

Surgery Illustrated – Surgical Atlas

Prepubic urethrectomy

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ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com

INTRODUCTION

The indications for simultaneous urethrectomy during cystectomy have been recently revisited. Years ago, prophylactic urethrectomy was used in most patients who needed a cutaneous diversion. Currently, only patients with TCC at the level of the prostatic urethra or the bladder neck are considered to be at substantial risk of urethral recurrence [1]. Since the introduction of bladder replacement techniques, the indications for prophylactic urethrectomy have become restricted. The evaluation before and during surgery of the prostatic urethra in men, and of the bladder neck in women, is the determining factor in the appropriate management strategy of the urethra in patients with bladder cancer [2].

However, every defunctionalized urethra after cystectomy or cystoprostatectomy is at risk of later urethral recurrence, and this risk is probably higher in patients who had a bladder substitution. Therefore there is a rationale for not leaving the urethra in situ when the patient does not get a substitute bladder, or is at high risk of recurrence because of prostatic invasion by TCC. This is the place for prophylactic urethrectomy at the time of cystectomy [3]. Classically this urethrectomy was done through a perineal incision, but many years ago we described a prepubic urethrectomy through a caudally extended midline abdominal incision [4] (Fig. 1).

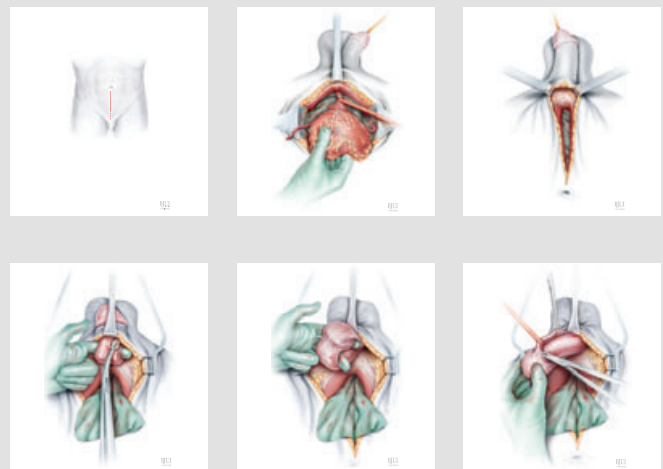
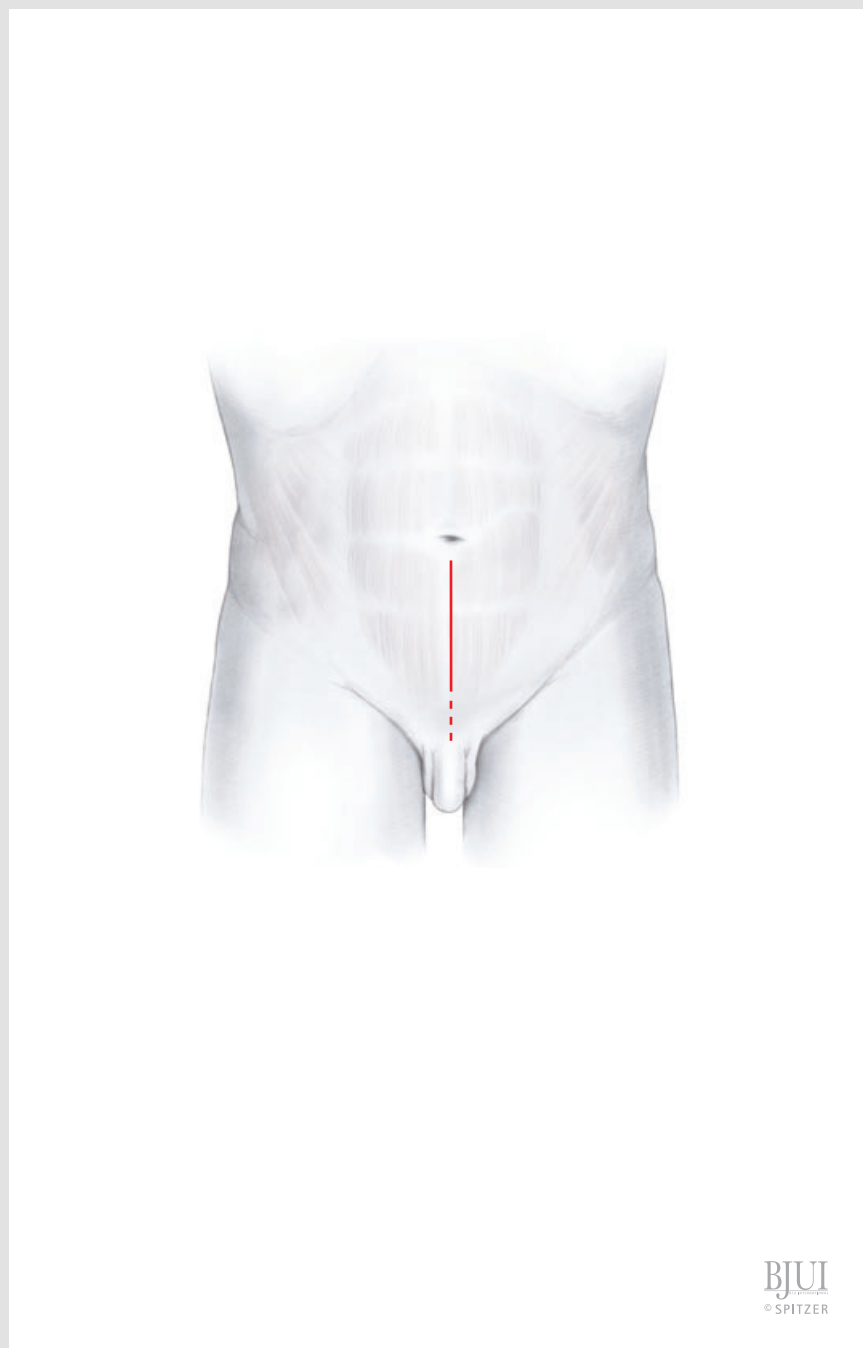


Figure 1

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PLANNING AND PREPARATION

INDICATIONS

The incidence of urethral recurrence of TCC after cystectomy for TCC is estimated at 5–10%. The risk depends on several factors, i.e. tumour stage, multifocal TCC, trigone or bladder neck involvement, carcinoma *in situ*, prostatic urethral involvement and associated upper tract TCC; the most important are bladder neck and prostatic urethral involvement.

When there is a urethral recurrence after cystectomy it is often detected late, at a stage when metastasis has already occurred, due to the lack of sensitive diagnostic tools [5]. Superficial urethral recurrences can, when detected early, be treated by endoscopic laser coagulation. However, this does not allow a pathological diagnosis or staging, and invasive TCC cannot be excluded. Therefore, most urethral recurrences are treated by delayed perineal urethrectomy, that is not easy to perform because of postoperative fibrosis exactly at the level of the bulbar or membranous urethra. As even patients in a low-risk category can develop urethral recurrence, prophylactic urethrectomy can be advocated in all patients who are left with a defunctionalized urethra. In the high-risk category, with bladder neck or prostatic stromal invasion by TCC, prophylactic urethrectomy is mandatory [6].

