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ORIGINAL ARTICLE

Laparoscopic adrenalectomy for large adrenal masses: Is it really more complicated?

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Abstract Laparoscopic treatment of large adrenal tumors is still questionable due to concern over the risk of malignancy as well as the technical difficulties. No exact dimensional cut-off has been described for laparoscopic adrenalectomy (LA). In this study, we reviewed our experience with LA for masses $\geq$ 8 cm and tried to determine the limitations of this surgery in this group of patients. Sixteen patients with adrenal mass $\geq$ 8 cm (Group 1) and 19 patients with adrenal mass $<$ 8 cm (Group 2) treated with transabdominal LA were included in this study. We analyzed operative time, intraoperative and postoperative complications and length of postoperative hospital stay with respect to tumor size and clinopathologic features. Mean maximum tumor diameters were 91.7 mm (range, 80–150 mm) and 52.4 mm (range, 35–73 mm) in Group 1 and Group 2, respectively. Operation time and blood loss were higher in Group 1 compared to Group 2, but these differences did not reach significant levels ($p > 0.05$). Conversion to an open procedure required in two patients, one from each group, because of the firm attachments of adrenal mass to the surrounding tissue. In conclusion, our study demonstrated that LA is a safe and feasible procedure for large lesions even up to 15 cm. The risk of finding incidental adrenal cortical cancer was significantly increased for large lesions in our series as in the literature; therefore, it is important to follow the strict oncological principles in these cases.

Conflicts of interest: All authors declare no conflicts of interest.

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Introduction

The first laparoscopic adrenalectomy (LA) was performed by Gagner et al. [1] in 1992, in a case of Cushing's syndrome. Since then, LA has become the procedure of choice for most adrenal pathologies. The superiority of LA over open procedures, in terms of operative and perioperative outcomes, has been proven by many investigators [2–4]. Today LA is indicated in various adrenal pathologies including nonfunctional adenoma, pheochromocytoma, Cushing's disease, aldosteronoma, myelolipoma, and cyst. The only specific contraindication for this surgery is radiologic evidence of invasion of the tumor to the periadrenal tissue [5]. Laparoscopic treatment of large tumors is still questionable due to concern over the risk of malignancy as well as the technical difficulties. No exact dimensional cut-off has been described for LA. Traditionally, a tumor size of 6 cm and later 8 cm has been considered as an upper limit for LA [6,7]. In this study, we reviewed our experience with LA for masses $\geq$ 8 cm and tried to determine the limitations of this surgery in this group of patients.

Methods

Between July 2005 and December 2013, 84 patients with adrenal masses underwent LA in our clinic. All patients were evaluated with computed tomography; magnetic resonance imaging was used in selected cases. All patients underwent a detailed physical examination and medical history. The laboratory investigations included routine blood counts together with complete endocrine evaluation to assess functioning of the adrenal mass. Indications for surgery were hormone secreting tumors, all tumors $\geq$ 5 cm, and tumor growth on follow-up. The cases that showed suspicion of local invasion at imaging studies were accepted as ineligible for LA. All operations were performed at a tertiary care center by an experienced laparoscopic surgeon (M.A). Institutional Review Board approval was obtained from the Local Ethics Committee (Izmir Bozyaka Training and Research Hospital, Izmir, Turkey): Decision number 1; September 08, 2015.

In 16 patients, the tumor size was measured at $\geq$ 8 cm (Group 1). Transabdominal LA was performed in all patients in Group 1. Group 2 was defined as the patients with a maximum diameter of the tumor $<$ 8 cm operated on transabdominal LA ($n = 19$). To homogenize the two groups, the patients who underwent retroperitonoscopic LA and single site surgery (all had tumor $<$ 8 cm) were excluded from the study. All intraoperative and postoperative parameters were gathered from the daily progress notes and electronic records of the patients. Postoperative complications were graded using the Clavien–Dindo classification scale. We analyzed operative time, intraoperative and postoperative complications, and length of postoperative hospital stay with respect to tumor size and clinopathologic features. Also, the outcomes of the procedure in large adrenal masses were evaluated according to the tumor lateralization.

Surgical technique

All laparoscopic adrenalectomies were performed through a lateral decubitus transperitoneal approach. On the left side, three ports (5–12 mm) were used, and an additional fourth port was required for liver retraction on the right. For right adrenalectomy, the liver was mobilized by dissecting the retroperitoneal attachments. Later, retroperitoneum was opened longitudinally until the vena cava was exposed. Periadrenal fat was dissected and adrenal vein was identified. After controlling of adrenal vein, the inferior and superior adrenal vessels were cauterized or clipped. The harmonic dissector was used for division of small vessels coursing from the gland. In cases with excessively large adrenal veins and firm attachments around the adrenal vein, endovascular stapler was used for vessel control. Specimens were placed into a bag and extracted through the extension of the incision of the port side. For left adrenalectomy, left colonic flexura was mobilized to expose the upper pole of the kidney. The splenic attachments were cauterized and divided until the tail of the pancreas was exposed. Later, Gerota's fascia was opened and adrenal vein control and specimen extraction was performed as described above.

Results

The intra- and postoperative parameters of both groups are summarized in Table 1. Of 84 adrenal masses, 16 were $\geq$ 8 cm in diameter and three were larger than 10 cm. The largest tumor resected laparoscopically was measured 130 cm $\times$ 110 cm $\times$ 150 cm. All operations were performed via transabdominal route. Mean maximum tumor diameters were 91.7 mm (range, 80–150 mm) and 52.4 mm (range, 35–73 mm) in Groups 1 and 2, respectively. Mean operative time was longer in Group 1 compared to Group 2, but this difference did not reach significance (113.4 $\pm$ 41.0 minutes vs. 103.2 $\pm$ 20.2 minutes, $p = 0.765$). Also, mean blood loss was higher in Group 1 although this was not statistically significant (141.9 $\pm$ 80.5 mL vs. 100.5 $\pm$ 40.1 mL, $p = 0.143$). Adrenal cortical carcinoma was found more frequently in Group 1, whereas adrenal metastasis was more common in Group 2. The final histopathological diagnoses of the specimen in both groups are shown in Table 2.

Conversion to an open procedure was required in two patients, one from each group, because of the firm attachments of adrenal mass to the surrounding tissue. The pathological analysis of the mass that was 8 cm in diameter revealed adrenal cortical carcinoma. The other one was 6 cm in diameter and pathology reported as adrenal adenoma. Splenic capsular injury occurred in three patients (2 in Group 1 and 1 in Group 2). A liver capsular laceration was detected in another patient in Group 1. Bleeding was controlled with electrocautery in all patients but one. Laparoscopic splenectomy was required for a patient whose bleeding could not be controlled with cauterization. Complications are summarized in Table 3. Three patients with