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The technique of laparoscopic extraperitoneal simple prostatectomy (adenomectomy) – first experience based on 66 consecutive cases

Technika wyłuszczenia gruczołka stercza metodą laparoskopii przedotrzewnowej – doświadczenia własne na podstawie pierwszych 66 przypadków

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Summary

Introduction and Objectives. The development of endovision techniques in urology make possible to perform laparoscopic enucleation of prostatic adenoma via extraperitoneal approach.

Aim of the study present the operative technique of laparoscopic prostate adenomectomy (LAP-Ad).

Material and methods. The paper was prepared after team experience based on LAP-Ad performed from January 2006 to March 2010 in 66 cases of symptomatic bladder outflow obstruction and a prostate gland > 60 cc. Prostatic size on TRUS, operative times, intraoperative blood loss, transfusion rate, complications, catheterization period, irrigation requirements, hospitalization time and surgical specimen weight were determined prospectively.

Results. In every patients the procedure was performed without conversion to standard, open technique. Average patient age was 71.2 ± 6.5 (range 55-78 years). Average operating time was 55 min \pm SD 10.0 (range 45-85 min). A mean prostate volume on TRUS of $85 \text{ cm}^3 \pm \text{SD } 10.0$ (range 70-100 cm^3). Mean estimated blood loss was 200 ml \pm SD 20.0 (range 100-250 ml). Blood transfusion was not necessary in all cases. Mean postoperative catheterization period was 7 days \pm SD 1.0 (range 6-9 days). The drain remained in place an average of $2.5 \pm \text{SD } 0.5$ days (range 2-3 days). Mean duration of postoperative hospital stay was $5 \pm \text{SD } 2.0$ days (range 5-10 days). No postoperative complications were reported. Only two patients with preoperative urinary retention presented with mild urinary incontinence requiring a small urinary pad every 24 hours. No new erectile dysfunction was reported. Mean weight of the enucleated tissue was 85.5 ± 14.9 g (range 65-100 g). Postoperative pathological diagnosis was benign prostatic hyperplasia in all cases.

Conclusions. LAP-Ad is an effective, technically easy and considerably less invasive procedure from open prostatic surgery. LAP-Ad makes possible to perform efficient and safe adenoma of the prostate enucleation in cases of advanced benign prostatic hyperplasia.

Key words: laparoscopy, benign prostatic hyperplasia, simple prostatectomy

Streszczenie

Wstęp. Wzrastająca dostępność technik endowizji umożliwia skuteczną przeprowadzenie laparoskopowego wyłuszczenia gruczołka stercza u chorych na zaawansowany łagodny rozrost gruczołu krokowego. Celem opracowania jest przedstawienie wczesnych wyników pooperacyjnych i techniki adenomektomii stercza wykonanej laparoskopowo.

Materiał i metoda. Materiał jest pokłosiem doświadczenia opartego na laparoskopowym wyłuszczeniu gruczołka stercza

(LAP-Ad) przeprowadzonym w okresie od stycznia 2006 r. do do marca 2010 r. u 66 chorych na zaawansowany objawy rorost stercza z wielkością gruczołu krokowego powyżej 60 cm³. Ocenie poddano wielkość stercza/gruczolaka metodą ultrasonografii przezodbytnicznej (TRUS), czas operacji, śródoperacyjną utratę krwi, odsetek transfuzji, powikłania, czas utrzymywania cewnika, czas hospitalizacji oraz ostateczną masę preparatu pooperacyjnego.

Wyniki. U wszystkich chorych operację przeprowadzono z powodzeniem, bez potrzeby konwersji. Średni wiek chorych wynosił 71,2 ± 6,5 (55-78 lat). Średni czas operacji wynosił 55 min ± SD 10,0 (45-85 min). Średnia wielkość gruczołu krokowego określona metodą TRUS wynosiła 85 cm³ ± SD 10,0 (70-100 cm³). Średnia utrata krwi wynosiła 200 ml ± SD 20,0 (100-250 ml). U żadnego chorego nie istniała konieczność przetoczenia krwi. Średni czas pozostawienia cewnika w pęcherzu moczowym wynosił 7 dni ± SD 1,0 (6-9 dni). Czas utrzymywania drenażu wynosił 2,5 ± SD 0,5 dni (2-3 dni). Średni czas hospitalizacji wynosił 5 ± SD 2,0 dni (5-10 dni). Nie obserwowano żadnych powikłań w czasie ani we wczesnym okresie po operacji. U dwóch chorych operowanych w stanie całkowitego zatrzymania moczu zaistniała konieczność zastawienia podkładów z powodu nieznacznej i przemijającej inkontynencji trwającej wyłącznie 24 godziny. Średnia masa usuniętego gruczolaka wyniosła 85,5 ± 14,9 g (65-100 g). Na podstawie badania histopatologicznego stwierdzono u wszystkich chorych łagodny rozrost stercza.

