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When and How Should We Test the Tightness of the Vesicourethral Anastomosis after Retropubic Radical Prostatectomy?

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Key Words
Retropubic radical prostatectomy · Prostate cancer · Vesicourethral anastomosis · Cystography · Extravasation

Abstract
Objective: To determine when the vesicourethral anastomosis (VUA) becomes tight after retropubic radical prostatectomy (RRP) and if an additional lateral view cystography provides significantly more information than the only anterior-posterior view. ***Patients and Methods:*** Pressure-controlled cystography with anterior-posterior and lateral views was performed on postoperative days (POD) 3, 6 and 9 and evaluated in 100 consecutive patients after RRP. ***Results:*** On POD 3, 6 and 9, 82, 80 and 82% of all VUA, respectively, were tight. 85% of all tight VUA on POD 3 remained tight on POD 6 and 9. Of the 52 extravasations in a total of 300 cystographies, 65% were recognizable in the anterior-posterior as well as in the lateral view cystography, 6% were seen only in the anterior-posterior view and 29% only in the lateral view. ***Conclusions:*** The VUA after RRP is tight in about 80% of the cases on POD 3, 6 and 9. A tight VUA on POD 3 does not exclude later extravasation on POD 6 and 9 (14%). About one third (29%) of all extravasations of VUA are seen only in the lateral view cystography after RRP.

Introduction

In case of a non-tight vesicourethral anastomosis (VUA) after radical prostatectomy (RP) the risk of a healing disturbance of the anastomosis and stricture formation is increased [1–3]. On the other hand, early removal of the bladder catheter improves the patient's comfort and results in earlier discharge from the hospital [4–9]. Therefore, it seems appropriate to leave the bladder catheter in place until the VUA is tight [10]. Interestingly, some institutions leave the bladder catheter in situ for 10–15 days knowing that significant extravasation is common until POD 5 to 8 [11–15]. Most groups perform a cystography at least in the anterior-posterior plane before they remove the catheter [9, 12, 16, 17]. Other surgeons perform a cystogram only in patients in which they are not satisfied with the integrity of the anastomosis, in case of clinical suspected leakages or of wide bladder neck reconstruction [18].

The objectives of this prospective study were first to determine how many patients had a tight VUA on POD 3, 6 and 9 after retropubic radical prostatectomy (RRP), and secondly to determine if an additional lateral view cystography provides more clinically significant information than the anterior-posterior view alone.

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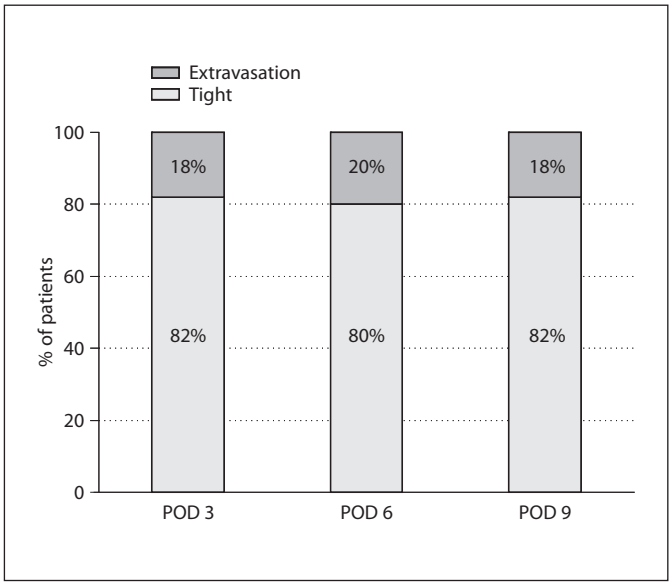

Fig. 1. Tightness of the VUA after retropublic radical prostatectomy on POD 3, 6 and 9.

Table 1. Patients' characteristics

Number of patients (with complete follow-up)	100
Median age	58 years (range 48–76)
Histopathological tumor stage	
pT2	82 (82%)
pT3	17 (17%)
pT4	1 (1%)
Histopathologucal lymph node status	
pN0	87 (87%)
pN+	13 (13%)
Gleason score	
2–4	2 (2%)
5–7	81 (81%)
8–10	17 (17%)
Attempted nerve sparing	
None	12 (12%)
Monolateral	35 (35%)
Bilateral	53 (53%)

Patients and Methods

One hundred and seven consecutive patients who underwent RRP and pelvic lymph node dissection (PLND) for organ-confined prostate cancer were included in the study. All patients were operated by 3 senior surgeons.

