

# Surgery Illustrated

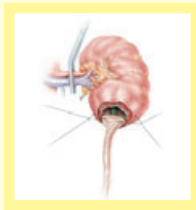
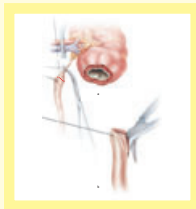
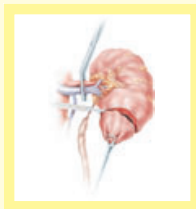
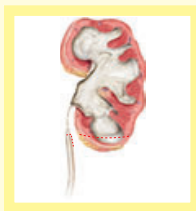
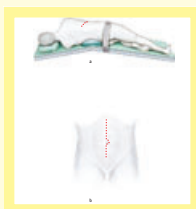
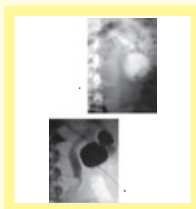
## Surgical Atlas

### Open ureterocalycostomy

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ILLUSTRATIONS by STEPHAN SPITZER, [www.spitzer-illustration.com](http://www.spitzer-illustration.com)



#### INTRODUCTION

Pyeloplasty is usually a very successful procedure, but unusual renal anatomy or complications require alternative techniques. Ureterocalycostomy is an excellent operation in properly selected patients for restoring upper urinary tract continuity [1]. It gives good results especially in reconstructive efforts for renal salvage [2–8]. Because of its particular indications this procedure is rarely used and usually surgeons have limited experience.

#### INDICATIONS

Anastomotic strictures of the PUJ and severe peripelvic fibrosis after

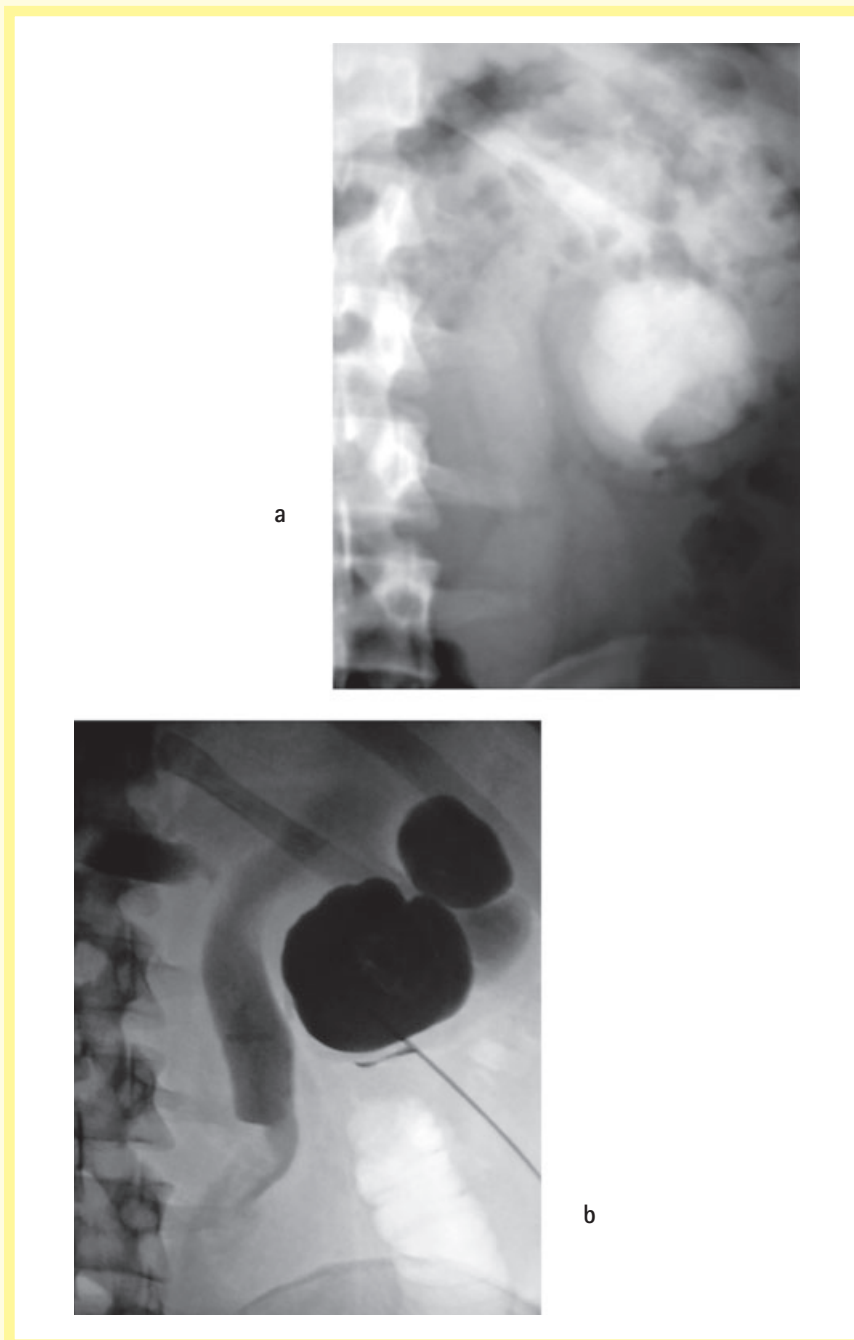
- failed pyeloplasty [2,4,7].
- repeated pyelolithotomies [2].
- failed ante- or retrograde endopyelotomy [3,6].
- traumatic rupture [8].
- former renal tuberculosis [8].

