

Transvesical (Suprapubic) Prostatectomy

Leul Shigut and David R. Jeffcoach

Introduction:

The goal of transvesical prostatectomy is to remove the hypertrophic transitional zone of the prostate to reduce urinary obstruction. It is not a surgical procedure for malignant lesions.

Appropriate history (including functional status inquiry) and physical examination are done prior to any investigation. Physical exam always includes digital rectal exam. Enlarged lateral lobes can be easily felt and the rectal mucosa should move freely over the prostate. Any nodularity or fixation of the rectal mucosa should alert you to the possibility of prostatic cancer and core needle biopsy should be done before proceeding with the admission.

In a young patient, one with history of multiple sexual partners, or previous purulent urethral discharge, rule out urethral stricture with a retrograde urethrogram. Rarely, a stricture at the membranous urethral will have the same appearance as benign prostatic hypertrophy.

Preoperative workup includes:

- Imaging: ultrasound helps assess the size of the prostate. It is also an invaluable tool when assessing the residual urine, to look for bladder wall changes, back pressure effects (hydronephrosis,) and findings concerning for cancer (nodularity, capsular invasion, lymphadenopathy.)
- In high-resource settings, uroflowmetry is done to assess the flow rate of urine. Results <10ml/sec indicate a definite peak obstruction and deserve intervention.
- Complete blood count, blood type and crossmatch, urinalysis, fasting serum glucose, serum creatinine, and prostate-specific antigen.
- Electrocardiogram and echocardiogram can be ordered depending on the physical status of the patient.

After the above two evaluations, if the patient has only frequency of micturition with a residual urine volume of <150ml and no evidence of back pressure (hydronephrosis) on ultrasound, the patient likely suffers from non-prostate related urinary retention. Uroflow, if available confirms the diagnosis if >15ml/sec. The patient can be reassured

and advised to avoid heavy alcohol consumption which may be the cause. Another important point is to avoid postponing micturition.

If the patient does not fulfill the criteria for surgery or is deemed unfit for surgery for various reasons, there are two classes of drugs available:

- 5 α -reductase inhibitors, such as finasteride. These help in prevention of hyperplasia of the prostate. Dosing is 5mg daily for 6 months. Typically the patient must take the medicine for 1-2 weeks before seeing any improvement, and full effect can take up to 6 months.
- α -adrenergic blockers: tamsulosin (most selective,) alfuzosin, and terazosin. The latter two are primarily antihypertensives, with increased urine flow as a side effect. These help relax the internal sphincter for better drainage of the bladder. They are typically not used for prostate larger than 80cc because of the possible side effect of acute urinary retention. Typically α -blockers are effective immediately after beginning use.

Suprapubic Prostatectomy is performed in the following steps:

- Abdominal incision and entry into the retroperitoneal (extraperitoneal) space
- Opening of the bladder and placement of retractors
- Incision in the mucosa between the urethral orifice and the ureteric orifices
- Blunt dissection and enucleation of the prostate
- Placement of hemostatic sutures in the capsule
- Passage of the 3-way foley catheter and beginning bladder irrigation
- 2-layered closure of the bladder
- Closure of the fascia and skin

Steps:

1. Patients typically receive spinal anesthesia for the procedure unless otherwise contraindicated.
2. Through a foley catheter, inflate the bladder with 180 – 240 cc sterile saline mixed with iodine and then remove the catheter. This helps to both reduce infection rates and distend the bladder,



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making identification and incision less challenging.

3. Make sure to clip and not shave any pubic hair.
4. The patient is prepared and draped in the supine position from the xiphoid process to the mid-thigh including testicles and penis including the glans.
5. As with all pelvic surgeries, a right handed surgeon may prefer to stand on the left side of the patient; this will aid during enucleation of the adenoma. But this is not mandatory.
6. A lower midline longitudinal skin incision is made below umbilicus for a length of 8 cm to the pubic symphysis.



