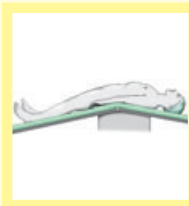


Surgery Illustrated

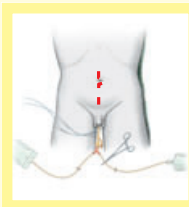


Surgical Atlas Transureteroureterostomy

JOHN M. BARRY

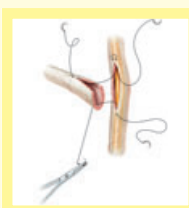
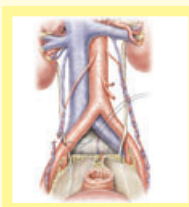
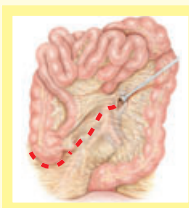
The Oregon Health & Science University, Portland, Oregon, USA

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



INDICATIONS

The indication for transureteroureterostomy is to bypass a distal ureter without compromising the recipient ureter with disease from the donor renal unit. It is useful in patients who have had previous pelvic surgery that would make a ureteroneocystostomy with a psoas hitch, with or without a bladder flap procedure, difficult or inadvisable. The procedure is not recommended under the following circumstances: chronic pyelonephritis, renal calculus disease, previous ureteric trauma with scar, idiopathic retroperitoneal fibrosis, fibrosis following previous aortoiliac vascular surgery, high-dose radiation therapy, urosepsis, uroepithelial tumours, pelvic visceral tumours with ureteric involvement, or inadequate ureteric length for a tension-free anastomosis. The procedure is useful when the better of the two ureters is reimplanted into the bladder. When a normal ureter remains after nephrectomy, a transureteroureterostomy will provide drainage for the remaining kidney when its ureter is diseased. The procedure is of value when the smaller of two ureters is anastomosed to the larger one, which is then used to bridge the abdominal wall and form a stoma.



SPECIFIC EQUIPMENT/MATERIALS

- Basic Bookwalter table-fixed retractor.
- Basic laparotomy set.
- Headlight.
- Magnification if the patient is small.
- Morse-Andrews suction tube.

