

Minimally invasive treatment of vesicourethral leak after laparoscopic radical prostatectomy

Tratamento minimamente invasivo para fístula vesicouretral após prostatectomia radical videolaparoscópica

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ABSTRACT

Objective: to describe our experience with a minimally invasive approach for persistent vesicourethral anastomotic leak (PVAL) after Laparoscopic Radical Prostatectomy (LRP). **Methods:** from 2004 to 2011, two surgeons performed LRP in 620 patients. Ten patients had PVAL, with initially indicated conservative treatment, to no avail. These patients underwent a minimally invasive operation, consisting of an endoscopically insertion of two ureteral catheters to direct urine flow, fixed to a new urethral catheter. We maintained the ureteral catheters for seven days on average to complete resolution of urine leakage. The urethral catheter was removed after three weeks of surgery. **Results:** the correction of urine leakage occurred within a range of one to three days, in all ten patients, without complications. There were no stenosis of the bladder neck and urinary incontinence on long-term follow-up. **Conclusion:** the study showed that PVAL after laparoscopic radical prostatectomy can be treated endoscopically with safety and excellent results.

Keywords: Prostatectomy. Urinary Fistula. Anastomosis, Surgical. Minimally Invasive Surgical Procedures. Prostatic Neoplasms.

INTRODUCTION

Prostate cancer is the most common malignancy in men. A large portion of the male population is subjected to screening tests, which makes early diagnosis increasingly frequent. Many of these patients are currently treated with laparoscopic radical prostatectomy (LRP) as a primary surgical approach aimed at cure^{1,2}.

The vesicourethral anastomosis between the bladder neck and the membranous urethra for reconstruction of the lower urinary tract after removal of the prostate is a crucial point of LRP. Leakage of urine between the anastomosis stitches in the postoperative period is common, but is usually of low output and self-limited, during two or three days³.

Persistent vesicourethral anastomotic leaks (PVAL) can be defined as significant urinary losses through the drain after the third postoperative day, usually above 100 or 200 ml. It is a rare event, about which there is little published literature. However, its occurrence is of difficult control for the medical staff and patients,

prolonging hospital stay, and bringing risks of potentially serious complications.

The objective of this study is to analyze the results of a endoscopic, minimally invasive approach to control PVAL when conservative treatment fails, thus avoiding more invasive surgical procedures, such as repair by conventional open surgery or nephrostomy, options traditionally used as the last resort in such cases.

METHODS

A total of 620 patients with adenocarcinoma of the prostate, clinical stage T1c, and a mean age of 61 years, underwent transperitoneal laparoscopic radical prostatectomy (LRP). The vesicourethral anastomosis was made with wire 3-0 Monocryl, as described by Van Velthoven *et al.*, without bladder neck plasty prior to the anastomosis^{3,4}. Ten patients had persistent vesicourethral anastomotic leaks (PVAL), with urine output by the perivesical drain of 100-400 ml in 24 hours, reaching 400-1100 ml on the second day after surgery. The fluids collected from the

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tubes were consistent with urine after laboratory results. All patients underwent total abdomen computed tomography, which showed collection of fluid within the pelvis. The ureters were preserved and the bladder Folley catheters were correctly positioned in the bladder. A retrograde cystogram was also carried out by urinary catheters in all ten patients, clearly showing contrast leak through the vesicourethral anastomosis (Figure 1).

Initially, conservative techniques had been used, such as traction and attachment of the bladder catheter to the patient's thigh so that the catheter balloon occluded the urine leakage site, associated with a lower fluid intake. After the failure of these initial measures, these ten patients underwent endoscopic intervention for treatment of persistent urinary fistulas. The time interval between the LRP and the endoscopic reintervention ranged from three to nine days.

The procedure consisted of bilaterally placing ureteral catheters exteriorized alongside a new Folley catheter, to direct the urine out via the urethra and to reduce the leakage through the fistula, allowing its closure. Initially, we carried out a urethrocystoscopy with a rigid, 19Fr cystoscope, under sedation and local anesthetic gel, allowing the exact identification of the fistula opening and its location relative to the ureteral ostia (Figure 2). Then 6Fr ureteral catheters were inserted bilaterally over a hydrophilic guidewire under radioscopic control and

externalized through the urethra, along with a new, 18 Folley bladder catheter, also placed in the bladder with the aid of a guidewire.

