Laparoscopic adrenalectomy offers low morbidity rate, short hospitalization time, improved cosmesis and a rapid recovery. For this reason, it has now become the gold standard for benign adrenal masses. In this study we tried to compile the characteristics of adrenal mass and surgical parameters of laparoscopic adrenalectomy done in our center in last 7 years.

Methods: Total 43 patients were enrolled in this study from January 2013 to December 2020 and underwent LA under general anesthesia. Preoperative endocrine evaluation was performed in all patients. All the patients had contrast enhanced CT scan of KUB before surgery and only those with radiological feature of benign adrenal mass either functional or nonfunctional were included in the study. Smaller incidentaloma (< 4 cm) and suspected malignant mass were excluded. In all these cases demographic data like age, sex, laterality, tumor characteristics and surgical parameters like operating time, blood loss, hospital stay were recorded. Recommended preoperative preparation for functional tumors were take where indicated.

Results: Total 43 patients with mean age of 51.2 years underwent laparoscopic adrenalectomy in the study period. 44.2% were diagnosed incidentally and 55.8 % had symptoms. Nonfunctioning adenoma was 51.2%, Pheochromocytoma was 18.6%, Cushing was 16.3% and Conns was 9.3%. Mean operating time was 107 minutes, mean blood loss was 89 ml. Only one patient needed blood transfusion. Conversion to open surgery was needed in one case. Mean hospital stay was 4.2 days. No major postoperative complication was observed.

Conclusion: Laparoscopic adrenalectomy is a safe and feasible procedure which provides rapid recovery, early ambulation, shorter hospital stays and over all less postoperative morbidity.

Keywords: Laparoscopic Adrenalectomy, Adrenal Mass, Pheochromocytoma, Conns Disease, Cushing, Incidentaloma.

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INTRODUCTION

Perhaps no organ is better suited for laparoscopic surgery than the adrenal gland, by reason of its small size and its relatively difficult location in the retroperitoneum. Laparoscopic approach is better suited for benign adrenal masses. Large malignant adrenal tumors are usually operated by open approach due risk of hemodynamic instability and tumor dissemination. This open approach is associated with more postoperative pain, longer hospital stays and more morbidity.[1]

Laparoscopic adrenalectomy (LA) was described in 1992 by Gagner et al.[2] Laparoscopic adrenalectomy offers low morbidity rate, short hospitalization time, improved cosmesis and a rapid recovery.[3] For this reason, LA has now become the gold standard for benign adrenal masses. Initially laparoscopic approach was selected for small adrenal mass, but experience surgeons can remove large adrenal mass by this technique.[4,5]

Many techniques for LA have been described, the most popular is the lateral transabdominal approach and retroperitoneoscopic adrenalectomy.[6,7] In this study we used transabdominal approach for LA for treating benign adrenal mass, both functional and non-functional incidentaloma.

MATERIALS AND METHODS

A total of 43 patients with benign adrenal tumors admitted in Urology ward of Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh was enrolled in the study and underwent LA from January 2013 to December 2020. All of the patients had contrast enhanced CT scan (CECT) of the KUB to determine the nature of the adrenal tumor by radiological features. Also, functional assessment of the tumor was done before surgery. Overnight low dose Dexamethasone suppression test (DST), 24-hour Urinary cortisol level and serum electrolytes were done for all the patients. Patients with hypertension (HTN) were also evaluated by 24-hour Urinary metanephrine level and morning plasma aldosterone level. Patients with incidentaloma of ≥ 4cm size and hyperfunctional adrenal tumor of any size with radiological features of benign adrenal mass was selected for LA. Cases with suspected malignant adrenal tumors or incidentaloma measuring less than 4 cm were excluded from the study.

Before surgery, all patients underwent laboratory tests chest X-ray, ECG examination for anesthetic fitness. Appropriate pharmacological treatment was started in case of pheochromocytoma (PCC) and Conn syndrome. Diagnosed cases of pheochromocytoma received alpha-1 blocker and if needed Beta blocker for cardiac stabilization and control of blood pressure.

LA were performed using a standard transperitoneal laparoscopic approach in lateral position. 4 ports were used for right adrenalectomy and 3 ports were used for left adrenalectomy. Patients with pheochromocytoma received IV crystalloid preload before surgery. During surgery several parameters like blood loss, operating time, any peroperative complications were noted. Intraoperative systolic blood pressure (SBP)> 180 mmHg was defined as hypertensive crisis and SBP < 90 mmHg was defined as hypotensive crisis.

During the postoperative period early mobilization and feeding was given on the first postoperative day (POD). Drain tube was removed on the second or third POD. Any major or minor complications were recorded. Postoperative morbidity and duration of hospital stay were also recorded.

Continuous variables are given as the mean± SD, categorical variables as relative frequencies. Complications after surgery was classified according to the Clavien-Dindo classification.[8]

Table 1: Demographic data

N = 43		Percent
Mean Age, median (Range)	51.2 (22- 78)	
Male (n)	17	39.5
Female (n)	26	60.5
Clinical presentation		
Asymptomatic incidentaloma (n)	19	44.2
Symptomatic (n)	24	55.8
Resistant HTN	9	20.9
Loin pain	12	27.9
Extreme lethargy and limb weakness	3	6.9

Table 2: Characteristics of adrenal tumors

N = 43		Percent
Size in cm, Mean (range)	5.8 (3-18)	
Right side (n)	23	53.4
Left side (n)	20	46.6
Nonfunctioning Adenoma	22	51.2
Pheochromocytoma	8	18.6
Aldosterone secreting tumor	4	9.30
Cortisol secreting tumor	7	16.3
Adrenal cyst	01	2.33
Myelolipoma	01	2.33

