

Endoscopic extraperitoneal radical prostatectomy: An initial report following the first 30 cases

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Introduction To present initial observations after the first 30 cases of endoscopic extraperitoneal radical prostatectomy carried out at our department, which so far has had no experience with this surgical procedure.

Material and methods In the period of 15 months a group of 30 patients with organ confined prostate cancer, underwent endoscopic extraperitoneal radical prostatectomy using Montsouris technique. All procedures were performed by the same team of two urologists and one resident.

Results The mean age of the patients was 65.3 years (43–73 years), the mean preoperative prostate specific antigen (PSA) was 7.2 ng/ml (4–9.8 ng/ml), the mean prostate volume measured in TRUS was 41 cm³ (25–80 cm³). The mean operative time was 3 h 55 min (3 h 15 min – 5 h 30 min). The negative margin was achieved in 26 patients (86%). In seven patients (23%) blood transfusion was required. Three patients had intraoperative rectal injury. In two cases trauma was supplied laparoscopically, and in one case it was decided to perform diverting colostomy. The majority of patients (65%) were discharged home on the fifth day after surgery. Two months postoperatively 13 patients (43%) were continent, 16 (35%) presented moderate stress incontinence with occasional urine leakage during normal activity and 1 patient (3%) presented severe stress incontinence.

Conclusions Endoscopic extraperitoneal radical prostatectomy during the early phase of learning is technically difficult, requiring from the operator the laparoscopic skills, determination and a thorough knowledge of the theoretical basis of the subsequent stages of the procedure. Urologists who start performing this procedures must be aware of possible intra as well as postoperative complications.

Key Words: laparoscopic radical prostatectomy ↔ prostate cancer ↔ endoscopy

INTRODUCTION

Since 1997 when the Schuessler and colleagues, after performing the first 9 cases of endoscopic extraperitoneal radical prostatectomy [1], questioned the desirability of the development of this procedure due to the long duration and the scale of difficulty, LPR has undergone massive modifications. Guilloneau and Vallancien described a technique (LPR Montsouris technique) which allowed to perform surgery in less than three hours [2]. In order to avoid complications associated with the transperitoneal route [3, 4], new

solutions were introduced. Raboy and colleagues proposed preperitoneal access [5], which found its use and justification in a series of 42 cases performed by Bollens and co-workers in 2001 [6]. The advantage of laparoscopic procedures when compared with open procedures are less postoperative pain, shorter postoperative hospital stay, faster return to physical activity and through advanced optical systems, better vision of the operative field [7]. It has been shown that the laparoscopic procedures generate less activity of acute-phase reaction (measured through, for example C-reactive protein, IL-6, IL-10) when com-

pared with open surgery, which results in intraoperative patient's safety and shorter postoperative period of convalescence [8]. LPR has become a first line treatment for patients with localized prostate cancer, in many centers around the world.

MATERIAL AND METHODS

To meet the general trend in European Urology, interests and expectations of patients associated with laparoscopic procedures, as well as, the growing importance of laparoscopy in Poland, we started to implement laparoscopic procedures in our department. One of our urologists completed a six-month fellowship at the center of L'institut Mutualiste Montsouris in Paris. During the fellowship he assisted prostatectomies, completed a simulator training; however, he did not perform the operations himself. After the fellowship finished, we launched in our center the initial cases of endoscopic extraperitoneal radical prostatectomy. In the period from August 2014 to December 2015, a group of 30 patients with organ confined prostate cancer, underwent endoscopic extraperitoneal radical prostatectomy, according to the Montsouris technique [2]. The mean age of the patients was 65.3 years (43–73 years), the mean preoperative prostate specific antigen (PSA) was 7.2 ng/ml (4–9.8 ng/ml), the mean prostate volume measured in TRUS (transrectal ultrasound) was 41 cm³ (25–80 cm³). All patients were classified as the low risk group (d'Amico) so we did not perform lymph node dissection.

