

Laparoscopic Adrenalectomy-Our Experience

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Abstract

Adrenal glands are known to be central to homeostasis and consequently their affections are responsible for major human ailments. Laparoscopic adrenalectomy has become the procedure of choice for handling these benign functioning and non-functional affections. Recently, literature has documented the feasibility of laparoscopic procedure for even the larger (>5cm) tumors. We present our first-hand experience with ten laparoscopic adrenalectomies done at our center for adrenal masses upto 6cm in diameter. Ten patients with adrenal masses upto 6cm in diameter underwent laparoscopic adrenalectomy at our department between Jan 2010 and Jan 2013. There were 7 males and 3 female patients. There were six left sided tumors and four right side tumors with an average tumor size of 4.5cm. Seven out of ten cases had functional tumors. All of the procedures were completed successfully without any major intraoperative complication. The mean (range) operating time was 130 (100-210) min. There was an average (range) blood loss of 200 (150-400) ml. A drain was kept in all the patients and removed mostly on 1st postoperative day. The patients were strictly followed up after the surgery and none of them developed any complication. From our favorable results, we can safely conclude that laparoscopic adrenalectomy is safe and feasible procedure especially for smaller tumors. More experience is needed to tackle the larger size tumors.

Key Words

Laparoscopic, Adrenalectomy, Tumors

Introduction

Ever since the performance of first laparoscopic cholecystectomy in 1987, minimal access surgery has slowly and effectively crept into other surgical domains too. The technological improvements in laparoscopic equipment coupled with the improved skills of laparoscopic surgeons and the desire of patients to have less traumatic and disfiguring operations have extended the applications of minimally invasive operative techniques. The main advantage is in the procedures where the trauma of access is more than the trauma of the main procedure itself. Since its first description in 1992 by Gagner *et al.* (1), laparoscopic adrenalectomy has become the gold standard surgical approach for adrenal adenomas and has virtually replaced open adrenalectomy. Patients undergoing this approach experience less morbidity, shorter hospitalization and faster recovery than with the open approach (2). Laparoscopic adrenalectomy can be performed via a transperitoneal or retroperitoneal approach, both of which were similarly effective in a prospective randomized trial (3). We present our early experience with ten laparoscopic

adrenalectomies done at our Centre from Jan 2010 to Jan 2013.

Material and Methods

Between January 2010 and January 2013 a total of 10 patients underwent laparoscopic adrenalectomy in the Department of General Surgery, Government Medical college, Srinagar. Patients with benign, functional as well as non-functional adrenal masses upto 6cm were taken up for the study. A single surgeon having expertise in the field of minimal access surgery did all the cases. An informed consent was taken from all the patients. Age, sex, tumor size, operating time, blood loss, postoperative visual analog pain scale (VAS) scores, and duration of hospitalization were recorded for each one of the cases. The patients were taken for a preanaesthetic check-up and an injection of ceftriaxone 1g was given prophylactically to all the patients.

Surgical technique

After the introduction of general anaesthesia, the patients were placed in the semilateral decubitus position, and the side with the lesion was given an elevation of 40

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to 60 degrees using sandbags. Pneumoperitoneum was established by closed technique at the umbilicus. A 10-mm optical trocar was inserted along the midclavicular line at the level of the umbilicus. Two additional 5 or 10mm trocars were inserted along the anterior axillary line and the midaxillary line, respectively, at points 2 cm below the costal margin. For left-sided tumors, adrenalectomy was performed through three trocars. For right-sided tumors, a fourth 5- or 10-mm trocar was inserted immediately below the xyphoid process for the purpose of liver retraction. The procedure started with the reflection of the colon medially by making an incision at the line of Toldt. This would bring the Gerota's fascia in view. The Gerota's fascia was then incised using Harmonic Ace and the kidney with the diseased adrenal gland identified (*Fig1*).

Standard hand instruments and a 10-mm 30 degrees lens laparoscope were used in all procedures. The adrenal vein was then isolated and divided with clips (*Fig 2, 3*).

