

Outcome of Laparoscopic Adrenalectomy in Obese Patients

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ABSTRACT

Objectives: To compare early morbidity of obese and nonobese patients with minimally invasive adrenalectomies.

Method: Retrospective study of a prospectively maintained database, between June 2003 – December 2012, in a university affiliated tertiary hospital. Selection criteria: Minimally invasive adrenalectomy. Obese patients were defined as BMI over 30 kg/m².

Results: From 205 patient with laparoscopic adrenalectomies we counted 30 obese patients (OG), 25 of them female and only 5 men with a median age of 54,20 years versus 47,94 years for nonobese group (NOG) ($p=0.008$). In OG were 15 right sided tumor, 11 on the left side and 4 bilateral all treated with transperitoneal antero-lateral approach. Median operating time was 92.20 minutes for OG versus 91.13 minutes for NOG ($p=0.924$). In OG, 5 patients had previous abdominal surgeries and we counted 4 conversion to open surgery, 2 postoperative complications (6.6%) and no mortality. All OG patients have diverse comorbidities, 50% of them more then 3. Median specimen size was 5.92 cm for OG versus 4.85 cm for NOG ($p=0.057$). The histology of OG was: adenoma 11 cases, hiperplasia 13 cases and pheochromocytoma 6. In NOG we had: postoperative hospital stay was 6.57 days in OG versus 4.11 days in NOG ($p=0.009$).

Conclusions: Although obese patients had a higher rate for early morbidities, the minimally invasive approach has particular benefits for them. Although postoperative hospital stay was significantly longer, we believe that advantages of minimal invasive surgery for obese patients remains valid even in a BMI over 30.

Keywords: laparoscopy, adrenalectomy, obesity, early morbidity.

INTRODUCTION

After 1992, when Gagnier (1) and Higashihara (2) independently described the first laparoscopic adrenalectomy, this approach became the gold standard for adrenal pathology. Although at the beginning the indications were limited, due to its very low morbi-

dity and mortality, the laparoscopic approach of adrenal pathology gained more popularity. The indications for minimally invasive approach have expanded to include the pheochromocytoma (3-6), malignancies (7-9), and tumours larger then 6 cm (10-13). Nowadays, the medical literature does not present any absolute contraindication, related to patient's age or BMI.

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The rapid success (14) of laparoscopic adrenalectomy was caused by its proven advantages (15,16), such as reduced mortality, high patients satisfaction, reduced need for analgetics, shorter hospital stay (17) (till one day surgery (18)), better cosmesis, shorter convalescence. The laparoscopic approach has also benefits for the operating surgeon, due to retroperitoneal deep location of the adrenal glands, the open approach requiring an extensive dissection, time consuming and traumatic for neighboring organs.

In the 21st century, the world population became older (19), with more and more comorbidities. On the other hand, in the developed countries, the median BMI is continuously increasing (20,21). On literature searching we found no study that contraindicate the laparoscopic adrenalectomy for obese patients.

The obesity itself has a strong correlation with patients' comorbidities (22-24), such as diabetes, cardiovascular diseases (25), sleep apnea, depressions (26). The surgical management of obese patients is quite demanding, these patients requiring a multidisciplinary care (27). Obesity is frequently associated with adrenal diseases (28,29). In this study we are evaluating the effects of obesity on minimally invasive adrenalectomy. □

MATERIAL AND METHODS

The main objective of this study is to define the early morbidity and mortality in obese patients with laparoscopic adrenalectomies.