The classical perineal approach for immediate prophylactic urethrectomy increases the operative duration by ≥ 1 h. This procedure

requires repositioning of the patient into the lithotomy position, increases postoperative pain and delays mobilization, all factors that can increase morbidity and postoperative mortality, because of deep venous thrombosis and pulmonary embolism [7]. Immediate prophylactic urethrectomy using the prepubic technique offers several advantages and has a much more acceptable morbidity. Only adding 15–20 min to an already time-consuming procedure, the prepubic urethrectomy can, with no additional incision, be done as part of the complete resection of the lower urothelium, and is well in accordance with the generally accepted concept of oncological surgery of 'en bloc' resection.

PATIENT SELECTION

Since we developed the prophylactic prepubic urethrectomy we recommend that all patients who were not considered for bladder replacement should undergo this procedure. This indeed makes the follow-up after cystectomy easier [8], avoiding the need for urethral washout cytology or follow-up urethroscopy [9]. The risk of urethral recurrence, although it might be low, is then completely abolished. The 'en bloc' prepubic urethrectomy, as a part of the routine cystectomy, is less time-consuming than the perineal approach, and was shown to be safe and easy to perform.

SPECIFIC EQUIPMENT/MATERIALS

Standard surgical instruments are sufficient. The use of haemostatic clips for haemostasis

rather than classic ligation helps to reduce the surgical time. Electrocautery can assure haemostasis of bleeding that can occur at the level of the corpus cavernosum. Long Langenbeck retractors are necessary to expose the prepubic area. After the prepubic urethrectomy a compressive wrapping of the penis and scrotum are necessary, for which an elastic Velpeau-like draping is most appropriate.

SPECIFIC PATIENT PREPARATION

At our institution radical cystectomy is mostly performed under general anaesthesia, with preoperative placement of a stay epidural catheter that remains in place for 3–4 days to reduce postoperative pain. All patients have low molecular-weight heparin prophylaxis to avoid thrombosis, and have a bowel preparation. The patients wear compression stockings and are mobilized from bed from the first day after surgery, with the help of a nurse or a physiotherapist.

The patient is placed supine, with lowering of the chest to increase the visibility to the small pelvis.

SURGICAL STEPS

The technique of the prophylactic prepubic urethrectomy was first described in 1989 and has since been refined and detailed [4,10,11].

Figure 2***Retropubic dissection of the membranous urethra***

Once the radical cystoprostatovesiculectomy has been done in the classical manner, the specimen remains attached to the membranous urethra. The latter is still fixed in the pelvic floor and can be dissected out with blunt dissection all around its circumference, so that the dissecting finger can reach the infra-prepubic area from above. While a 24 F transurethral catheter is still inserted, the proximal membranous urethra is dissected.

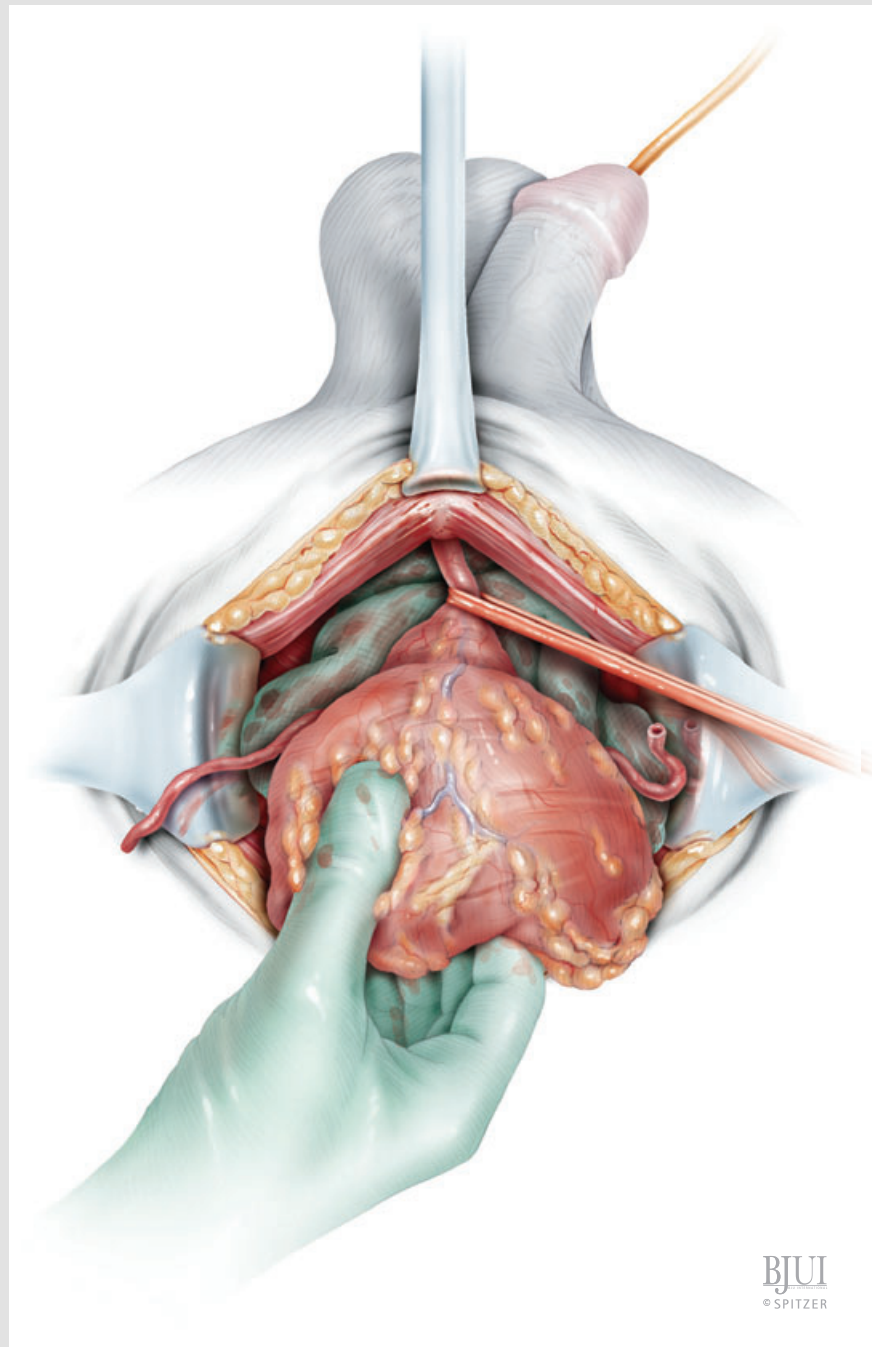
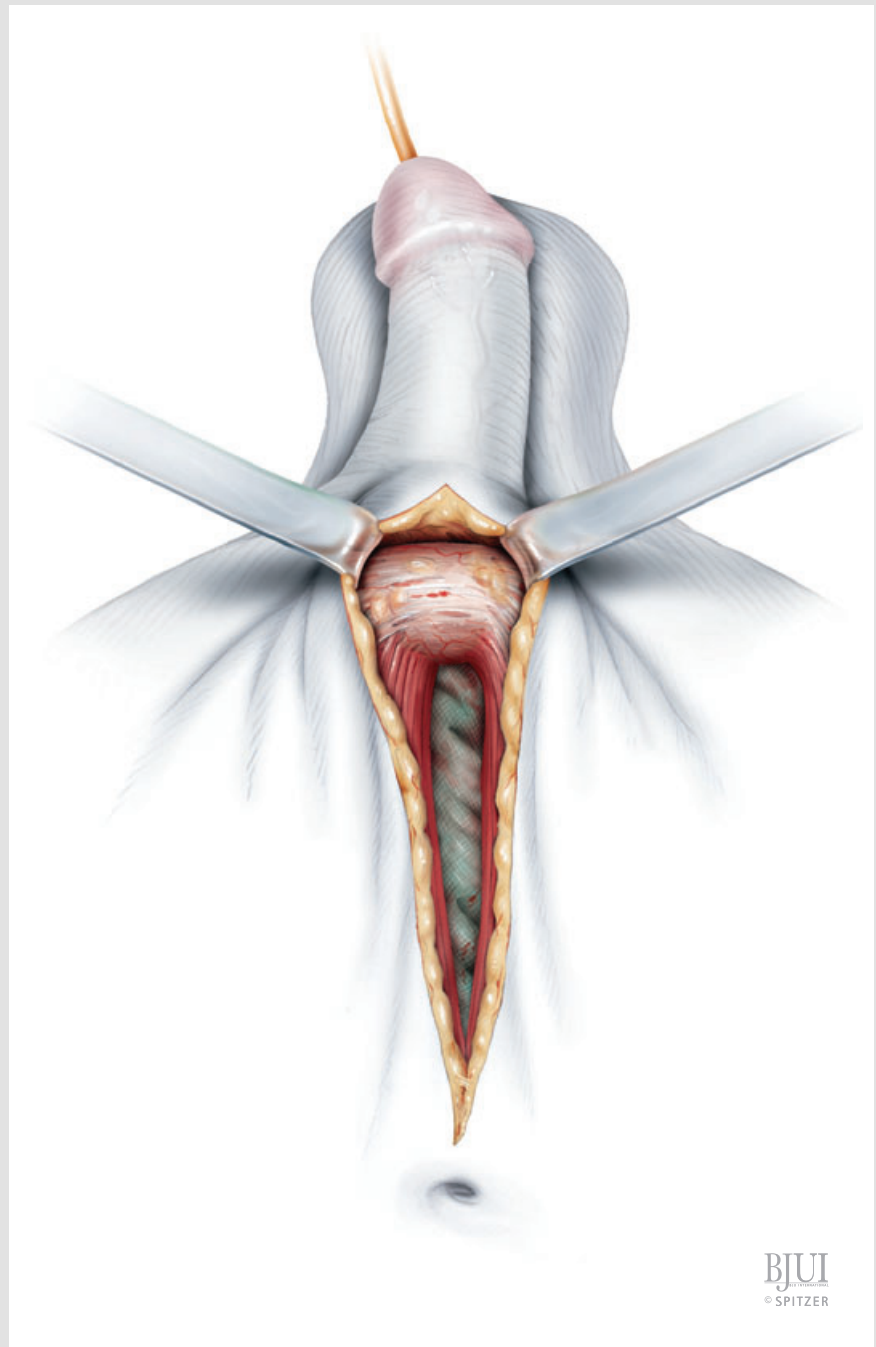


