

Aim of the study: This paper presents our personal experience in performing laparoscopic radical prostatectomy (LRP) at our institution.

Material and methods: Within less than two years, i.e. from November 2008 to August 2010, 30 laparoscopic radical prostatectomies were performed at the Department of Urology and Uro-Oncology in Poznań. The operations were performed with the retroperitoneal approach. Lymphadenectomy was performed only in the patients with a preoperative prostate specific antigen (PSA) level greater than 10 ng/ml and/or Gleason score 7 or greater.

Results: The operating time ranged from 150 to 360 minutes (mean operating time was 234 minutes). Two cases required conversion to open surgery because of highly increased prostate volume (100 ml) and due to difficult operating conditions. During one of the very first procedures rectal injury occurred and the patient developed a rectourethral fistula two weeks after surgery. Six patients had a prolonged drain leakage (> 7 days) caused by dehiscence of the vesicourethral anastomosis. One patient developed a large abdominal wall haematoma in the right and left lumbar region which was successfully treated with conservative management. One patient presented haematuria which stopped spontaneously on the 10th postoperative day. On the first post-operative days 5 patients developed a fever which lasted a few days.

Conclusions: An increasing number of urology clinics and hospitals perform laparoscopic radical prostatectomy. This ablative and reconstructive surgery is a technically challenging procedure and can be successfully performed by a urological team experienced in laparoscopy and radical prostatectomy. The procedure requires consistent improvement of the operative technique in order to provide patients with the most satisfactory oncological and functional results. The complication rate for all 30 patients undergoing the operation was low and complications were more frequent in initial cases.

Key words: prostate cancer, laparoscopy, complications.

Assessment of intraoperative and postoperative complications during implementation of laparoscopic radical prostatectomy in patients with locally advanced prostate cancer

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Introduction

Prostate cancer is the 2nd or 3rd most common cancer diagnosed in men. Surgery is one of the available methods of treatment for early stage prostate cancer. Minimally invasive laparoscopic radical prostatectomy (LRP) has become the method of choice for surgical management of localized prostate cancer. In 1991 Schuessler performed the first LRP [1]. Since then the technique has been modified many times. However, the development of this procedure was prevented by a long operating time increasing the risk of metabolic and cardiovascular complications as well as technical difficulties occurring during laparoscopic surgery. Several years later Gaston in Bordeaux and Guilloneau and Vallencien in Paris pioneered LRP. The method developed rapidly in subsequent years. It is now commonly performed at urology centres all over the world but still it is a technically demanding operation that requires a long learning curve and vast laparoscopic experience. In comparison with open procedures, the benefits of the laparoscopic technique are significant and include excellent visibility of the surgical anatomy, less blood loss and shorter hospitalization. The oncological rates are equivalent to those for classical interventions. However, this minimally invasive technique is not free from complications. We now have performed laparoscopic procedures for 2 years at our centre. This paper aims to share our experience gained after 30 laparoscopic radical prostatectomies performed at the Department of Urology and Uro-Oncology in Poznań.

Material and methods

Between November 2008 and August 2010, 30 retroperitoneal laparoscopic radical prostatectomies were performed at the Department of Urology and Uro-Oncology in Poznań. All the patients were diagnosed with localized prostate cancer on the basis of positive prostate biopsy. The operations were performed with the retroperitoneal approach by the same urology team (P.C. and M.O.). Two 5-mm and three 10-mm trocars were used during surgery. The working space was made by finger tissue dissections under lamina of the rectus abdominis muscle and under the muscular sheath and then under full visual control by means of insufflations and laparoscope, without the Gaur balloon device. The 5-mm and 10-mm trocars were placed on both sides under visual control. Ports were placed symmetrically. 10-mm ports were placed 2-3 cm below the Hasson trocar on the lateral side of the rectus abdominis muscle. 5-mm trocars were placed frontally to the anterior superior iliac spine and

2-3 cm below the 10-mm trocars. The first step was the incision of the lateral pelvic fascia, exposure of the lateral prostatic fascia and dissection of the puboprostatic ligaments with the Santorini plexus. The dorsal vein complex was ligated twice with a soluble 2-0 Vicryl suture with a CT1 needle. Bleeding was controlled by means of mono- and bipolar coagulation. The harmonic scalpel was used during the last ten operations. In four cases sharp dissection was performed in order to preserve one of the vascular nerve bundles. 10-mm metal clips were used to secure haemostasis in these procedures. The method was used in chosen cases, always on the opposite side of the prostate lobe in which prostate cancer was diagnosed by biopsy. The urethrovesical anastomosis was performed with continuous sutures (Vicryl 2-0). The anastomosis was always checked for water tightness. A Foley catheter was maintained for three weeks. Patients with a prostate specific antigen (PSA) level greater than 10 ng/ml and/or Gleason score 7 or greater underwent pelvic lymph node dissection. Patients received antithrombotic therapy for 30 days.