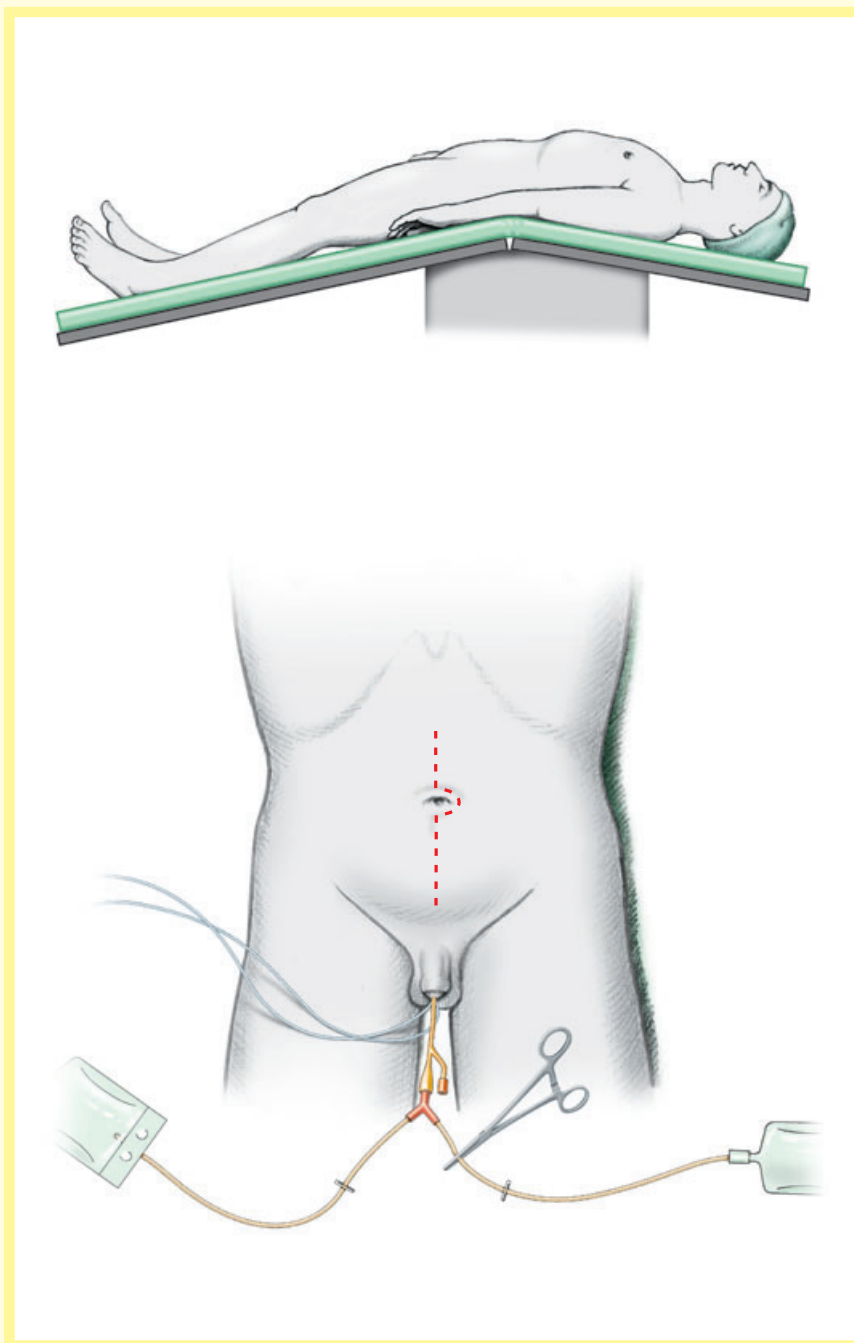
- DeBakey 'Atraugrip' vascular tissue forceps.
- Lahey/Sweet gallbladder duct forceps, 19 cm.
- Potts-style scissors with short blades and semi-sharp tips.
- Thin vascular needle holders.
- 5/0 double-armed monofilament absorbable sutures.
- Soft suction drain.
- Y-connector system for intraoperative bladder irrigation and drainage.
- Double-pigtail stent with thread left on bladder/distal end.
- Cysto-urethroscope set-up with two open-ended ureteric catheters to accept guidewires (optional).
- Foley catheter that will comfortably fit the urethra after calibration with bougie à boule.
- Sequential calf-compression devices.

SPECIFIC PATIENT PREPARATION

- Treat urinary tract infection if present.
- Bowel preparation if the patient has bowel dysfunction, infrequent bowel movements, or prior abdominal surgery.
- Antibiotic administration within 30 min of procedure.
- Calf sequential compression devices to prevent deep venous thrombosis.

