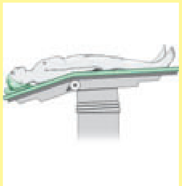
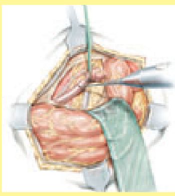
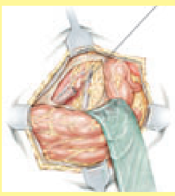
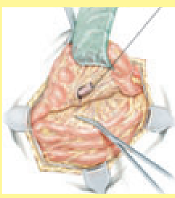
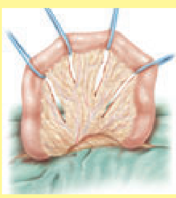
Surgery Illustrated











Surgical Atlas
Replacing the ureter by an ileal tube, using the Yang–Monti procedure

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INTRODUCTION

Long-segment defects of the ureter may result from chronic inflammatory disease (e.g. tuberculosis or bilharziasis), retroperitoneal fibrosis, iatrogenic injuries during open or endourological surgery, neoplasms and radiation damage. If the ureteric loss cannot be repaired with intrinsic urinary tract tissues, ureteric replacement is indicated. Various surgical techniques have been proposed for replacing damaged ureters, including the use of synthetic material, free autologous or pedicled grafts [1]. Except for pedicled bowel segments, most of these techniques have failed to gain wide acceptance.