Wnioski. Przedstawiona operacja jest skuteczna i technicznie prosta. Jej inwazyjność jest istotnie mniejsza od klasycznego, operacyjnego wyluszczenia gruczolaka stercza. Sądzymy, że LAP-Ad umożliwia sprawne i bezpieczne wyluszczenie gruczolaka stercza i stanowi wartościową alternatywę dla operacji klasycznych.

Słowa kluczowe: laparoscopia, łagodny rozrost stercza, adenomektomia

INTRODUCTION

Transurethral resection of the prostate (TURP) is the still gold standard management when surgery is indicated for treatment of BPH (1). However large volume prostates are not the ideal cases for TURP due to the prolonged operative time required which may lead to complications (2). Open simple prostatectomy is permissible option for large sized prostates (> 60 cc) because the entire adenoma is removed with finger dissection swiftly and bloodlessly if the correct separation plane between the adenoma and the surgical capsule is entered. However it is invasive and requires a longer hospitalization period than TURP (3).

Therefore in the setting of a continuous drive to apply laparoscopy to all surgical procedures, laparoscopic simple prostatectomy has been performed with good results. In most of these series enucleation was performed with a combination of acute dissection and laparoscopic instrument tip enucleation (4).

We present our experience with laparoscopic simple prostatectomy in order to combine the advantages of laparoscopy with the quick and massive removal of the entire prostatic adenoma.

METHODS

From January 2006 to March 2010, we performed 66 consecutive laparoscopic simple prostatectomies using extraperitoneal approach in men with symptomatic bladder outflow obstruction and a prostate gland > 60 cc on transrectal ultrasound examination (TRUS). No patient had concomitant surgical pathology of the bladder such as lithiasis or diverticulum. All patients provided informed consent and were informed about the open and transurethral alternatives. Prostatic size on TRUS, operative times, intraoperative blood loss, transfusion rate, complications, catheterization period, irrigation requirements, hospitalization time and

surgical specimen weight were determined prospectively.

Operative technique

Preoperative antibiotic prophylaxis was used in all patients before induction of general anesthesia. Patients were placed in a supine Trendelenburg position with the legs in 20° spread. After a 10 mm incision 1 cm below the umbilicus the working space was created by finger dissection along the undersurface of the anterior rectus fascia. A Hasson 10 mm trocar was subsequently placed, through which the camera was inserted and insufflation initiated. Under full visual control and without using a balloon device the working space was augmented with the use of the camera for further dissection. Subsequently 2 more 10 mm ports were placed on each side in the middle of the distance between the anterior iliac spine and the umbilicus. An additional 5 mm port was placed below and lateral to the 10 mm trocar on the surgeon's side. Extraperitoneal dissection of the space of Retzius was completed with removal of the fat situated above the prostate. The endopelvic fascia was not opened. All laparoscopic simple prostatectomies used a Millin-type procedure. A longitudinal opening was made in the prostatic capsule and the adenoma was enucleated with the finger entering the preperitoneal space through a 1 cm incision above the pubis in the midline. After enucleation the incision was temporarily closed with a trocar and a towel grasper. Hemostasis was achieved with bipolar diathermy or suturing when necessary. A 24F 3way catheter is inserted and closure of the capsule with a running suture is contemplated. The prostatic adenoma without using a lap sac is removed through the suprapubic incision, which is extended according to the adenoma's size. A suction drain is placed through the suprapubic incision, and the remaining trocars are removed and closed. The bladder was placed on

continuous fluid irrigation. No suprapubic catheter was inserted.

In all patients bladder irrigation was stopped and the catheter was subsequently removed when the urine was light rose or clear. Patients were discharged home the day after the catheter was removed. Blood transfusion was initiated when serum hemoglobin was less than 8 g/ml or symptoms of acute blood loss were apparent.