SPECIFIC PATIENT POSITIONING

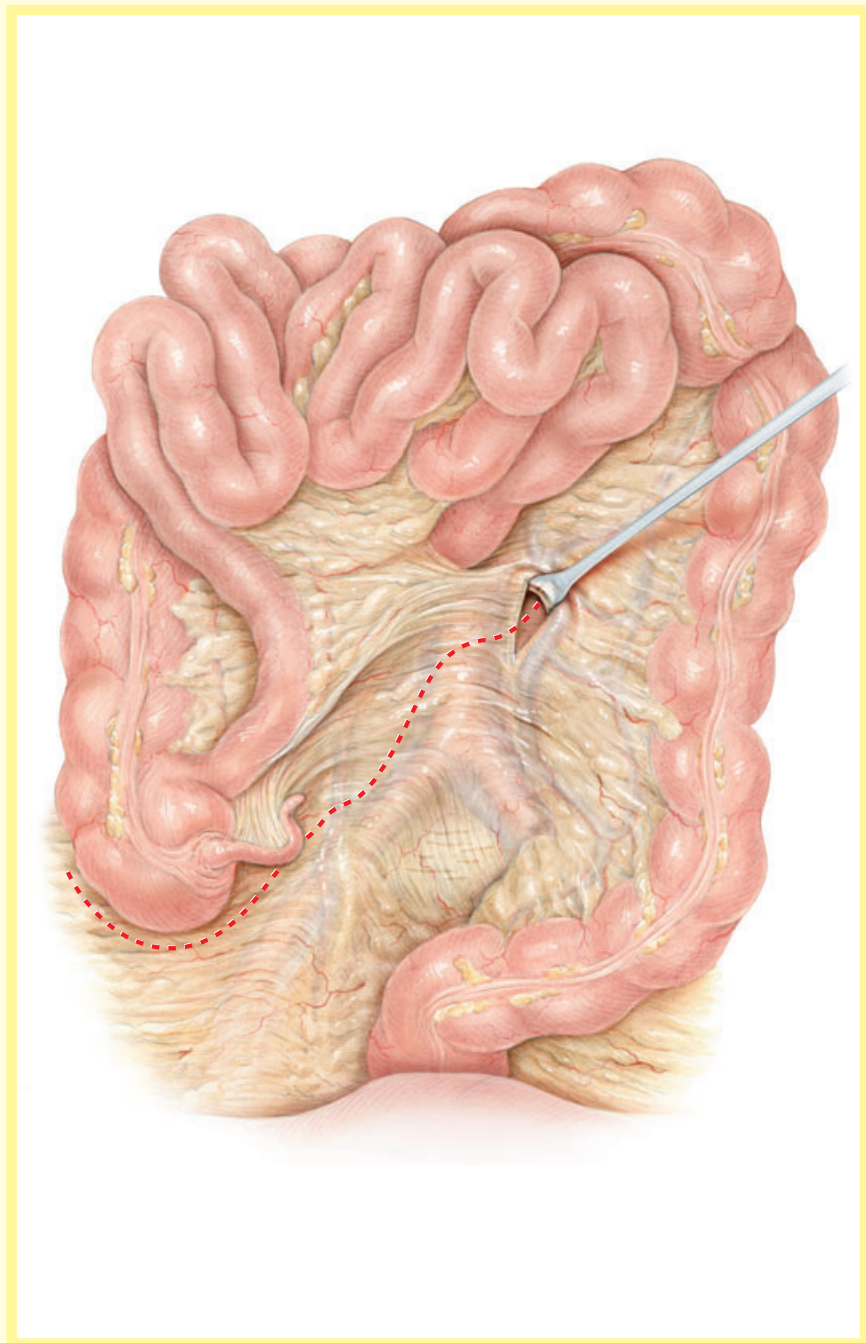
- Lithotomy position for cystoscopy and bilateral ureteric catheterizations (optional).
- After cystoscopy and bilateral ureteric catheterization, extended supine position with a break in the table just above the iliac crest.