The use of small bowel for ureteric replacement was described as early as 1906 [1]. In 1959, Goodwin *et al.* [2] reported the use of ileal ureter not only for the repair of damaged ureters but also as for recurrent urinary stones. Ileal replacement of bilharzial ureters was described by Bazeed *et al.* [3]. Results were generally unsatisfactory, particularly in patients with low creatinine clearance. To circumvent some of the problems and improve the functional outcome, tailoring of the ileal ureter and reflux prevention by a nipple valve was attempted [4]; the reported results showed only a marginal improvement. Nevertheless, creating the stapled nipple valve was followed by a tendency toward stone formation in a significant proportion of cases.

The feasibility of constructing a long tube from short segments of ileum was evaluated clinically [5] and experimentally [6]. The application of this procedure for ureteric replacement was explored initially in experimental animals [7]. Because the functional outcome was excellent, the technique was applied in the clinical setting. Herein, we report the technical details.

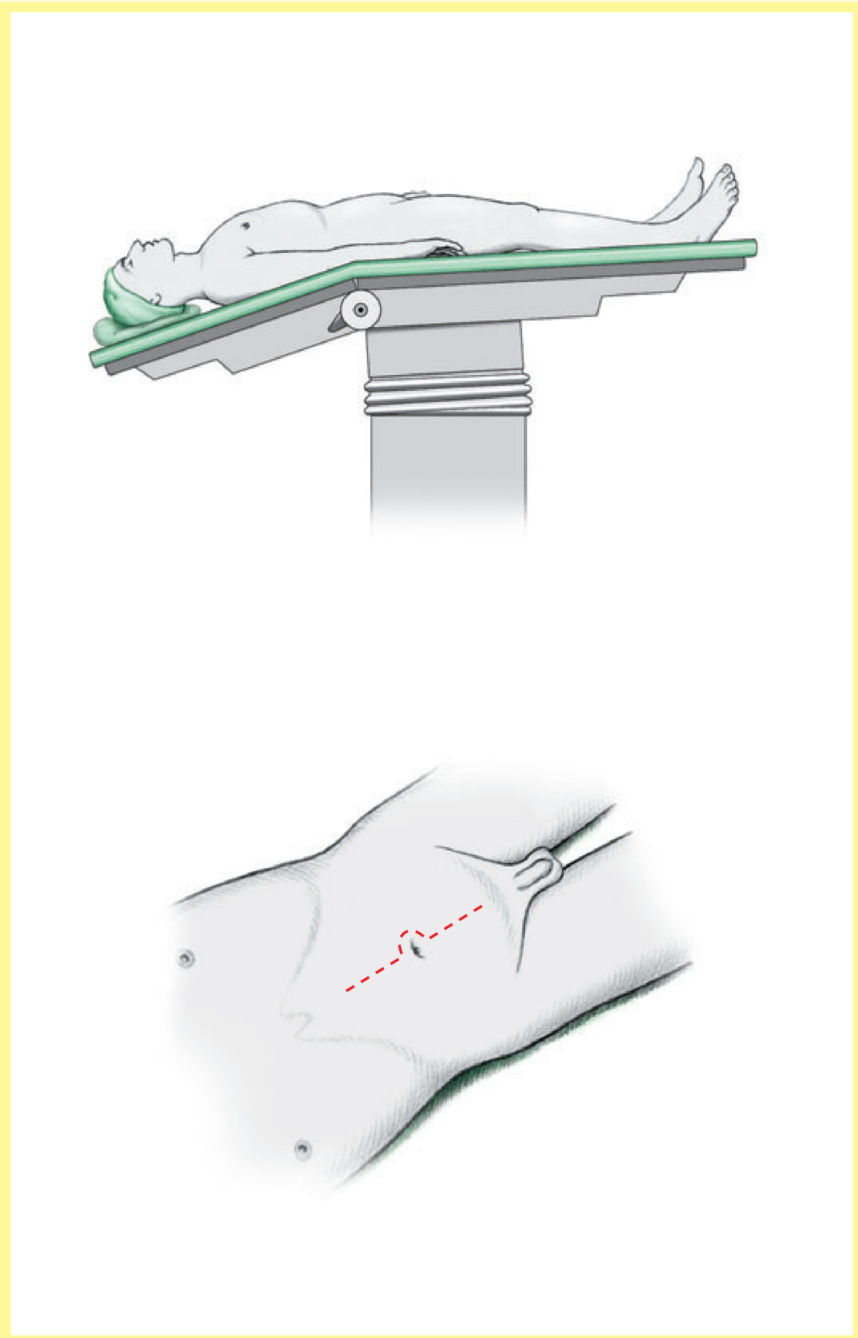
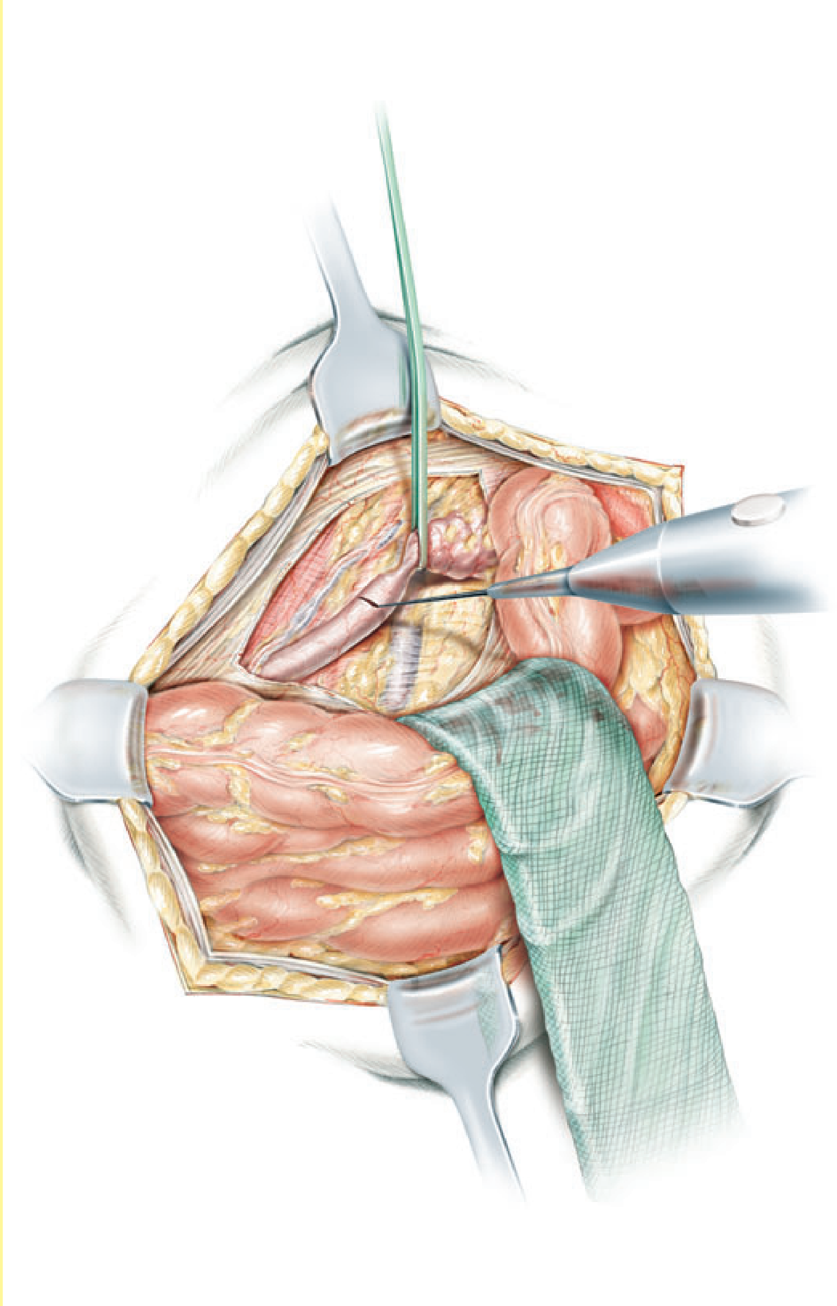


