

## Studer Orthotopic Neobladder: A Modified Surgical Technique



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<b>OBJECTIVE</b>	To describe a modified technique for orthotopic ileal neobladder preparation. The Studer technique is the method most frequently used worldwide and seems to be an ideal reconstructive solution after radical cystectomy.
<b>METHODS</b>	After radical cystectomy, urinary diversion is attained by means of a detubulized ileal segment. About 40 cm are used to create the reservoir and 15 cm for a tubular afferent limb. A spheroidal-shaped reservoir is then obtained with a conic distal part that will be anastomized to the urethral stump. After the reconstructive part, the neobladder and the afferent limb are attached to the levator ani and psoas muscles, respectively. Postoperative results on a series of 36 patients are reported.
<b>RESULTS</b>	The final shape of the reservoir was roughly spherical. A small amount of anastomotic strictures was registered. Renal function was not impaired after surgery, even at late follow-up.
<b>CONCLUSION</b>	Even if the Studer technique is already well described, we believe that our technical changes may improve urinary tract restoration, and potentially decrease complications typical of urinary orthotopic diversion. Further cases are required to confirm possible advantages of the modified technique. UROLOGY 88: 222–225, 2016. © 2016 Elsevier Inc.

Radical cystectomy is the gold standard of treatment of muscle invasive bladder cancer.<sup>1,2</sup> Since 1980, a number of orthotopic reservoirs have been described and gradually improved; these diversions have to meet both oncological criteria and the patient's expectations from a functional point of view.<sup>3</sup> Cystectomy, which is regarded as an ablative step, is in itself a procedure subject to high risk of intra- and postoperative complications.<sup>4,5</sup> Furthermore, potential symptoms connected to urinary storage/voiding phases and erectile failure may worsen the quality of life. Long-term renal function can also be impaired by postsurgical urinary tract obstruction due to uretero-ileal or neobladder-urethral strictures as well as ureteral reflux.<sup>6</sup>

Among different reconstructive modalities, ileal neobladder with Studer technique is a frequent orthotopic diversion.<sup>1,7</sup> Even if this is regarded as a well-defined procedure, we report our experience with a modified technique to improve the morphological features of the diversion and its location within the pelvis.

### METHODS

#### Surgical Procedure

##### Common Steps With Traditional Studer's Technique.

After radical cystectomy and pelvic lymphadenectomy, orthotopic diversion is made through the isolation of an ileal

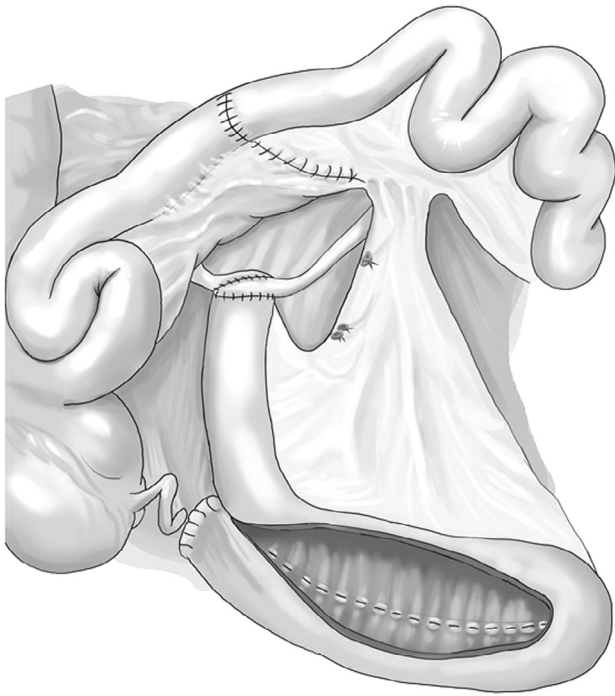
segment 50-60 cm long (25 cm proximal to the ileocaecal valve, to avoid risk of vitamin B12 malabsorption or diarrhea due to bile acid). The distal end of the ileal segment, 40-44 cm long, is opened along its antimesenteric border whereas the proximal 15 cm maintain their tubularization (so called "afferent limb"). Ureters are then separately anastomosed to that afferent tubular ileal segment in an end-to-side fashion. Up to the realization of the posterior face of the bladder substitute, which is shown in Figure 1, the procedure is identical to the traditional Studer technique. Small bowel continuity is achieved in a latero-lateral fashion with the aid of mechanical staplers and with a running 3-0 Vycril seromuscular suture. The reconstruction of the reservoir is completely manual, realized by a series of continuous 3-0 Monocryl sutures on the luminal side and 3-0 Vycril on the serosal side.