All patients underwent a control retrograde cystogram to verify the complete resolution of the urine leakage before removal of the ureteral catheters, which took place after seven days. The bladder catheter was removed three weeks after prostatectomy.

RESULTS

The resolution of the persistent vesicourethral anastomosis leak (PVAL) occurred within a range of one to three days for all ten patients. There were no perioperative or immediate postoperative complications of the reintervention. The drains were removed after leakage become less than 50 ml per day (Table 1). There were no bladder neck stenosis or urinary incontinence after a mean follow up of 12 months (6-18 months).

DISCUSSION

Laparoscopic radical prostatectomy (LRP) is a procedure that requires great skill in making the vesicourethral anastomosis. Leakage of urine by the anastomosis is very common, but the persistent one is a rare event. The incidence of persistent vesicourethral anastomotic leaks (PVAL) after radical prostatectomy has been estimated at 0.9% to 2.5%. It is generally treated with ineffective conservative measures, and when it requires a therapeutic approach, procedures are very invasive for the patient, such as conventional open surgery or nephrostomy⁵.

To confirm the PVAL diagnosis there are several available exams. Conventional cystogram remains a very useful tool to this day, and allows to record the contrast extravasation with simple radiographic images after injection through the bladder catheter. However, images obtained by computed tomography can provide more information, especially with three-dimensional volume estimate, which allows to better define the conduct in cases where the flow rate through the fistula is not very high. Lee *et al.* found a statistically significant difference between the urinary leak detection rate by cystography using tomography and con-

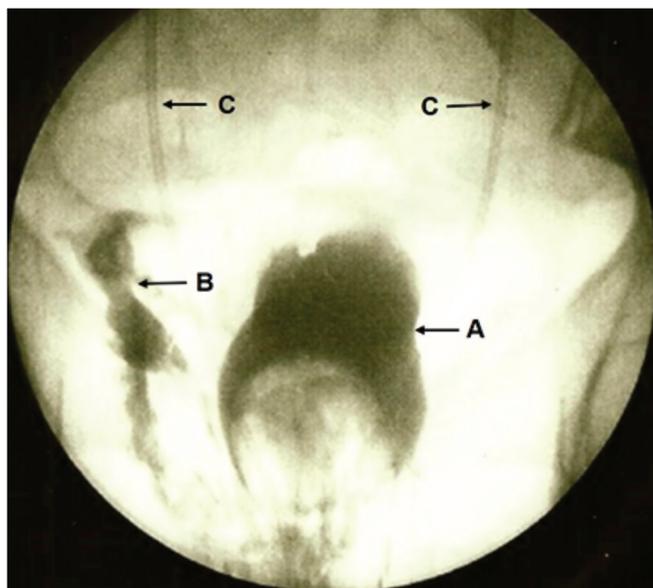


Figure 1. Retrograde cystogram by the Folley catheter positioned in the bladder (A), where we can see the contrast leakage (B) from the posterior aspect of the anastomosis and the ureteral catheters (C) already positioned bilaterally

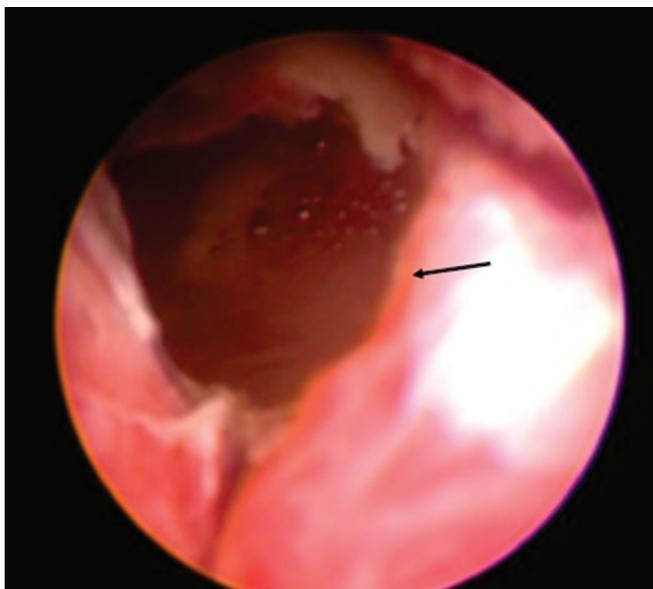


Figure 2. Urethrocytostcopy showing the fistulous orifice (arrow) in the anastomosis.

ventional cystography (80.4% vs. 54.3%). Therefore, even when conventional cystogram shows normal results, the leak can be detected by tomography^{6,7}.