Figure 1

The left ureter became obstructed after a complicated ureteroscopy. The patient is placed supine position and a median laparotomy performed.

Figure 2

The paracolic gutter is incised and the descending colon reflected medially to expose the retroperitoneum. The left ureter is exposed proximal to and away from the strictured segment to avoid difficult dissection of the dense adhesions with the possibility of injury to adjacent structures. A loop is passed beneath the ureter and held up for traction, to facilitate its dissection.



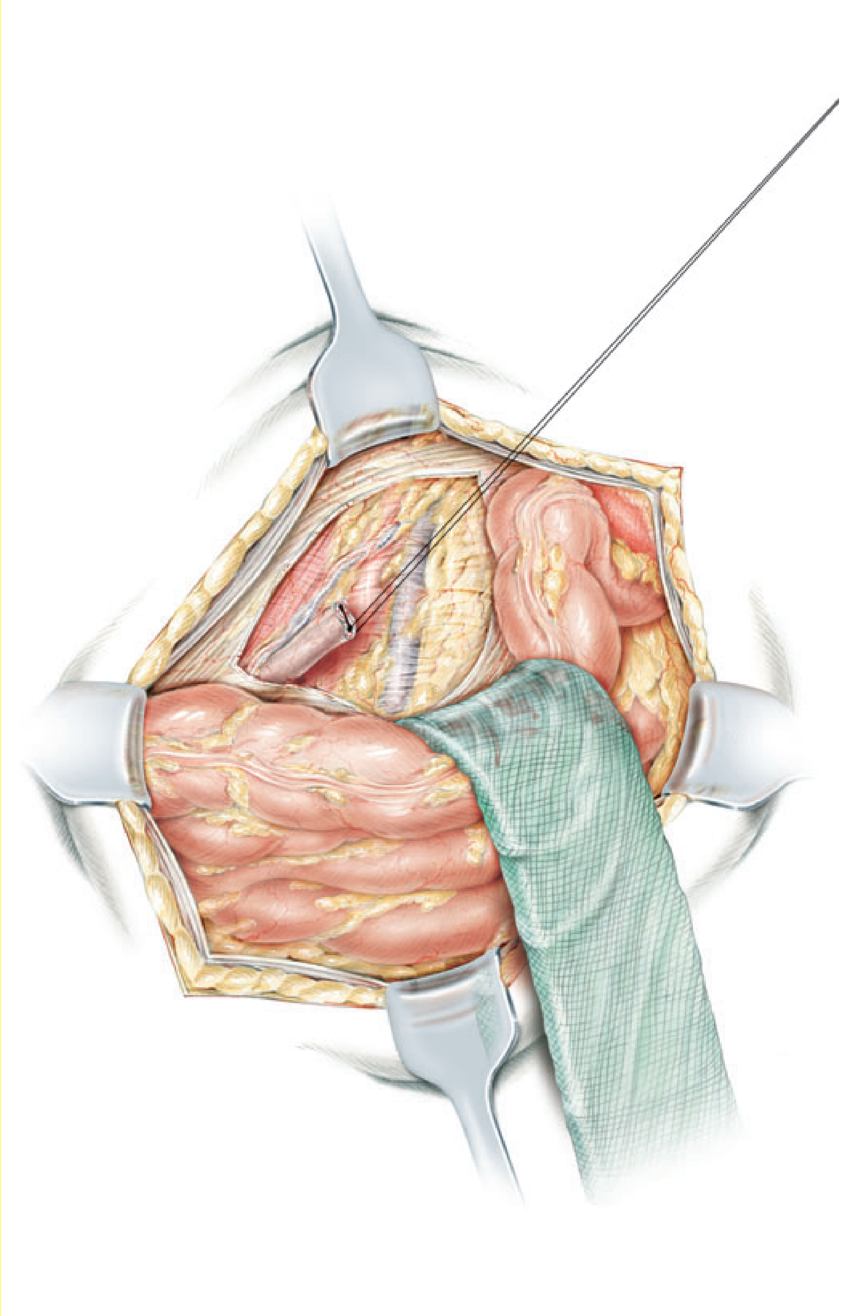
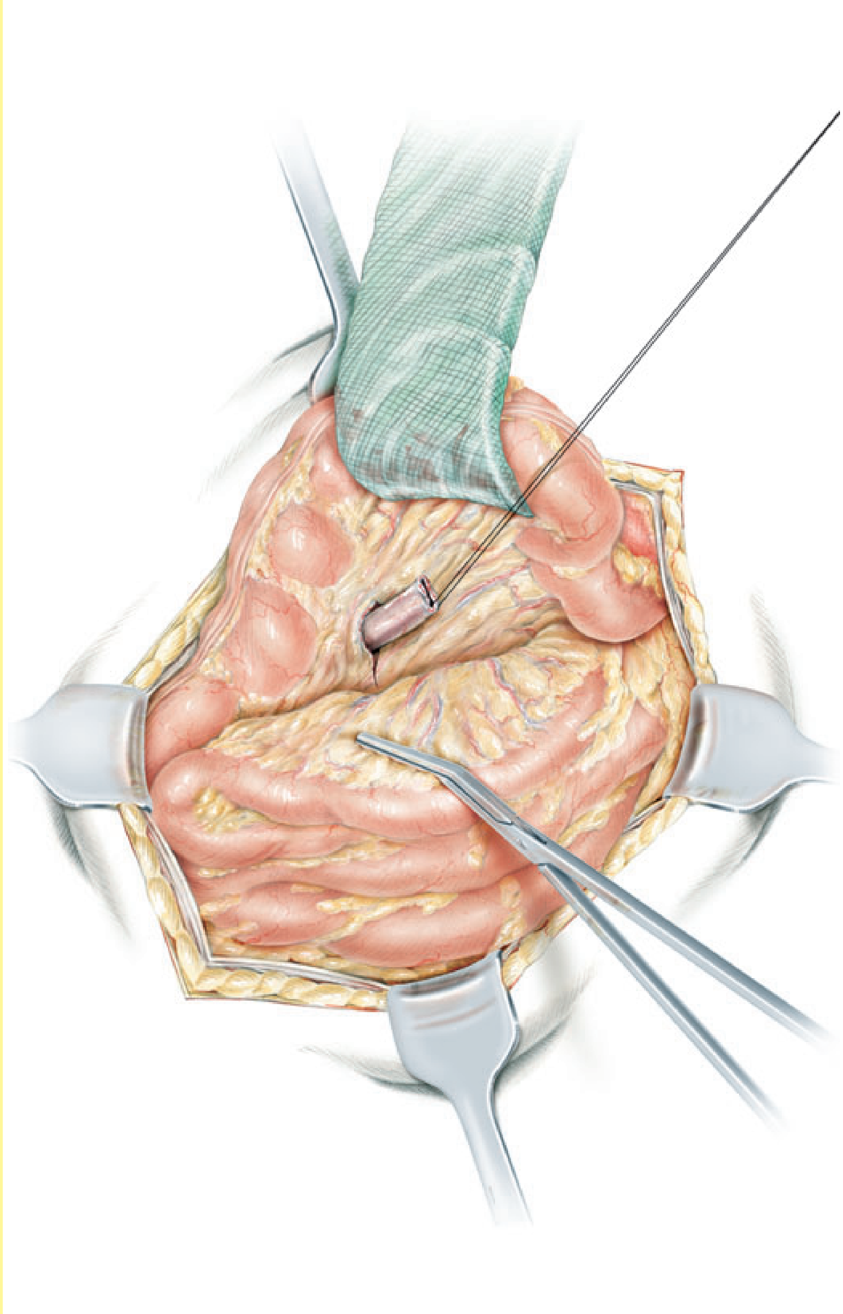


Figure 3

The ureter is transected at a healthy well vascularized segment and freed cranially, taking care to preserve its blood supply. A stay suture is applied which helps later in proper orientation to avoid the possibility of any axial rotation.

Figure 4

A sufficiently wide, properly placed buttonhole is created in the left mesocolon near its base; this site is carefully selected to avoid injury of the mesocolic vessels. With the help of the previously inserted stay suture, the ureter is pulled through this window and laid intraperitoneally.