The gland was then mobilized circumferentially with control of the variable arterial blood supply using Harmonic Ace (*Fig 4*). Special care was exercised to minimize trauma to the gland itself and it was ensured that the entire gland was removed. Once completely separated, the adrenal gland was placed into a specimen retrieval bag. Meticulous haemostasis was ensured and the gland was then delivered via 10-mm working port. A 16 Fr suction drain was kept in all the cases. The ports were then closed back; 10mm in 2 layers and 5mm in a single layer.

Postoperative care: For the immediate postoperative pain relief, injectable diclofenac sodium 50 mg intramuscular was used. Later oral diclofenac 50 mg tab was used. Patients were made ambulatory on the next day. Orals were usually started on the first postoperative day and the patients discharged home the day after. After discharge from hospital patients were called for follow-up at 1 week, 4 weeks, and 6 months thereafter.

Results

1. Age and sex: The median age of patients included in the study was 46 years and the range was 29-56 years. There were 3 females and 7 males.

2. Body Mass Index (BMI): Out of 10 patients, 6 patients fell in the ideal group and 4 were overweight. (Underweight: less than 18.5, Ideal: from 18.5 to 25, Overweight: from 25 to 30, Obese: >30).

3. Presentation of patients: Out of 10 patients, 7 patients had functional tumors.

5. Peri-Operative details: The mean (range) operating time was 130 (100-210) min. There was an average (range) blood loss of 200 (150-400) ml. All the procedures

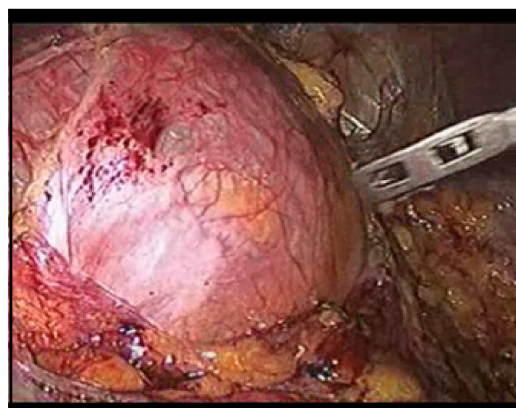


Fig1. Showing the Adrenal Tumor



Fig2. Showing the Adrenal Vein being Isolated

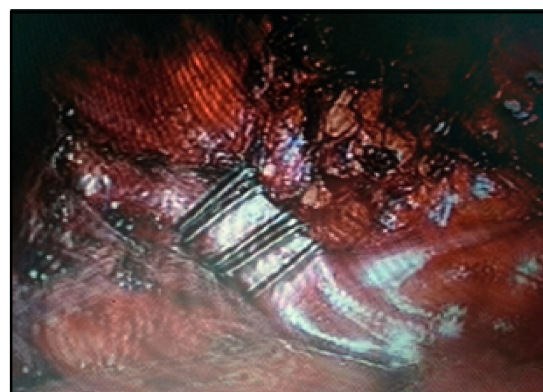


Fig3. Showing Adrenal Vein clipped using LT 300 clips
were completed successfully without the need for conversion or any other major complication.

6. Post-operative details: There were a total of 2 postoperative complications in the form of port site infection and was managed conservatively. Postoperative pain was quantified using Visual Analogue Scale (VAS Score) and the total quantity of analgesic, diclofenac sodium, (intramuscular injection plus per oral) required in the postoperative period. On an average 100 mg of diclofenac was needed.

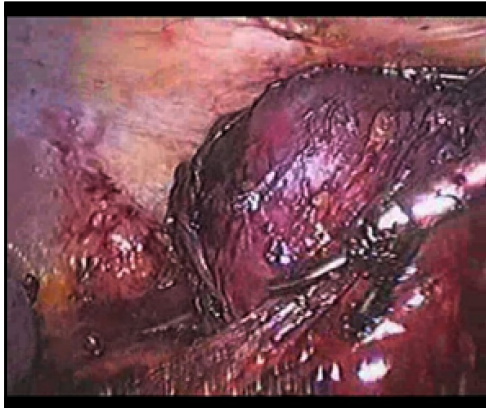


Fig.4 Tumor being Dissected Circumferentially

7. Hospital stay: The mean hospital stay was 4 days; the mean being 3-9 days

8. Return to work: most of the patients returned to their normal routine work within 2 weeks of surgery. However the patients who developed wound infection took a little longer.