Figure 3***Prepubic exposure***

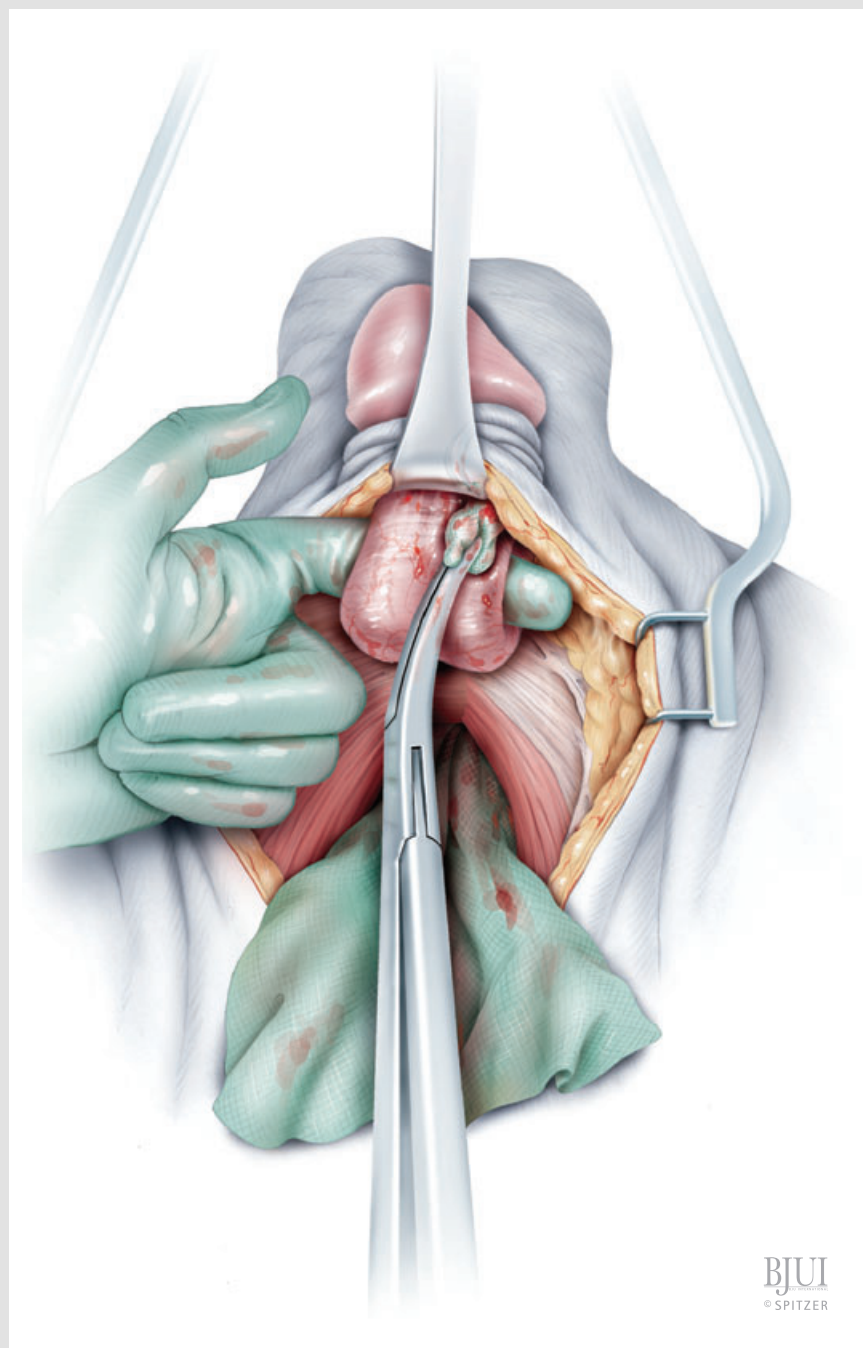
The skin incision is prolonged caudally over the pubis right to the basis of the penile shaft, to allow access below the pubic bone. The suspensor ligament of the penis does not need to be sectioned.