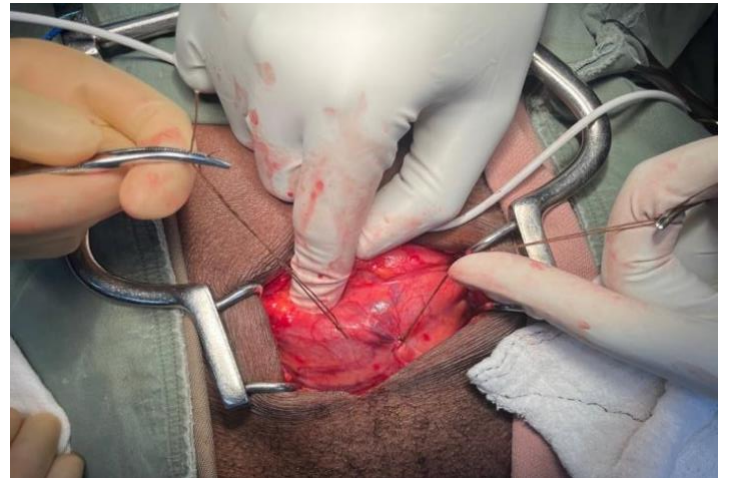
A vertical incision below the umbilicus can be used to approach the extraperitoneal bladder. A Pfannenstiel incision is also acceptable. In all of the following pictures, the patient's head is towards the top of the pictures.

7. Electrocautery is used to dissect through the subcutaneous tissue. The linea alba is incised, allowing the rectus abdominis muscles to be separated in the midline. The transversalis fascia is incised sharply or with electrocautery to expose the space of Retzius.



Following division of the linea alba between the rectus muscles, the transversalis fascia is seen. This is divided taking care to avoid entering the peritoneum. The fat around the bladder is then seen.

8. Identify the bladder by clearing any peritoneal fat off of it bluntly, sweeping in a cranial direction. Place two anchoring sutures of 1-0 chromic on the bladder wall.

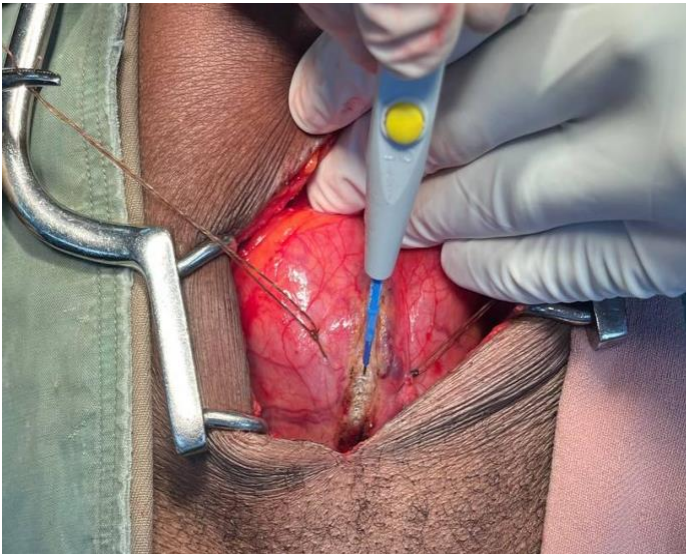


Once the bladder is identified, place two traction sutures before opening it.

9. Care should be taken to not inadvertently enter the peritoneum during this step. If there is confusion, use a small 22G needle to aspirate the bladder to ensure you are entering the correct space.
10. Perform your cystostomy for a length of 4-5cm in craniocaudal direction and remove the instilled fluid from the bladder.