Results

The average age of the patients was 63 years (50-73 years). The mean pre-operative PSA concentration was 8 ng/ml (3.05-18.4 ng/ml). Two patients underwent skeletal scintigraphy because the PSA level was larger than 15 ng/ml. Prostatic volume was assessed by transrectal ultrasonography and measured between 15 and 100 ml (mean: 35.9 ml). The operation time ranged from 150 to 360 minutes (mean operating time was 234 minutes). We observed that the operating time became regularly shorter with experience, decreasing to 180 minutes in the last group of patients. The average blood loss was 400 ml (200-1300 ml). Postoperative histological examinations confirmed prostate cancer and demonstrated T2A in 4 patients (13%), T2C in 16 patients (53%), T3A in 6 patients (20%), T3B in 3 patients (10%) and T4 in 1 patient (3%). Positive surgical margins were detected in 7 cases. Those patients who underwent lymphadenectomy had no nodal metastases detected. Intensive physiotherapy was started from the 1st post-operative day. The mean hospital stay was 6.4 (4-13) days. Longer hospital stay resulted from persistent drain leakage caused by dehiscence of the vesicourethral anastomosis and sustained haematuria. Positive margins were not detected in patients who had nerve preserving technique performed. Two patients required conversions to open surgery. The first conversion was required because of high prostate volume (100 ml), technical difficulties and relatively low experience in performing the laparoscopic procedure (it was one of the initial cases). The second conversion to open surgery was necessary because of prolonged operating time and serious difficulties during management of anaesthesia. During 3 procedures a slipped ligature caused bleeding of the dorsal vessels which was stopped by selective coagulation or repeated suture ligation of the bleeding vessels. One serious complication concerned a patient who developed a urethro-rectal fistula in the second week after the laparoscopic procedure. The fistula was probably caused by diathermy applied to the rectal area to control haemostasis. The patient had a double-

barrel stoma of the large intestine created. The Foley catheter was maintained for a longer period of time. Follow-up examinations (cystoscopy, rectoscopy) performed a couple of months after the surgery showed no evidence of fistula. There were six cases of prolonged (> 7 days) drain urine leakage through vesicourethral anastomosis. A Foley catheter as well as gravitational drainage were required for an extended period of time. In a few cases drains were placed too close to the anastomosis and manipulation proved to be very helpful. No patient required reoperation. Six patients developed fever (> 38) on the first postoperative days despite routine antibiotic treatment. Conservative treatment normalized the body temperature. There was 1 case of a massive abdominal wall haematoma in the right and left lumbar region which developed during the first few days after the surgery. It was probably caused by unrecognized injury of the epigastric vessels during laparoscopy. Haemoglobin level was stabilized after the transfusion of erythrocyte mass and plasma and close observation of the patient. Bruises regressed spontaneously within a few weeks of treatment. One patient had prolonged haematuria, without anaemia, which ceased without treatment after 10 days.

However, not only surgical complications but also special anatomy of the organ and technical difficulties emerging during the procedure proved to be challenging for our team. One operative difficulty is low prostate volume (< 20 ml). Because of the small size and specific anatomical structure, prostate dissection may cause additional problems during the operation. It can be concluded that injury to the parietal peritoneum occurs most often during the initial stage of the operation. As a result of such injury, the parietal peritoneum is affected by penetrating gas and the operative area becomes significantly restricted. In some cases, for the retroperitoneal approach, we used a 5 arm liver retractor, which was introduced into the preperitoneal space to hold the parietal peritoneum and the laparoscopic procedure was facilitated.

Another difficulty emerged during one of the initial operations. The patient was very tall (190 cm) and standard techniques of trocar placement prevented a safe and effective procedure (excessive distance between tools and operating space). The procedure was successfully performed when the ports were placed below the typical placement.

A different problem emerged when the dissection was taken too close to the vesical orifice of one of the ureters.

Excellent vision facilitated a very precise vesicourethral anastomosis and the problem was solved. USG performed on the first postoperative day and regular follow-up USG revealed no dilatation of the upper urinary tract.

Discussion

Our institution has considerable experience in performing radical retropubic prostatectomy (approximately 100 operations per year). Prior to taking on LRP we had already gained vast experience in performing laparoscopic operations of varying degrees of difficulty. Numerous laparoscopic skills training courses and incalculable help of our colleague – an experienced laparoscopist, who shared with us his extensive knowledge of LRP – facilitated smooth implementation of radical prostatectomy into a wide range of proce-

dures performed at our institute. Gradual experience gained by the whole operative team (including the anaesthetic team mastering the skill of proper management of anaesthesia) is reflected in the sequential reduction of operating times, from 360 minutes in the initial cases to 150 minutes. It is clearly seen in our example that operating time for LRP is now similar to that of the classical procedure. The learning curve for laparoscopic techniques is well documented. Proper training and mentoring (laparoscopic training courses, assistance during operations, performing surgery under supervision by well-experienced surgeons) enables safe performance of the procedure.