## ANATOMICAL CONSIDERATIONS [2,3,9]

A megaureter with hydronephrosis and recurrent stone formation in the lower calyx

**Figure 1**

Figure 1A. Preoperative IVU shows severe left hydronephrosis in a 27-year-old man after percutaneous nephrolithotomy in adulthood and psoas hitch-ureterocystoneostomy for obstructive megaureter in childhood. Fig. 1B is a percutaneous nephrostogram after nephrolithotomy, showing marked hydronephrosis, reduced parenchyma and angulation of the megaureter at the PUJ.



Congenital megacalycosis with recurrent stones in the lower calyx

The limitations and risks are: kidney function, with a MAG3 clearance of >20%. The proximal ureter must be intact and long enough for a tension-free anastomosis. The contraindications are

- Poor kidney function, with a MAG3 clearance of <20%.
- Infundibular stenosis.
- Long proximal ureteric stenosis with no possibility of a tension-free anastomosis.
- Denuded medial ureter.

Diagnostic procedures before surgery include:

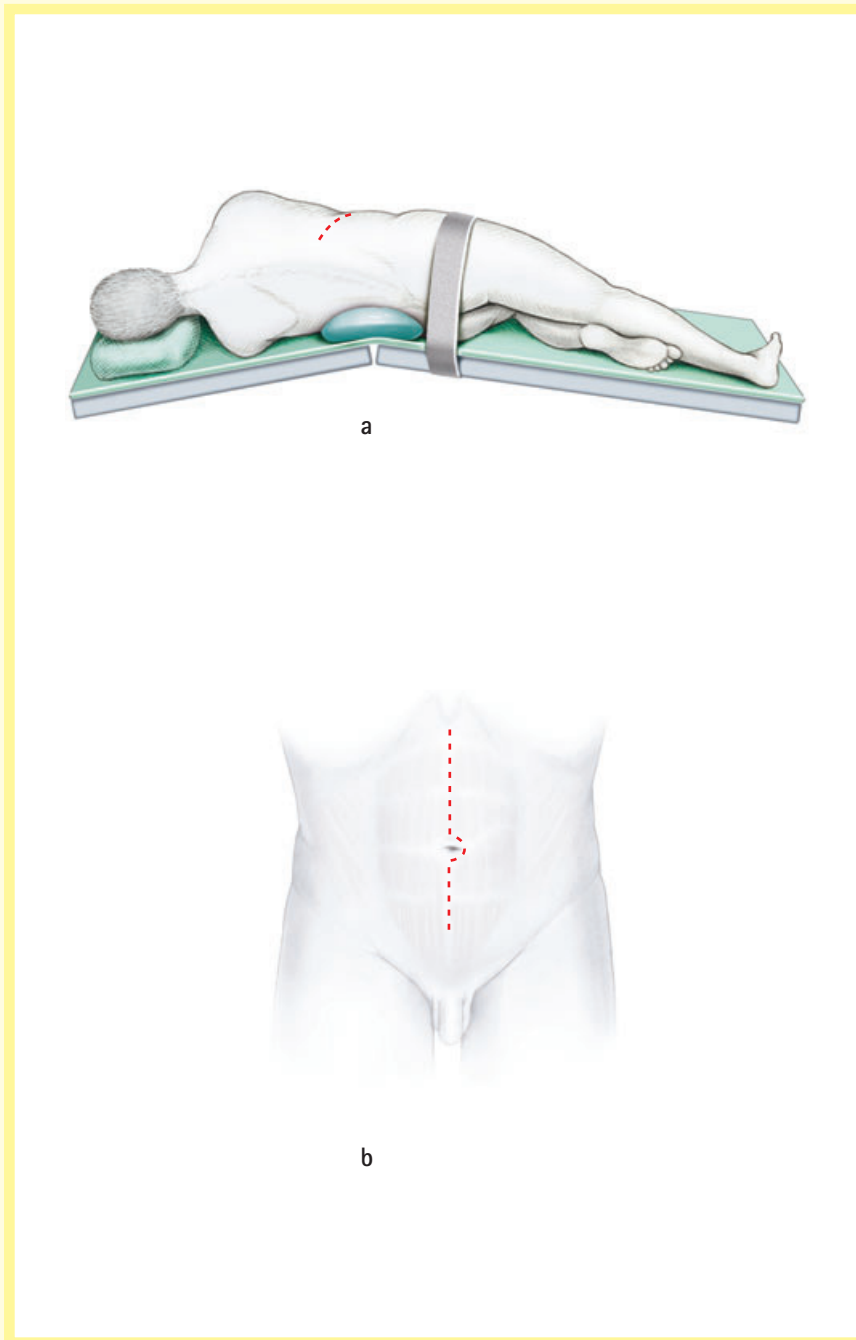
- Urine culture.
- Kidney ultrasonography.