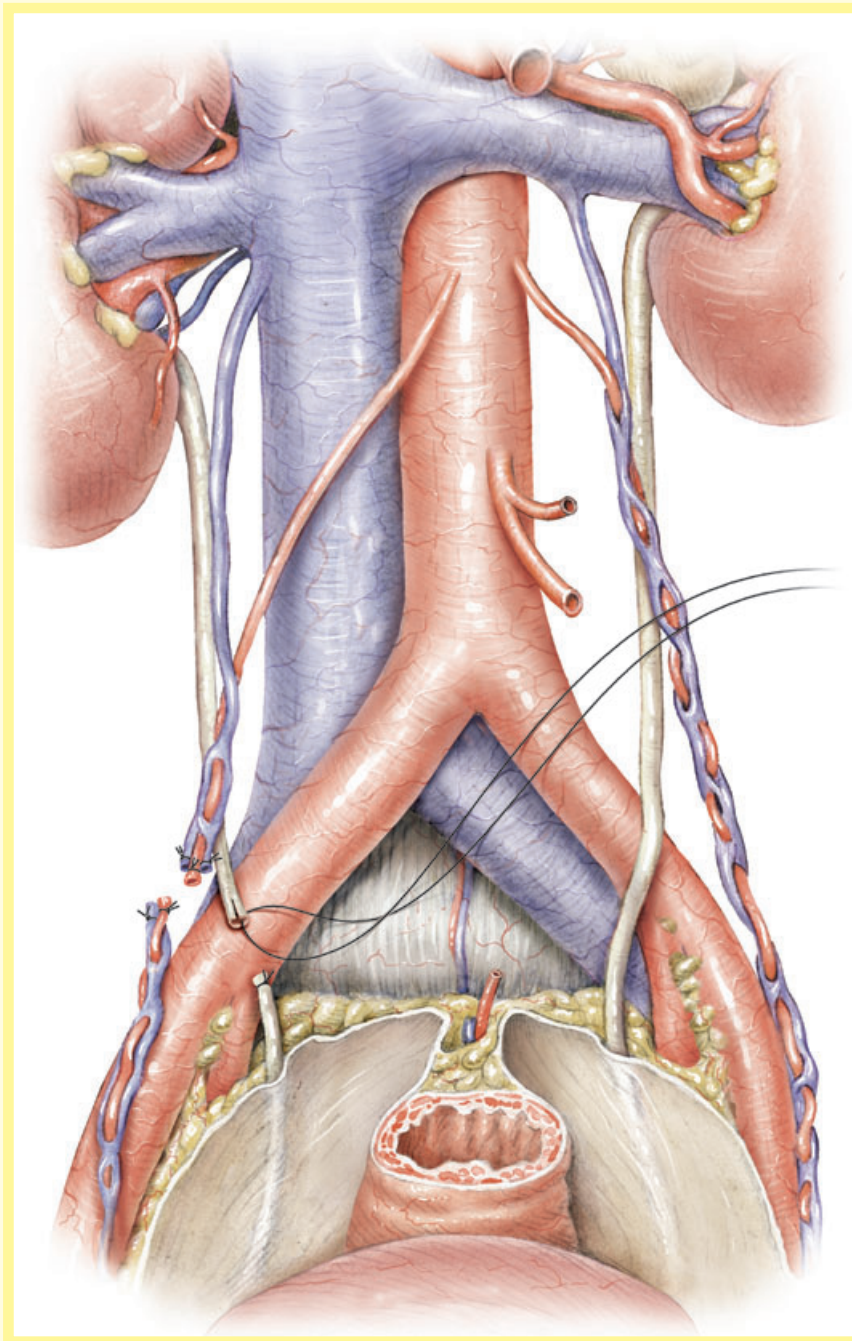
**Figure 1**

Cystoscopy is performed and open-ended ureteric catheters placed. The ureteric catheters are brought out alongside the Foley catheter and each connected to its own drainage system; they will be removed later. The patient is placed supine, slightly hyperextended, sequential calf-compression devices applied (not shown), and the Foley catheter attached to a Y-connector, connected to an irrigation/drainage system so that the anaesthetist can drain and fill the bladder during surgery. The patient is prepared and draped for a vertical midline incision that will be extended as much as necessary to comfortably perform the procedure.

Figure 2

Enough adhesions are taken down to allow the Bookwalter retractor to be placed; the Bookwalter ring is positioned 4–5 cm above skin level. When the abdominal wall retractors are placed, this creates intra-abdominal space to pack the intestines out of the way. The posterior peritoneum is incised as would be done for a retroperitoneal lymphadenectomy. This will expose both ureters. If they are not easily seen, suspicious structures can be plucked and observed for peristalsis, or the previously placed ureteric stents palpated.



**Figure 3**

The donor ureter is traced into the pelvis, and as much peri-ureteric tissue as possible is left with the ureter to provide blood supply. The catheter in the donor ureter is withdrawn from below. The donor ureter is ligated distally and divided proximal to the ligature. The ureter is spatulated on its medial surface to create a 2-cm opening and tagged with a stay suture that will be used for gentle traction. The donor ureter is dissected proximally. The gonadal vessels are divided between ligatures so they will swing medially with the donor ureter. (If the patient has had previous vasectomies, he will probably develop testicular atrophy on the side of the donor ureter.)