11. Follow up and patient satisfaction: All patients were followed strictly after the surgery. Mean follow up of the patients in the study group was 6 months and a range of 7-14 months. All the patients had improved symptomatically and there were no incisional/port site hernias or any other delayed complications.

Discussion

A variety of operative approaches can be used for resection of the adrenal glands. Higashihara et al. introduced a laparoscopic approach as alternative of adrenal resection (4). Other investigators have confirmed the feasibility and safety of laparoscopic adrenalectomy (5-6). The findings of these studies were similar to our results demonstrating smaller operative bleeding and less complications rates for patients having laparoscopic adrenalectomies. As we were new to the field of laparoscopic adrenalectomies, we considered the procedure on benign functioning and non-functioning tumors of adrenal gland of less than 6 cm in size as larger lesions were thought to be associated with a more complex dissection and an increased risk of malignancy (4). As to the difficulty associated with size Henry et al. detected no significant differences in operative time, conversion rate, or complication rate by comparing two groups of patients with tumors of less than 4 cm and between 4 and 12 cm. In addition Gagner et al. (7, 8,9) demonstrated the feasibility of adrenalectomy for 13cm size. In our study group, the mean size of adrenal masses resected by laparoscopic adrenalectomy was 4.5cm. Laparoscopic adrenalectomy

may be used for large adrenal tumors where adrenocortical carcinoma is a possibility, as long as the surgeon is experienced, appropriate en bloc oncological surgical techniques can be applied and when there is no evidence of local invasion of the surrounding structures on preoperative MRI or CT imaging. The surgeon should be ready to convert at any time if he or she is not certain that laparoscopic adrenalectomy can be achieved without compromising a potentially curative operation. The specimen should be protected in a specimen retrieval bag to minimize the risk of seeding tumor in the abdominal wall or peritoneal cavity. In our series, all patients suffering from hormonal hypersecretion returned to baseline levels after surgery. Laparoscopic approach to pheochromocytoma decreases the intraoperative release of catecholamines compared to the open technique therefore minimizing the risk of hypertension crisis and fatal arrhythmias (10).

Conclusion

Our series confirms that laparoscopic adrenalectomy is a safe and effective procedure, associated with minimal morbidity, short hospital stay and recovery time, and that any adrenal mass is potentially amenable to laparoscopic approach.

References

1. Gagner M, Lacroix A, Bolte E. Laparoscopic adrenalectomy in Cushing's syndrome and pheochromocytoma. *N Engl J Med* 1992; 327:1003
2. Hallfeldt KK, Mussack T, Trupka A, Hohenbleicher F, Schmidbauer S. Laparoscopic lateral adrenalectomy versus open posterior adrenalectomy for the treatment of benign adrenal tumors. *Surg Endosc* 2003; 17(2), 264-267
3. Rubinstein M, Gill IS, Aron M, et al. Prospective, randomized comparison of transperitoneal versus retroperitoneal laparoscopic adrenalectomy. *J Urol* 2005; 174(2), 442-45.
4. Higashihara E, Tanaka Y, Horie S, et al. A case report of laparoscopic adrenalectomy. *Nippon Hinyokika Gakkai Zasshi (Japanese)* 1992; 83:1130-33
5. Gagner M, Lacroix A, Bolte E. Laparoscopic adrenalectomy in Cushing's syndrome and pheochromocytoma. *N Engl J Med* 1992; 327:1033
6. Fernandez-Cruz L, Benarroch G, Torres E, Astudillo E, Saenz A, Taura P. Laparoscopic approach to the adrenal tumors. *J Laparoendosc Surg* 1993; 3:541-546
7. Gagner M, Lacroix A, Prinz RA, et al. Early experience with laparoscopic approach for adrenalectomy. *Surgery* 1993; 114: 1120-5.
8. Gagner M, Pomp A, Heniford BT, et al. Laparoscopic adrenalectomy: Lessons learned from 100 consecutive procedures. *Ann Surg* 1997; 226:238-47.
9. Gagner M. Laparoscopic adrenalectomy. *Surg Clin North Am* 1996; 76:523-37.
10. Edwin B, Kazaryan AM, Mala T, et al. Laparoscopic and open surgery for pheochromocytoma. *BMC Surg* 2001; 1:2.