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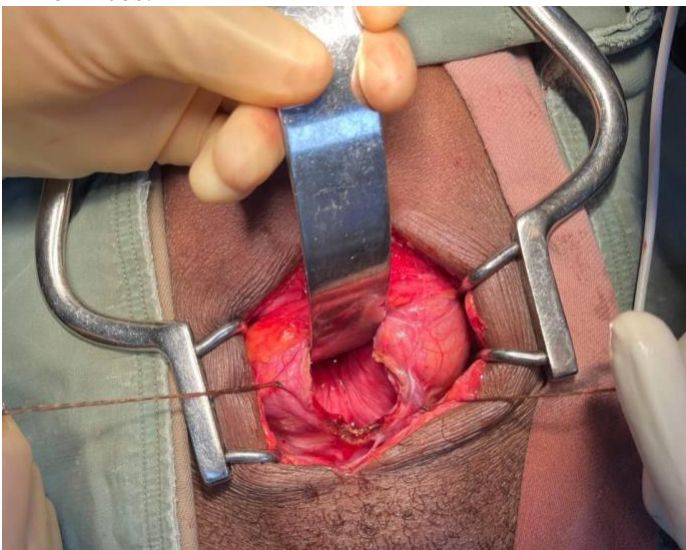
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Make a longitudinal incision in the bladder, going slowly by layers to assure hemostasis.

11. Insert a small self-retaining retractor inside the bladder and expose the bladder fully. Place a gauze at the dome of the bladder then a narrow Deaver retractor can be placed over top which can be used to retract the bladder cephalad. The gauze will help move redundant bladder tissue cephalad. An additional small Richardson retractor can be placed over the bladder neck and used to further expose the trigone.

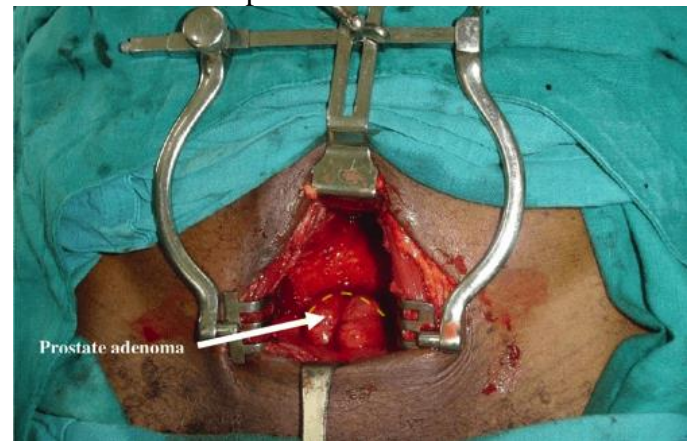
12. Explore the bladder cavity for any lesions, ulcers, stones, or diverticuli. Identify both ureteric orifices.



In this photo, the small self-retaining retractor has not yet been placed in the bladder. The narrow Deaver retractor is crucial

to retract the mucosa away from the trigone and ureteric orifices, so that they are seen more easily. A folded gauze can be placed behind this retractor so that it pulls the mucosa in a cranial direction more effectively.

13. Develop the appropriate plane between the adenoma and the prostate capsule using electrocautery in a circular incision in the bladder mucosa cranial to the urethral orifice, between the adenoma and the ureteric orifices.. This is done so that the mucosa is not torn as blunt enucleation is performed.

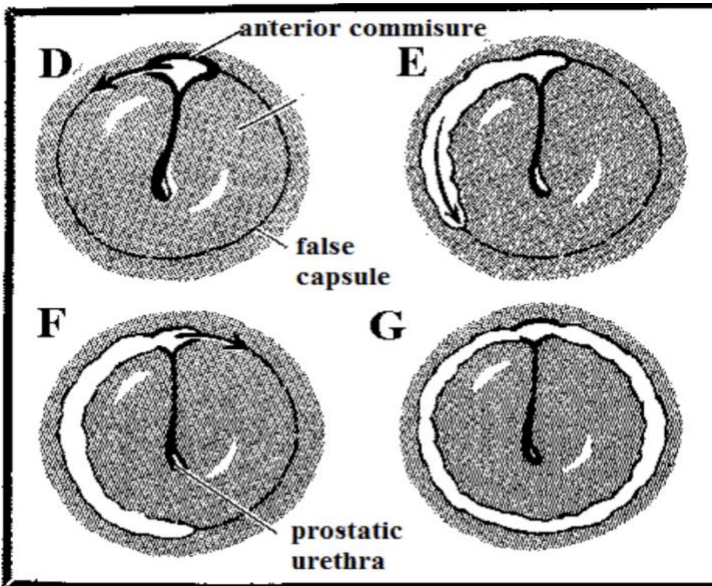


The mucosa is divided along this Yellow dotted line, so that when blunt enucleation is performed the mucosa is less likely to tear into the ureteric orifices, which are cranial to this line. Source: Nthumba PM, Bird PA. East Centr Afr J Surg 2007;12:2 53-58

