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Laparoscopic extraperitoneal adenomectomy: surgical technique and preliminary results

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ABSTRACT

Objective: We analyze the laparoscopic adenomectomy preliminary results and describe the surgical technique, for benign prostatic hyperplasia (BPH), for glands greater than 60 cc.

Materials and methods: From January to April 2009 we performed 10 laparoscopic adenectomies. We performed a descriptive and retrospective study and early postoperative results were analyzed. Descriptive statistical analyses were performed using IPSS 17.0. The surgical technique is described step by step.

Results: Conversion to open surgery was not required, and none of the patients had serious peri-operative and post-operative complications. None of the ten patients required blood transfusions. Median operating time was 112.5 min (80-135). Median hospital stay was 3.5 days (2-5) and median catheterization period was 7 days (3-21). The median prostate enucleated weight was 62 gr (40-93). The median postoperative Qmax was 18.8 ml/sec and the median score of IPSS was 5.

Conclusions: Laparoscopic adenomectomy is a low rate morbidity technique and reproducible in centers with laparoscopic skills. Prospective and comparative studies with open surgery will be necessary to choose the best technique for our patients.

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Adenomectomía extraperitoneal laparoscópica: descripción técnica quirúrgica y resultados preliminares

RESUMEN

Objetivos: Analizamos los resultados preliminares de la adenomectomía laparoscópica y su descripción técnica, para el tratamiento de la HBP, en glándulas con un tamaño superior a 60 cc.

Material y métodos: Entre enero y abril de 2009 hemos realizado 10 adenomectomías laparoscópicas. Realizamos un estudio retrospectivo y descriptivo y analizamos los resultados obtenidos en el postoperatorio inmediato. El análisis estadístico descriptivo se realizó con el programa SPSS versión 17. Se describe paso a paso la técnica quirúrgica utilizada.
Introduction

The surgical approach to benign prostatic hyperplasia (BPH) mainly depends on prostate volume. Prostate glands less than 60-70 mL in volume have traditionally been considered as candidates to endoscopic treatment by transurethral resection, while those exceeding such volume have been treated by open adenomectomy.

Minimally invasive procedures have been developed in recent years, including prostate laser vaporization, which provides excellent results in terms of hospital stay with minimum bleeding and bladder catheterization time. However, larger prostates require enucleation procedures ensuring a long-term symptom improvement such as open adenomectomy, holmium laser enucleation of the prostate (HoLEP), and laparoscopic adenomectomy.

At our department, laparoscopic surgery is firmly established in urological procedures such as radical cystectomy, radical prostatectomy, and renal and retroperitoneal surgery.

Since BPH is a very common condition, this procedure would allow us to gain experience in laparoscopic pelvic surgery, thus providing patients with a procedure with low morbidity and an excellent functional outcome.

The objective of this article was to provide a detailed description of the surgical procedure and the preliminary results obtained with it.

Materials and methods

From January to April 2009, 10 extraperitoneal laparoscopic adenomectomies were performed in patients in whom surgery was indicated for BPH.

All patients were previously studied at our clinic using an IPSS questionnaire, physical examination with digital rectal examination, urine analysis, serum creatinine levels, PSA levels, flowmetry (except in patients with an implanted bladder catheter), and ultrasound measurement of prostate volume and postvoiding residue.

Ultrasound-guided prostate biopsy was required in 4 of the 10 operated patients before adenomectomy due to high PSA levels. Negative biopsy results were found in all 4 patients.

A retrospective, descriptive study was conducted, and an analysis was made of results achieved in the early postoperative period: complications, transfusion requirement, hospital stay duration, bladder catheterization time, and postoperative voiding quality.

SPSS version 17.0 software was used for the descriptive statistical analysis.

Description of surgical procedure

Patient was placed in a supine position with Trendelenburg at 30º.

All procedures were performed under general anesthesia.

A Foley 18Ch bladder catheter was inserted. A 2-cm horizontal infraumbilical incision was done, followed by finger dissection to access the preperitoneal space. A 10-12 mm balloon trocar (Space Maker Plus® dissector system/Autosuture) was introduced and pneumatic dissection of the retropubic space was performed. The dilating balloon trocar was subsequently replaced by a Hasson self-retaining trocar. CO₂ was used to work at a constant pressure of 13-14 mm Hg, and three additional trocars were introduced under direct vision: two 5-mm trocars in both iliac fossae and a 10-12 mm suprapubic trocar.