RESULTS

A total of 66 patients with a mean prostate volume on TRUS of $85 \text{ cm}^3 \pm \text{SD } 10.0$ (range 70-100 cm^3) underwent successfully a laparoscopic Millin simple prostatectomy without any conversion or mortality. Average patient age was 71.2 ± 6.5 (range 55-78 years). Average operating time was $55 \text{ min} \pm \text{SD } 10.0$ (range 45-85 min). Mean estimated blood loss was $200 \text{ ml} \pm \text{SD } 20.0$ (range 100-250 ml). Blood transfusion was not necessary in all cases. Mean postoperative catheterization period was 7 days $\pm \text{SD } 1.0$ (range 6-9 days). The drain remained in place an average of $2.5 \pm \text{SD } 0.5$ days (range 2-3 days). Mean duration of postoperative hospital stay was $5 \pm \text{SD } 2.0$ days (range 5-10 days). No postoperative complications were reported. Only two patients with preoperative urinary retention presented with mild urinary incontinence requiring a small urinary pad every 24 hours. No new erectile dysfunction was reported. Mean weight of the enucleated tissue was $85.5 \pm 14.9 \text{ g}$ (range 65-100 g). Postoperative pathological diagnosis was benign prostatic hyperplasia in all cases.

DISCUSSION

Large sized prostates requiring surgical management for BPH can be a challenge for the urologist. Transurethral resection has been used for large prostates however long resection times are required and this may lead to significant blood loss and or irrigation fluid absorption leading to TUR syndrome (hypodilutional hyponatremia) (5). Thus resecting only one prostatic lobe especially when the surgeon is not a skilled endourologist is not uncommon in community practice (6). Minimal invasive alternatives for surgical management of BPH have been used with success especially for small to medium size prostates. Laser ablation presents with equivalent postoperative surgical outcomes with the advantage of requiring less hospital stay and minimal blood requirements. However large sized prostates require long operative times and the amount of ablative tissue is less compared to a standard TURP (7). Holmium laser has also similar outcomes to standard TURP (8) and is also very effective for large prostates (9) however studies suggest that the technique takes longer and is relatively difficult to master while complications can be present especially during morcellation of the enucleated specimen (10).

Open simple prostatectomy is rarely used in developed countries to such an extent that residents are

rarely exposed to this procedure. The incision required along with a significant rate of complications and long hospital stay, are deterrents to the use of this option. However, when properly performed large sized prostates can be entirely enucleated in a few moments very effectively and with minimal blood loss. This procedure has endured the test of time and is used in some countries for large sized prostates much more than we think with excellent long-term outcomes (11).

Laparoscopy has been a minimal invasive alternative for many operations in urology. The main advantage in almost all laparoscopic procedures is to replicate the open technique with similar results and faster recovery and hospital discharge time. Also less pain and better cosmetic results are obtained, while operative time and estimated blood loss depend upon the expertise of the laparoscopic surgeon. In an attempt to combine the advantages of open prostatectomy for large sized prostates with the benefits of laparoscopy the feasibility of laparoscopic simple prostatectomy has been evaluated in a couple of series (12). Results have been satisfying. Mean total blood loss, irrigation time, duration of catheterization and hospital stay were significantly less in the laparoscopic group than in the open group. Functional results and complications were similar between the two approaches while only operating time was longer for the laparoscopic group (13).

With the technique described in this study the open simple Millin prostatectomy is replicated in an effort to evaluate laparoscopy as a minimally invasive alternative to the open procedure for large sized prostates. The consistent use of finger enucleation through one port is something newly described and provides fast and relatively bloodless removal of the adenoma. No problems were encountered with hemostasis especially with properly performed enucleation. In fact average blood loss was low (200 ml). There was no need of ligating the dorsal vein or the pedicles of the prostate (near the bladder neck) to control the intraoperative bleeding as described in some series (14). Swift enucleation and specimen retrieval allows short operating times of an average of 55 minutes, which are similar to those reported for open prostatectomy but shorter than those reported in other extraperitoneal laparoscopic simple prostatectomy series. However hospital stay, irrigation and catheterization period were longer than desired and similar to those reported for the open approach. Both of the above mentioned variables however may differ depending from the institution and the country's health system. Several institutions discharge the patient with the catheter as long as the urine is clear and removes the catheter in an outpatient setting. This can affect the length of hospital stay. Irrigation time also may differ but rarely is the amount of irrigation fluid used evaluated. Slow flow irrigation can be continued for several days depending among surgeons preference. This may affect the length of irrigation fluid as well. In some laparoscopic series catheterization period has

been shorter than the time presented in this evaluation. In most cases although irrigation was stopped and urine was clear the catheter remained in place in order to provide time for capsulotomy healing. The technique presented was used in large sized prostates (average 80 cc) with no concomitant bladder pathology. In case a middle lobe was present we extended the capsulotomy to the anterior surface of the bladder, which we found assisted removal. Improvement was obvious in all patients and no complications were described confirming the safety of this procedure.