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Figures 4 and 5***Prepubic dissection of the penile body and distal urethra***

The dissection of the root of the penis is easily done bluntly. Luxation of the penis within the prepubic incision is only possible when the penis is dissected up to Buck's fascia. Traction on the penile shaft will allow luxation of the penis into the incision by progressive invagination.



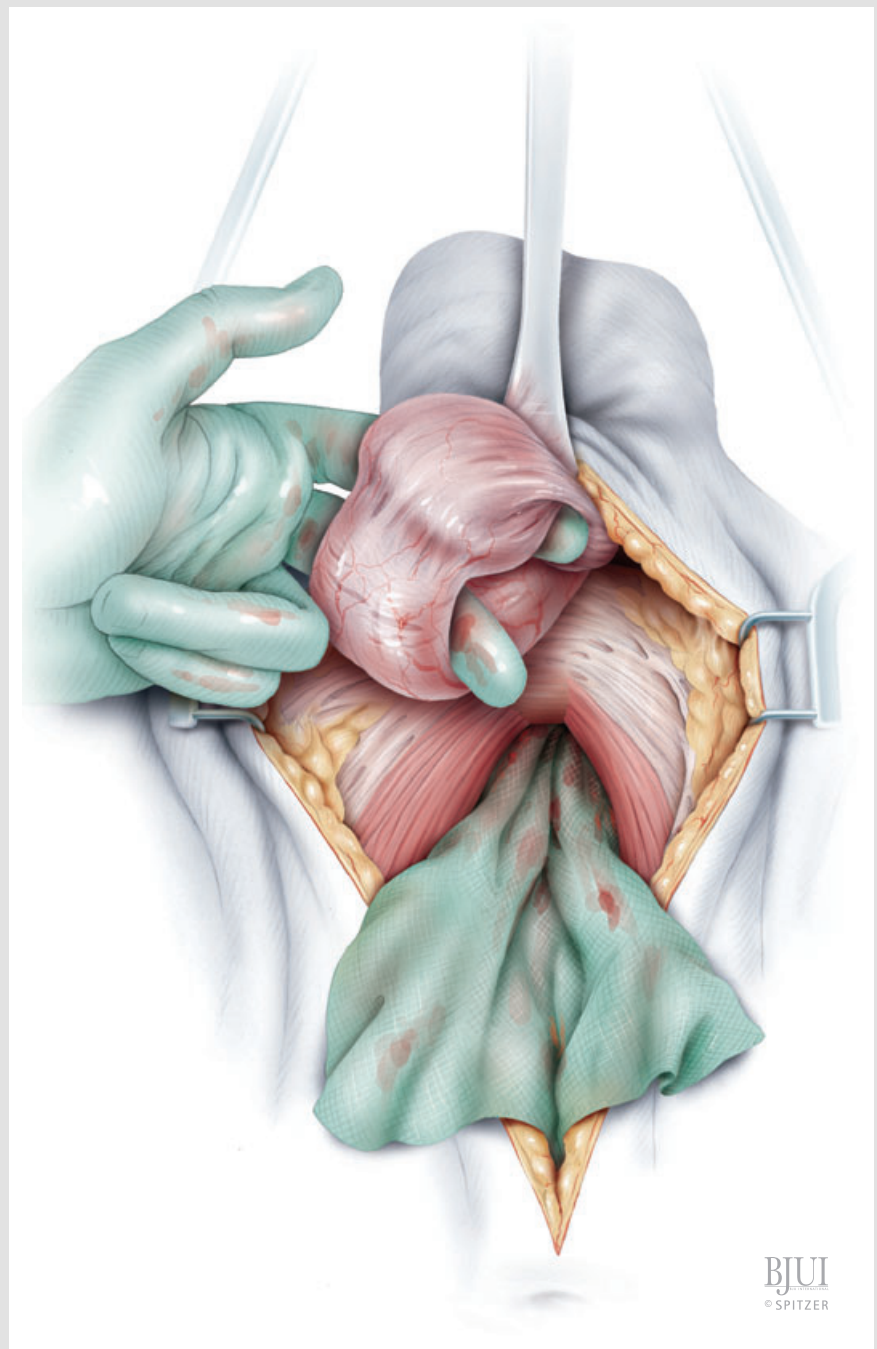
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Figure 6

Now the dissection is started between the corpus spongiosum around the urethra and the corpora cavernosa. This is done sharply, guided by the firm tunica of the corpora cavernosa. The urethra can then, in its distal part, be progressively dissected from the corpora cavernosa. Small perforating vessels between the corpus spongiosum and the corpora cavernosa need to be coagulated. Inadvertent laceration of the corpus cavernosum must be oversutured.