- MAG3 clearance.
- IVU, nephrostogram or retrograde ureteropyelogram to visualize the obstructed region.

Conditioning before ischaemia is used to reduce renal vasoconstriction during and afterward, to ameliorate reperfusion and recovery after ischaemia[10]. After inducing anaesthesia, positioning the patient, and establishing stable haemodynamics, 1.25 mg i.v. of the angiotensin-converting enzyme inhibitor enalaprilate is given ( $\geq 30$  min before the start of ischaemia). This dose is halved in patients with previous hypotension. An additional 20% mannitol (1 mL/kg body weight) can be given. Good intraoperative hydration is ensured and heparin (2000 IU) as an i.v. bolus is given 2–5 min before starting ischaemia.

## MATERIALS

- Bladder catheter; 18 F in females, with cystostomy, and 14 F in males.
- Standard instruments for renal surgery.
- Magnification lenses.
- Vessel loops, atraumatic vascular clamp.
- 5/0 polypropylene sutures for the renal arcuate vessels.
- Proximal ureteric division suture: 2/0 polyglactin.
- Ureteric stay suture: 5/0 polyglactin.
- Ureteric JJ stent: 7 or 8.5 F.
- Anastomosis sutures: 4/0 polyglactin.
- Fat/omentum fixation: 2/0 polyglactin.
- Nephropexy sutures: 2/0 polyglactin.
- Wound drain: Penrose or silicone 27 F.

