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The Studer Neobladder: An Established and Reproducible Technique for Intracorporeal Urinary Diversion

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The aim of orthotopic neobladder reconstruction techniques is to provide satisfactory functional outcomes for patients undergoing radical cystectomy while preserving body image. Since it was first described by Beecken et al in 2003 [1], robotic surgery has been increasingly used to perform cystectomy with complete intracorporeal neobladder reconstruction, allowing these complex surgeries to be performed in a minimally invasive manner. Many different techniques have been described, although there is currently no consensus on which type of intracorporeal neobladder reconstruction is the best. Our group has been using the intracorporeal Studer approach since 2003.

Guiding surgical principles must be respected to provide the patient with a compliant low-pressure urine reservoir. Regardless of whether the reconstruction is performed intracorporeally or extracorporeally, adherence to these principles will maximize the chance of obtaining a satisfactory functional outcome while minimizing the risk of complications.

A neobladder should be constructed with a folded detubularized intestinal segment. This is an important

point, as detubularization helps to prevent the occurrence of coordinated neobladder contraction. The use of folded detubularized segments also allows maximization of the neobladder volume while maintaining a low-pressure system and minimizing the length of intestine required.

Ileum is the intestinal segment of choice for orthotopic neobladder construction as it is mobile and can usually reach the urethra without tension. Although colon has also been used in the construction of orthotopic neobladder in the past, its use has mostly been abandoned because of unfavorable results.

Importantly, an ideal orthotopic neobladder technique should also be simple, standardized, and reproducible by different surgeons in different centers. Postoperative and long-term outcomes should also be reproducible and published in the literature.

Here we address the controversy regarding whether the Studer [2] or Hautmann [3] technique should be considered the best option for intracorporeal neobladder reconstruction.

It should first be emphasized that both the intracorporeal Studer and the Hautmann W-pouch techniques involve construction from folded detubularized ileum and respect the surgical principles highlighted above. Thus, they both represent acceptable options for neobladder reconstruction.

The Studer pouch technique was first published in 1989 [4] and has since become a common approach for orthotopic neobladder construction. The intracorporeal version of the Studer pouch technique was described in 2011 [2]. An important adaptation is that the ileourethral anastomosis is performed as the first step of the reconstruction, allowing excellent visualization to create a tension-free anastomosis with good vascularization, potentially diminishing the risk of urinary leakage (Fig. 1). It has the

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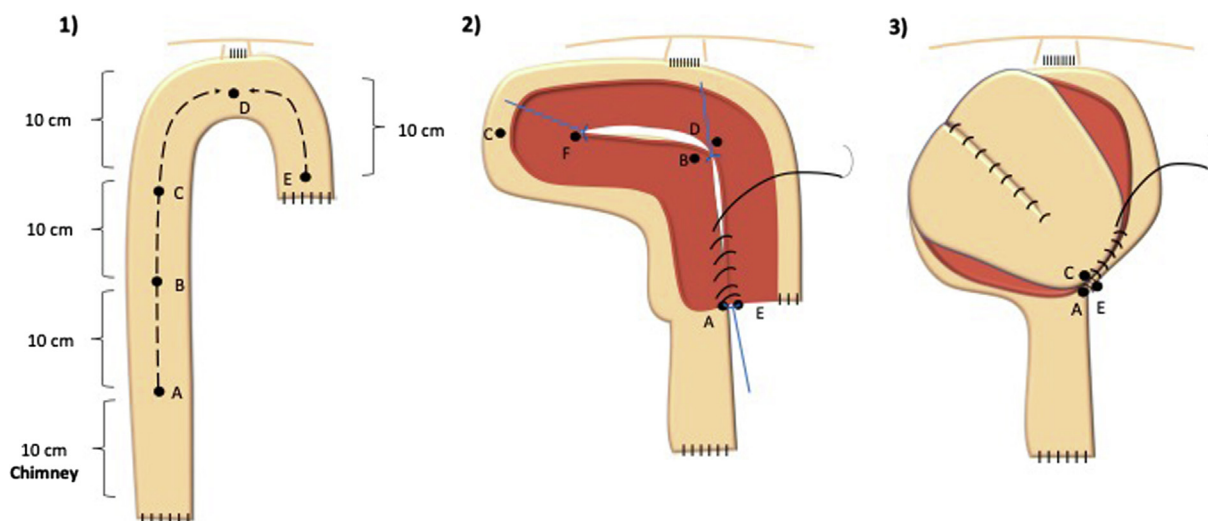


Fig. 1 – Intracorporeal Studer neobladder reconstruction. (1) Ileourethral anastomosis is performed first and a segment of ileum extending 40 cm proximal and 10 cm distal to the anastomosis is then isolated. Starting 10 cm away from the proximal end to account for the chimney, the ileum segment is then opened on its antimesenteric border. (2) Three stay sutures (depicted in blue) are then placed to facilitate positioning of the bowel segment. The posterior wall of the neobladder is closed with a barbed suture in a running fashion from point A-E to point F. (3) The lateral limb is then folded over (point C is brought over to point A-E) to create a spherical neobladder. The distal part of the anterior neobladder is then closed. A Wallace ureteroileal anastomosis is performed at the proximal end of the chimney before closing the proximal half of the anterior wall.

advantage of being a relatively simple neobladder that can easily be brought down to the urethra. In our experience of approximately 500 cases, we have never had to convert to a different type of diversion because of difficulty in bringing the pouch down.

Since its description, the vast majority of the literature supporting the use of an intracorporeal neobladder has been based on the Studer reconstruction. Ataola-Arca et al [5] showed that the Studer pouch was used in 70% of published series, with median follow up of more than 2 yr in many of the largest series [6]. By contrast, even though the first intracorporeal robotic neobladder described in 2003 used the Hautmann pouch [1], only a few cases using this technique have been published since then [3,7].

The intracorporeal Studer pouch has proved to be a reproducible technique, with good operative and functional outcomes obtained in multiple different centers; many of the largest series have reported daytime and nighttime continence rates reaching 85% and 70%, respectively [5]. Favorable short- and long-term outcomes have also been published for the open Hautmann pouch, but there are limited data available to confirm that these outcomes are reproduced with the intracorporeal technique [8].

Although it remains relatively rare, conversion of a neobladder to an ileal conduit can be indicated in the case of urethral recurrence, poor adaptation to the neobladder, or for patient preference. An advantageous feature of the Studer technique in this situation is the possibility to use the chimney to convert the neobladder to an ileal conduit without having to resect a new segment of ileum or reimplant the ureters.

One perceived disadvantage of the Studer pouch compared to the Hautmann pouch is the necessity to bring the left ureter under the sigmoid mesentery to perform ureteroenteric anastomosis. In our experience, this has not been a major issue and the ureteroenteric stricture rate remains low at approximately 6% [9]. This result can be

achieved by adequately freeing the ureters and by performing a widely spatulated Wallace anastomosis, which has been associated with a lower risk of stricture [10].

In conclusion, no single neobladder technique has been shown to be clearly superior. Adherence to certain surgical guiding principles is paramount. The intracorporeal Studer pouch is a reproducible technique that provides favorable functional outcomes and is currently supported by the largest body of literature.

Conflicts of interest: Peter Wiklund participates in an advisory board for Medtronic. Etienne Lavallée has nothing to disclose.

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