14. Place the index finger into the prostatic urethra.
15. "Finger fracture" the adenoma against the pubic bone by pushing anteriorly. This move will start to dissect the adjacent adenoma off of the capsule. With the same finger move side to side and continue blunt dissection of the transitional prostate. Be gentle but firm while doing this. Resist the urge to grab and pull the adenoma, as this has shown to increase post operative incontinence.

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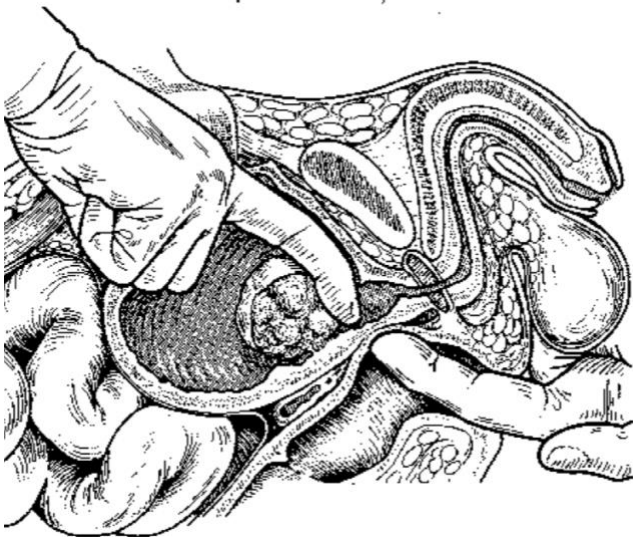
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Insert a fingertip into the urethral orifice and move it gently from side to side until a plane starts to develop. Then follow this plane on one side of the capsule until you have completed a semi-circle. Return to the anterior aspect of the capsule and dissect the other side in a similar fashion. Source: Primary Surgery Vol. 1 : Non Trauma

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16. Complete the dissection using the index finger until only the distal urethra attachment remains; this will finally be cut using curved scissors and the adenoma freed. Avoid passing your fingertip into the urethra below the prostate, this can cause stricture.



Bluntly enucleate all of the prostate until only the distal urethra remains. In this illustration, another finger is inserted in the

rectum as a “guide” but this is not necessary. Source: Primary Surgery Vol. 1 : Non Trauma

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17. Dealing with a difficult enucleation: Sometimes the adenoma will be adherent to the prostatic fossa, making it difficult for enucleation. There are various reasons for this, such as missed diagnosis of prostatic cancer or repeated prostatic infection. If one encounters difficult enucleation, use a sponge forceps to grasp the adenoma and complete the dissection using diathermy.



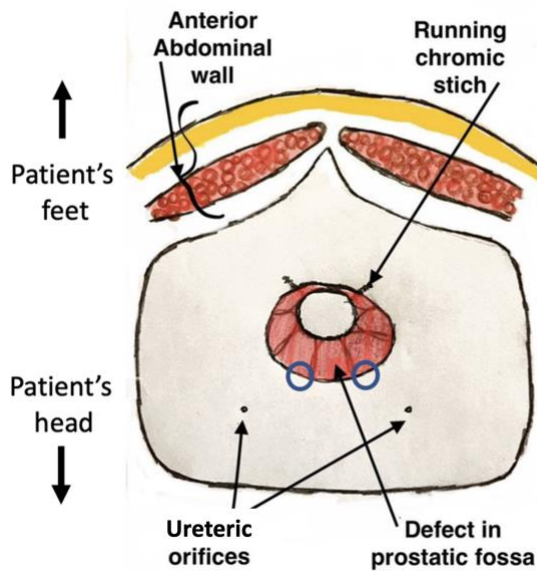
Typical appearance of a hypertrophic prostate gland after blunt enucleation. Sometimes the two lateral lobes will remain connected to each other after enucleation, other times, as here, they will be removed separately.