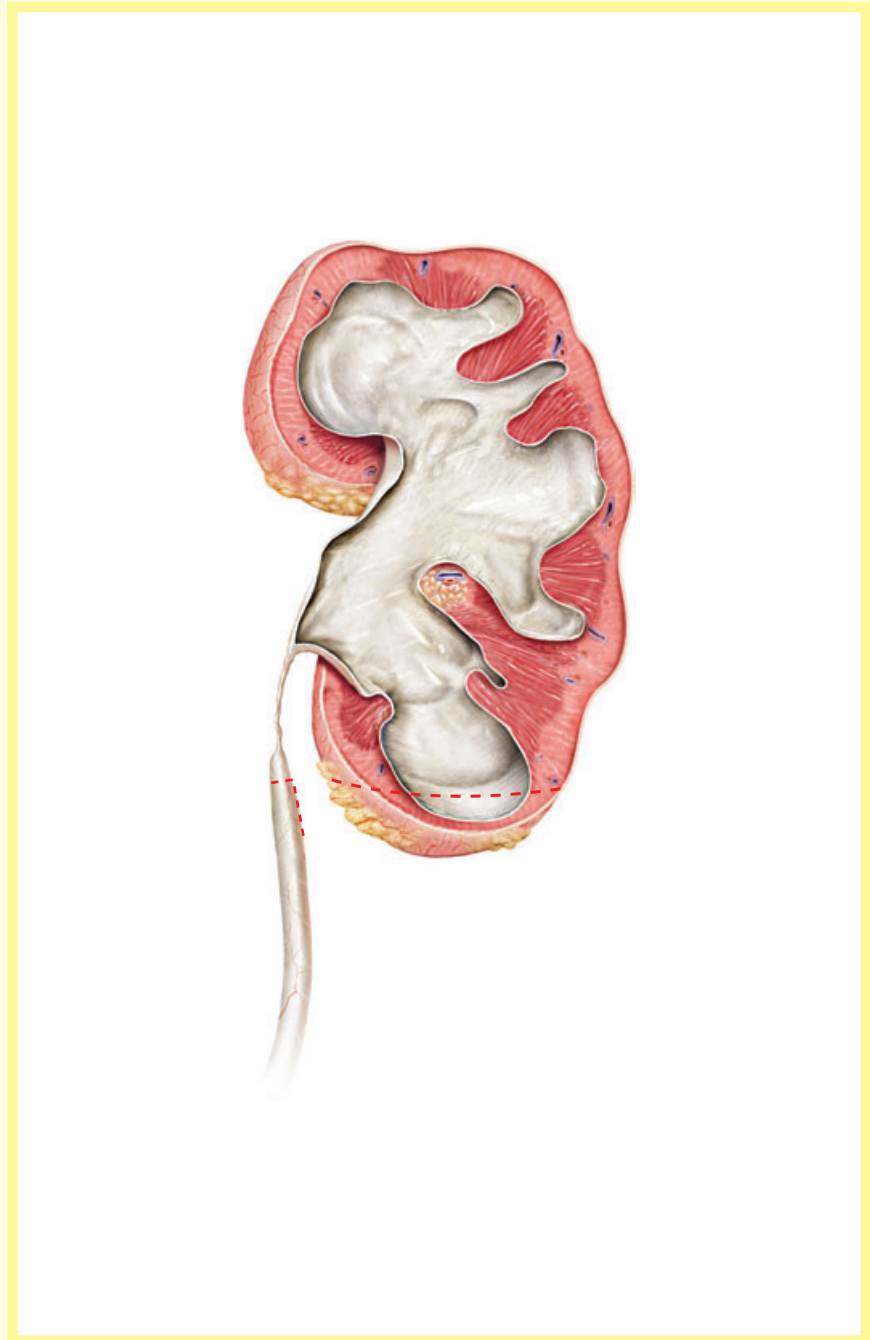


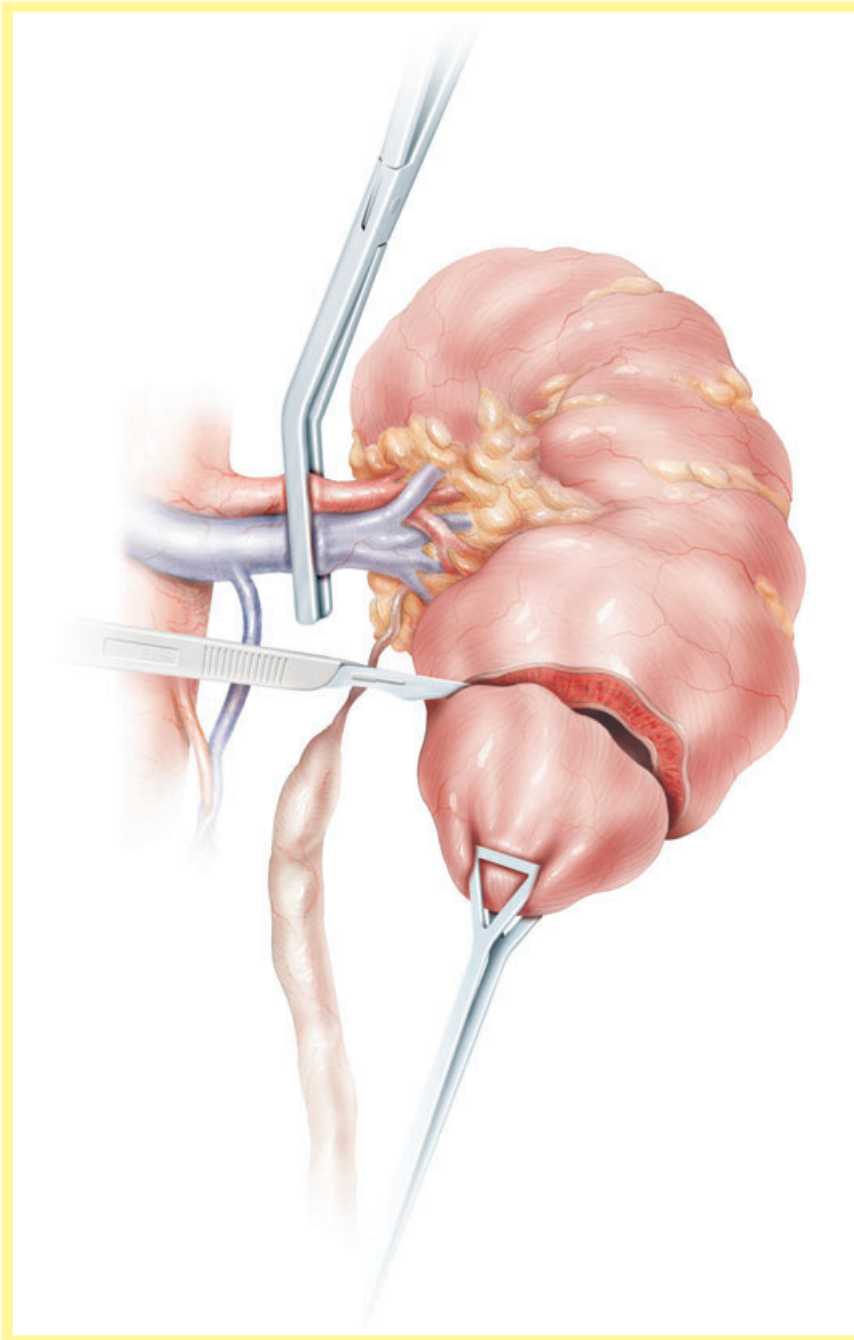
**Figure 2**

The lumbotomy or anterior transperitoneal incision to allow small bowel interposition if it is necessary.