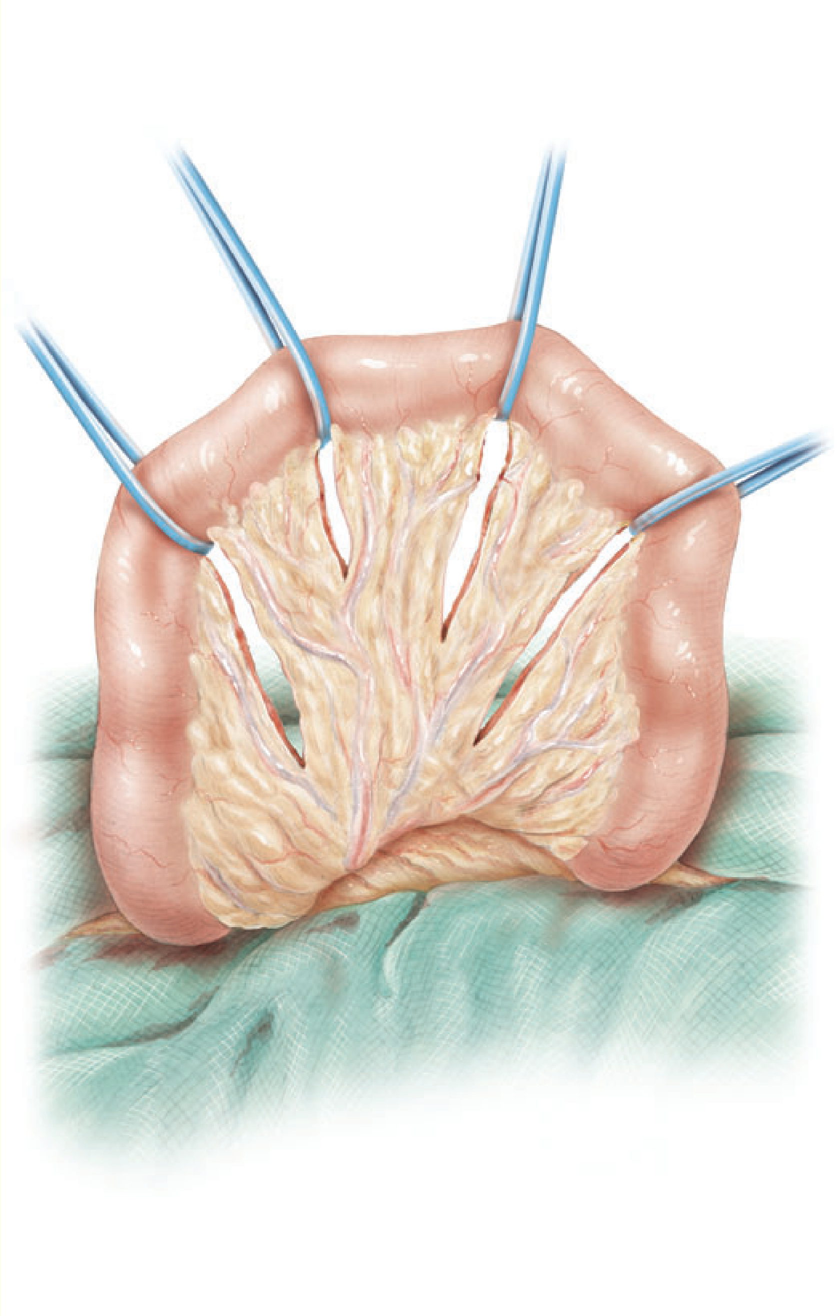
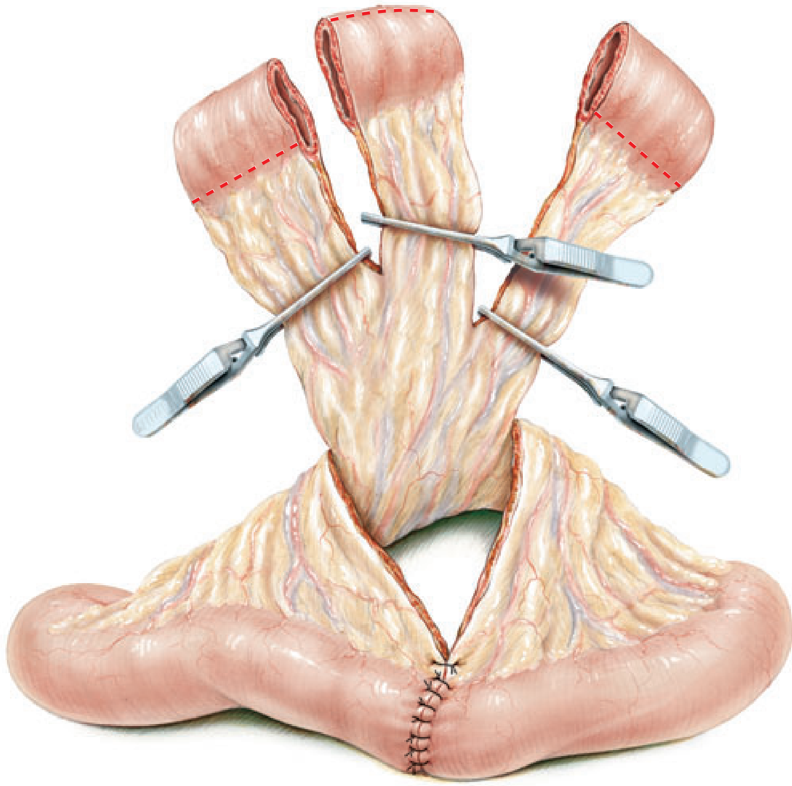


Figure 5

The intestinal substitute is derived from the terminal ileum; a segment 6–7 cm long is usually sufficient. The main operating room lights are switched off. With back transillumination, the arborization of the blood vessels within the mesentry is clearly visible. The selected segment is further subdivided into three equal parts, with preservation of the individual blood supply.

Figure 6

The isolated segments are then separated and the continuity of bowel re-established. The pedicles of the isolated ileal rings are temporarily controlled by a soft bulldog clamp.