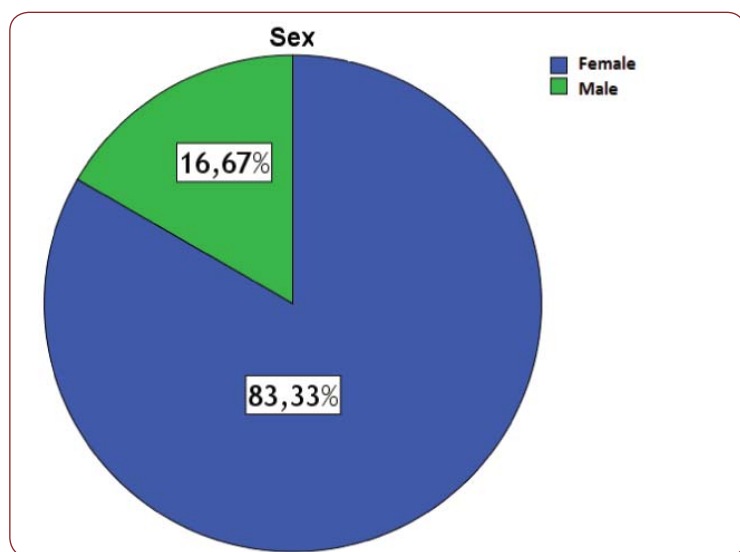


FIGURE 1. Sex distribution.

The cutoff value used to define obesity was 30 kg/m². Study design: Retrospective study of a prospectively maintained database. Study interval: 9 years (June 2003-December 2012). Setting: Emergency Hospital of Bucharest, Romania. Selection criteria: Minimally invasive adrenalectomy. All patients were managed by a constant surgical-anesthetical team, in the General Department of Surgery of the Emergency Hospital Bucharest, Romania. The preoperative workup and the postoperative follow-up was performed in over 99% of cases at the C.I. Parhon National Institute of Endocrinology Bucharest, Romania. All patients had a preoperative imaging, either through CT or MRI and all pheochromocytoma cases were treated for at least 14 days preoperatively with α +/- β blockers. Our laparoscopic technique includes only the transperitoneal approach, with the patient in lateral decubitus, using four 10 mm trocars and a 12 mm Hg pneumoperitoneum.

All values are presented as mean $\pm$ standard deviation for continuous variables, or percentages for categorical variables. Means are compared using Independent Samples T-test, and categorical variables with Fischer's exact test. We have used to declare statistical significance a p value < 0.05. For statistical analysis we have used IBM SPSS statistics 20.0 for Windows. □

OUTCOMES

In a 9 and half year period there were 215 laparoscopic adrenalectomies for 205 patients with different adrenal pathologies. There were 226 specimens, 10 patients being treated separately for each side and 11 patients with bilateral approach during the same surgery. Table 1. 30 patients had a BMI over 30 Kg/m², 25 female and 5 male. Figure 1.

Median patients age for obese group was 54.20 years (with a minimum of 35 and a maximum of 75), versus 47.94 years for patients with a BMI lower than 30 kg/m² (p = 0.008) (Table 2). In the OG, there were 15 right, 11 left and 4 bilateral adrenalectomies (Figure 2). 5 out of 30 patients had previously major open abdominal surgeries and 21 patients had more than three comorbidities. The obesity status includes: 16 patients with grad I (BMI 30-34.9), 8 patients with grad II (BMI 35-39.9), 6 patients with grad III (≥ 40) and no patient with morbid obesity (Figure 3).

The operating time for obese patients was 25 – 260 minutes, with a mean of 92.20 minutes (Table 3), while for NOG it was 91.13 minutes ($p=0.924$). Due to the previous abdominal surgeries, in two cases we have performed an extended laparoscopic adhesiolysis.

There were 4 conversions (13.3% in OG versus 9% in the NOG) to open surgery (3 on the right side and 1 of the left side). We had one reverse conversion, on the right side, from the open to laparoscopic approach, due to difficulty to reach the adrenal gland. Reason for conversions were bleeding in one case, local adhesions in one case and the specimen size in 2 cases. The size of the specimens was of 2–20 cm, with a median of 5.92 cm for OG (Table 4), while this was 4.85 cm for NOG ($p = 0.057$).