**Figure 3**

A scarred proximal ureter and kidney with reduced parenchyma. The renal cortex over the involved calyx is thin and has a dilated collecting system.

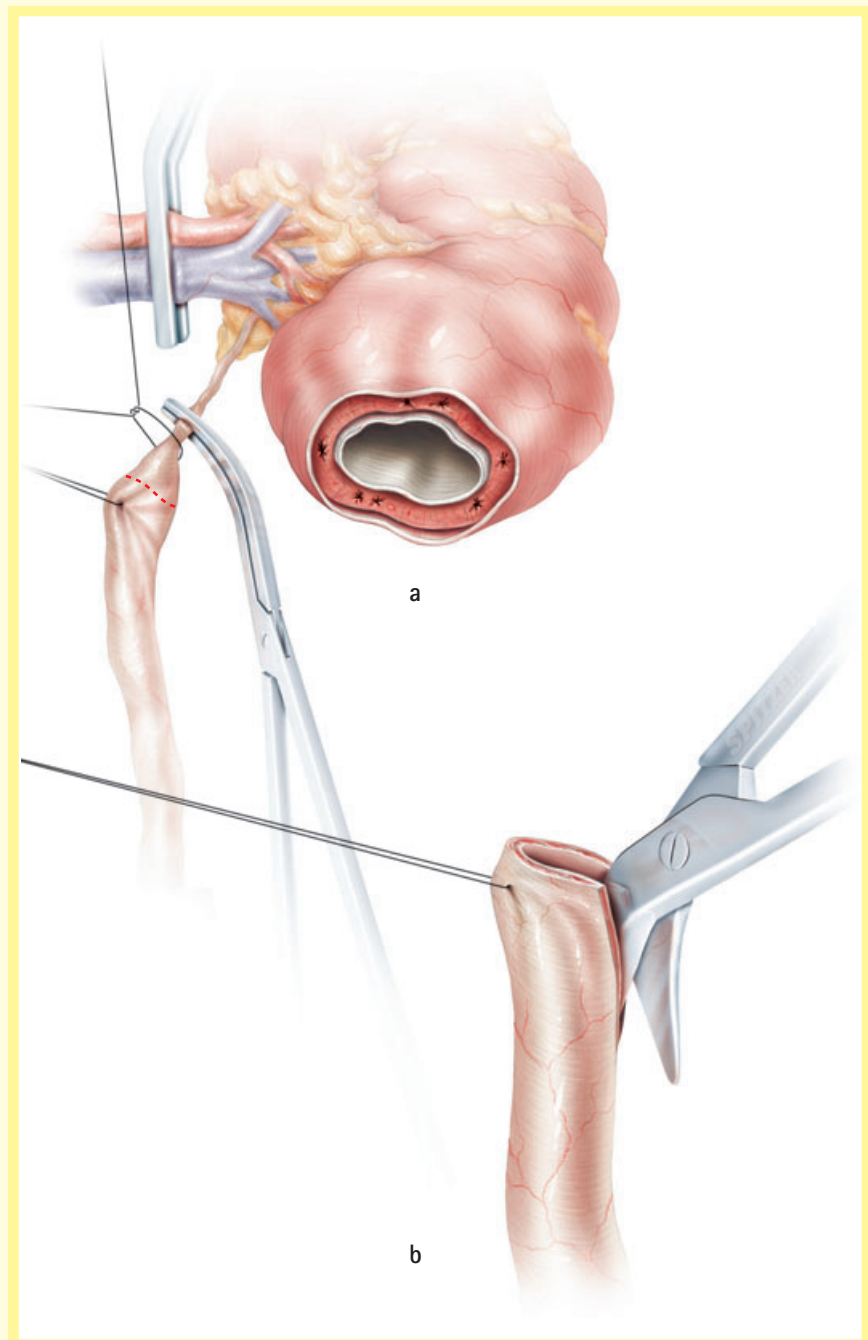


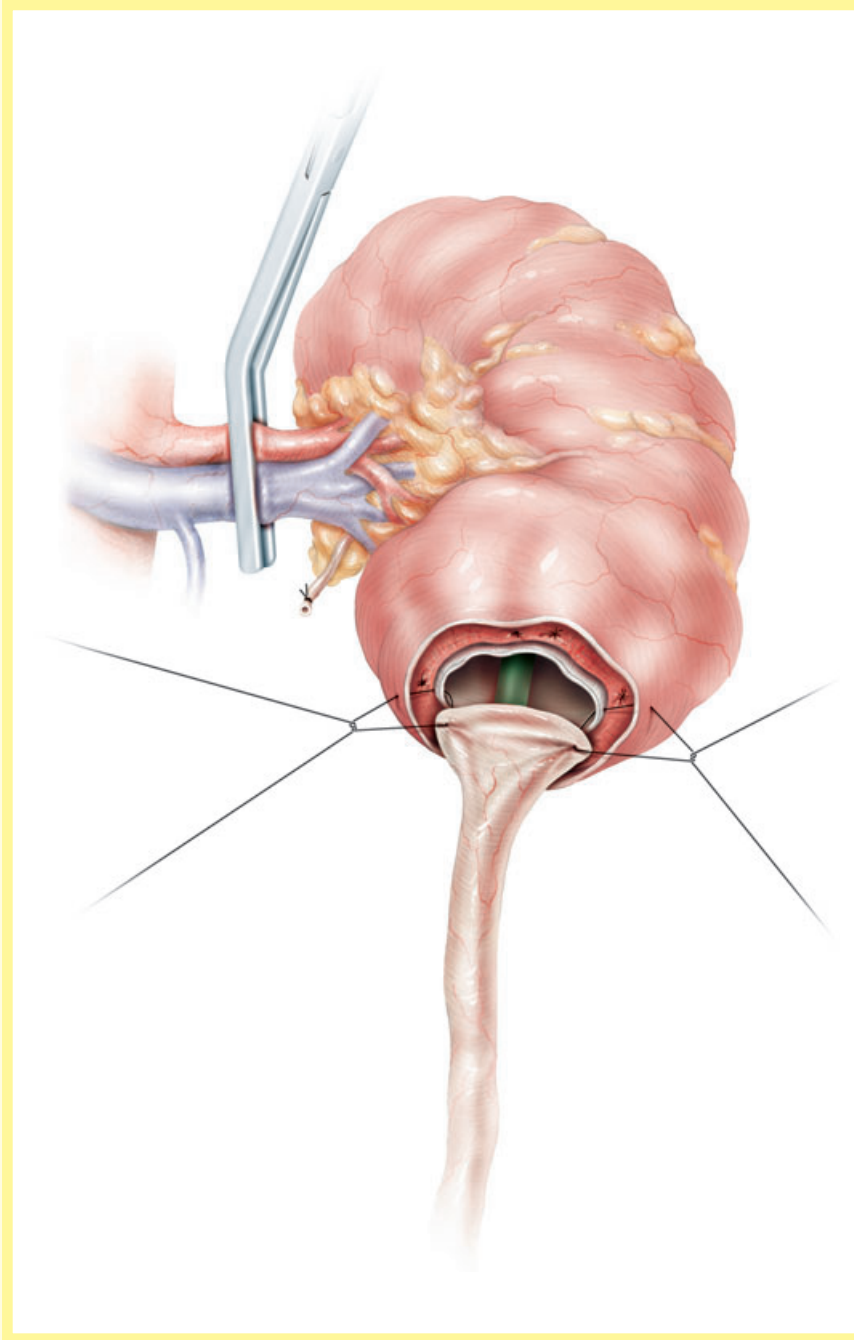
**Figure 4**

Cystoscopically place a ureteric stent before or during surgery, if it is difficult to identify the ureter. In addition to thoroughly mobilizing the kidney, it is important to be able to control the renal hilar vessels, if necessary. Identify and carefully dissect the proximal ureter. Ascertain that the ureter will be long enough after the diseased portion is resected. Incise the capsule around the lower pole of the kidney in the frontal plane and amputate the renal parenchyma.

**Figure 5A**

Remove sufficient parenchyma to expose the infundibulum of the lower calyx. Excess parenchyma will contact around the ureter and constrict it. Open the calyx tangentially at its widest point. Complete the haemostasis using 5 × 0 polypropylene sutures at the arcuate vessels. Place a fine traction suture (5/0 polyglactin) in the ureter and a clamp just above it. Divide the ureter and ligate the proximal stump (2/0 polyglactin). Fig. 5B. Spatulate the ureter on its lateral side for a distance equal to the length of the calyceal defect.