**Modified Surgical Steps.** Ureters are firstly spatulated on their distal side for about 2 cm and cannulated with 6 Ch ureteral catheters, then the left ureter is mobilized and carried retroperitoneally beside the right ureter. Next they are anastomosed together and with the most proximal side of the afferent limb in an end-to-end fashion, using the Wallace technique. The opened part of the ileal segment is then folded to configure the anterior plate of the neobladder. As clearly shown in Figure 2, the main difference in our technique from the original Studer depiction is that reconstruction of the anterior plane begins with the first stitch, which passes between the middle of the left side and that of the right side, then we proceed with a continuous suture downwards ending at the bottom, configuring a conic neobladder neck. This passage facilitates

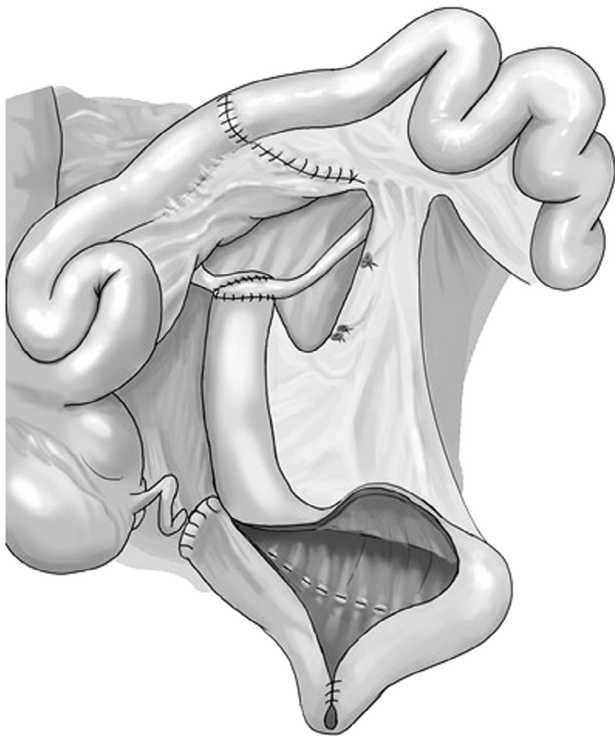
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**Figure 1.** Folding of the posterior plate.



**Figure 2.** Folding of the anterior plate: reconstruction begins with a first stitch, which passes between the middle of the left side and that of the right side, and then we proceed with a continuous suture downwards ending at the bottom, configuring a conic neobladder neck. This passage facilitates the anastomosis between urethral stump and neobladder. The superior hemi-suture is then performed transversally.



**Figure 3.** Final configuration of the neobladder, which gains a “heart-like” shape.

the anastomosis between the urethral stump and the neobladder.

The superior hemi-suture is then performed transversally to give the reservoir a “heart-like” shape (Fig. 3). Urethra-neobladder anastomosis is usually performed with 9 singular stitches and by means of magnification loops. After the reconstructive step, the neobladder and its afferent limb are fixed to the levator ani muscle and parietal peritoneum respectively, to give the reservoir a correct placement and to assure its morphological stability.

## RESULTS

We report partial outcomes on 36 patients with regard to the configuration of the diversion and its implications at early and mid-term follow up.

The postoperative course was uneventful in 86.1% (31/36) of the patients, and without leakage at the neobladder-urethral anastomosis in 77.7% (28/36). Mean follow up is  $3.21 \pm 1.4$  years. The result was overall renal function unaffected by the diversion (creatinine values before surgery:  $1.07 \pm 0.26$  mg/dL; creatinine values at follow-up:  $1.19 \pm 0.47$ ;  $P = .138$ ). Imaging was assessed with multidetector computed tomography (CT) scan or magnetic resonance imaging. As late occurrences, 2 uretero-neobladder strictures and 1 case of ureteral reflux were recorded. The stricture

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