

Laparoscopic radical nephrectomy in extremely obese patients

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KEY WORDS

kidney tumor ▶ obesity ▶ nephrectomy ▶ laparoscopy

ABSTRACT

Laparoscopic radical nephrectomy has been widely accepted as the preferred management of low stage renal masses. Endoscopic management is advantageous for its reduction in perioperative and postoperative complications. In the mid-1990s, morbid obesity was considered a relative contraindication to laparoscopic technique. The authors present two cases of laparoscopic radical nephrectomy due to renal tumors in extremely obese patients. The aim of this study is not only to present the operative technique but also to show that the laparoscopic procedure is safe and effective in morbidly obese patients.

INTRODUCTION

The prevalence of obesity is increasing in Poland and worldwide [1, 2]. Obese patients are predisposed to the early development of diabetes mellitus, hypertension, heart disease, and certain malignancies [2, 3]. Furthermore, obesity has been considered a potential risk factor for poor outcomes after surgical procedures [3, 4]. According to the World Health Organization, overweight (measured in kg/m²) is defined as body mass index (BMI) of 25 to 29.9; a BMI 30 to 34.9 is considered obese, and morbid obesity is defined as a BMI >35 [5]. Morbidly obese patients often have greater incidences of perioperative complications and morbid obesity is considered by some authors to be a relative contraindication to laparoscopic surgery [6]. The efficacy and morbidity of laparoscopic nephrectomy in obese patients were examined in few studies in comparison with the conventional open approach. Some authors suggested surgery is more complicated in obese than in non-obese patients independent of the method of surgery, but laparoscopic access results in fewer complications in obese patients than the open approach [7, 8]. Retroperitoneal laparoscopic surgery may be more advantageous in the obese patient than transperitoneal laparoscopic surgery because of the large abdominal girth and the easier retroperitoneal access [9]. However, at our institution, we favor the transperitoneal approach because of its familiarity with traditional anatomic landmarks. In this study we present two cases of laparoscopic radical nephrectomy due to renal tumors in extremely obese patients.

PATIENTS AND METHODS

Patient 1

A 54-year-old man was admitted to our department for surgical treatment of a left kidney tumor. In medical history, the patient reported arterial hypertension, obesity, and no previous



Fig. 1. Patient 1.

abdominal surgery. Three months earlier, abdominal ultrasound was performed because the patient felt a presence in the left upper abdominal quadrant. The performing radiologist described a renal mass with 7 cm diameter and abnormal echodensity. Abdominal CT was performed and diagnosis of kidney tumor was confirmed.

Patients data: height – 176 cm, weight – 130 kg; BMI – 42.44; ASA class – 3 (Fig. 1). Laboratory results showed normal peripheral blood morphology and biochemical parameters. In physical examination – patient was extremely obese. The patient was then qualified for laparoscopic radical left nephrectomy with the technique described below.

Patient 2

A 49-year-old man was referred to Clinic of Urology also for surgical treatment of tumor in right kidney. The patient's history revealed arterial hypertension, obesity, and appendectomy (40 yrs. ago). Right kidney tumor was found incidentally during abdominal ultrasound performed due to intermittent abdominal pain. The CT examination revealed a 5 cm centrally localized renal mass. Laboratory results showed normal peripheral blood morphology and renal function.

Patients data: height – 176 cm, weight – 176 kg; BMI – 56.81; ASA class – 3 (Fig. 2). In physical examination – extreme obesity. The patient was then qualified for laparoscopic right radical nephrectomy using the technique described below.



Fig. 2. Patient 2.