However, it should be noted that LRP, as an ablative and reconstructive surgery, is a technically challenging procedure that demands skill and laparoscopic experience of the whole operative team. In order to provide the patients with the most satisfactory oncological and functional results, the procedure requires consistent improvement of the operative technique. We decided that two cases required conversions to open surgery and they concerned patients in the first series of ten patients. At that stage the whole operative team had relatively little experience in performing the laparoscopic procedure. In the first case we did not manage to finish the operation in a laparoscopic way because of high prostate volume (100 ml) and prolonged time of the procedure. In the second case, prolonged time of the procedure and difficulties with safe management of anaesthesia forced us to convert to open surgery. The average degree of obesity in some patients was not a contraindication to the described procedure.

Conversion to open surgery has been reported by other authors and its rate is 1-10% [2-8]. The most common reasons for conversion from laparoscopy to open technique include adhesions, significant obesity, massive intraoperative bleeding and large size of the prostatic gland. It can be concluded, on the basis of other authors' research, that open conversion from LRP is more likely to occur during a surgeon's early experience. None of the patients qualified for the surgery underwent hormone therapy. Histopathological underestimation caused problems during the procedure. Accurate localization of the plane or adhesions were observed only in those cases where progression of localized prostate cancer was greater than it had been estimated (histopathological underestimation – T3B and T4 tumours).

Operating time was variable and was significantly different for the first and the last series of patients (range 150-360 minutes, mean operating time 234 minutes). The average time for the last procedures was 180 minutes. Lymphadenectomy performed in some patients significantly prolonged operating time. The use of the ultrascision scalpel in some cases provided better homeostasis and clearly reduced the operating time. Similar findings were presented by other authors [3, 5, 6, 8]. Experience gained after every performed procedure (learning curve) gradually reduced the operating time. The curve was changeable and differed for particular operators [3]. The operating time for a LRP in the last group of patients was similar to that of the classical procedure.

Mean estimated blood loss was 400 ml (range: 200-1300 ml) and was similar to other findings [3, 6]. However, it is difficult to estimate blood loss during radical prostate-

ctomy as blood is mixed with urine and irrigation liquid. Excessive bleeding caused by a slipped ligature was controlled by selective coagulation or repeated suture ligation of the bleeding vessels. Such incidents were eliminated after gaining some experience in management of Santorini's plexus (double ligation). The observed bleeding in our group of patients was not an indication for conversion to open surgery. We agree with other authors that factors significantly reducing intraoperative bleeding include high operating pressure (12 cm H₂O or greater), very precise coagulation of bleeding vessels resulting from excellent vision [7, 8] and optional use of the harmonic scalpel [9]. We observed six cases of prolonged (> 7 days) drain urine leakage most likely caused by lack of vesicourethral anastomosis tightness and/or because the drains were placed too close to the anastomosis. The problem was solved by long-term Foley catheterization, dependent drainage and manipulation of drainage tubes. Similar outcomes have been reported by other authors and they usually concern initial cases [4, 5, 9]. We think that a safe and reliable anastomosis procedure requires a very precise placement of sutures on the posterior wall of the urethra (5-7 o'clock). With the experience gained in performing anastomosis we observed complete reduction of drain leakage in the last ten cases. The anastomosis tightness was checked after performing anastomosis (continuous suture technique). In cases of significant anastomosis leaks we added single sutures on anastomosis.

One patient developed a massive abdominal wall haematoma in the lumbar region during the first postoperative days. Similar complications were reported by other researchers [5]. The haematoma was probably caused by unrecognized intraoperative injury of the epigastric vessels. The patient responded well to conservative therapy and did not require reoperation.

One serious complication observed during our practice concerned a patient who developed a rectourethral fistula in the second postoperative week. The fistula was probably caused by a coagulation applied during preparation of the apex of the prostate. It is one of the typical places where intestinal injury may occur as the Denonvilliers' fascia lies here very close to the rectum. Similar complications were noted by other authors [2, 9]. The patient had a double-barrel stoma of the large intestine created and the Foley catheter was maintained for a longer period of time. Follow-up examinations performed a couple of months after the procedure showed no evidence of the fistula.

Conclusions

Laparoscopic radical prostatectomy is a technically challenging ablative and reconstructive surgery and can be successfully performed by an experienced team. In order to provide patients with the most satisfactory oncological and functional results the procedure requires consistent improvement of the operative technique. The surgical learning curve for laparoscopic radical prostatectomy is extensive but we agree with the other authors that the operative time decreases significantly with experience and the technique becomes reproducible after performing 20 radical prostatectomies.

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