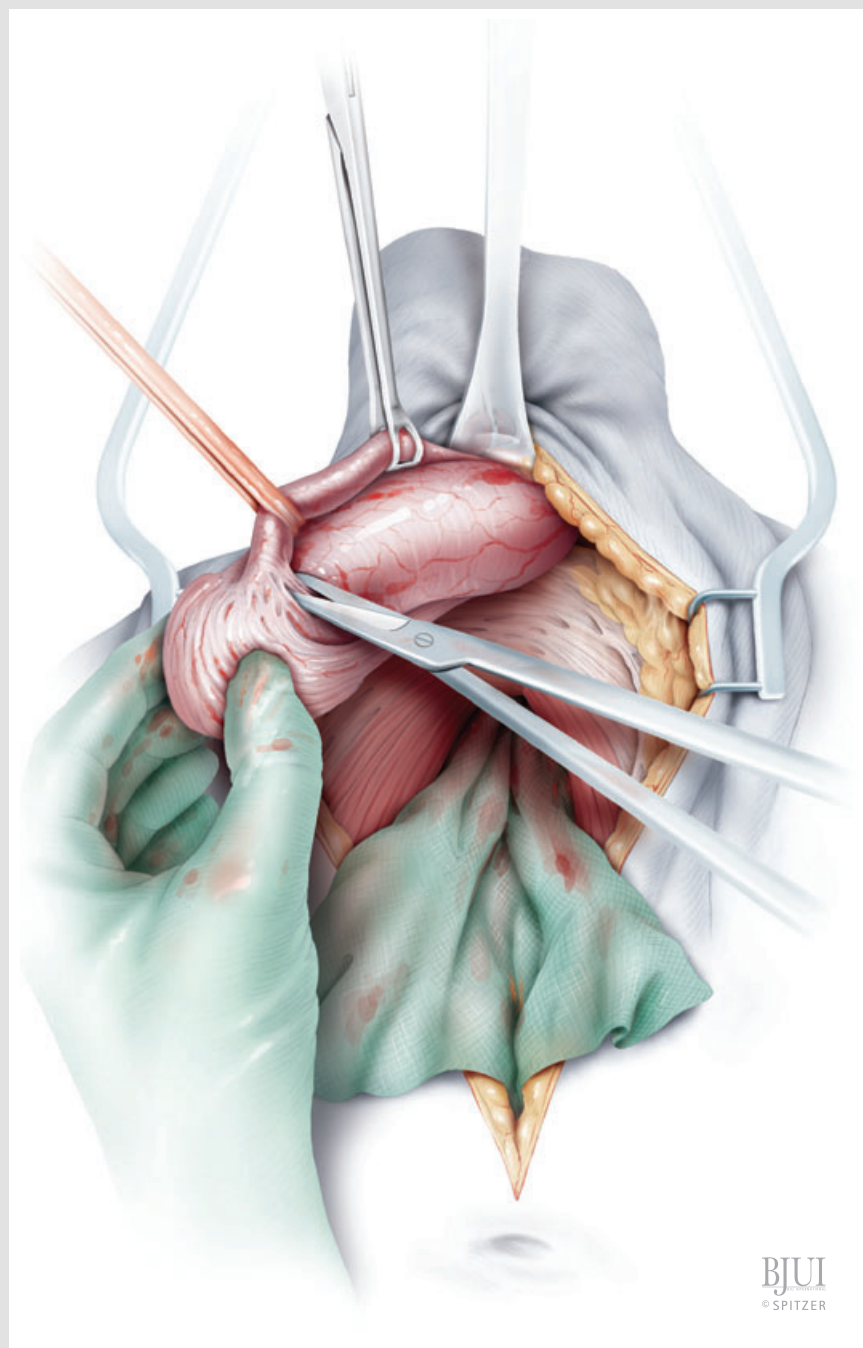


Figure 7

Dissection of the most distal and intraglandular urethra

The dissection between the erectile bodies is continued towards the glans penis. The glans can be completely inverted by manual compression of the glans, allowing complete resection of the intraglandular urethra up to the level of the navicular fossa. Careful haemostasis must be used at the transection edge in the glans penis by electrocoagulation.

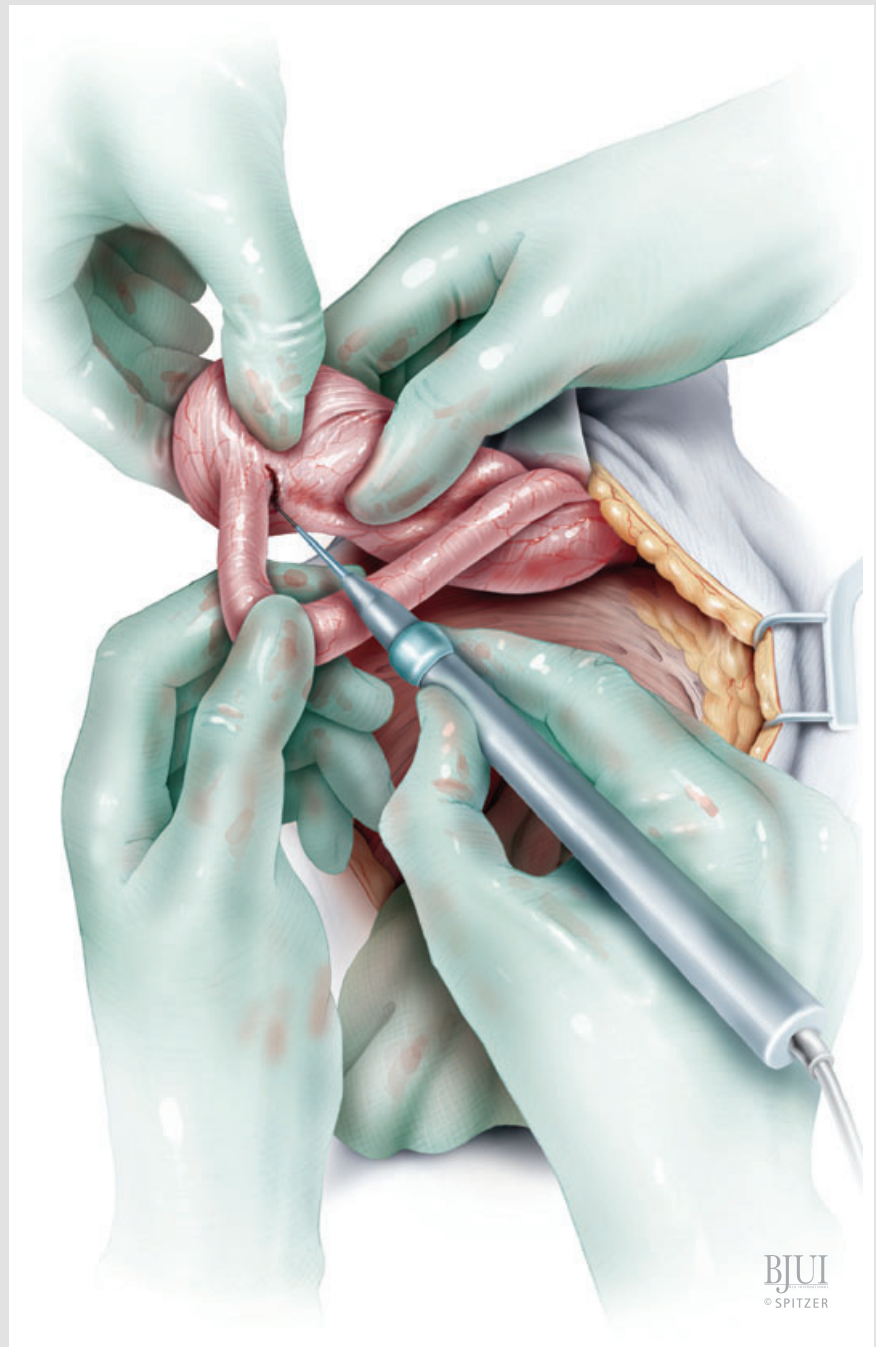


Figure 8

The transurethral catheter is cut and a Kocher clamp placed on the distal urethra, allowing traction to be applied and the dissection of the urethra continued proximally.