Table 3: Surgical parameters

N = 43	
Mean operating time in minutes	107 (range 76-180)
Mean intraoperative blood loss (ml)	89 (range 40-290)
Hypertensive crises (SBP > 180 mmHg)	02 (4.6 %)
Hypotensive crises (SBP < 90 mmHg)	0 (0 %)
Conversion to open procedure (n)	1 (2.33%)
Mean Hospital Stay (days)	4.2 (range 3-8 days)
COMPLICATIONS	
Minor complication [a]	02 (4.65%)
Major Complication [b]	0 (0%)

a = Grade I – IIIa Clavien-Dindo classification of surgical complications[8]

b = Grade IIIb – V Clavien-Dindo classification of surgical complications[8]

RESULTS

Total 43 patients were enrolled in this study from January 2013 to December 2020 and underwent LA under general anesthesia. Mean age of the patients was 51.2 years, 60.5% were female and 39.5% were male (Table 1). Among the 43 patients, 44.2 % cases of adrenal mass were diagnosed incidentally who showed no symptoms related to adrenal mass at the time of diagnosis. Majority of the patents (55.8%) presented with either resistant HTN, loin pain or muscular weakness which is 20.9%, 27.9% and 6.9 % respectively (Table 1).

All the patients had unilateral tumor, 53.4% on the right side and 46.6 on the left. No case of bilateral adrenal mass was found in this series. Mean size of the tumor was 5.8 centimeters. The largest adrenal tumor we removed by LA was 18 cm and was a benign nonfunctioning adenoma (Table 2). Mean operating time was 107 minutes. Highest operating time was 180 minutes in a 11 cm tumor where right adrenal vein tear lead to conversion to open surgery. This patient lost about 290ml of blood and was replaced by 1 unit of whole blood during surgery. No other patient required blood transfusion. Mean intraoperative blood loss was about 89 ml (Table 3).

Two patients with pheochromocytoma developed hypertensive crisis (SBP > 180 mmHg) during surgery, which was promptly managed by anesthetist without any cardiac or peroperative complication. No patient had hypotension during surgery or in the post-operative period. Only two patient had minor postoperative complication as port site infection. One of them required secondary suture under local anaesthesia. No major complication was observed. Mean hospital stay was 4.2 days (Table 3).

DISCUSSION

Laparoscopic adrenalectomy (LA) has now replaced open adrenalectomy (OA) in case of benign adrenal mass. Since Gagner et al first described La in 1992, the technique has gained popularity among the surgeons for its less morbidity, rapid recovery, excellent cosmesis and early return to work.[2, 9] With the advent of modern instruments and energy sources even larger adrenal tumors can be safely removed by laparoscopy.[4] In This study the largest tumor we removed by LA was 18 cm in maximum diameter.

OA is now a days reserved for mostly malignant adrenal mass. Because LA for malignant tumor is associated with higher chance of tumor spillage, higher rate of early local recurrence, higher rate of incomplete resection and lower survival rate.[10,11] In this study we excluded the cases with tumors that are likely to be malignant according to their radiological feature. None of our 43 specimens after LA came out to be malignant after histopathological examination, thanks to the accuracy of preoperative ultrasonogram (USG) and CECT.

With the widespread availability and use of imaging like USG and CT scan, many adrenal tumors are being diagnosed incidentally while investigating for some other symptoms. 44.2 % of cases in our study was diagnosed incidentally. Among the symptomatic patients, most common symptom was loin pain (27.9%). This group of patients had larger tumor and the pain may be due to pressure to adjacent structure or capsular stretching. 9 patients presented with resistant HTN that was not controlled even after three antihypertensive drugs. 8 of these cases turned out to be pheochromocytoma and other one was Conn's disease. Although al the patients with pheochromocytoma received preoperative Alpha blockade and Beta blockade, 2 of them developed hypertensive crisis (SBP>180 mmHg) during manipulation of the tumor. 7 patient had cortisol secreting tumor. Interestingly none of the developed any wound infection or postoperative hypotension. The 2 patient who developed wound infection had nonfunctioning adenoma. It is not clear what caused the infection, however one of them was diabetic although controlled by insulin.

The operating time was a bit longer in initial 25 cases, but as experience was gained later cases took less time to operate. Several literatures also showed that learning LA requires around 30 cases.[12-14] Mean blood loss was below 100 ml and most of the patient didn't require blood transfusion. Only one patient required blood transfusion due to loss of around 290 ml of blood. This was due to tearing of right adrenal vein during dissection of a large mass. Which was later converted to open surgery. This was one of the initial cases of the series and remains the only conversion in this study period.

Postoperative period was mostly uneventful. Patients could be mobilized on first POD and most of them were discharged within five days after surgery. Patients with nonfunctional adenoma was discharged even earlier. But cases with functional tumor was kept a bit longer at hospital for monitoring their cardiovascular stability after surgery. Patients with Cushing required oral corticosteroid supplement after surgery which was later tapered down over period of several months allowing the contralateral adrenal gland to recover from suppression.

Although 7 years is long time, but our sample size is not very high as adrenal tumors are not very common. Moreover, this was a single center study. As the place of the study is a teaching hospital, surgical team was not the same in all cases, although principal surgeons were same.

Adrenal operations are uncommon operations for most of the hospitals. This requires close cooperation between the surgeon, endocrinologist and radiologists as well as anesthesiologist. So, to manage adrenal mass a good multidisciplinary team is essential. For this reason, tertiary care hospitals are ideal for management of adrenal mass.

CONCLUSION

LA is safe and feasible also for large benign lesions. It offers decreased blood loss, lower morbidity, shorter hospitalization, faster recovery, and overall cost-effectiveness. A skilled operative team, composed by surgeons experienced in LA after adequate learning curve, is recommended.

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