In the first two patients, four hemostatic Vicryl® 1/0 stitches were placed in the prostatic capsule, two in the lateral spaces at the level of vesico-prostatic vessels and another two in the anterior side of capsule, to cranially and caudally delimit capsulotomy. This step was omitted in all other patients because of the minimum bleeding seen when capsulotomy was directly performed using Ultracision® harmonic scalpel.

Once prostatic capsule was exposed, vertical capsulotomy was performed from the prostatic apex, prolonging incision up to 1 cm above the bladder neck.

An incision was made on bladder mucosa covering the prostate gland and the plane between capsule and adenoma was exposed and started to be dissected in an antegrade direction from the bladder neck. Both lobes were laterally dissected, and adenoma was enucleated up to the apex (fig. 1).

Surgical specimen was placed inside the lateral prostatic fossa for subsequent removal.

Hemostasis of prostate cell was reviewed and cell was regularized, removing residual adenomers.

Three Vicryl® 2/0 stitches were used for trigonization (fig. 2).
A 22Ch continuous bladder irrigation catheter was inserted. Incision in the bladder and prostatic capsule was closed with two uninterrupted Vicryl® 0 hemisutures. Suture tightness was verified by filling the bladder with 250 mL of saline. An EndoBag® (Autosuture) was introduced through the 10-mm port and surgical specimen was placed inside the bag for subsequent removal through the infraumbilical incision.

**Results**

Median patient age was 66.5 years (61-80), median prostate volume measured with transrectal ultrasound was 104 cm³ (63-147), and median maximum flow rate (Qmax) was 7.6 mL/sec (5.3-7.9). Flowmetry was not performed in 4 patients (40%) because they had acute urinary retention requiring bladder catheterization. Median IPSS questionnaire score before surgery in the 6 patients with spontaneous voiding was 24 (19-33).

Surgery was indicated in 4 patients due to two or more failed attempts at bladder catheter removal after AUR despite medical treatment (40%), and in 6 patients for lower urinary tract symptoms attributable to BPH not improving on drug treatment (60%).

Median preoperative PSA level was 10.7 ng/mL (3.04-21.3) and digital rectal examination revealed a normal consistency in all patients; patients with higher PSA levels were those with an implanted bladder catheter. Ultrasound-guided prostate biopsy was performed in 5 of the 10 patients because of their high PSA levels and was negative for malignancy in all of them.

No patient had a history of prostate surgery. Conversion to open surgery was not required in any of the 10 patients. Median operating time was 112.5 min (80-135). Median blood loss was 150 mL (100-300 mL), and no patient required blood transfusion during or after surgery. No severe complications occurred during surgery, but a patient had a false urethral passage when the (3-way) washing catheter was introduced. This required bladder catheterization under endoscopic vision, which increased operating time above the mean (135 min).

Four patients (40%) had mild complications in the early postoperative period. One patient had high fever after surgery, and was treated with antibiotics with a good response (he had a bladder catheter implanted before surgery). Another patient had hematuria after removal of the washing saline, and this was therefore maintained for an additional 24 h. However, hematuria had no impact on the complete blood count. A third patient showed an increased urine output through the drainage in the first 24 h after surgery, but this subsided at 48 h. Finally, a patient with a history of alcohol consumption showed an acute confusional state 48 h after surgery. Once his neurological condition had improved, the catheter was removed during admission and patient was discharged on the fourth day.

Drainage was removed at 48 h in all patients but one (10%), in whom it was maintained for 3 days. Median hospital stay was 3.5 days (2-5).

Bladder catheter was removed at 7 days in 5 patients (50%) who were discharged with a bladder catheter, on the third day of admission in 4 patients (40%), all of whom showed adequate micturition, and the catheter was maintained in one patient for 3 weeks due to a false urethral passage.

Pathological study confirmed the presence of nodular prostatic hyperplasia in all specimens. The median weight of enucleated tissue was 62 g (40-93).

At follow-up 30 days after surgery, all patients were continent. One patient experienced after removal of bladder catheter acute orchiepididymitis which was successfully treated with oral antibiotic therapy, and three patients (30%) had urgency without incontinence. Only one of these patients required treatment with anticholinergics.
Two months after surgery, a lower urinary tract questionnaire (IPSS) was administered and a flowmetry was performed. Median Qmax was 18.8 mL/sec (15.5–34.8), and median score in the IPSS questionnaire was 5 (0–9).

Discussion

Retropubic adenomectomy continues to be the treatment for large prostatic adenoma. Despite the great efforts made to find new minimally invasive procedures to replace conventional surgery, open adenomectomy is still the treatment of choice for bulky prostates, particularly in young patients, and accounts for up to 30% of all invasive procedures performed for the treatment of BPH in Europe.1

At our department, 10 consecutive patients underwent extraperitoneal laparoscopic adenomectomy. Surgery was performed in all cases by the same surgeon, who had a great experience in laparoscopic surgery, in order to assess whether this procedure really provides benefits, particularly as regards postoperative morbidity, and short-term functional results superimposable to those of open surgery.