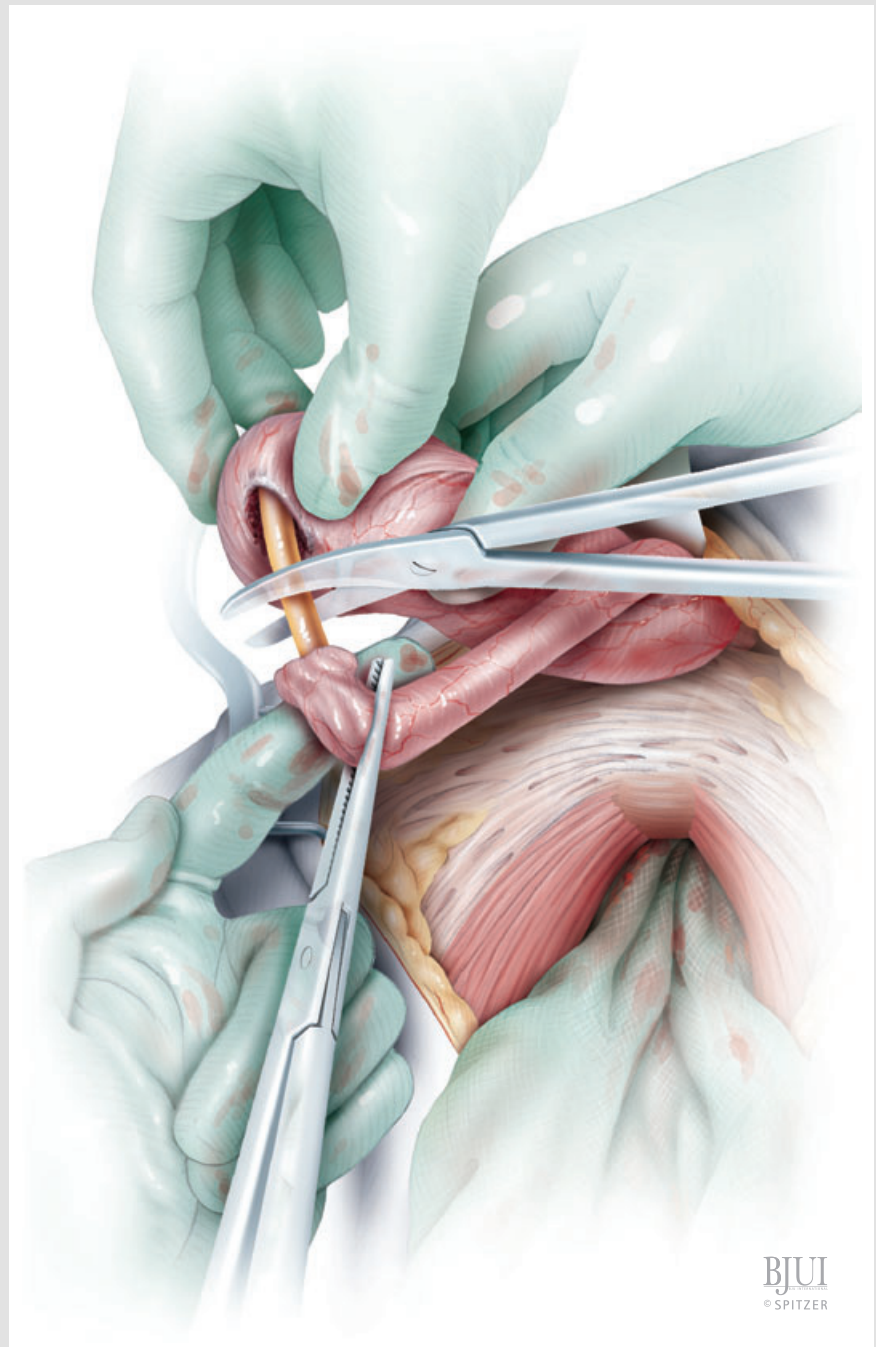


Figure 9

Dissection of the penile urethra

Further dissection between the corpora cavernosa and corpus spongiosum is done in the prepubic area while this is exposed with the help of deep Langenbeck retractors.

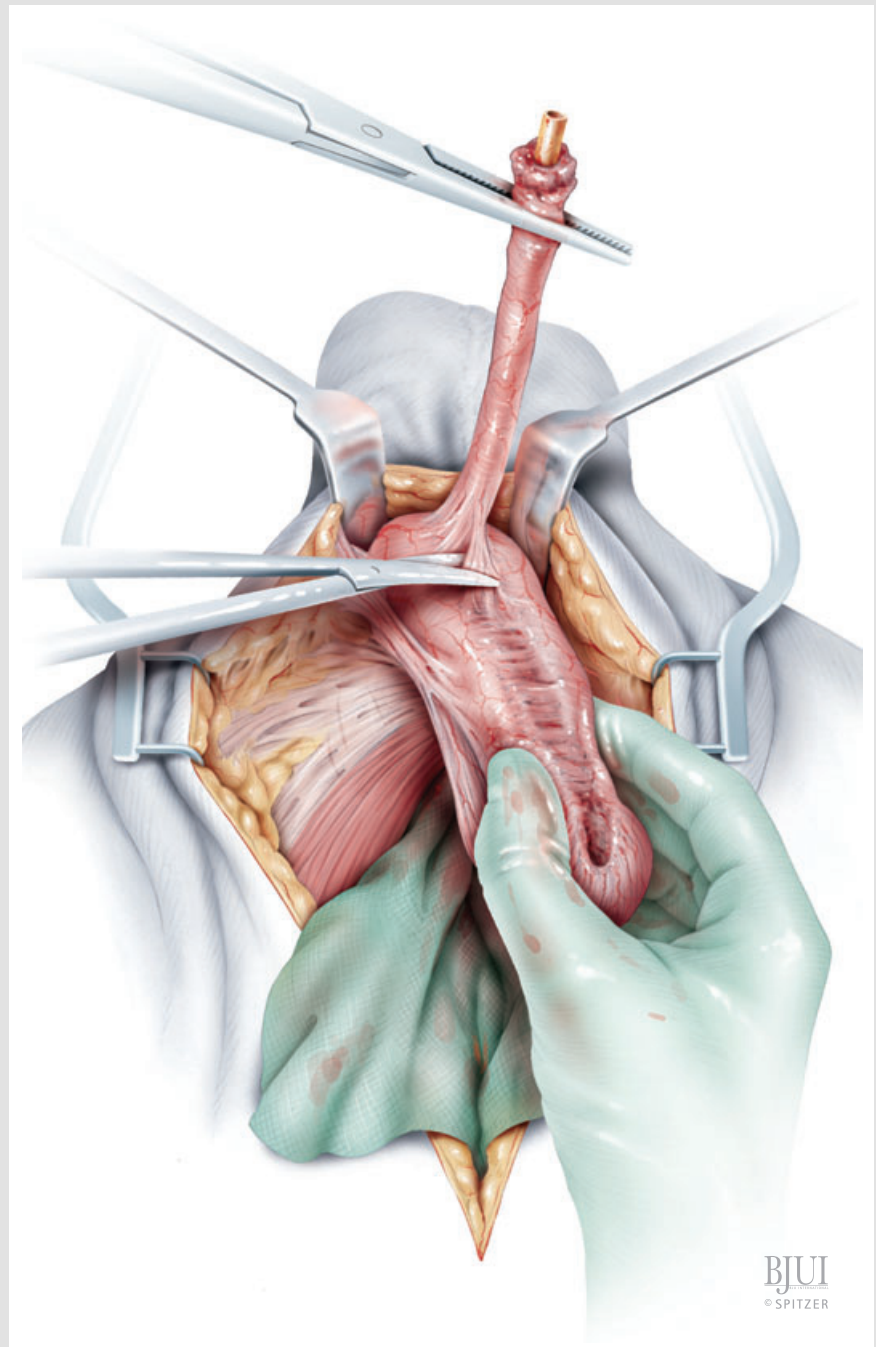
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Figure 10

Once the level of the separation of the two corpora cavernosa is reached, blunt dissection of the more proximal urethra is easy. The dissection will then reach the bulbar urethra that is still fixed posteriorly by the left and right bulbar arteries. The dissection is continued towards the area that was prepared during the endopelvic dissection of the membranous urethra. At this point the prepubic and the endopelvic dissecting finger reach each other.

