

# Laparoscopic Transperitoneal Adrenalectomy for Patients with Previous Abdominal Surgery

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**Background:** Adrenal surgery has been radically changed by laparoscopic approach and we wonder whether the increase in the number of adrenalectomies is entirely justified by better understanding of the pathology and a developed diagnosis method. The type of approach (transabdominal/retroperitoneal) remains still a matter of surgeon's experience.

**Method:** In past 6 years we performed 152 laparoscopic adrenalectomies by transperitoneal approach, 24 of them having previous significant abdominal surgery (cholecistectomy, gastric surgery, colectomy, bowel obstruction, exploratory laparoscopy, adrenalectomy). The patients had a variety of adrenal pathologies like Cushing's disease, Cushing's syndrome, Conn's syndrome, incidentaloma, pheochromocytoma and even carcinoma.

**Results:** Three cases were converted to open approach, only one because of the adhesions. Reasons for conversion were also: spleen infarction and a difficulty in mobilizing the tumor. Operating time was not significantly prolonged because of the adhesions (40–360 min, median time 127 min). Postoperative evolution was simple, with no morbidity or mortality and a fast recovery.

**Conclusions:** Choosing the type of approach is related to surgeon experience, although 79–94% of surgeons prefer the transabdominal lateral approach. We believe that with an experienced surgical team there is no difficulty in performing adrenalectomy by transabdominal approach, with no significantly prolonged operating time, even when the patient had previous abdominal surgery.

**Keywords:** laparoscopic adrenalectomy, previous abdominal surgery, adrenal pathology, transperitoneal approach

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## Introduction

Since M Gagnier [1] performed the first laparoscopic adrenalectomy in 1992 up to the present, the indications for this type of surgery were modified and enlarged, and one of the ongoing debates concerned laparoscopic approach for patients with previous abdominal surgery. In the past decade laparoscopic adrenalectomy became the “gold standard” for adrenal pathology, regardless of catecholamine levels for tumors smaller than 6 cm, although we believe that even a larger tumor (functioning or nonfunctioning) can be safely removed by laparoscopic approach, if there are no contraindications for laparoscopy [2].

Previous abdominal surgery remains a challenge for surgeons when there is a need for laparoscopic adrenalectomy, but also in the case of an open approach, because of adhesions. The most important problem in laparoscopic adrenalectomy for patients with previous abdominal surgery is creating pneumoperitoneum and working space, followed by multiple adhesions, which can prolong operating time, increase technical difficulty and represent a higher risk of iatrogenic lesions [3]. The type of approach used depends largely on the surgeon's experience. Most surgeons are more comfortable with the transabdominal approach, mainly because they are familiar with the abdominal cavity, and in case of a conversion to open surgery, they can perform the surgery faster and safely for patient. Adrenal tumors are rare and adrenalectomies, both open or laparoscopic, are pretty uncommon, therefore, there are only a few centers where this type of surgery can be performed with the best results.

Although there are surgeons who approach the adrenal gland retroperitoneally in patients with previous abdominal surgery, there is no specific contraindication for the transabdominal approach (some authors consider it as a “relative contraindication”) [4–6].

Adrenal tumor size and local invasions also represent relative contraindications, if we consider that laparoscopic adrenalectomy can be performed safely for tumors larger than 10 cm, and also for carcinomas, with no morbidity or mortality and a fast recovery [1]. Advantages of the laparoscopic approach can be also consistent in adrenal pathology. Minimally intraoperative blood loss, low postoperative pain, cosmetical appearance, fast recovery, perioperative complications are only the most significant advantages.

Due to the fact that this type of surgery is generally for adults, there are a lot of patients with previous abdominal surgery (open or laparoscopic approach). In our study we included only patients with previous surgery in the upper abdomen (excluding appendectomies or gynecologic surgery,) and we tried to demonstrate that there is no significant difference regarding operating time, conversion rate or postoperative recovery and hospital stay.

## Material and method

We reviewed retrospectively 6 years of experience (2003–2009) in laparoscopic adrenalectomy in a single surgery department in the Emergency Hospital Bucharest. In this period of time, the same surgical anesthesia team performed 152 laparoscopic adrenalectomies by anterolateral transperitoneal approach, 23 of them for patients with previous abdominal surgery in the upper abdomen (one patient with Cushing's disease had 2 consecutive operations

Table I. Demographic information

Demographic	Women	Men
Nr.	21	3
Age (years)	49.71 (27–72)	53.66 (47–61)
Side		
Left	9	1
Right	11	2
Bilateral	1	0

for the left and right side). Our surgical-anesthesia team is trained in advanced laparoscopic surgery and have been performing laparoscopic adrenalectomies since April 2003, meaning that this study also includes the learning curve for this type of surgery.