Using the laparoscopic approach did not require extra costs since only reusable instrumentation was used. In addition laparoscopic simple prostatectomy serves as a training experience for residents learning

laparoscopic radical prostatectomy since the initial steps of the two procedures are similar.

CONCLUSIONS

Laparoscopic simple prostatectomy is an effective, technically easy and considerably less invasive procedure from open prostatic surgery and makes possible to perform efficient and safe adenoma of the prostate enucleation in cases of advanced benign prostatic hyperplasia. Our technique of laparoscopic simple prostatectomy for significant sized symptomatic BPH is presented with the modification of using the index finger for enucleation through one port site instead of using instrumentation for planar dissection of the adenoma.

REFERENCES

1. Lynch M, Anson K: Time to rebrand transurethral resection of the prostate? *Curr Opin Urol* 2006 Jan; 16 (1): 20-4.
2. Reich O, Gratzke C, Bachmann A et al.: Morbidity, mortality and early outcome of transurethral resection of the prostate: a prospective multicenter evaluation of 10,654 patients. *J Urol* 2008 Jul; 180 (1): 246-9. Epub 2008 May 21.
3. Varkarakis I, Kyriakakis Z, Delis A et al.: Long-term results of open transvesical prostatectomy from a contemporary series of patients. *Urology* 2004 Aug; 64 (2): 306-10.
4. McCullough TC, Heldwein FL, Soon SJ et al.: Laparoscopic versus open simple prostatectomy: an evaluation of morbidity. *J Endourol*. 2009 Jan; 23 (1): 129-33.
5. Hahn RG, Ekengren J: Patterns of irrigating fluid absorption during transurethral resection of the prostate as indicated by ethanol. *J Urol* 1993; 149: 502-6.
6. Agrawal MS, Aron M, Goel R: Hemiresection of the prostate: short-term randomized comparison with standard transurethral resection. *J Endourol* 2005 Sep; 19 (7): 868-72.
7. Horasanli K, Silay MS, Altay B et al.: Photoselective potassium titanyl phosphate (KTP) laser vaporization versus transurethral resection of the prostate for prostates larger than 70 ml: a short-term prospective randomized trial. *Urology* 2008 Feb; 71 (2): 247-51.
8. Ahyai SA, Lehrich K, Kuntz RM: Holmium laser enucleation versus transurethral resection of the prostate: 3 year follow up results of a randomized clinical trial. *Eur Urol* 2007; 52: 1456.
9. Kuo RL, Kim SC, Lingeran JE et al.: Holmium laser enucleation of the prostate (HoLEP): the Methodist hospital experience with greater than 70 gram enucleations. *J Urol* 2003; 170: 149.
10. Roehrborn CG, Bartsch G, Kirby R et al.: Guide-lines for the diagnosis and treatment of benign prostatic hyperplasia: a comparative, international overview. *Urology* 2001; 58: 642.
11. Serretta V, Morgia G, Fondacaro L et al.: Open prostatectomy for benign prostatic enlargement in southern Europe in the late 1990s: a contemporary series of 1800 interventions. *Urology* 2002 Oct; 60 (4): 623-7.
12. Zhou LY, Xiao J, Chen H et al.: Extraperitoneal laparoscopic adenomectomy for benign prostatic hyperplasia. *World J Urol* 2009 Jun; 27 (3): 385-7.
13. McCullough TC, Heldwein FL, Soon SJ et al.: Laparoscopic versus open simple prostatectomy: an evaluation of morbidity. *J Endourol* 2009 Jan; 23 (1): 129-33.
14. Mariano MB, Graziottin TM, Tefilli MV: Laparoscopic prostatectomy with vascular control for benign prostatic hyperplasia. *J Urol* 2002 Jun; 167 (6): 2528-9.

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