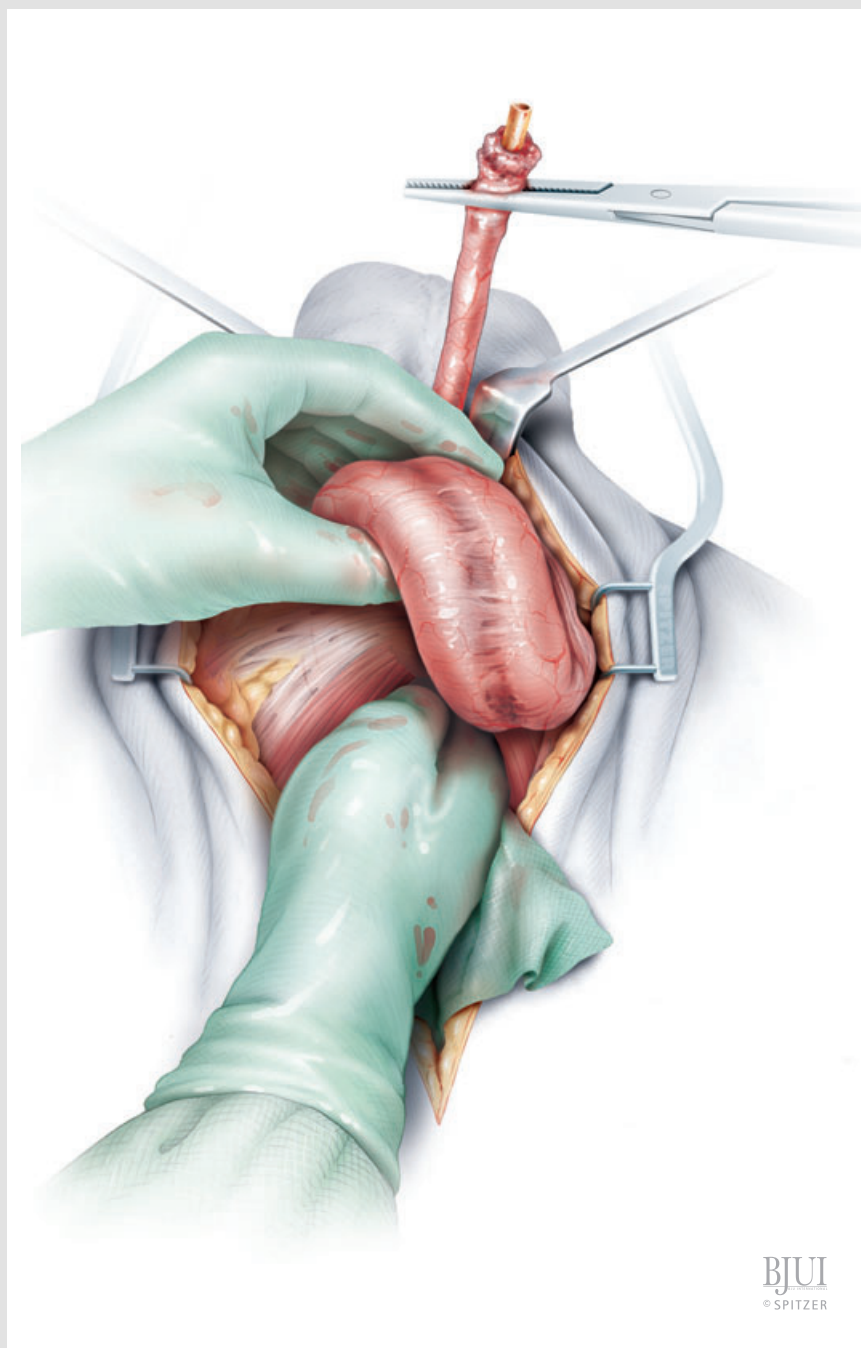


Figure 11

Control of the bulbar arteries with the urethra still in its anatomical position is difficult, and can only be done by simple blunt disruption of the bulbar arteries. This is usually not followed by severe bleeding, but some patients might have important bleeding during or after surgery. We currently try to clip the bulbar arteries. To do that, the distal urethra is brought from the prepubic area into the small pelvis. Gentle traction on the completely intrapelvic specimen allows identification, deep in the pelvic floor, of the bulbar arteries that can be clipped before sectioning. The cystoprostatourethrectomy specimen can then be removed en bloc through the suprapubic incision.

