Retroperitoneoscopic Adrenalectomy in Prone Position

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Abstract

Introduction and objectives: Laparoscopic or retroperitoneoscopic approaches are the options of choice for removing benign adrenal tumor masses. The aim of this paper is to assess the results of our initial experience with retroperitoneoscopic adrenalectomy in prone position.

Materials and methods: Between 2005 and 2013 there were 63 cases of benign adrenal tumor masses that received endoscopic treatment in our center. 18 of them underwent a laparoscopic and 45 a retroperitoneoscopic adrenalectomy. For 33 of these patients the surgery was performed in a flank position and for the other 12 in a prone position (7 on the right and 5 on the left). After the general anesthesia in the supine position, the patients were flipped in a prone position. 3 trocars were inserted (middle 12 mm at the tip of the 12th rib, median 10 mm next to the para-spinal muscle, lateral 5 mm close to the tip of the 11th rib). The retroperitoneum was inflated with CO₂ at 14-20 mmHg. First the upper pole of the kidney was dissected, then the adrenal gland was separated from the kidney and the vena cava (or aorta) with a harmonic scalpel. The dissection was finalized, and the organ was removed in an endocatch bag. Different from the original „Walz“ technique, we used the middle (12 mm) trocar for the camera during dissection, and switched to the median (10 mm) trocar only to remove the tumor.

Results: This approach was easy and fast. No immediate or late complications were encountered, with no significant blood loss and no cardiovascular problems. Mean operation time was of 75 minutes, even if this is our initial experience with the technique. Only 3 trochars were always required. Mean tumor size was 4.3 cm (3-6 cm). The larger tumors were removed by morcellation in the endocatch bag through the middle 12 mm trochar, without extending the initial incision. Histology revealed nonsecretory cortical adenomas in all cases.

Conclusions: Retroperitoneoscopic adrenalectomy in a prone position is the best approach for benign adrenal tumors because it provides the easiest access to the adrenal gland, avoiding intraabdominal adhesions and other organs. Requiring only 3 trocars and a short learning curve, it also is the simplest and fastest method. And it allows higher inflation pressures without the risk of a decrease in venous return, and can be safely performed, even in obese patients or bilateral tumors.

Key words: Retroperitoneoscopic adrenalectomy, prone position, benign suprarenal masses

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**Introduction and objectives**

In the treatment of benign suprarenal masses, minimally invasive surgery, performed laparoscopically or retroperitoneoscopically, represents the standard approach.

The current technique of choice is represented by the transabdominal laparoscopic adrenalectomy, which was used for the first time in 1992. While the transabdominal approach is a safe and efficient way for performing an adrenalectomy, it has its limitations in obese patients, cases with bilateral tumors and patients with a history of previous multiple peritoneal surgical interventions or abdominal wall postoperative complications.

The posterior retroperitoneoscopic adrenalectomy (PRA) was first performed in 1995 and it came as an obvious solution for the limitations of the transabdominal approach. In the beginning the method was viewed with skepticism by many because it required a larger insufflation pressure in order to obtain a good exposure of the retroperitoneum.

Giebler and Walz performed several measurements in which they demonstrated that the venous return wasn’t affected during the PRA, and stated that higher retroperitoneal pressures don’t have the same effect on the vena cava as higher intraperitoneal pressures.

The aim of this paper is to assess the results of our initial experience with retroperitoneoscopic adrenalectomy in prone position.

**Materials and methods**

Between 2005 and 2013 a number of 63 cases of benign adrenal tumor masses received endoscopic treatment in our center, 18 of them underwent a laparoscopic adrenalectomy and 45 a retroperitoneoscopic adrenalectomy.

For 33 of these patients the surgery was performed in a flank position and for the other 12 in a prone position (7 on the right and 5 on the left).

All the patients underwent an abdominal contrast enhanced CT scan prior to the operation (Fig. 1).

The patient is first placed in the supine position, in order to administrate general anesthesia, and afterwards the patient is flipped in a prone jackknife position (Fig. 2).

We used 3 trocars inserted in the following manner: middle (12 mm) at the tip of the 12th rib, median (10 mm) next to the para-spinal muscle, lateral (5 mm) close to the tip of the 11th rib (Fig. 3).

Our technique is slightly different from the original “Walz” technique, because we used the middle (12 mm) trocar for the camera during dissection, and switched to the median (10 mm) trocar only to remove the tumor, while Walz describes the PRA technique with the camera inserted through the median trocar.

The retroperitoneum was inflated with CO\textsubscript{2} at 14-20 mmHg.

All the other surgical steps were performed as described by Walz in the original PRA technique.

First the upper pole of the kidney was dissected and separated from the adrenal gland (Fig. 4). Afterwards we dissected the medial aspect of the adrenal gland from the vena cava (or aorta) using a har-
monic scalpel for hemostasis (Fig. 5).

The dissection was finalized on the lateral and superior aspects of the adrenal gland, and the organ was removed using an endocatch bag, and a drainage tube was left in place, exteriorized through the lateral trocar orifice (Fig. 6).

The patients were discharged 3 days postoperative, with no significant problems, and underwent a check-up at 1 month after the surgery. (Fig. 7)

Results
In the postoperative period no immediate or late complications were encountered, with no significant blood loss and no cardiovascular problems.

The mean operating time was 75 minutes, even if this is our initial experience with the technique, because of its easy access on the adrenal gland and because of the very good exposure of the retroperitoneum.

We always used only 3 trocars and because of the mean tumor size of 4.3 cm (3-6 cm), we were able to retrieve the tumors with an endocatch bag through the middle 12 mm trocar, without extending the initial incision, using morcellation for the larger tumors.

In all our cases the anatomopathological result revealed nonsecretory cortical adenomas.

Discussion
The optimal treatment for small benign adrenal masses should be without doubt a minimal invasive approach.

We consider that retroperitoneoscopic adrenalectomy in a prone position is the method of choice for small suprarenal benign masses.

As the initial fear of using higher retroperitoneal pressures has been surpassed by data revealing that the vena cava can sustain them in the retroperitoneum without cardiac venous return problems, the PRA seems an obvious choice with considerable advantages and minimal disadvantages.

Among the other advantages we can mention the possibility of bilateral adrenalectomy without repositioning the patient, easy access in obese patients and good approach in patients with multiple abdomen surgeries.

The disadvantages are mild and come from the fact that the surgeon operates in a well known area, but using an angle he is not accustomed to, so important landmarks such as the upper pole of the kidney must be always kept in mind.

We used a slight modification in the trocar function compared to the original Walz technique, because we found our approach more intuitive and simpler for the spatial sense of positioning of the operator.

An important element in our studied group was patient selection. As this is an initial experience, we highly selected our patients, and we considered only the ones with benign nonsecretory tumors, smaller than 6.5 cm, fit for this surgical approach.

Although there are reports in the literature of larger tumors (> 7 cm) being operated through PRA, these cases must be reserved to high volume centers and experienced surgeons.

All the patients in our group had CT scans performed preoperative in order to evaluate the tumor properly. For the patients we suspected with malignant tumors due to the imagistic findings (ex: masses which invade adjacent structures) an open technique was used.
Conclusions
Retroperitoneoscopic adrenalectomy in prone position is the best approach for benign adrenal tumors because it provides the easiest access to the adrenal gland, avoiding intraabdominal adhesions and other organs.

Requiring only 3 trocars and a short learning curve, it also is the simplest and fastest method.

It allows higher inflation pressures without the risk of a decrease in venous return, and can be safely performed, even in obese patients or bilateral tumors.

References: