

Managing urine leakage following laparoscopic radical prostatectomy with active suction of the prevesical space

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Abstract

Introduction: Urine leakage following laparoscopic radical prostatectomy (LRP) is a possible complication that may herald chronic urine incontinence. Intraoperative measures aiming to prevent this is not standardised.

Aim: Presentation of experience with active suction of the prevesical space in managing postoperative urine leakage.

Material and methods: At the Department of Urology, where laparoscopy of the upper abdomen and open RP were performed, a protocol for extraperitoneal LRP was established in 8/2008. Until 5/2011, 154 LRPs have been performed. Urine leakage from a suction drain appeared in 9 cases (5.8%). Permanent active suction (with a machine for Büllae thoracic drainage) of the prevesical space with negative pressure of 7-12 cm of H₂O was started immediately.

Results: Urine leakage started after a mean of 0.9 (0-2) days postoperatively and stopped after a mean of 8.1 (15-42) days. Leakage stopped with only suctioning in 7 cases. In one case, open re-anastomosis was performed on the 7th postoperative day (POD). In another case, ineffective active suction was replaced on the 10th POD by needle vented suction without effect and the leakage stopped following gradual shortening of the drain up to the 15th POD.

Conclusions: Active suction of the prevesical space seems to be an effective intervention to stop postoperative urine leakage after laparoscopic radical prostatectomy.

Key words: prostate cancer, radical prostatectomy, laparoscopy, complications, urinary leakage.

Introduction

The main aims of laparoscopic surgery are to minimise abdominal wall injury with the same or better functional and oncological results and as low as possible occurrence of complications [1-3]. In laparoscopic radical prostatectomy (RP) it is not an easy task

due to a high risk of many complications. Anastomotic urinary leakage following RP is a well-known complication irrespective of the surgical approach (retropubic, laparoscopic and robotic) and reportedly it may be as high as 13.5% [4]. However, in most series the frequency is between 2% and 4% [5-8]. The effect of the urine leakage on the functional results

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of RP is unknown. Some authors have speculated [9] on whether urine leakage may lead to contracture of the bladder neck, but other investigators do not seem to support this view [10]. Minimizing the risk of postoperative urinary leakage is in our view an important aspect of prostatic surgery. The experience of the surgeon is likely an important factor in minimizing this risk. Due to the relatively low incidence of this postoperative complication and possibly due to reporting bias, postoperative urine leakage is not well covered in the literature.

Aim

In this paper we present our experience with this complication and suggest that active suctioning of the prevesical space is an effective method in handling this.

Material and methods

Operative technique

In a dorsal supine position with slightly straddled legs, with a 10-15° head down tilt, a 5-port extraperitoneal approach, antegrade (descending) technique was used. This five-port approach (2 × 10 mm, 3 × 5 mm ports) requires one surgeon and two assistants. Through a short subumbilical incision, the operative space is created with the index finger and 4 ports are introduced blindly under control of both index fingers or under visual inspection. A video port is applied through an initial incision (Hasson type trocar). Pelvic lymph node dissection (PLND) as a part of the RP was performed in 6 cases; in 5 as a modified

procedure. In 1 case an extended PLND was performed [11]. The endopelvic fascia is opened on both sides of the prostate and the Santorini plexus (dorsal vein complex) is ligated with polyglactin suture. The prostate is divided from the bladder neck with a harmonic scalpel or Thunderbeat® Olympus. Complete bladder neck sparing technique was used. The seminal vesicles were dissected. Denonvillier's fascia was opened. The dissection of the prostatic pedicles was performed with a harmonic scalpel or Thunderbeat® (including resection of neurovascular bundles) or in a nerve sparing technique with Hem-o-lok® Weck clips size L and ML. Puboprostatic ligaments, Santorini plexus and urethra were cut with scissors. The prostatic specimen was extracted through a subumbilical incision. We did not use posterior reconstruction of the rhabdosphincter (rebuilding the posterior musculofascial plate) as described by Rocco *et al.* [12, 13] previously; we have started using it since case 150. A urethrovesical anastomosis was performed in three different ways [14] (for details, see below). If a bladder neck preserving technique could not be applied, a bladder neck reconstruction ("tennis-racket" reconstruction) was performed at a 6 (in "Van Velthoven" [15] stitch cases) and later at a 12 o'clock position. The water-tightness of the anastomosis was finally controlled by filling with 200 ml sterile water and a 20 F catheter is introduced and one is withdrawn on the 14th postoperative day (POD). At the end of the surgical procedure a suction drain 14 F is introduced (Photo 1).

Results

Results are shown in detail in the Table I. Urine leakage started after a mean of 0.9 (0-2) days postoperatively and stopped after a mean of 8.1 (15-42) days. Leakage stopped with only suctioning in 7 cases. In 1 case, open re-anastomosis was performed on the 7th POD. In another case, ineffective active suction was replaced on the 10th POD by needle vented suction without effect and the leakage stopped following gradual shortening of the drain up to the 15th POD. Here, we add some details pertaining to the technique used when creating the urethrovesical anastomosis which is a crucial point for urine leakage. The vesicourethral anastomosis was performed in the first 118 cases with running suture in standard fashion as described by Van Velthoven [15] with poliglecaprone 25 (Monocryl® Ethicon) 3-0. In this group,



Photo 1. Abdomen following 5-port extracapsular radical prostatectomy. Suction drain 14 F in the left 5 mm port

Table 1. Details about patient with urine leakage following laparoscopic radical prostatectomy