There were 3% (6 cases) of postoperative complications in the entire group of study. According to Clavien-Dindo classification there were 2 (6.6%) postoperative complications in the OG (both with left laparoscopic adrenalectomy). These two complications were a faecal peritonitis and a bleeding, both requiring surgical reintervention. Intraoperative blood loss was 20-300 ml, and no patient required intraoperative transfusions.

Postoperatively all patients were early mobilized, at 6-8 hours after surgery, starting the oral intake at 6 hour.

In OG the histology findings were: adenoma (11 cases), hyperplasia (3 cases) and pheochromocytoma (6 cases) (Table 5).

Mean postoperative hospital stay in OG was 6.57 days (2-50 days) (Table 6) comparing with 4.11 days for NOG ($p= 0.009$). We have no mortality and no recurrence till date. □

DISCUSSION

Even from the beginning of laparoscopic era in the adrenal pathology, there were debates related to the indications and advantages over open approach (30-32). With time all the benefits of laparoscopic approach were well documented, with numerous studies within the last years (14-16). It is considered that experience in laparoscopic approach is required in order to prevent gland fragmentation that can lead to disease recurrence (33) and most of the conversions to open surgery occurred in learning curve (34-36). Although the tumor size and its impact was addressed by other researchers even from the beginning of the laparoscopy (10,12,13), a special attention for obese patients was not

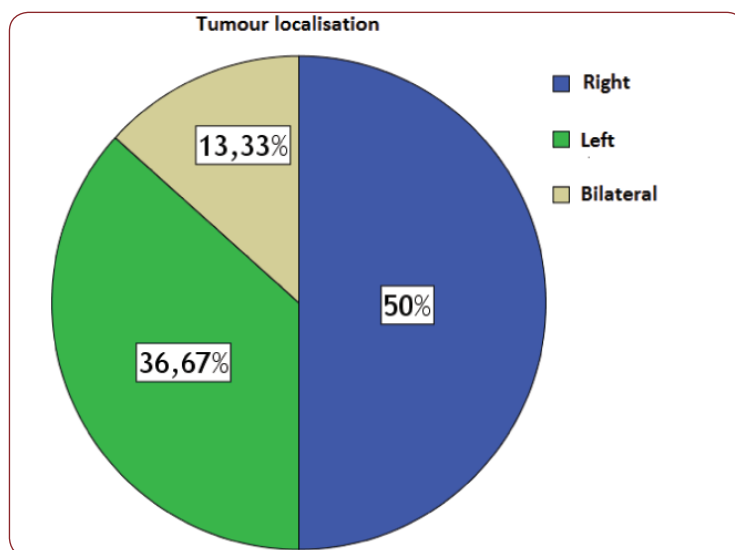


FIGURE 2. Tumour localisation.

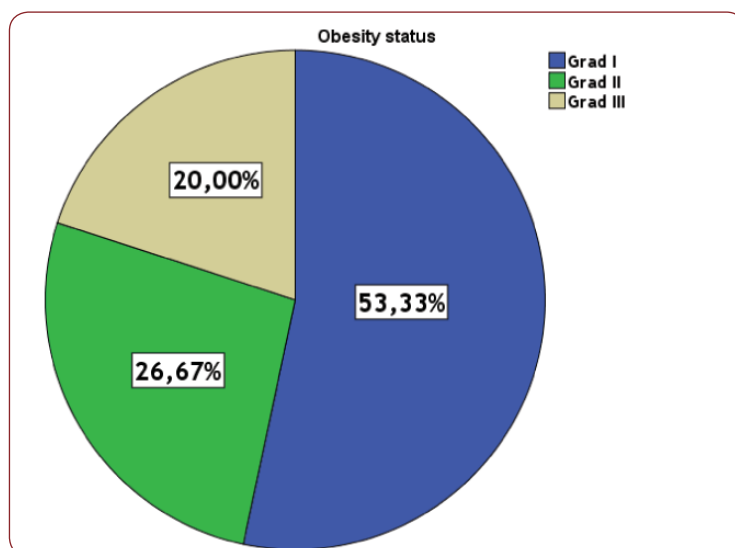


FIGURE 3. Obesity status.