The donor ureter is swung over the great vessels towards the recipient ureter. The donor ureter is passed cephalad or caudad to the inferior mesenteric artery depending on which will bring the donor ureter closer to the recipient ureter with no tension. If necessary, a plane lateral to the recipient ureter is opened, and the ureter is teased medially towards the donor ureter until they meet with no tension.

Figure 4

A, 5/0 monofilament stay sutures are placed side-by-side in the recipient ureter at the proposed longitudinal ureterotomy.

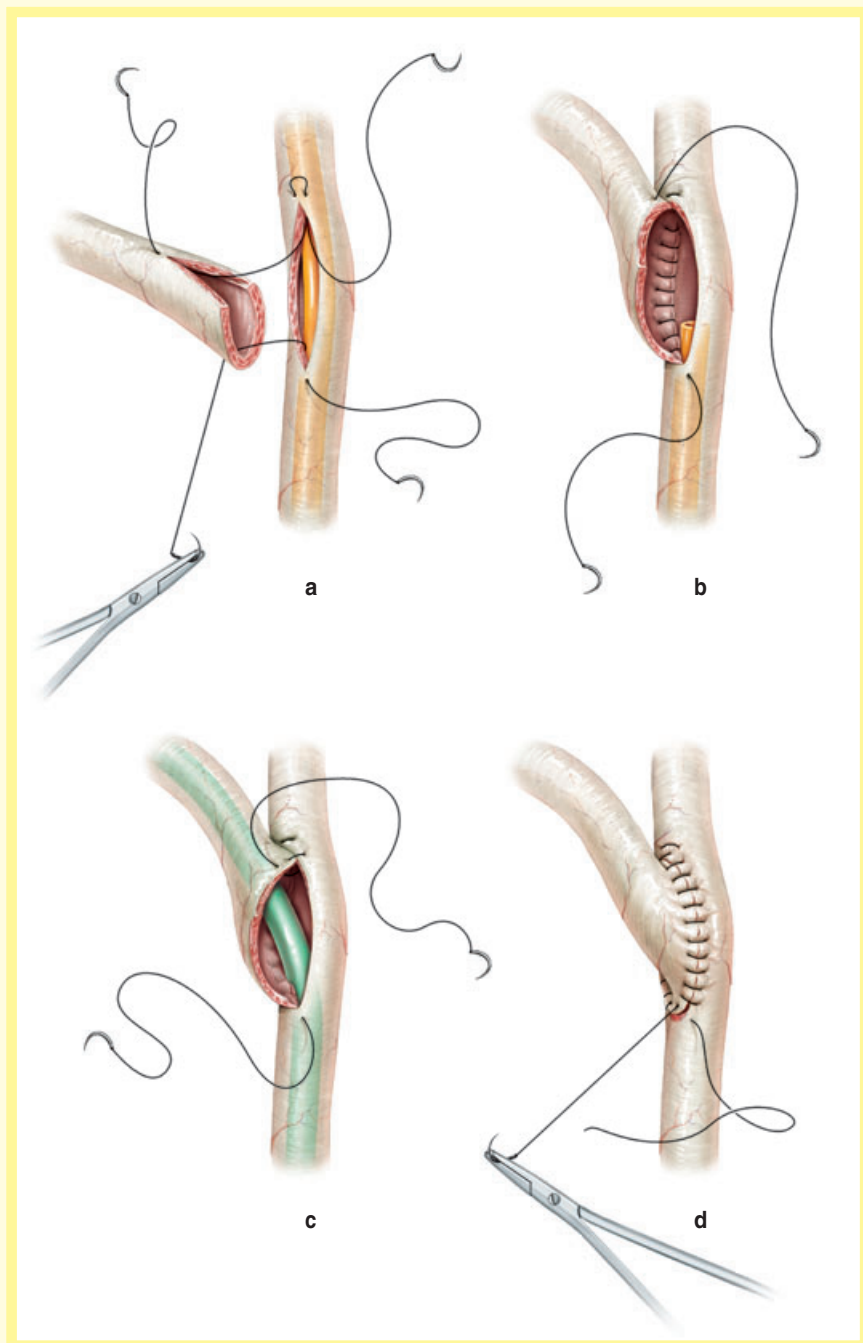
The recipient ureter is incised with a #15 blade and the incision is extended with Potts-style scissors to match the opening in the donor ureter; 5/0 absorbable monofilament sutures are placed at either end of the recipient ureterotomy and into the heel and toe of the donor ureter.