The medical records for all 23 patients with 24 surgical procedures in this study were reviewed for demographic data, surgical procedure (including previous abdominal surgery), pathology and outcome. All patients treated in our clinic were diagnosed and prepared for surgery by endocrinologists from the “C.I. Parhon” National Institute of Endocrinology, including preoperative medication for patients with pheochromocytoma and postoperative survey.

## Results

From a total of 161 adrenalectomies carried out in the General Surgery Department of Emergency Hospital Bucharest, 152 were performed by laparoscopic approach by the same surgical team, 24 patients having had previous abdominal surgery in the upper abdomen. Table I shows the demographic data of these patients, while their preoperative diagnoses are presented in Table II.

The surgical procedure used for all patients, once the patients signed the informed consent, consisted of a transperitoneal anterolateral subcostal laparoscopic approach with 4 trocars of 10 mm, pneumoperitoneum of 12 mmHg with the operation table adjusted to expose the subcostal region and optical of 30°. During the first year of experience (5 cases in the studied group) the adrenal gland dissection was carried out with the monopole dissector – Hook, and the adrenal central vena being clipped and then sectioned. Subsequently the dissection was carried out with LigaSure Altas sealing and sectioning the central vena

Table II. Pathology

	Women	Men
Cushing's disease	4 (5 procedures)	1
Cushing's syndrome	4	1
Conn's syndrome	1	0
Incidentaloma	8	1
Pheochromocytoma	2	0
Neoplasia	1	0

with the aid of this tool (19 cases from the studied group).

These patients had previous abdominal surgery in the upper abdomen as presented in Table III.

Operating time was between 40 and 360 minutes (Figure 1), median 127 minutes, with no lengthening because of the postoperative adhesions (our median operating time in all 152 laparoscopic adrenalectomies was 100.92 minutes [7]), but we encountered 3 conversions to open surgery due to adhesions after hiatal hernia, spleen infarction which also needed a splenectomy, and inflammatory adhesions with a very difficult mobilization of the specimen (Table IV).

Blood loss was no more than 200 ml (30–200ml), so we did not use blood transfusions and all patients had a drainage for 24 hours. There were no complications, postoperative morbidity or mortality.

Demographic data for the patients who underwent conversion to open surgery are presented in Table V.

From 23 patients and 24 procedures we had 25 adrenal glands removed (1 patient had a bilateral approach in the same operating time), with dimensions between 1 and 6 cm, as showed in Figure 2. The histologic examination found 8 adenomas, 13 hyperplasiae, 2 pheochromocytomas and 1 neoplasia.

Postoperative hospital stay was not longer than for patients with no previous abdominal surgery and pain medication was similar with every other laparoscopic procedure (except for the cases which needed conversion to open adrenalectomy). Median postoperative stay in our previous experience was 4.79 days [7] and 4.5 days (3–7 days) for this study group, as presented in Figure 3.

All our patients were clinically and paraclinically evaluated post surgery in the “C.I. Parhon” National Institute

Table III. Previous abdominal surgery

Previous abdominal surgery	Number
Cholecystectomy laparoscopic/open	4/3
Biliary surgery (open)	1
Hiatal hernia (open)	1 (2 procedures)
Adrenalectomy (open)	3-relapse
Umbilical hernia, POVH (open)	2
Gastric surgery (open)	2
Colectomy (open)	1
Splenectomy (open)	1
Hepatic hydatid cyst (open)	1
Laparoscopy	1
Mesenteric infarctisation (open)	1
POVH (open)	2

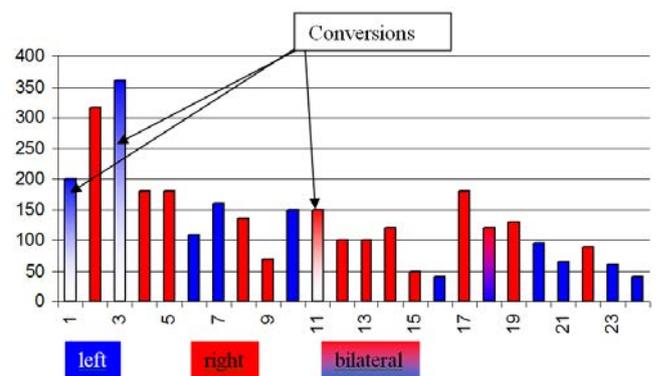
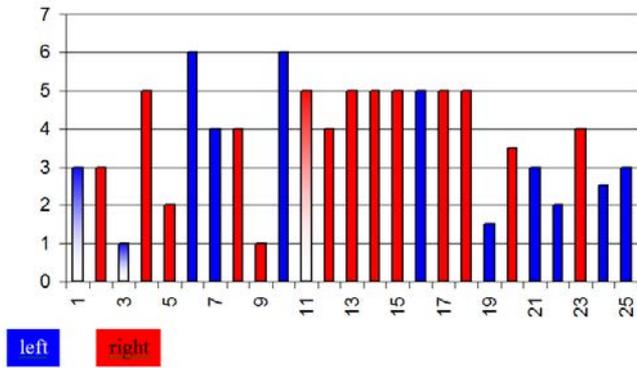