18. Repair the bladder neck using 2.0 chromic suture. (Note- several methods are commonly employed.)

- Running locked fashion for a half-circle along the posterior circumference of the mucosa of the capsule edge
- Two separate stitches placed at 5 and 7 o'clock, through the location of the arteries to the gland.

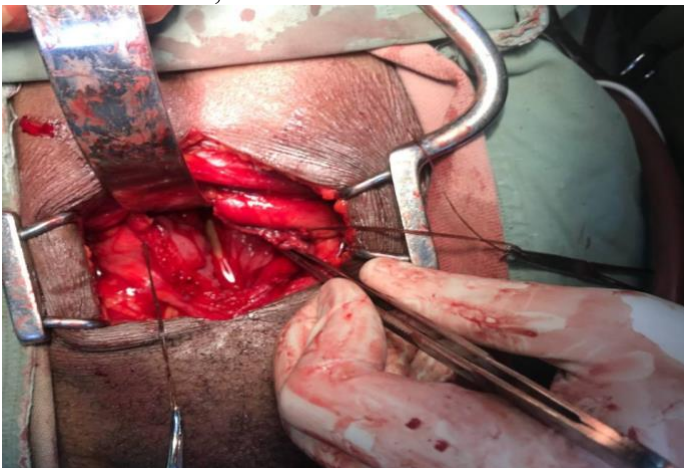
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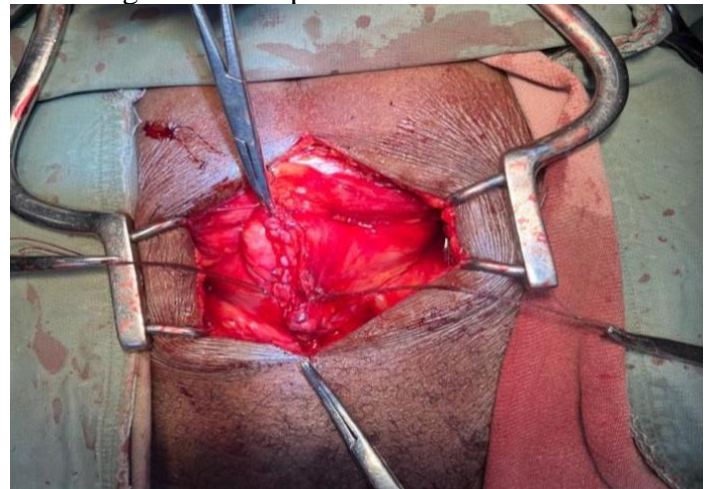
Drawing of the surgeon's view during closure of the bladder capsule. The two Blue circles represent the typical location of the blood vessels to the prostate: these are ligated either by a continuous semicircular suture through the cranial aspect of the capsule, or by individual ligation at these locations.

19. Place a three-way urethral catheter through the urethra and inflate with 10cc so that the tip of the catheter and the balloon remains in the bladder. You may need to guide the tip into the bladder with one finger in the prostatic fossa. Do not inflate the balloon within the prostatic fossa, as this is theorized to prolong the duration of hematuria post operatively. If a 3-way catheter is not available, see "Pitfalls" below.



Hemostatic suture of the capsule after prostatectomy. Note that the tip of the foley catheter is visible coming through the capsule. At times you will have to guide the catheter with your fingertip.

20. Repair your cystotomy in two layers using absorbable 2.0 sutures. The first layer is a running mass closure incorporating the mucosa, submucosa and muscularis layers. The second layer involves only the outer muscular layer, inverts the previous suture line, and is done in either an interrupted or running manner. Ensure airtight closure by inflating the bladder with 120cc saline. If any leak is identified, an additional suture is placed over the leak whilst taking care not to puncture the balloon.