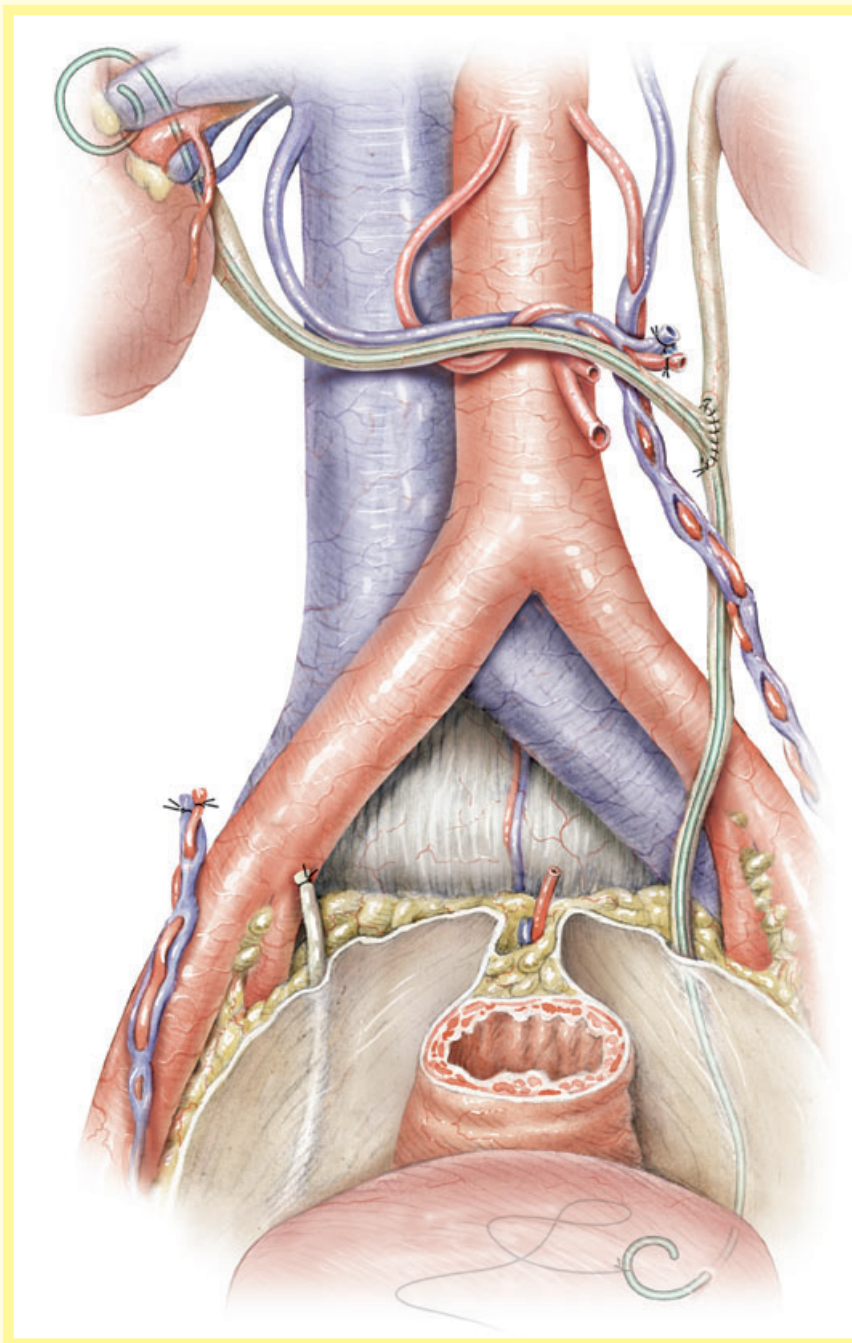
B, The posterior wall of the donor ureter is sewn to the medial wall of the recipient ureter from inside the lumen. The recipient ureteric catheter is withdrawn by an unscrubbed assistant until the open end appears in the half-completed anastomosis. A guidewire is passed into the end of the recipient ureteric catheter and withdrawal of the ureteric catheter is completed.