After meticulous lymph node dissection, particularly along the internal iliac vessels, the outer layer of the endopelvic fascia was sharply incised medially to the tendinous arc, leaving the puboprostatic ligaments untouched to ensure urethral stability. In case of attempted nerve sparing the neurovascular bundle was carefully rolled away from the lateral prostate after incision of the second layer of the endopelvic fascia, the periprostatic fascia. The deep Santorini's plexus was bunched and ligated over the apical prostate and at the bladder neck, and then transected over the ventral aspect of the prostate to avoid damage to the urethral sphincter. The prostatic apex was approached directly along the lateral side of the prostatic capsule and the urethra was transected sharply with scissors. The bladder was opened on the ventral side. After urine ejaculation allowed localization of the ureteral orifices the bladder neck was transected and the prostate was removed. Bladder neck sparing was not attempted. The bladder neck was reconstructed by a dorsal running seromuscular suture to 8–10 mm wide using a 2-zero polyglycolic acid. Six 2-zero polyglycolic acid sutures were placed and tied over an 18-Fr urethral silicon catheter without eversion of the bladder mucosa [19]. We routinely placed 2 pelvic 'easy flow' drains in the right and left fossa obturatoria during surgery, with removal when the drainage was <50 ml/day.

A pressure-controlled cystography (max. 20 cm H_2O) with anterior-posterior and lateral view were performed on POD 3, 6 and 9. VUA was defined as non-tight by extravasation of any size. In case of a tight VUA or only a small extravasation (defined as less than half of the diameter of the 18-Fr bladder catheter), the bladder catheter was removed after the cystography on POD 9. In case of a more extensive extravasation, the bladder catheter was left in place and cystography was repeated on POD 15 or later if leakage persists. Patients received a single antibiotic dose with 2 g intravenous cefazolinum perioperatively. This study has been approved by our center ethics committee and conducted in accordance with the tenets of the Declaration of Helsinki. Written informed consent was obtained from the patients before inclusion.

Results

Complete follow-up is documented in 100 of 107 patients. Seven patients were excluded from the study by uncompleted cystographic follow-up. Patients' characteristics represent an average population for RRP and are described in table 1.

Eighty-two of 100 VUA were tight on POD 3, 80 were tight on POD 6 and 82 were tight on POD 9 (fig. 1). Median catheterization time was 9 days (range 9–18 days). Of the 18 patients with a non-tight VUA on POD 3, 3/18 (17%) were tight on POD 6, 8/18 patients (44%) on POD 9 and 2/18 patients (11%) on POD 15. In 5 of the 18 patients (28%) VUA showed only a small extravasation less than 2–3 mm on X-ray images on POD 9 and, nevertheless, the urethral catheter was removed (fig. 2a). Ninety-five percent (78/82) of all VUA which were tight on POD 3 remained tight on POD 6 and 9. However, 4 of the 82 patients (5%) who had a tight VUA on POD 3 showed ex-

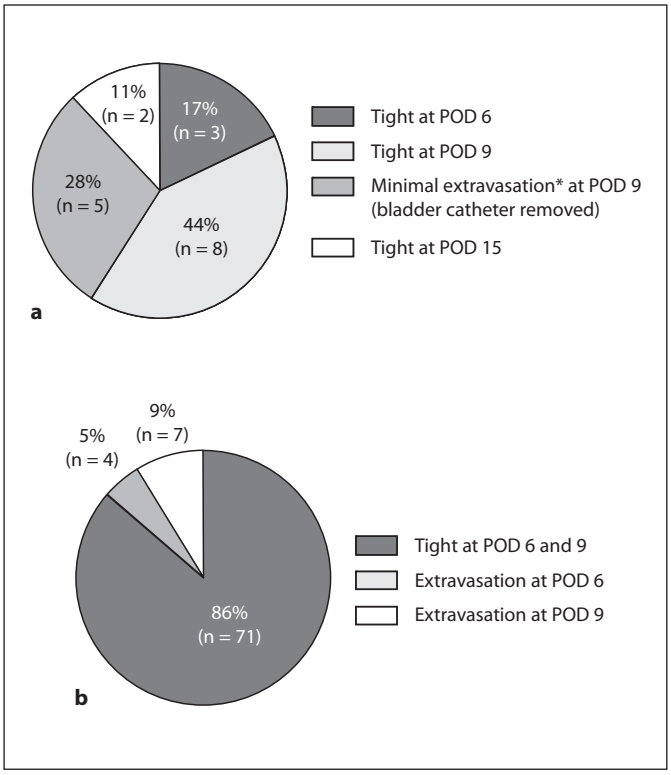

Fig. 2. a Outcome of 18 primary non-tight VUA on POD 3. * Defined as less than about half the diameter of the 18-Fr bladder catheter. **b** Outcome of primary tight VUA at POD 3 (n = 82).

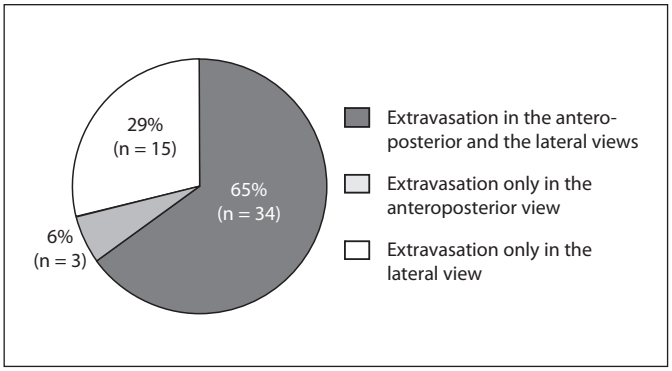

Fig. 3. Recognition of 52 extravasations in the anterior-posterior and the lateral view in over 300 cystographies performed in 100 patients.

travasation at cystography on POD 6 and 7 of the 82 (9%) had extravasation in the cystography on POD 9 (fig. 2b). Two of 100 patients (2%) showed a leakage on POD 15 and none on POD 18.