Operative technique

The patient was placed in a right 45° flank position. The procedure was performed in a transperitoneal fashion using four ports. To create a pneumoperitoneum a Hasson 2 cm minilaparotomy was used. We placed our ports in a cluster fashion in the ipsilateral upper quadrant (Fig. 3) with lateral shift such that the midline trocars were repositioned lateral to the abdominal rectus muscle. The first 10 mm umbilical trocar was inserted and pneumoperitoneum was achieved in a standard manner. Three additional trocars (2 x 5 mm, 1 x 12 mm) were inserted under direct vision: a 5 mm trocar halfway between the umbilicus and xiphoid in the midclavicular line, a 12 mm trocar below the umbilicus laterally to the edge of the rectus muscle, and another 5 mm trocar in the anterior axillary line below the costal margin. The colon was mobilized medially and the ureter was localized. After the lower pole of the kidney was freed, the kidney covered by the perirenal fat and Gerota's fascia was moved laterally and the renal vessels were identified. Once freely dissected, the renal artery was clipped and transected using titanium clips (TFX Medical Ltd., High Wycombe, UK). The renal vein was secured by means of an Endo-GIA (Tyco Healthcare Group LP, Norwalk, Connecticut, USA) stapling device. Using the Liga-Sure device (Tyco Healthcare UK Ltd., Gosport, UK) the upper pole of the kidney was fully mobilized. The lateral attachments were dissected to completely free up the kidney. The ureter was clipped and dissected as distally as possible; the renal specimen was entrapped in an Endocatch bag (Tyco Healthcare UK Ltd., Gosport, UK). The 5-mm closed suction drain was left in the retroperitoneal space; it was inserted through the port left by the lateral 5 mm trocar. The trocars were removed and the ports were closed. Specimens were removed intact without morcellation through a lengthened incision of the port site. In both cases, blood loss was 300 ml. The operative time was 185 min in first case and 355 min in second. There were no intraoperative complications.

Postoperative course

Blood transfusion was needed neither intra- nor postoperatively. Renal function parameters were in normal range postoperatively. No temperature rise was noted postoperatively. The time to resume oral intake was two days in both cases. In both cases wounds healed normally (Fig 2, 3). In case 1, the drain left after the surgery (left retroperitoneal space) was removed on the 4th postoperative day; while in the second case, the drain was removed on the 9th day. Patients were discharged from the hospital on the sixth and fifth day after surgery in case 1 and 2 respectively.

DISCUSSION

Obesity has been considered by some as a relative contraindication to laparoscopic surgery because of the higher risk of complications [6]. Moreover, obese patients have more perioperative complications than non-obese patients regardless of the surgical method used and are at a greater risk of wound, pulmonary, and cardiovascular complications [10].

Laparoscopic surgery is appealing in obese patients because of lessened pulmonary restriction caused by pain, minimized wound complication, and early ambulation [11]. Technical challenges specific to laparoscopy in the obese patient included adequate insufflation of the peritoneal cavity, trocar insertion, maintenance and physiologic complications of the pneumoperitoneum and visualization due to limited exposure [8, 12]. However, techniques, instrumentation, and knowledge of physiology associated with laparoscopic procedures are still improving. As a result of this progress, obese patients can undergo laparoscopic procedures safely with reduced patient morbidity, which was shown in some contemporary series. Hedican and associates reported on 30 obese patients (mean BMI 35.8) who underwent hand-assisted laparoscopic renal surgery, mostly for malignant disease [13]. There were only seven minor and no major complications. Kapoor and coworkers compared the results of 23 transperitoneal laparoscopic procedures on morbidly obese patients with historic controls and found no significant differences in the number of complications [10]. Matin and associates compared 21 patients with a BMI >30 who underwent laparoscopic renal or adrenal surgery with a historical cohort of comparable patients who previously had open surgery [8]. The laparoscopic cohort had a 29% postoperative complication rate with four (19%) major