Mariano et al were the first to perform laparoscopic adenomectomy in 2002. They collected a surgical specimen of 120 g after an operating time of 3.8 h and recorded a blood loss of 800 mL.2

The learning curve of the surgical technique has been short because other procedures such as radical prostatectomy, radical and partial nephrectomy, and radical cystectomy were already routinely done at our center by the laparoscopic route.

All procedures were performed using an extraperitoneal, retropubic approach because the presence of infected urine in patients with bladder stones, high postvoiding residue, and indwelling bladder catheters advised against a transperitoneal access (the one routinely used at our center for radical prostatectomy) due to the possibility of communicating the peritoneal cavity with an infectious focus.

As shown by the results achieved, our bleeding rate was very low and no transfusions were required, probably because image magnification allows for more careful dissection and improved hemostasis. Moreover, CO2 decreases retrograde bleeding of a venous origin, as occurs in most laparoscopic procedures. However, unlike other authors3,4 who performed a transverse capsulotomy with control of dorsal venous plexus by hemostatic sutures, of the Millin type, we used a combined (transcapsular and transvesical) approach using longitudinal capsulotomy extended to the bladder neck, a modification which appears to decrease bleeding, as reported by other authors.5

Although our series had a limited number of patients, median hospital stay was 3.5 days, shorter than reported by other authors.3,4,6 No patient remained at the hospital for longer than 5 days, and 50% stayed for only 2 days. Of the two patients who stayed at the hospital for 5 days, one experienced postoperative fever resolved with intravenous antibiotic therapy, and the other hematuria requiring additional days of continuous bladder washing.

The complication rates of open adenomectomy are highly variable and range from 15%-45% depending on the series.2 Our results regarding perioperative and postoperative complications are quite promising, as no patient had severe complications and there were 4 mild complications (40%), all of which were resolved without the need for repeat surgery or transfusion, and with no significant delay in hospital discharge. A single mild urinary infection (10%) occurred in a patient who had a bladder catheter implanted previously, a result similar to those reported by other series (8%-21%).7

Long-term results are not available yet, but 2 months after surgery no patient had a bladder catheter implanted or urinary incontinence and they all showed objective signs of clinical improvement. However, long-term follow-up data will be required to adequately assess their subsequent course.

Casey McCollough et al conducted a study comparing open and laparoscopic adenomectomy. Their results showed a shorter hospital stay, a shorter time with a bladder catheter, and a lower rate of postoperative urinary infections with the laparoscopic approach. By contrast, mean operating time was shorter when open surgery was performed, and no significant differences were seen in intraoperative bleeding (28.1% and 29.3% in the laparoscopic and open surgery groups respectively).8

The results achieved (in terms of hospital stay, bleeding, operating time) cannot be compared to results of the same center because this was not a prospective, randomized, and controlled study. The purpose of our study was simply to show the feasibility of the procedure and to report our initial experience in 10 patients with long-term results, since follow-up time is short and size of the series small. A comparative study based on a large sample of consecutive patients operated on by the same surgical team will be considered in the future.

A larger number of patients followed up for a longer time may possibly detect a higher complication rate or a better understanding of the functional outcome of the procedure.

Preliminary experiences with initial satisfactory results such as this may help promote and improve the procedure at centers with laparoscopic experience, reproducing results similar to those reported by other groups.3-6,8

Today, the advent of minimally invasive surgical procedures (single-port laparoscopic transvesical enucleation of the prostate9 or preperitoneal robotic adenomectomy10 and the development of state-of-the-art laser energy sources (120 W green laser,11 holmium laser enucleation,12 thulium laser vapor resection, diode laser vaporization) may change the traditional concept and the gold standard of BPH treatment. Studies comparing laparoscopic surgery and endoscopic treatment using new technologies are indispensable.

Conclusions

Preliminary data about laparoscopic extraperitoneal adenomectomy are promising, showing that this is a reproducible procedure causing little morbidity. Their main advantages include a short hospital stay, a minimum bleeding rate, and no transfusion needs. Long-term results are needed,
and prospective studies comparing open to laparoscopic surgery and to other minimally invasive procedures with promising results, such as holmium laser enucleation, are required to assess the advantages and disadvantages of each procedure with a greater scientific rigor.

**Conflict of interest**

The authors declare no conflict of interest.

**REFERENCES**