Fig. 1. Operating time (min)

**Table IV. Conversion**

	Pathology	Specimen size cm	Side	Operating time (min)	Postop stay (days)
Adhesions	Cushing disease	3	Left	200	6
Spleen infarctisation	Conn syndrome	1,5	Left	360	7
Inflammatory adhesions and difficult mobilization	Cushing disease	5	Right	150	7



**Fig. 2. Specimen size (cm)**

of Endocrinology, and up to the present day there were no relapses or mortality in this study group.

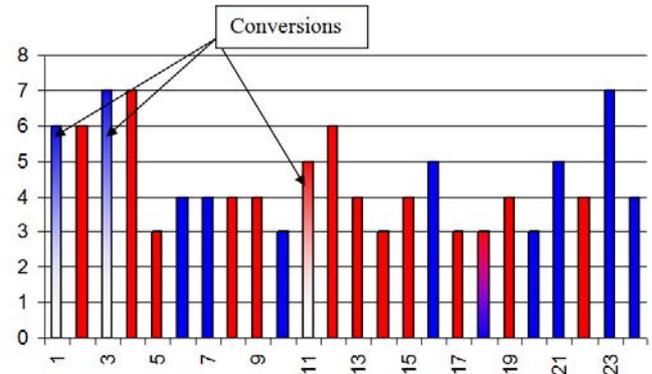
**Discussion**

Minimally invasive surgery changed adrenal surgery in the past 2 decades, although there is no consensus about the type of access, either transperitoneal or retroperitoneal. In our clinic, general surgeon teams perform the laparoscopic adrenalectomy and it is the only approach that we used for all our patients with adrenal pathology, except for patients with general contraindications for laparoscopy, is anterolateral transperitoneal approach even for patient with previous abdominal surgery. Choosing the type of approach is related to surgeon experience, although 79–94% of general surgeons prefer the transabdominal lateral approach [8], because there are more clear and familiar anatomic landmarks and they can also explore the entire abdominal cavity, in order to diagnose and treat other associated pathologies.

Although we are not an endocrine surgery department, the increase in the number of adrenalectomies from 9 in our first year, to 34 in the last year, shows not the increasing incidence of adrenal pathology in our population, but the increasing experience in the diagnosis of this pathology, coupled with highly performant imaging and treatment methods [9]. The reason we approach laparoscopically

**Table V. Demographics**

	Gender	Age	Previous surgery	Histology
Adhesions	Women	35	Hiatal hernia	Adenoma
Spleen infarctisation	Women	55	Laparoscopic cholecystectomy	Hyperplasia
Inflammatory adhesions and difficult mobilization	Women	59	Laparoscopic cholecystectomy	Hyperplasia



**Fig. 3. Postoperative hospital stay (days)**

almost all of our patients with adrenal pathology (with a very careful preoperative preparation, especially for pheochromocytomas) is that we are beyond the learning curve, and now we can perform safely all adrenal pathologies and remove tumors even larger than 10 cm.

In this study group, we did not significantly prolonged operating time because of the adhesions, and conversion rate was not higher than for patients with no previous abdominal surgery, therefore we do not believe that laparoscopic adrenalectomy performed by antero lateral transabdominal approach, is contraindicated for patients with previous abdominal surgery, even open and major surgery in the upper abdomen. The reasons for conversion to open surgery were not different than in other laparoscopically approached pathologies, and the most common reasons are always adhesions or difficult mobilization.

The right moment for surgery is another problem to discuss. An accurate diagnosis and a proper preparation from the endocrinologist are essential for the success of the surgery, as is postoperative follow-up. All patients from this study were diagnosed in the “C.I. Parhon” National Institute of Endocrinology, where CT scans were performed, along with biochemical measurements. The benefits of minimally invasive surgery are important for these patients, especially if we consider that patients with Cushing's disease or Cushing's syndrome are more likely obese, and an open procedure can be complicated as far as the surgical procedure, but also postoperative recovery and overall morbidity are concerned.

**Conclusions**

Laparoscopic adrenalectomy is a challenging technical procedure which needs advanced laparoscopic skills to be performed safely. A better understanding of the anatomy, physiology and pathology of the adrenal gland, along with

a very careful pre- and postoperative medication are essential for an outstanding outcome.

With an experienced surgical team, there is no difficulty in performing laparoscopic adrenalectomy by transperitoneal approach, with no significantly prolonged operating time, even when the patients had previous abdominal surgery.

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