A double-pigtail stent is passed over the wire into the bladder. A suture is left on the distal curl in case the curl later retracts up the ureter. The wire is removed and the position of the distal curl confirmed when the anaesthetist fills the bladder through the Y-connector hook-up by clamping the outflow catheter and opening the inflow tube.

A guidewire is passed through a side hole in the double-pigtail stent to straighten the proximal curl, and the proximal stent is passed up the donor ureter into the renal pelvis. The guide wire is removed.

C, The ureteric anastomosis is completed with the running 5/0 monofilament absorbable suture.



**Figure 5**

A soft suction drain is placed in the retroperitoneum and brought out lateral to the colon through a stab wound lateral to the abdominal incision. The posterior peritoneal incision is closed with running 3/0 absorbable suture. The intestines are allowed to return to their natural positions. The midline incision is closed with interrupted far-far-near-near 0 monofilament absorbable sutures. If epidural catheter analgesia will not be used, the wound is injected with a long-acting local anaesthetic such as ropivacaine. Scarpa's fascia is closed with running 3/0 absorbable suture. The skin is closed with a running 4-0 absorbable subcuticular suture. Adhesive strips are applied across the suture line. Dry dressings are placed over the wound and the drainage tube. The Y-connector is removed and the Foley catheter is connected to a urine drainage bag.

CARE AFTER SURGERY

Patient-controlled intravenous analgesia is used. The Foley catheter is removed in a day or two when the patient can void or resume intermittent catheterization. If epidural analgesia is used, urethral catheter removal is delayed for ≥ 6 h after the epidural has been discontinued.

The wound dressing is removed 2 days after surgery. The adhesive strips will come off several days later with a bath or shower. The sequential calf compression devices are removed when the patient is ambulating. The suction drain is removed when the drainage is <50 mL/24 h. In ≈ 6 weeks, the patient has baseline renal ultrasonography and the double-pigtail ureteric stent removed via flexible cystoscopy in the clinic 10 min after instilling a urethral anaesthetic.

SURGEON TO SURGEON

The Y-connector system can be used to fill the bladder to consider the option of ureteroneocystostomy with or without a psoas hitch or bladder flap procedure, instead

of a transureteroureterostomy. Some surgeons will prefer to avoid ureteric catheterization for ureteric identification and rely on simple observation and diuresis to identify the ureters.

Dissecting clamps like the Lahey/Sweet gallbladder duct forceps have longitudinal rather than cross serrations and do not get caught on tissues during dissection.

Skin closure with an absorbable subcuticular suture is more comfortable for the patient than skin staples, clips or nonabsorbable sutures any of which must be removed later.

One of our more disappointing cases was donor ureteric obstruction that occurred as a child grew and the ureter became trapped under the inferior mesenteric artery.

CLOSING COMMENTS

Material has been used freely, and with permission, from a previous publication [1]. The procedure was described in dogs and cadavers nearly 100 years ago [2], and reported in a patient 70 years ago [3].

Although transureteroureterostomy may seldom be indicated, it is a good procedure to have available.

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Correspondence: John M. Barry, The Oregon Health & Science University, Portland, Oregon, USA.

e-mail: barryj@ohsu.edu

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- 3 **Higgins CC.** Transuretero-ureteral anastomosis: Report of a clinical case. *J Urol* 1935; **34**: 349–55