

Adrenalectomy with Minimally Invasive Approach

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Abstract

Objective: Laparoscopic adrenalectomy is considered to be the standard technique for the surgical removal of the adrenal gland for benign conditions. This report is a four-year single centre experience with transperitoneal laparoscopic adrenalectomy.

Methods: From 2015 to 2019 a total of 18 patients with a preoperative diagnosis of benign adrenal tumor were operated with minimally invasive approach. Patient's demographics, histopathological findings, operation time, hospitalization time and complications were evaluated and compared with the literature.

Results: All of 18 operations were completed with minimally invasive approach without converting to open surgery. 5 right and 13 left adrenal glands were removed with laparoscopy. Indications were Cushing's syndrome in 9, Conn's syndrome in 6, Pheochromocytoma in 2 and a non functional adenoma in 1 patients. Histopathologic examination revealed an adenoma in 13 patients, hyperplasia in 2, pheochromocytoma in 2 and a carcinoma in 1 patients. Average operation time was 122 minutes and hospital stay was 3.5 days.

Conclusion: Benefits of laparoscopic adrenalectomy include shorter hospital stay, quicker recovery, less incidence of complications with reduced risk of herniation or wound separation. Laparoscopic adrenalectomy should be considered as the first choice treatment for benign adrenal tumors.

Keywords: Adrenalectomy, Adenoma, Cushing's syndrome, Conn's syndrome, Pheochromocytoma

I. INTRODUCTION

Adrenalectomy was performed by either transabdominal or lumbar large incisions since Gagner et al described minimally invasive adrenalectomy in 1992, in a case series of 3 patients who had laparoscopic adrenalectomy [1]. Laparoscopic adrenalectomy (LA) is considered to be the standard technique for the surgical removal of the adrenal gland for benign conditions. Benefits of laparoscopic adrenalectomy include shorter hospital stay, quicker recovery, better cosmetic results, less incidence of complications with reduced risk of herniation or wound separation [2].

The anatomical location of the adrenal gland has led to a number of laparoscopic approaches, including posterior or lateral retroperitoneal, transthoracic, and lateral transperitoneal. Each approach has specific advantages and disadvantages [3]. In this paper we review the lateral transperitoneal technique used for LA.

II. MATERIALS AND METHOD

We retrospectively reviewed the medical records of patients who had adrenalectomy between January 2015 and January 2019. Open adrenalectomies and patients below age 18 were excluded. Demographic data, diagnostic workup, surgical treatment patterns, histopathologic features and outcome parameters were documented. Follow up date was collected from medical records and telephone interviews. The collected data was coded using "SPSS 20.0" computer

programme but due to restricted number of the study population we did not perform statistical analysis

Operative Technique: All patients had lateral transperitoneal laparoscopic adrenalectomy. All patients had a complete endocrine evaluation before surgery. A clear liquid diet administered the day before surgery and a mechanical bowel preparation was done with rectal enemas on the day of surgery. Patients were placed in semilateral decubitus position. Abdominal cavity is entered with open technique using Hasson trocar at the lateral border of rectus abdominus muscle just above to the umbilicus. 3 trocars are used for left sided lesions and 4 trocars for right sided lesions.

III. RESULTS

All of 18 operations were completed with minimally invasive approach without converting to open surgery. 5 right and 13 left adrenal glands were removed with laparoscopy. There were 17 females and just one male patient. The mean age of the patients was 53.

Indications were Cushing's syndrome in 9, Conn's syndrome in 6, Pheochromocytoma in 2 and a non functional adenoma in 1 patient as shown in table 1.

Table 1. Indications of adrenalectomies

| Indication | number | percentage |
|--------------------|--------|------------|
| Cushing's syndrome | 9 | 50 |
| Conn's syndrome | 6 | 33 |
| Pheochromocytoma | 2 | 11 |

| | | |
|------------------------|---|---|
| Non-functional adenoma | 1 | 6 |
|------------------------|---|---|

Average tumor diameter was 3.3 cm (1-10 cm). Histopathologic examination revealed an adenoma in 13 patients, hyperplasia in 2, pheochromacytoma in 2 and a carcinoma in 1 patients as shown in table 2.

Table 2. Final diagnosis after histopathologic examination

| Diagnosis | number | percentage |
|------------------|--------|------------|
| Adenoma | 13 | 72 |
| Hyperplasia | 2 | 11 |
| Pheochromacytoma | 2 | 11 |
| Carcinoma | 1 | 6 |

Average operation time was 122 minutes (50-186). Five of 18 patients had a previous abdominal surgery. Average postoperative hospital stay was 3.5 days (2-6). There was not any preoperative complication such as bleeding, injury to surrounding organs, conversion to open surgery or pneumotorax. There was not also any early postoperative complication such as bleeding, wound infection, pneumonia or deep vein thrombosis.

IV. DISCUSSION

The adrenal gland is particularly amenable to laparoscopic surgery because of its small size, benign nature of most adrenal lesions and the difficulty of reaching the organ via open means. Both the transabdominal and the retroperitoneal approaches represent a significant benefit in terms of patient recovery as opposed to open surgery [4-5]. Transperitoneal approach offers the greatest visualization of the operative field, reducing intraoperative injuries and ensuring minimal morbidity. Transperitoneal LA is the most common technique performed by endocrine surgeons. In our study all of 18 operations were completed with minimally invasive approach without converting to open surgery.

The major disadvantage of lateral transperitoneal LA seems to be the need for dissection of the surrounding organs to reach the gland. Spleen, splenic flexura of the colon, stomach for left sided lesions and liver for right sided lesions are dissected to reach the gland. Previous intra-abdominal surgery is a great challenge for this procedure [6]. 5 of our patients had a previous abdominal surgery but there was not conversion to open surgery. The largest diameter of tumor removed in this series is 10 cm. Average tumor diameter was 3.3 cm.

The average operative time in our study was 122 minutes. Similar average operation times are reported for LA. Mercan et al reported a significant shorter operative time for right sided adrenalectomies with posterior laparoscopic approach (115 vs. 180 minutes) [7]. Our patients' operative time for right vs. left sided adrenalectomies was 108 vs. 128 minutes.

There were 17 females and just one male patient in our cases. Adrenal pathologies are reported to be more common in females. But the small size of our study population limits any comment for this study. Castillo et al reported a 1/1.6 male/female ratio for a total of 227 adrenalectomies [8].

There was not any major perioperative complication in our series. This could be explained by the fact that all these 18 operation were done by 2 experienced oncologic surgeons

who are especially concerned with laparoscopic surgery. But the small size of study population limits inference.

Average postoperative hospital stay was 3.5 days. Similar results are reported for hospital stay [2-8].

V. CONCLUSION

Laparoscopic adrenalectomy is a safe and effective technique for the surgical removal of adrenal masses. This minimally invasive approach provides clear advantages over open resection

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