Surgical technique of endoscopic extraperitoneal radical prostatectomy

All the procedures were completed using the Montsouris 2 technique [2, 11] in which the patient is laid on his back in the Trendelenburg position (inclination approx. 20°), with legs spread, which enables a digital rectal examination during surgery. The incision is made onto approx. 1 cm, under the umbilicus in the midline. Incision of rectus fascia is performed and then the location of the *linea alba*, through which using Pean and then a finger we get under the rectus muscle to the preperitoneal space. After insufflation (12 mmHg), we introduced optics 0° and then, under visual control, an additional four ports (5 mm and 10 mm for the operator and 2x5 mm for assistance). During the procedure we used only bipolar tools, including the Biclamp® forceps for the operator's left hand. We found this tool comfortable for both preparation and coagulation.

In the first stage, after the release of the adhesions and fat tissue, we located the bladder neck. A useful maneuver is pulling on the Foley catheter inserted

before the procedure or deflating and refilling the catheter balloon which allows the precise location and incision of the bladder neck. After visualization of the catheter, we emptied the balloon. Assistance pulled the catheter upward, towards the pubic symphysis so that the posterior wall of the urethra could be cut off. Gently pulling down on the posterior wall of the bladder, we mobilized the neck and separated it from the prostate. It was important to stay close to the bladder's wall at this stage in order not to enter the prostate. By getting into the adenoma, it would have made finding a proper layer difficult and time consuming.

Next by pulling the prostate upward, in the direction of the pubic symphysis, we were able to uncover vertical fibers of the anterior layer of the Denonvilliers' fascia. Its incision showed the retrovesical space in which the vas deferens was located and then showed where the more laterally lying seminal vesicles were located. During preparation of the seminal vesicles we advised a good hemostasis of the medially situated vessels. Lifting by the aid of the assistance, we cut off the vas deferens and dissected the seminal vesicles unveiling the posterior layer of the Denonvilliers' fascia. Horizontal incision was made revealing a characteristic prerectal fat. This maneuver enabled the preparation and safe sectioning of the prostate pedicles in a further step.

In a next step, incision of endopelvic fascia was performed, laterally on both sides of the prostate. We proceeded with the dissection of the lateral surface of the prostate. After sectioning and local hemostasis with both Biclamp® forceps and Hem-o-lok plastic clips, the prostate pedicles were sectioned by moving close to the prostate, as far as the pericapsular fatty space in which neurovascular bundles are located. After the sectioning of the pedicles, the dissected neurovascular bundles remained preserved. Limitation of the thermal trauma (excessive coagulation) helps to keep the bundles in good condition. Before sectioning the apex of the prostate, we control the dorsal vein complex (DVC) with 2 zero resorbable sutures. The needle was passed from the right side of the complex to the left. In case of the suture being located too close to the prostate, the hemostasis of dorsal vein complex (DVC) might not be effective after incision. In this situation in order to prevent excessive bleeding, we decided to increase the insufflations pressure up to 16 mmHg and to introduce an additional suture after freeing the prostate. Introducing to the urethra the Benique catheter allowed for the tactile perception of the urethral wall and precise dissection near the apex. The incision of the urethra is performed and after the withdrawal of the Benique catheter, the sectioning of the pos-

terior urethral wall is completed. Dissecting and cutting the urthro-rectal fibres completely releases the prostate specimen.

The urethrovesical anastomosis was performed using a running suture V-Lock™. We found this suture easy to handle thanks to the one needle system and because of its construction a watertight effect of the anastomosis was achieved, even for a non-experienced surgeon.

The first suture is placed at the 5 o'clock position, running the outside in the bladder. Then the Benique catheter helped to guide the needle in the urethra inside out. The second and following sutures were placed at the 7, 9, 11, 1 and 3 o'clock position, running the outside in the bladder and inside out of the urethra. The Foley Catheter was inserted and its position was checked in the bladder between the 9 and 11 o'clock sutures. In series of last 10 cases we decided to insert the catheter earlier, after the 7 o'clock suture. The balloon was inflated and the bladder was filled to check the watertight anastomosis.