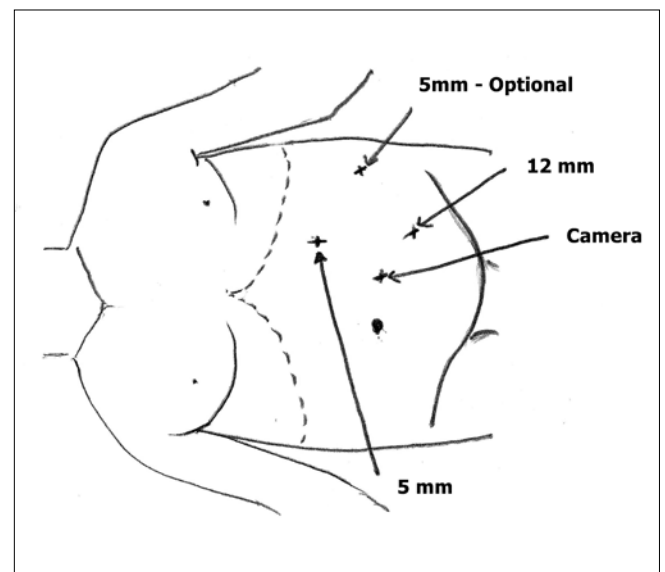


Fig. 3. Port placement in morbidly obese patients.

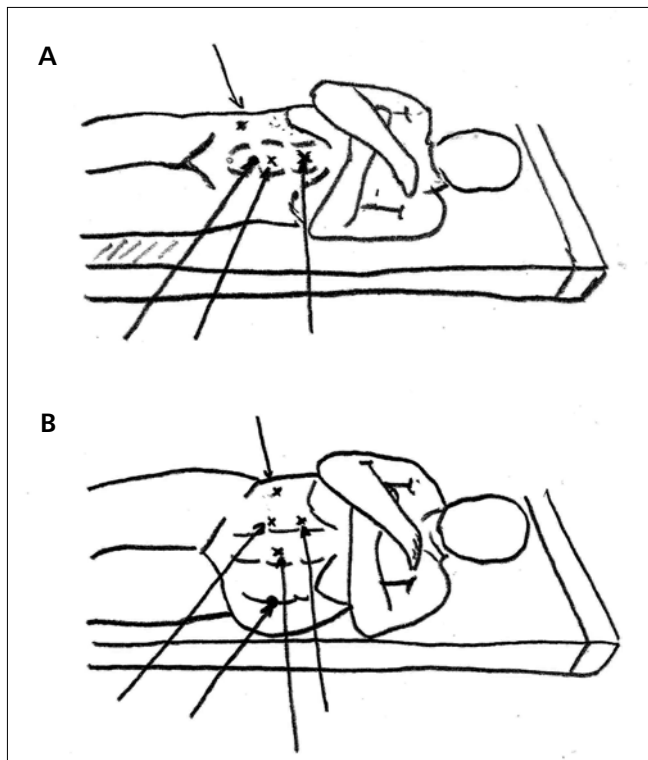


Fig. 4. Modified flank position - trocar placement for non-obese (A) and obese (B) patients.

complications. This finding compared favorably with the open surgical cohort, where the authors experienced a 67% complication rate with seven (33%) major complications. Furthermore, the benefits of reduced analgesic use, shorter hospital stays, and faster convalescence favor performing endoscopic surgery in the obese population.

The key alterations in the laparoscopic technique in morbidly obese patients include modifications in trocar positioning [7, 8, 10, 12]. When patients are placed in the supine position, the anatomic landmarks are similar between obese and nonobese patients. However, when patients are placed in a modified flank position, the pannus in morbidly obese patients invariably shifts disproportionately (the umbilicus relative to the midline) (Fig. 4). In consequence of this endocavitary transposition, trocar placements at the level of the umbilicus will be below the level of the midline. A lateral shift accounts for this anatomic landmark displacement, but also compensates for the distance from the retroperitoneum as the peritoneum expands radially with insufflation. By placing the trocars laterally in the obese patients, the distance to the area of interest is reduced and visual obstruction by intra-abdominal contents is prevented. This allows for an intra-abdominal view similar to that in nonobese patients. The decision to use a fourth trocar in our cases depended on intra-abdominal factors (ie, liver, spleen, and bowel retraction) and not obesity.

CONCLUSIONS

In our opinion laparoscopic radical nephrectomy in morbidly obese patients is a feasible and safe procedure using minor technical modifications. Proper trocar site selection and previous experience in laparoscopic procedures were crucial for success. Extreme obesity should not be considered a major contraindication to laparoscopic surgery.

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