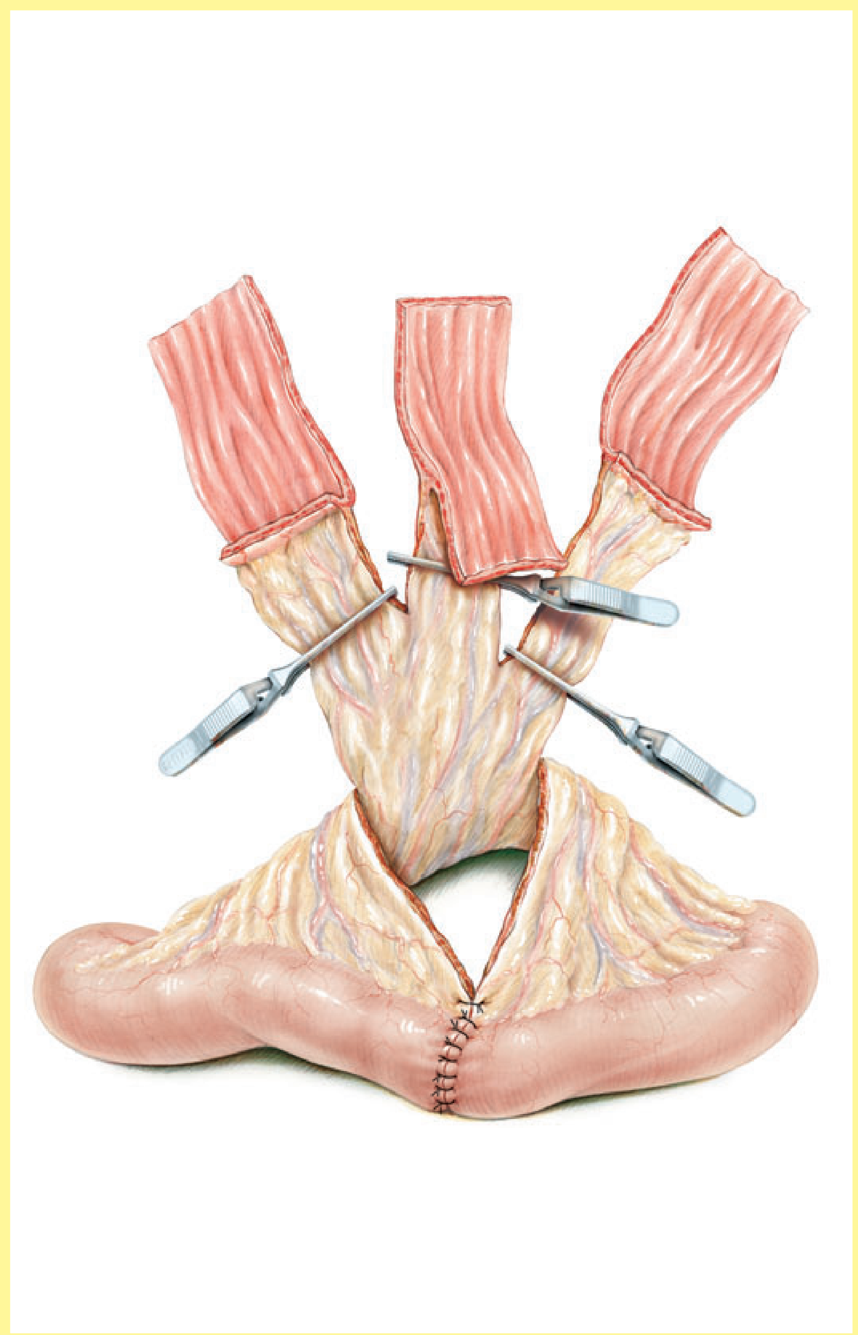


Figure 7

Each ring is then incised along its longitudinal axis; the incisions of the most proximal and distal segments are not at the antimesenteric border but close to the mesenteric attachments. The incised segments