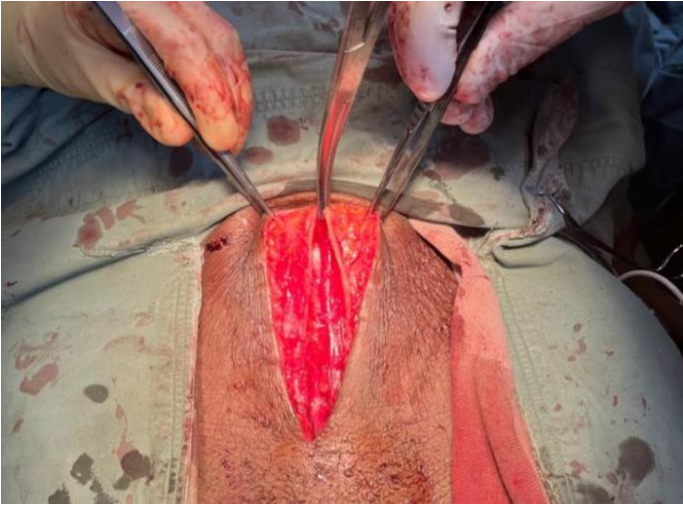


Closure of the bladder in 2 layers with absorbable sutures. We prefer to start the bladder irrigation immediately before beginning the first layer of bladder closure.

21. Inflate the foley with additional 20cc saline, and place it on traction (this is optional and the surgeon might opt to leave the Foley catheter without traction) plus continuous irrigation.
22. Approximate the rectus muscle (optional)
23. Close the fascia in a running manner with slowly absorbable (PDS 1-0) or non-absorbable sutures.

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Closure of the fascia. Below the umbilicus, there is no posterior rectus sheath, so only closure of the anterior layer is necessary.

24. Close the skin and place a sterile dressing.
25. In the recovery area, the amount of irrigation fluid required is monitored. The traction on the foley catheter can be released on the following day. The patient is encouraged to ambulate and clear their secretions with adequate pulmonary exercises. The transurethral catheter is removed on postoperative day 3-5, after the urine remains clear without irrigation. Once the patient is able to void without any difficulty, appropriate discharge instructions are reviewed with the patient at this time in preparation for discharge.

Pitfalls

- While some blood loss is expected in the postoperative period, achieving adequate hemostasis while repairing the bladder neck allows you to avoid excessive amounts of bleeding. Excess bleeding also occurs if the bladder irrigation is neglected for too long. In both cases, sometimes blood clots will fill the bladder, making the irrigation no longer effective. Gentle irrigation and forceful aspiration of the catheter usually removes the clots if this problem is caught early. Be careful not to overfill the bladder and potentially burst the closure. Sometimes a return to the operating room for clot removal and better hemostasis is necessary.

- If no 3-way catheter is available, a suprapubic foley or Malecot catheter can be incorporated into the bladder and abdominal wall closure: irrigation then occurs through one of the catheters and drainage through the other. On discharge, the suprapubic catheter can be clamped but must not be removed until the tract between the bladder and skin is mature, usually after 3-4 weeks.
- Post op incontinence risk can be reduced by resisting the urge to yank on the adenoma during the enucleation step. Divide the urethra below the prostate sharply. Postoperative incontinence is usually temporary after this operation. Treatment is with condom catheterization and instructions on pelvic squeeze (“Kegel”) exercises.
- Misdiagnosis of a urethral stricture as the main cause of obstruction can occur. Sometimes the patient will have concurrent enlargement of the prostate, causing you to think this is the problem. The presence of a stricture may not become apparent until you are attempting to catheterize the patient before surgery. Pay close attention to any history of failed catheterization. Recall that an enlarged prostate can make catheterization difficult as well, but it should always be possible to catheterize using a curved-tip catheter or a wire catheter guide (see “Urethral Catheterization.”)

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