Of the total 300 performed cystographies, 52 (17%) revealed extravasations. In 34 of 52 cystographies (65%), the extravasation was recognized in the anterior-posterior as well as the lateral view. In 3 of 52 cystographies (6%), the extravasation was seen only in the anterior-posterior images and in 15 (29%) only in the lateral view (fig. 3). The instilled volume for pressure-controlled (20 cm H_2O) cystography was median 110 ml (range 30–250 ml) on POD 3, 120 ml (range 40–230) on POD 6 and 110 ml (range 35–230) on POD 9. The bladder capacity differences between POD 3 and 6, POD 6 and 9 as well as POD 3 and 9 were not significant.

At hospital discharge, the median residual volume after voiding was 0 ml (range 0–80 ml). Two of the 100 patients (2%) were discharged with suprapubic bladder catheters in situ because of the inability to void spontaneously. The cystostomy catheters were removed 5 days later after anti-inflammatory therapy with diclofenac 50 mg 3 times daily.

Three of the 100 patients (3%) developed a stricture of the VUA 2 and 3 weeks and 3 months postoperatively. In 2 of the 3 patients who developed a stricture severe extravasations were diagnosed in the cystography on POD 3, 6 and 9. Two strictures were dilated under local anesthesia and in 1 case incision and resection of scar tissue of the stricture were necessary. After resection, this patient developed substantial stress incontinence necessitating 2–3 pads per day.

There was no statistical correlation between leakage of the VUA and pathological tumor stage.

Discussion

Many studies describe the use of cystography following RRP for confirmation of a watertight VUA before removal of the bladder catheter [9, 12, 16, 17]. These reports are quite variable regarding time of cystography and tightness rates. The presence of extravasations on cystography ranges between 4.6 and 25.9% [5, 7, 10–12, 15–17, 20]. Also, the time of the examination varies widely between POD 2 and POD 18 [5, 15]. Many authors emphasize the advantages of early catheter removal with shortening of the hospitalization time and increasing patient comfort [5, 7–10]. Tiguert et al. [5] reported improved continence related to early catheter removal, suggesting that the catheter may cause hypersecretion of the paraurethral glands which in turn may then enhance the risk of infection and interfere with the healing process.

Huang and Lepor [10] found that the prevalence of anastomotic strictures is unrelated to the degree of urinary extravasation on cystography but reflects many factors, including surgical technique, surgeons experience, postoperative blood loss and peri-anastomostic hematoma.

The fact that a primary tight VUA became secondarily non-tight can be explained by the fact that tissue edema at POD 3 may mask leaks which became evident later. To our knowledge, this is the first prospective study documenting the evolution of VUA tightness during the early postoperative course and the usefulness of lateral view cystography to detect extravasations. Furthermore, previous studies usually do not supply information about volume and pressure during the cystography nor whether the cystography was performed in two planes. The test of the VUA tightness by pressure-controlled bladder filling (20 cm H_2O) provides the advantage of evaluating extravasation such as a parameter related to a constant intravesical pressure in all the patients, regardless of bladder capacity.

Our results on the rate of VUA extravasation are similar to those already published, and this despite our diagnosis of extravasation being particularly accurate. In our study every recognizable extravasation of contrast in both radiological planes (anterior-posterior and lateral) was interpreted as such independent of size. Our cumulated rate of extravasations diagnosed on POD 3, 6 and 9 was 17%. This would be reduced to 12% if only the extravasations recognized on the anterior-posterior view were considered.

Thus, the clinical relevance of performing cystographies in two planes does not seem to be evident. In fact, our rate of symptomatic strictures complications due to VUA nontightness is not really different from those of groups performing monoplanar cystography. Based on our experience, we can conclude that cystography only in the anterior-posterior view will miss a consistent number of extravasations but it seems to be sufficient for daily clinical practice. Small extravasations do not seem to influence the healing process of the VUA [13]. Probably, the clinical significance of minor leakages is irrelevant in most cases. However, significant extravasations seem to facilitate the formation of VUA strictures which then need further therapy. In fact, 2 of the 3 patients developing a stricture of the VUA in our study had significant extravasations during the entire early postoperative follow-up. In our opinion, the main limitation of the present study is its small patient number. In addition, over 80% of men had no demonstrable extravasation on the first cystography (POD 3), limiting in this way the number of patients with useful information to fewer than 20.

Conclusion

About 80% of the VUA are tight on POD 3. Of the tight VUA on POD 3, 5% and 9%, respectively, showed extravasations on POD 6 and 9. An additional lateral cystography discovers about 30% more extravasations. Large extravasations might be a predisposition for a stricture formation. Because most VUA are already tight on POD 3 and 6, and, because the clinical significance of minor leakages is probably irrelevant, the catheter can be removed in this lapse of time, although a small percentage of already tight VUA becomes nontight.

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