are unfolded and their adjacent ends sutured together using 4/0 absorbable material.

Figure 8

The result is the creation of an intestinal plate of ≈2 cm wide and 16–18 cm long.

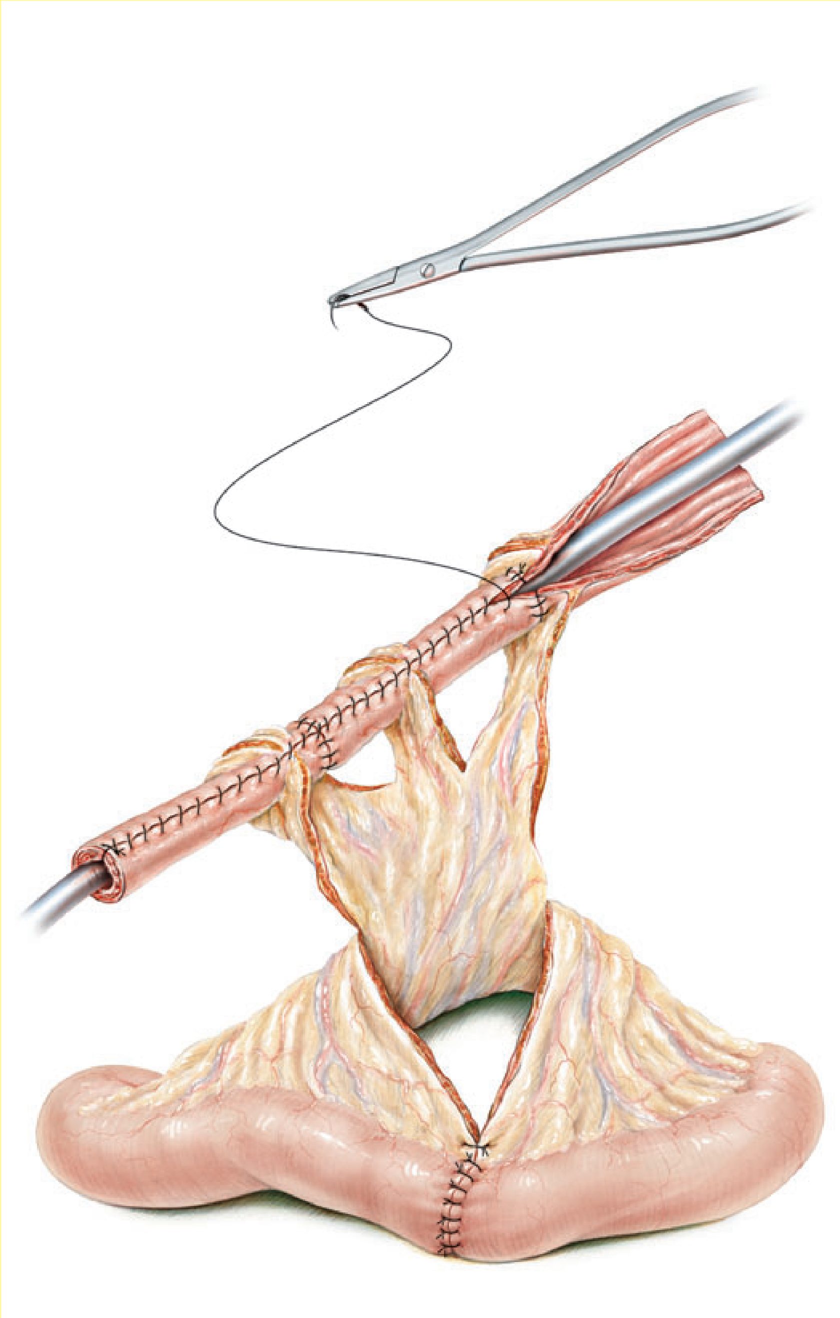
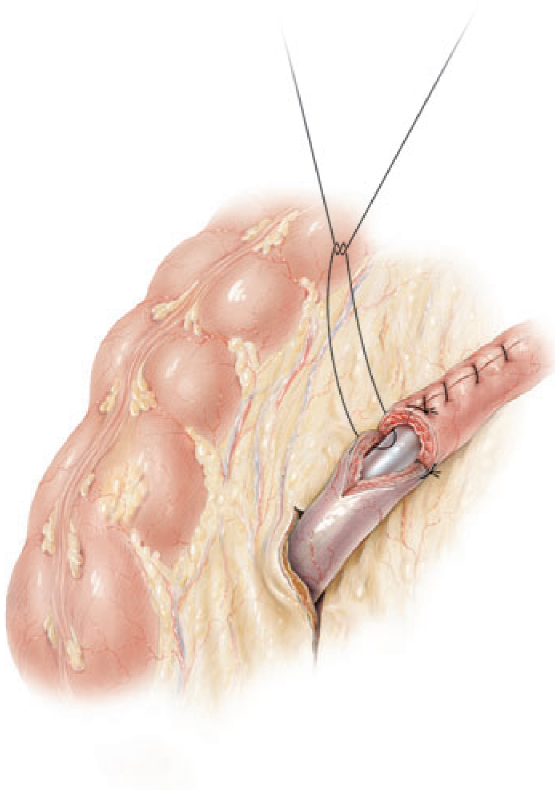