After the PVAL diagnosis, it is in the form of treatment that lies the difficulty for urologists. This is a complication that can indefinitely prolong patients' hospitalization and presents risks of adverse developments, such as secondary infection by resistant germs.

Moinzadeh *et al.* previously presented a conservative technique of continuous suction by the Folley catheter to help in these cases. However, all conservative techniques, including continuous suction catheter, have failed to correct the intraperitoneal fistula⁸.

In another study, the same group described the use of a percutaneous nephroureteral suction catheter having multiple fenestrae along its length and which allows the suction of urine, both from the bladder and from the renal pelvis. Thus, it forms a proximal urinary diversion, which allows the closure of the fistula. This minimally invasive technique avoids conducting bilateral nephrostomies or other reconstructive procedures, but also presents complexity compared to the endoscopic procedure⁹.

Yossepowitch *et al.*, from Urology Institute of the University of Tel Aviv, described their experience in treating PVAL after open radical prostatectomy, using the same endoscopic approach of our study. They treated 1,480 patients with open radical prostatectomy between 1996 and 2007. Seven patients had PVAL and underwent a rigid cystoscopy with a 19Fr cystoscope, followed by the bilateral placement of 5Fr ureteral catheters over a hydrophilic guidewire under fluoroscopic control. The average time between the intervention and removal of the pelvic drain (drain <50ml per day) was two days. The catheters were maintained for nine days on average. There was resolution of the urinary fistulas in all seven patients, which was confirmed by control cystography¹⁰.

Our results were similar to the Yossepowitch group ones, with the same surgical technique. We believe, therefore, that the persistent vesicourethral anastomotic leaks (PVAL) can be treated by endoscopically draining the urinary system, with ease and security. The procedure is an alternative, less aggressive approach than any other surgical treatment, with excellent results.

Table 1. Relationship between the high output of urine through the drain in patients with PVAL after LRP and the time of resolution of fistulas after endoscopic rapprochement.

Patient	Interval between procedures (with PVAL)	Fistula output (mean 24h)	Resolution after rapprochement (output <50ml)
1	9 days	400ml	24 hours
2	6 days	720ml	24 hours
3	3 days	950ml	48 hours
4	5 days	650ml	48 hours
5	6 days	450ml	48 hours
6	4 days	800 ml	72 hours
7	4 days	850ml	72 hours
8	7 days	560ml	24 hours
9	3 days	1100ml	72 hours
10	6 days	480ml	48 hours

PVAL: Persistent vesicourethral anastomotic leak.

R E S U M O

Objetivo: descrever nossa experiência com uma abordagem minimamente invasiva para fistula de anastomose vesicouretral persistente (FAVP) após prostatectomia radical laparoscópica (PRL). **Métodos:** de 2004 a 2011, 620 pacientes foram submetidos à prostatectomia radical laparoscópica realizada por dois cirurgiões. Dez pacientes apresentaram FAVP e o tratamento conservador foi inicialmente indicado sem sucesso. Esses pacientes foram submetidos a uma reoperação minimamente invasiva, por via endoscópica, com inserção de dois cateteres ureterais para direcionar o fluxo urinário, fixados a um novo cateter uretral. Os cateteres ureterais foram mantidos por sete dias, em média, até a completa resolução do vazamento de urina. O cateter uretral foi removido após três semanas da cirurgia. **Resultados:** a correção do vazamento de urina ocorreu dentro de um intervalo de um a três dias em todos os dez pacientes, sem complicações. Não foram observadas estenose de colo vesical ou incontinência urinária após acompanhamento em longo prazo. **Conclusão:** o estudo mostrou que a FAVP após a prostatectomia radical laparoscópica pode ser tratada por via endoscópica com segurança e excelentes resultados.

Descritores: Prostatectomia. Fistula Urinária. Anastomose Cirúrgica. Procedimentos Cirúrgicos minimamente Invasivos. Neoplasias da Próstata.

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