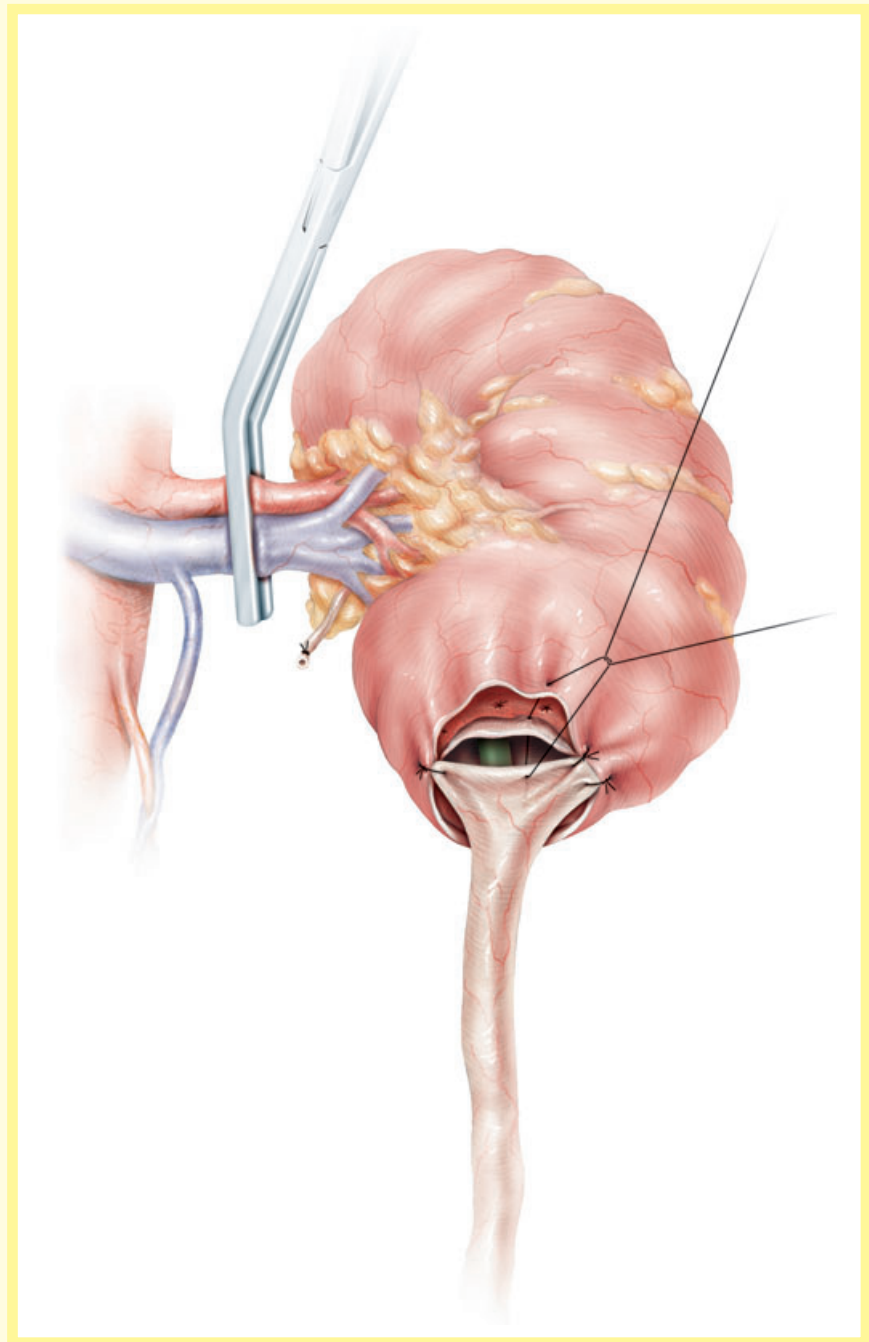
**Figure 6**

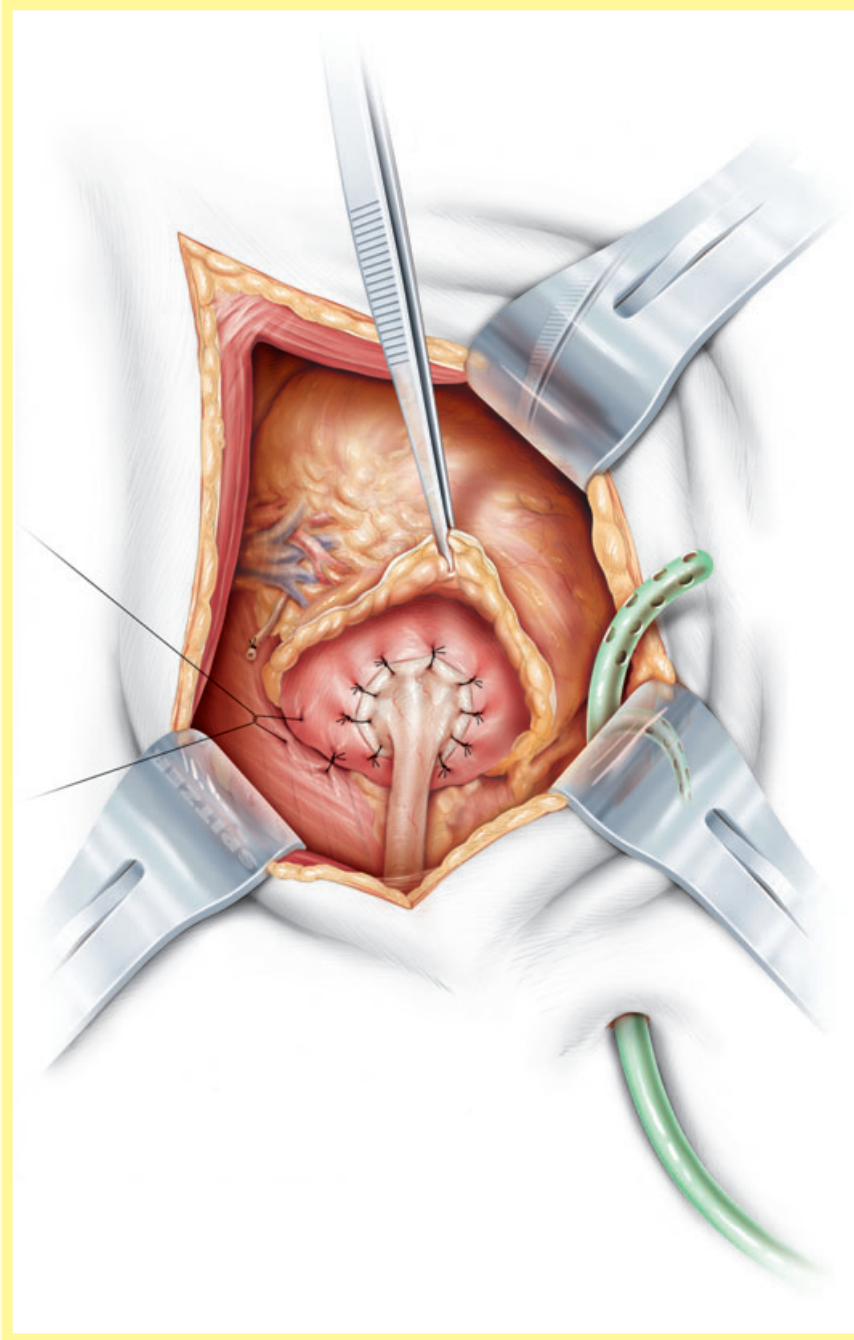
Place two 4/0 polyglactin anchor sutures through the capsule, then into the medial and lateral end of the calyx and out through the medial and lateral ureter. Insert a 7 F (in megaureters 8.5 F) down the ureter to the bladder and up into the renal pelvis. Tie both sutures.



**Figure 7**

Complete a circular anastomosis, catching the capsule, calyx and ureter. Irrigate through a potentially preoperatively placed nephrostomy tube to ensure that the closure is watertight.



**Figure 8**

Place one or two nephropexy sutures. Drain with a Penrose or silicone drain. Replace the perirenal fat and Gerota's fascia to encase the repair. In cases of inadequate coverage, mobilize the omentum and tack it about the anastomosis.

## POSTOPERATIVE CARE

- Remove the wound drain on day 3.
- Remove the bladder catheter on day 8.
- Clamp the cystostomy on day 8, if there is no residual urine remove it on day 9.
- Remove the ureteric stent after 3 weeks.
- Kidney ultrasonography after removing the drain and stent.
- Antibiotic treatment (cephalosporine) during stenting.
- Analgesic treatment.
- Assess MAG3 clearance after 3 months.

## COMMENTS/SURGEON-TO-SURGEON

Ureterocalycostomy is appropriate in patients where standard pyeloplasty cannot be used, i.e. in primary cases when unusual renal anatomy precludes success [2,3,9] or, more frequently, for salvage of the kidney after failed pyeloplasty [4,6,7]. Other alternative procedures should be considered to ascertain the need for this operation [1]. The renal cortex over the lower calyx should be thin and have a dilated collecting system [1].