Figure 9

This plate is then tubularized around a 16 F Nelaton catheter using a continuous 4/0 absorbable material. The result is the formation of an ileal tube with a suitable cross-sectional diameter and of sufficient length. The ends of this tube are devoid of any mesenteric attachments, because of the asymmetric incisions of the proximal and distal rings. This facilitates anastomosis of the tube to the ureter proximally and its antirefluxive implantation in the bladder distally.

Figure 10

An end-to-end-anastomosis is now made between the cephalic end of the ileal tube and the spatulated proximal ureter. The previously inserted stay suture helps in orientation and prevents any tendency for axial rotation. The anastomosis is made using interrupted 4/0 absorbable sutures and stented using a silicone tube of suitable size (10–12 F).



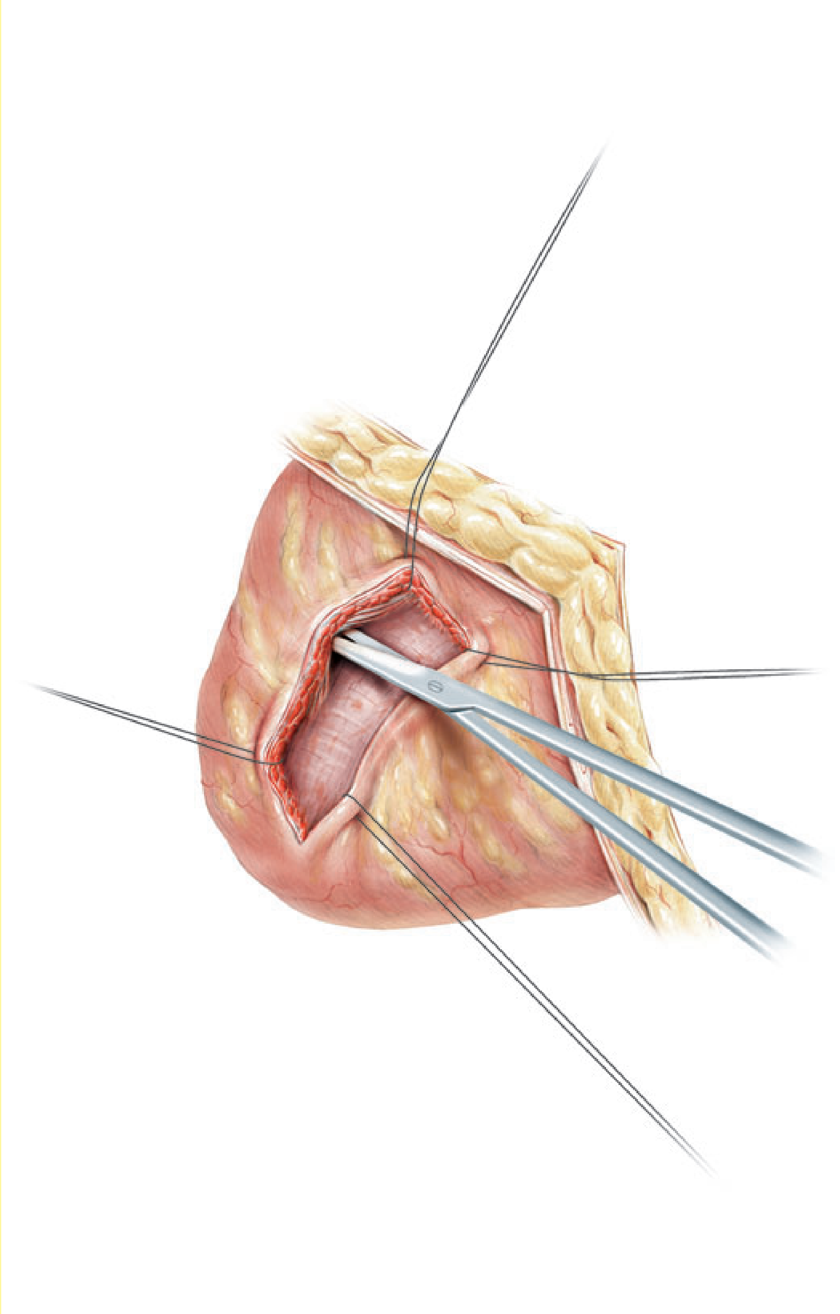
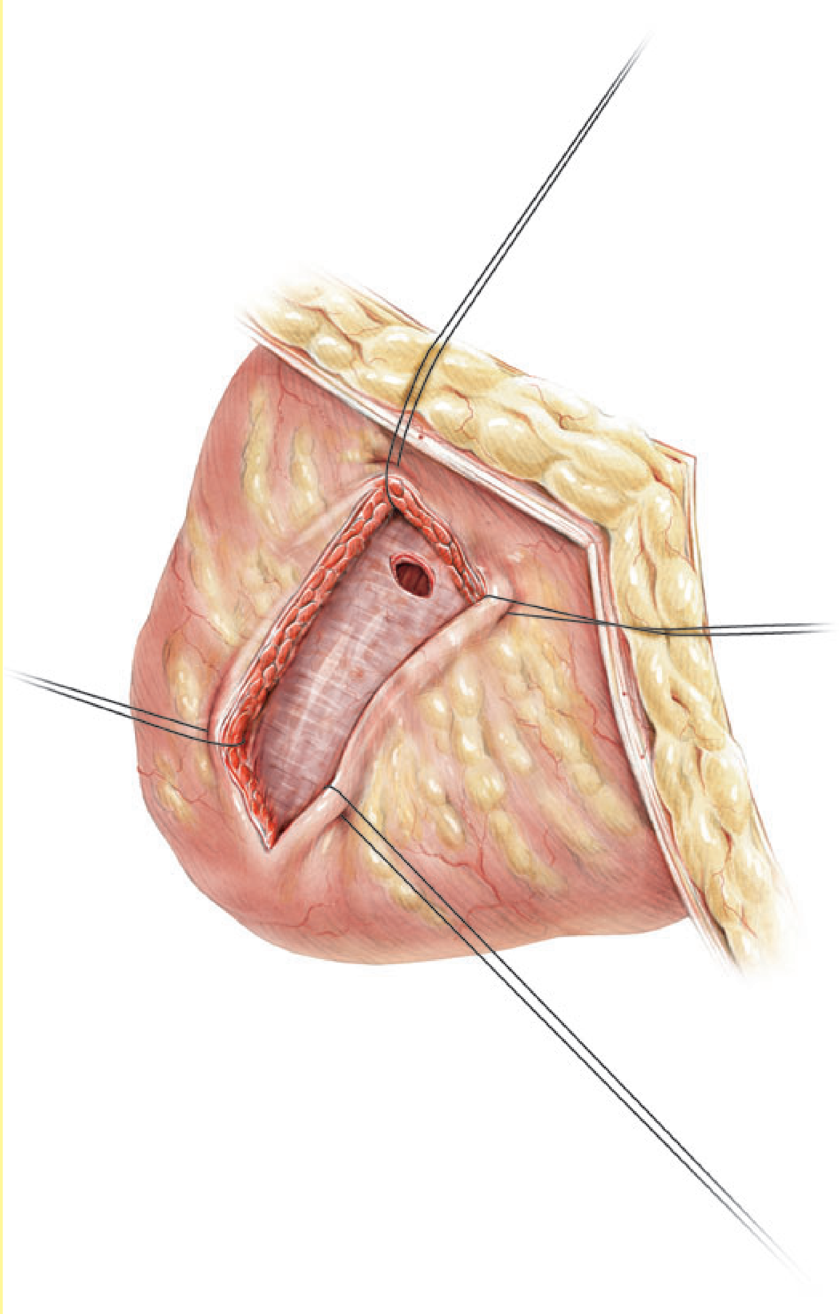