Number of patient	Order of patient	Age	Date of surgery	Leak by test of watertightness at the finishing of anastomosis with 200 ml	Note	Device	Anastomosis	Start of urine leak (postoperative day)	End of urine leak (postoperative day)	Any antibiotics	Lymphadenectomy	Time of surgery	Weight of specimen	Blood loss	Preoperative PSA	pT	R	pN	Gleason score	Follow-up
1	1	63.3	21.7.2008	0		LS V+	Van Velthoven	0	5	0	1	190	36	400	13.3	3a	1	0	7 (3+4)	Adjuvant RT, bicalutamide 150 mg, PSA 0.0
2	20	68.0	26.2.2009	1	Middle lobe, bladder neck racket closure, 7 th POD open re-anastomosis	LS V+	Van Velthoven	2	7	1	1	240	67	1000	17.9	2c	0	0	6 (3+3)	PSA 0.01
3	25	61.3	18.6.2009	0	Middle lobe	LS V+	Van Velthoven	0	4	0	0	160	41	300	6.8	2c	0	NA	7 (3+4)	SI grade 1, 1 pad/day, PSA < 0.04
4	40	72.2	20.1.2010	0	Less skilled surgeon	LS V+	Van Velthoven	1	7	1	0	190	66	1000	8.7	2c	1	NA	7 (3+4)	Adjuvant RT, LHRH analogues, urge incontinence, 1 paddy, PSA 0.01, no sexual activity
5	97	65.1	22.3.2011	1	Advanced tumour – T3b, broad bladder neck, racket closure	HS J&J	Van Velthoven	2	11	0	1	175	59	300	13.3	3b	1	0	7 (4+3)	SI grade 1 (1 pad/day), adjuvant RT, PSA 0.01
6	105	58.0	23.5.2011	0	Broad bladder neck, leakage of CO ₂ to peritoneal cavity	HS J&J	Van Velthoven	1	7	1	1	165	48	600	13.7	3b	0	0	9 (4+5)	Adjuvant RT, LHRH, SI grade 1
7	113	58.7	20.10.2011	0		HS J&J	Interrupted suture	2	15	1	1	135	64	300	17.2	2c	0	0	8 (3+5)	SI grade 1, ED – sildenafil

ED – erectile dysfunction, HS J&J – Harmonic scalpel (Harmonic Ace® Johnson&Johnson), LHRH – luteinizing hormone-releasing hormone agonists, LS V+ – Ligasure® Blunt Tip 35 mm®, max. – maximal value, min. – minimal value, NA – not applicable, RT – external beam radiotherapy, SD – standard deviation, SI – stress incontinence, TB – Thunderbeat® Olympus

leakage was seen in 6 patients (5.1%). In the 10 subsequent cases, an interrupted suture (6-8) with single polyglactin (Vicryl® Ethicon) 3-0 stitches was used [16]; leakage was present in 1 patient (10.0%). The last 26 cases were sutured by knotless running barbed polyglyconate suture (V-loc® Covidien) 3-0 [17, 18]. In this group, there were two cases of leakage (7.7%). In 1 of these patients, the leakage persisted for only 2 days.

Discussion

The following methods to try to manage postoperative urine leakage from the drain can be applied: (1) Catheter traction (which may damage the bladder neck). (2) Replacing the active suction with passive drainage. This technique may lead to overflow of urine in the pre- and paravesical spaces and may create a nidus for infection). (3) Shortening (pulling back) of the drain (with the risk of loss of drainage of the small pelvis and the formation of a urinoma). (4) Active suction with a Foley urinary catheter (needle vented suction) [19]. In this procedure, a needle is introduced in a supply pipe with negative pressure. The needle prevents the catheter from collapse. We used this technique in the last patient with a previous failure of active suction of the prevesical space, but this method proved to be inefficient. (5) Nephroureteral stent with suction [20]. This technique can be used as a “salvage method” in the event that the previously mentioned (1-4) methods fail. The main disadvantage of this method is that it requires the introduction of a nephrostomy with all the potential complications that are associated with such a procedure. As stated above, all these methods for managing postoperative urinary leakage have their advantages and disadvantages and it is not clear from the literature which is the most preferable. We feel that these methods, for the time being (given the lack of systematic studies), should be used with clinical judgement taking into account the specific constellation of factors that are relevant for a specific patient. A last resort is (6) reoperation. This is probably the most popular method in the event that any of the less invasive methods (1-4) have failed. Castillo *et al.* [21] accomplished successful laparoscopic repair (re-anastomosis) in 4 cases in their series, amounting to 1.0% of cases in their series of LRP. We opted for this in our case no. 1 on the 7th postoperative day through an open approach. We only found a very small defect.



Photo 2. Apparatus for active suction of thorax used for suction of prevesical space. Negative pressure is adjusted to 7-12 cm of water column (for thorax, 15-20 cm is used)

Healing of re-anastomosis was smooth. In all the other 8 cases in our cohort, the urine leakage was managed and eventually stopped with non-invasive methods, even if this took up to 15 days. Based on this, in retrospect, we believe that the decision to reoperate patient no. 2 was premature.

Conclusions

Management of urine leakage following laparoscopic radical prostatectomy is not standardised. In our view, using various methods for active suction of the prevesical space is a practically feasible and frequently successful approach to this problem. The decision to resort to reoperation should not be made prematurely; the leakage may take up to 15 days to

resolve. The optimal method for active suction of the prevesical space needs further study in relation to various patient-related factors.

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