The procedure ended up with removal of the prostate with the Endobag™ system. The 10 mm port used initially for the camera needed to be sometimes enlarged by up to 3 cm, depending on the prostate volume, to get the specimen out of the operation field. In the preperitoneal space, two drains of Redon's type were left. Incisions were closed.

RESULTS

From August 2014 until December 2015 we performed 30 cases of endoscopic extraperitoneal radical prostatectomy. All the operations were completed in laparoscopy mode. The mean operative time was 3 h 55 min (3 h 15 min – 5 h 30 min); however, during the first 15 cases the mean operative time was 4 h 25 min and during the second 15 cases it was 3 h 35 min (Table 3). The negative margin, shown in histopathology, was achieved in 86% of patients (26/30 patients). The positive margin in most cases concerned the apex of the prostate, which prompted us to closer dissection of this structure during the final stage of the procedure. Postoperative bladder catheterization time was ten days for all patients. We did not observe any urinary retention after catheter removal. Two months postoperatively 13 patients (43%) were completely continent, with no need for pads, 16 (35%) presented moderate stress incontinence with occasional urine leakage during normal activity and 1 patient (3%) presented severe stress incontinence (Table 1).

In seven cases (23%) transfusions were necessary (Table 2). Such a situation was observed in 5 cases in initial stage of learning (first 15 cases), and was

related to the insufficient supply of the Santorini's plexus before preparation of the prostate apex and bleeding at this stage of the procedure. In three cases (10%) an intraoperative rectal injury was observed. In two cases, the injury was supplied laparoscopically. In one case due to the size of injury, diverting colostomy was necessary. In one case, rectal injury occurred after dissecting and cutting the urethra near the apex of the prostate, during the preparation of urethro-rectal fibers and in two cases during the preparation of the posterior surface of the prostate. All three cases were observed during the first 15 cases. In two cases, during the creation of preperitoneal space an opening of the peritoneum was observed. The procedures were completed; however, we suffered from the limitation of the space in the operation field. The majority of patients (65%) were discharged from a hospital on the fifth day after surgery. The last three patients in our series were discharged home on the fourth day after surgery. In two cases (7%), we observed a prolongation of hospitalization, due to the continued leakage of urine from the drains. In cystography we found an anastomotic leak, caused probably by drains being placed directly on the anastomosis. After pulling the drains

Table 1. Initial results and complications after laparoscopy for prostate cancer in 30 patients

| | Pts 1–15 | Pts 16–30 |
|---------------------------------|----------|-----------|
| Mean operative time (mins.) | 265 | 215 |
| Rectal injury | 3 | 0 |
| Transfusions (%) | 33 | 13 |
| Anastomosis leakage (%) | 13 | 0 |
| Time of hospitalization (days) | 6.9 | 5.2 |
| Positive surgical margins (%) | 20 | 7 |
| Urinary retention (%) | 0 | 0 |
| Complete urinary continence (%) | 40 | 70 |
| Severe stress incontinence (%) | 3 | 0 |

Table 2. Complications after laparoscopy for prostate cancer in 30 patients

| Complications | Pts 1–15 | Pts 16–30 |
|---------------|----------|-----------|
| Rectal injury | 3 | 0 |
| Transfusions | 5 | 2 |

Table 3. Evolution of the mean operative time

| | Pts 1–15 | Pts 16–30 |
|-----------------------------|----------|-----------|
| Mean operative time (mins.) | 265 | 215 |

we observed the diminution of the leak followed by a complete watertight effect. No operative revision of the anastomosis was necessary.