Important considerations for successful ureterocalycostomy include a partial lower kidney pole resection, a wide, tension-free and stented anastomosis, and good vascularization of the medial ureter [1–3]. No renal parenchyma should be left at or below the level of anastomosis. If enough renal fibrotic capsule is available, it can be used to cover the lower pole [1,2]. After pre-ischaemic conditioning [10] temporary renal artery occlusion is often helpful but does not result in increased creatinine levels after surgery if the warm ischaemia time is <30 min, as recently described [11].

When this operation follows a failed previous procedure it bypasses extensive peri-pelvic scarring and inflammation, and provides dependent drainage while compensating for insufficient ureteric length [3].

The results of ureterocalycostomy are satisfactory; the operation allows good urinary drainage in special circumstances. Although the reported indications for this procedure are broader than when first described [12], including PUJ in association with anomalies of fusion, rotation or position [2,3], an intrarenal pelvis, a short proximal ureter [2], reconstruction associated with trauma [8], conservative renal surgery for tumour and urinary undiversion [3], it should mainly be used as a salvage procedure only when all other techniques are impossible [1]. Ureterocalycostomy remains a reliable salvage procedure after failed pyeloplasty.

Although laparoscopic approaches are currently used in specialized centres [13–16], most patients undergoing this reconstruction still require open surgery.

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