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Expanding the indications for laparoscopic retroperitoneal adrenalectomy: experience with 81 resections

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ABSTRACT

Background: Laparoscopic retroperitoneal (RP) adrenalectomy has gained popularity as the preferred approach over transabdominal (TA) method; however, surgeons have been reluctant to offer this operation to obese patients because of the concerns over inadequate working space and overall perceived higher rate of complications. The aim of the present study was to evaluate the feasibility and safety of RP adrenalectomy compared with TA adrenalectomy, specifically in morbidly obese patients.

Methods: All laparoscopic adrenalectomies performed at our institution between 2004 and 2012 were reviewed retrospectively. Presenting features, operative characteristics, and postoperative outcomes were evaluated. Complications were graded using Clavien system. Continuous variables were compared using Student *t-test*. Categorical variables were compared using χ^2-test. Prediction models were constructed using linear or logistic regression as appropriate.

Results: Eighty-one RP and 130 TA procedures were performed, 26 (12.3%) and 60 (28.4%), respectively in obese patients (BMI > 30). Among the obese patients, operative time and estimated blood loss were less for RP (90 *versus* 130 min; $P < 0.001$ and 0 *versus* 50 mL; $P < 0.001$). Differences in the length of stay, overall mortality, incidence and severity of postoperative complications, and rates of readmission were not statistically significant between RP and TA procedures for all comers and in the obese patients. Controlling the operative characteristics and patient-specific factors, neither operative approach nor obesity was found to independently predict the postoperative complications.

Conclusions: Laparoscopic RP adrenalectomy is a safe and feasible technique for obese patients. In the obese patients and for all comers, it offers shorter operative time, decreased

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estimated blood loss, with comparable length of stay and morbidity and mortality rates. We therefore recommend that this technique should be considered for patients undergoing adrenal resection.

1. Introduction

Laparoscopic adrenalectomy has become the preferred method for resection of most adrenal lesions, largely replacing the traditional open operation [1–4]. Advances in laparoscopic techniques have led to the development of variations in this method, including lateral transabdominal (TA) and retroperitoneal (RP) approaches [1]. The former has been used more commonly, generally secondary to familiarity with the view and well-defined anatomic landmarks. However, RP adrenalectomy has been gaining popularity in recent years, as several single-center retrospective studies demonstrated shorter operative time, decreased postoperative pain, and decreased length of stay (LOS) [4–6].

Although indications for the RP approach are expanding, some surgeons considered that patients with a high body mass index (BMI) were ineligible for this technique, largely because of the concerns over decreased working space, difficulty with positioning, inability to tolerate CO_2 insufflation of the retroperitoneum, increased operative time, and higher rate of postoperative complications. To date, however, no published reports exist specifically addressing the technical issues and postoperative outcomes of laparoscopic RP adrenalectomy in the obese patients. Given the growing number of patients who suffer from obesity, we sought to assess the feasibility and safety of this method, focusing in particular on this patient population to explore whether this method should be offered more frequently.

2. Methods

After the Institutional Review Board approval and in compliance with the Health Insurance Portability and Accountability Act regulations, all patients who underwent adrenal resections at our institution between 2004 and 2012 were identified using billing records. Preoperative variables included age, gender, race, BMI, presenting symptoms of adrenal disease, presence of a major comorbidity (defined as hypertension, chronic kidney disease, chronic obstructive pulmonary disease, coronary artery disease, diabetes mellitus, or antecedent diagnosis of cancer), history of any prior abdominal surgery, and incidence of tobacco and alcohol use. Intraoperative variables were obtained from nurse, anesthesiologist, and surgeon reports and included operating room time (defined as time between the start of incision and end of the procedure), estimated blood loss (EBL), any need for intraoperative transfusion, and any conversions from laparoscopic to open operation. Pathologic diagnosis was determined from the final pathology reports. Perioperative complications were gathered from the daily progress notes and discharge summaries, and graded using a scale proposed by Clavien *et al.* [7]. LOS was calculated from the date of operation to the date of hospital discharge. The readmission rate was defined as readmission within 30 d of hospital discharge. Perioperative mortality was defined as death within 30 d of the operation or within the same hospital admission after the operation. Obesity was defined as BMI >30 kg/m^2, according to the guidelines set forth by the National Heart, Lung, and Blood Institute [8].

All open adrenalectomies were excluded from analysis, and laparoscopic adrenalectomies were grouped into either RP or TA. Of note, we introduced the RP procedure at our institution in 2006. Symptomatic presentation of adrenal disease included history of palpitations, new onset arrhythmias, hypertension refractory greater than two antihypertensive pharmacologic agents, signs of Cushing syndrome, or symptoms of virilization.

Clinical and operative outcomes were evaluated in patients who were obese and compared with those in patients with normal BMI. Variables were compared using Student *t*-test or analysis of variance for continuous data and χ^2-test or Fisher exact test for categorical data. Prediction models were constructed using either linear or logistic regression, whichever appropriate. All tests were two-sided and a P value <0.05 was considered statistically significant. Statistical analyses were conducted using STATA software (version 12; StataCorp, College Station, TX).

3. Results

Between 2004 and 2012, 211 laparoscopic adrenalectomies were performed at our institution, 81 (38.4%) RP and 130 (61.6%) TA. All operations in which an RP approach was used were performed by a single surgeon using a standardized technique described by our group in a previous report [1].

Patient demographic and clinical characteristics are shown in Table 1. The group was 42.2% male and predominantly white (56.9%), but the differences in age, gender, and race were not statistically significant between RP and TA groups. Preoperative diagnoses of hypertension, diabetes, coronary artery disease, chronic obstructive pulmonary disease, and chronic kidney disease were similarly comparable. One hundred fourteen (55.3%) resections were performed for clinically symptomatic lesions, and the patients in this group were more likely to be offered RP adrenalectomy ($P < 0.001$). Differences in rates of tobacco use or alcohol intake were not statistically significant.

Preoperative and operative characteristics are shown in Table 2. Left-sided lesions were slightly more common overall, but RP and TA were equally likely to be used as an operative approach regardless of laterality ($P = 0.940$). Patients with a prior history of abdominal surgery were more likely to receive a TA operation ($P = 0.042$), but BMI >30 kg/m^2 was not associated with lower likelihood of having an RP resection ($P = 0.102$).

Overall, compared with TA, RP resections had shorter operative time (80 min *versus* 130 min; $P < 0.001$), less EBL (0 mL *versus* 50 mL; $P < 0.001$), and shorter LOS (1 d *versus* 2 d;