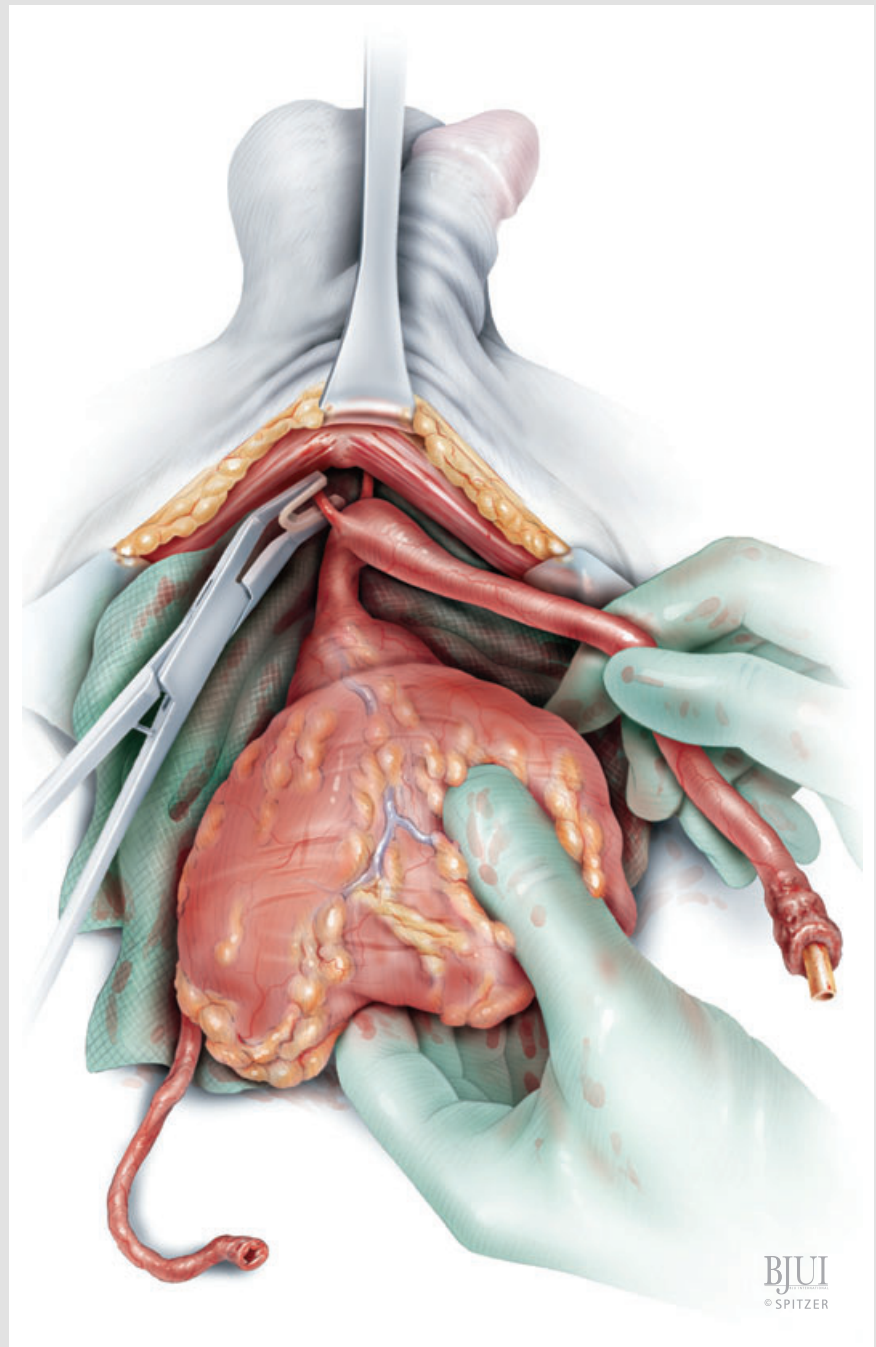
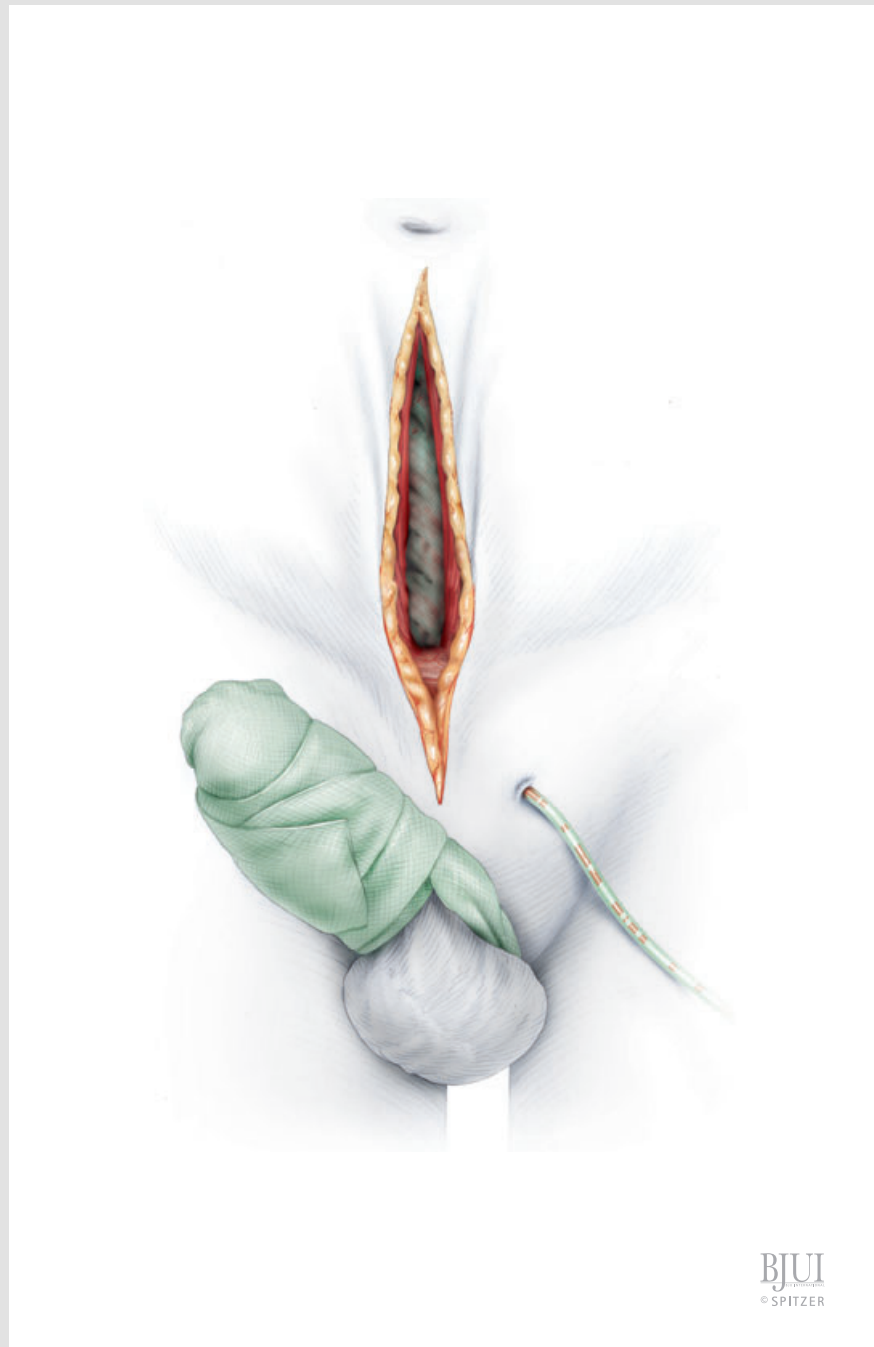
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Figure 12

A suction drain is immediately inserted in the prepubic urethral fossa. The prepubic space is closed with subcutaneous sutures so that active suction can be applied immediately. At the same time, a compressive draping is applied, not only around the penis but also around the scrotal base, to avoid a penile or scrotal haematoma. The draping around the base of the scrotum should be placed so that it does not compromise the vascularization of the scrotal content. This draping remains in place for 24 h. The suction drain remains in place as long as there is any drainage, but can mostly be removed within 48 h.



FROM SURGEON TO SURGEON

THE DIFFICULT CASE

Urethral dissection and freeing can be more difficult due to fibrosis after previous urethrotomies or other urethral surgery. Mostly urethrectomy is easier in older patients who can, however, have more perforating vessels between the corpora cavernosa and corpus spongiosum.

In some cases the membranous urethra is disrupted during the dissection. In these cases a retrograde stripping of the urethra can be attempted, to allow complete urethral resection.

THINGS TO MAKE LIFE EASIER

To facilitate urethral dissection we recommend inserting a 24 F transurethral catheter.

PERSONAL WORST CASE

The bulbar arteries are not easy to control. Possible bleeding must be avoided by deep sutures that close the levator ani muscle in the small pelvis, by correctly placing the prepubic suction drain, and by the compressive bandage. In one patient there was bleeding that was hard to control and unfortunately the compressive draping was removed in the intensive care unit a couple of

hours after the surgery, resulting in a huge scrotal haematoma. There was even a need for transfusion, due to significant blood loss. Some patients have had skin necrosis at the level of the penis because of haematoma combined with compression, resulting finally in an indication for circumcision.

SINGLE MOST HELPFUL ASPECT

Penile compressive bandage should be placed immediately after eversion of the penis, to avoid oedema and haematoma, and must stay in place for at least 24 h.

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