Clinical Pathology	Frequency (obese)	Percent
Cushing Disease	23 (8)	11,2
Cushing Syndrom	15 (5)	7,3
Conn Disease	17 (0)	8,3
Pheochromocytoma	27 (6)	13,2
Incidentaloma	118 (11)	57,6
Virrylizing Sindrom	2(0)	1,0
MEN 2A	2 (0)	1,0
Adrenogenital Sindrom	1 (0)	,5
Total	205 (30)	100,0

TABLE 1. Clinical Pathology.

common. The literature presents as many as 30% of this patients being obese. Erbil et al. described in 2010 that, in the obese patients, the amount of retroperitoneal fat is responsible for difficulty of surgery and not the BMI itself (37).

Statistics		
Age		
N	Valid	30
	Missing	0
Mean		54,20
Median		56,00
Std. Deviation		11,278
Minimum		35
Maximum		75
Percentiles	25	45,00
	50	56,00
	75	62,00

TABLE 2. Patient's age.

Statistics		
Operating time (min)		
N	Valid	30
	Missing	0
Mean		92,20
Median		80,00
Std. Deviation		51,759
Minimum		25
Maximum		260
Percentiles	25	60,00
	50	80,00
	75	101,25

TABLE 3. Operating time.

Statistics		
Specimen size (cm)		
N	Valid	30
	Missing	0
Mean		5,92
Median		4,00
Std. Deviation		3,826
Minimum		2
Maximum		20
Percentiles	25	4,00
	50	4,00
	75	8,00

TABLE 4. Specimen size (cm).

Histology					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Adenoma	11	36,7	36,7	36,7
	Hyperplasia	13	43,3	43,3	80,0
	Pheochromocytoma	6	20,0	20,0	100,0
	Total	30	100,0	100,0	

TABLE 5. Pathology of the resected specimen.

Statistics		
Hospital stay (days)		
N	Valid	30
	Missing	0
Mean		6,57
Median		4,00
Std. Deviation		9,954
Minimum		2
Maximum		50
Percentiles	25	3,00
	50	4,00
	75	6,00

TABLE 6. Hospital stay (days).

Complications of the laparoscopic adrenalectomy for obese patients, both intra and post-operative, are similar with those for other laparoscopic surgeries such as cholecystectomy (38), colerectal surgery (39-41), gastric surgery (42), appendectomy (43-45) and is reported with a frequency of 4.6- 32% (46-49).

A recent study of Askoy et al. (50) demonstrated that, in obese patients, the robotic adrenalectomy presents no notable advantages over laparoscopic approach, opposite to other pathologies, such as endometrial cancer (51), where is the procedure of choice. We performed only anterolateral transabdominal approach, other groups are poposing the retroperitoneal approach, for being more feasible in obese patients (52-54) or for patients with previous abdominal surgeries (55,56).

The laparoscopic approach of the pheochromocytoma was initially considered dangerous due to the risk of hemodynamic instability (57). With a proper preoperative and intraoperative therapy (58) it can be safely performed, even in obese patients. We had in our group 6 obese patients with pheochromocytoma successfully treated by a minimally invasive approach. The operating time and the hospital stay decreased after the learning curve and the team's experience (16), this being the case also for the obese patients, although these remains longer than for nonobese patients (59). We have observed a rate of intra- and postoperative complications of 13% for NOG, comparing with 9% in the NOG. Other groups are reporting a rate of postoperative complications of 4.6-32% (46, 47).

CONCLUSION

The laparoscopic adrenalectomy is feasible in obese patients, regardless of the adrenal pathology, including pheochromocytoma. Although the operating time and the hospital stay are prolonged, there were not differences regarding the postoperative complications. The laparoscopic resection of the adrenal tumors comes with all the benefits of the minimally invasive approach, such as lower intraoperative

blood loss, rapid mobilisation, better cosmetic aspect and faster recovery.

Conflict of interests: none declared.

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