Figure 11

The distal end of the ileal tube is then implanted into the bladder by a nonrefluxing ileo-vesicostomy, using the Lich-Gregoir principle. The bladder is moderately filled with saline solution. Exposing a 4–5 cm aspect of the bladder wall, the incision is carried out through the perivesical fascia, the detrusor muscle and down to the submucosa. The fascial muscular flaps are raised on either side by further dissection using a fine pair of scissors with a blunt tip. Care is taken to avoid injury of the underlying mucous membrane.

Figure 12

The bladder is then emptied of its fluid contents. A buttonhole is excised from the mucosa at the distal end of this trough.



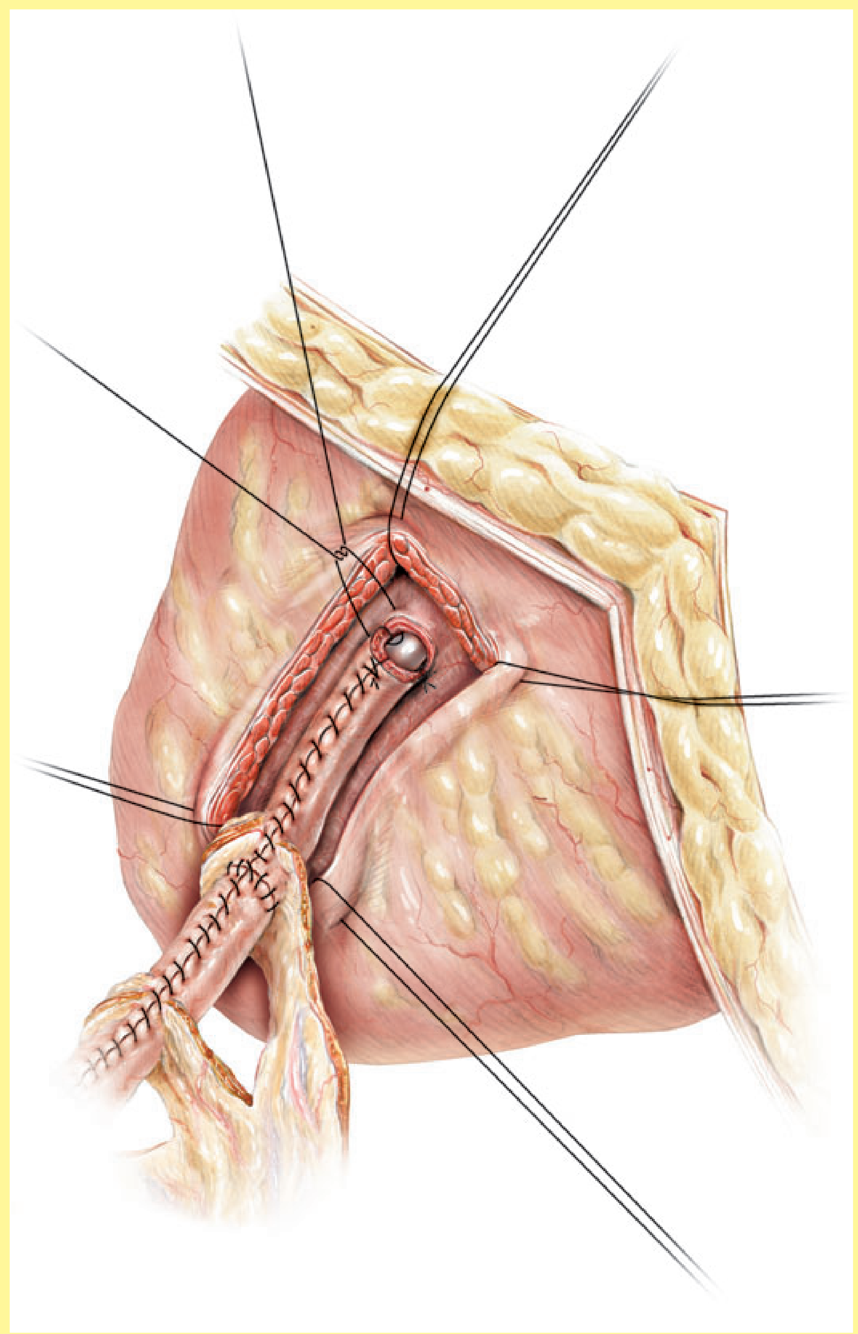
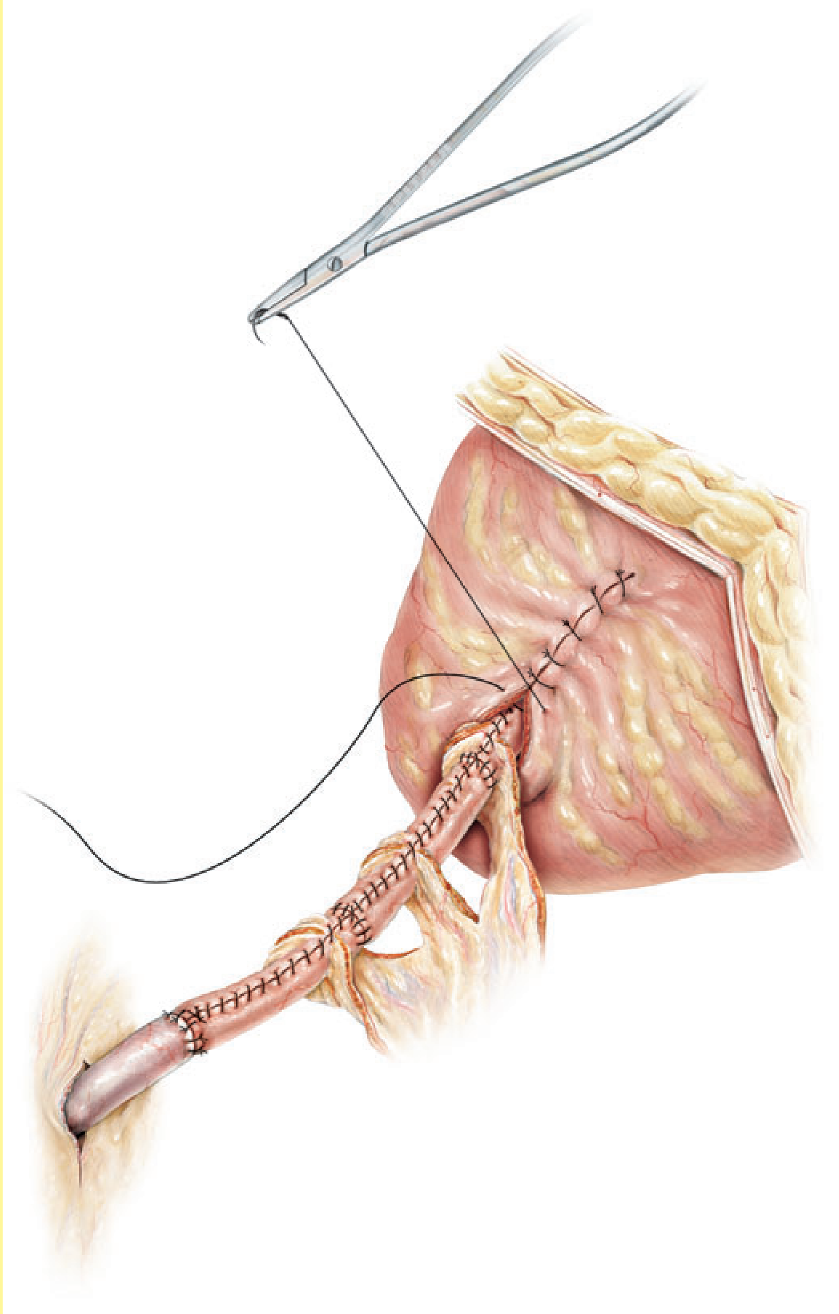


Figure 13

A stented mucosa-to-mucosa anastomosis is then made between the vesical mucosal membrane and the distal end of the ileal tube, using interrupted 5/0 absorbable material.

Figure 14

The previously dissected flaps are joined together in front of the ileal tube using interrupted 3/0 absorbable sutures.



POSTOPERATIVE CARE

The abdomen is drained by two tubes brought out through separate incisions in the abdominal wall. The abdomen is closed in layers. Intravenous alimentation is maintained until normal bowel function resumes. Prophylactic antibiotics are administered routinely. The drains are removed once fluid drainage has ceased. The ureteric stent is removed after 12–14 days, and the urethral catheter kept for 2 weeks.

FUNCTIONAL OUTCOME

Our initial clinical experience and early results were the subject of a previous publication [8]. Excretory urography and/or MR urography showed an excellent configuration of the substitute, with no dilatation or obstruction. All the treated renal units had evidence of improvement or stabilization.

CONCLUSIONS

This new technique offers some distinct advantages. A short bowel segment is included, with the consequent absence of metabolic complications. It allows construction of an ileal ureter with a suitable cross-sectional diameter with no need for tailoring, and makes possible the use of an antireflux technique.

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