DISCUSSION

Endoscopic extraperitoneal radical prostatectomy for many years has been the first line treatment in organ confined cancers of the prostate, in many urological centers. On the European stage, as well as, all over the world, it is more and more frequently being performed with the use of the Da Vinci surgical system (RALRP – robot assisted laparoscopic radical prostatectomy) [9, 10]. Despite such a significant popularization of this method, initial cases, performed especially in centers having no experience in this matter, is a major challenge. First of all, we found it very helpful to have at least one member of the laparoscopic team complete a practical fellowship in a center having an extensive experience in LPR (laparoscopic radical prostatectomy). Finding the appropriate habits and theoretical knowledge in the sequence of stages of the procedure, gained while assisting operations, facilitated the initial operations. Another issue was the surgical equipment. LPR (laparoscopic radical prostatectomy) is a time consuming procedure and any additional technical difficulties prolong operation, sometimes beyond a rational framework. Our observation was that the length of the procedure, in addition to the growing experience of the operator, was dependent on several components. First of all, proper and careful trocar placement plays a huge role ensuring good visibility throughout the operation and giving surgeons the necessary working space. Injured at this stage peritoneum, which inflates, significantly reduces the working space, hampering visibility and causing more frequent soiling of the camera which results in the need for interrupting the procedure. Maneuverability of tools is considerably reduced as well. Our advice is to start with patients without any previous abdominal surgery, such as appendectomy or inguinal hernia repair. We believe that useful maneuver is placing the patient in deep Trendelenburg position (up to 25°) in order to push the peritoneum cephalically. Unfortunately, in our center, especially during the initial cases, this maneuver was met with strong disapproval from anaesthesiologists. Another important issue was the ability of the operator to perform a time-consuming urethrovesical anastomosis. At this stage of operation the surgeon might already be tired. Therefore, trained skills could have an impact on how quick and successful the ending of the procedure could be. We found the running suture easy to control and advised it for the

beginners; however, we have no experience with other techniques. We believe that sewing the anastomosis is an activity that can and should be trained in the conditions of a simulation. Modification to the Montsouris technique [2, 11] applied in the last ten cases was controlling the DVC (dorsal vein complex) with a suture after cutting off the prostate. Our observation was that the suture was sometimes placed too close to the prostate and after sectioning the apex it did not work in a hemostatic manner. In four cases, we observed the prolongation of time of the urethrovesical anastomosis because of the catheter being inserted under the bladder, between 5 and 7 o'clock sutures. Our modification in last ten cases was inserting the catheter earlier during the anastomosis just after the 7 o'clock suture, to easily guide it to the bladder. As far as urinary continence goes, we believe that the improvement in incontinence rate between groups of patients 0–15 and 16–30 comes from more precise bladder's neck preservation as well as from limitation of coagulation during sectioning of the prostate apex and during cutting off the prostate next to the apex. When starting with LPR (laparoscopic radical prostatectomy) procedure, we must be aware of possible complications. Prostatitis, multiple biopsies or local inflammation after a biopsy, affect the strong adhesion of the prostate to the rectum making rectal injury more probable. In case of a difficult dissection of the posterior surface of the prostate we believe that inserting a finger into the rectum becomes a helpful maneuver (finger assisted laparoscopy) [11], in order to improve anatomical orientation. In our opinion preoperative MRI gives very helpful knowledge about the potential adhesion allowing the surgeon to avoid unnecessary mistakes. However, if the injury occurs the important issue is not to overlook it. The ability of suturing in a single or double layered manner, enables the successful completion of the case without the need for a conversion into open surgery. Despite increasing the skills of the operator and team involved after our 30 cases, the execution of the LPR (laparoscopic radical prostatectomy) procedure still took us around 3 h 30 min. I believe that this is the best proof as to how LPR (laparoscopic radical prostatectomy) is initially a difficult operation to master.

CONCLUSIONS

Despite many years of experience and the global spread of endoscopic radical prostatectomy, many centers, especially in Poland, have just started their initial operations in daily clinical work. Representing the Second Department of Urology in Łódź, we are one of these centers in Poland that have shown our

observation in this process, which is that the learning and launching of the LPR (laparoscopic radical prostatectomy) is a difficult, time-consuming and sometimes daunting process. It requires experience with laparoscopy, good surgical equipment, support of co-workers, thorough knowledge of anatomy and subsequent steps of the procedure and patience. In spite

of the initial obstacles, we are aware that minimally invasive procedures, including LPR (laparoscopic radical prostatectomy), is the state of art and its development and evolution will help shaping present urology.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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