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Surgery in Motion

Robotic Intracorporeal Padua Ileal Bladder: Surgical Technique, Perioperative, Oncologic and Functional Outcomes

Giuseppe Simone[a,†,*], *Rocco Papalia*[b,†], *Leonardo Misuraca*[a], *Gabriele Tuderti*[a], *Francesco Minisola*[a], *Mariaconsiglia Ferriero*[a], *Giulio Vallati*[c], *Salvatore Guaglianone*[a], *Michele Gallucci*[a]

[a] *Department of Urology, "Regina Elena" National Cancer Institute, Rome, Italy;* [b] *Department of Urology, Campus Biomedico University, Rome, Italy;* [c] *Department of Radiology, "Regina Elena" National Cancer Institute, Rome, Italy*

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Abstract

Background: Robot-assisted radical cystectomy (RARC) with intracorporeal neobladder reconstruction is a challenging procedure. The need for surgical skills and the long operative times have led to concern about its reproducibility.
Objective: To illustrate our technique for RARC and totally intracorporeal orthotopic Padua ileal bladder.
Design, setting, and participants: From August 2012 to February 2014, 45 patients underwent this technique at a single tertiary referral centre.
Surgical procedure: RARC, extended pelvic lymph node dissection, and intracorporeal partly stapled neobladder. Surgical steps are demonstrated in the accompanying video.
Measurements: Demographics, clinical, and pathological data were collected. Perioperative, 2-yr oncologic and 2-yr functional outcomes were reported.
Results and limitations: Intraoperative transfusion or conversion to open surgery was not necessary in any case and intracorporeal neobladder was successfully performed in all 45 patients. Median operative time was 305 min (interquartile range [IQR]: 282–345). Median estimated blood loss was 210 ml (IQR: 50–250). Median hospital stay was 9 d (IQR: 7–12). The overall incidence of perioperative, 30-d and 180-d complications were 44.4%, 57.8%, and 77.8%, respectively, while severe complications occurred in17.8%, 17.8%, and 35.5%, respectively. Two-yr daytime and night-time continence rates were 73.3% and 55.5%, respectively. Two-yr disease free survival, cancer specific survival, and overall survival rates were 72.5%, 82.3%, and 82.4%, respectively. The small sample size and high caseload of the centre might affect the reproducibility of these results.
Conclusions: Our experience supports the feasibility of totally intracorporeal neobladder following RARC. Operative times and perioperative complication rates are likely to be reduced with increasing experience.
Patient summary: We report the outcomes of our first 45 consecutive patients who underwent robot-assisted radical cystectomy with intracorporeal neobladders. Perioperative, oncologic, and functional outcomes support this technique as a feasible and safe surgical option in tertiary referral centres.

† These authors contributed equally.
* Corresponding author. Department of Urology, "Regina Elena" National Cancer Institute, Via Elio Chianesi 53, Rome 00144, Italy. Tel. +39 3924689214.
E-mail address: puldet@gmail.com (G. Simone).

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1. Introduction

Radical cystectomy (RC) is the standard treatment for muscle-invasive bladder cancer. It is a complex and morbid procedure performed predominantly in elderly patients [1]. Robot-assisted RC (RARC) with intracorporeal urinary diversion (ICUD) has recently emerged as a minimally invasive alternative to open RC (ORC) that replicates open surgical principles with encouraging oncologic and functional outcomes [2,3]. Several revisions of standard open reservoir configurations have been proposed to shorten the operative time of the robotic technique [2,4–6]. Such revisions improved ICUD efficiency, but the relatively long operative time and the complexity of the pouch configuration still raise concerns about wide reproducibility.

In this article, we describe our technique for the completely intracorporeal Padua ileal bladder (PIB) configuration using titanium staples to configure part of the neobladder, and we report perioperative, 2-yr oncologic and functional outcomes of our first 45 patients.

2. Patients and methods

Between August 2012 and February 2014, 45 consecutive patients with high-grade urothelial carcinoma underwent RARC and complete ICUD. All data were entered prospectively into an institutional review board-approved database and queried retrospectively. Inclusion criteria were muscle-invasive or recurrent high-grade urothelial carcinoma of the bladder refractory to intravesical immunotherapy. Severe cardiovascular diseases with an ejection fraction $< 36\%$, retinal vascular diseases, and the presence of a ventriculoperitoneal shunt were the only contraindications to robotic surgery.

2.1. Port placement and patient positioning

Port placement is shown in Figure 1. An additional suprapubic miniport was placed to introduce double-J stents. Motorized articulated EndoGIA staplers (Covidien, Dublin, Ireland) were used through the 12-mm midclavicular ports. After RC and extended pelvic lymph node dissection, Trendelenburg position was reduced from 45° to 20°.

2.2. RC and pelvic lymph node dissection

RARC was performed according to the technique described by Desai et al [7]. Distal ureters were cut between Hem-o-lok clips (Teleflex, Wayne, PA, USA) and sent for frozen section. The urethra was incised and the Foley catheter retracted in tight conjunction with the bladder neck and secured with a Hem-o-lok clip to avoid urine spillage. A meticulous *separate package* extended pelvic lymph node dissection including obturator, internal, external, common iliac, and presacral nodes was performed as described for open surgery [8].

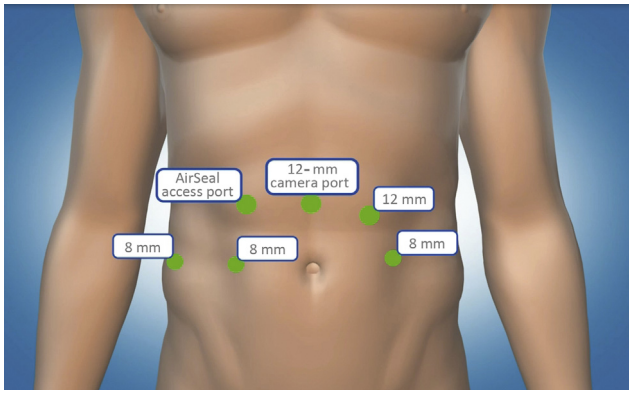

Fig. 1 – Port placement.

2.3. Choice of ileal segment to construct the neobladder

To select the ileal segment for the neobladder configuration, we chose the most sloped part of the ileum at a variable distance (minimum 20 cm) from the ileocecal valve in relation to the mesentery structure of each patient. Approximately 42 cm of ileum was used (Fig. 2A).

The division of the proximal ileum was made using only one stapler load (60 mm). Isolation of the distal extremity of the ileal segment was carried out with a 6- to 8-cm deep section of the mesentery using two consecutive stapler loads (60 mm and 45 mm).

The optimal point of the selected bowel loop to create the neobladder neck was identified about 12–14 cm proximal to the distal ileal section edge after ensuring a tension-free approach to the urethral stump (Fig. 2B). The proximal half of the loop was used to configure the left base and the dome of the neobladder.

The following ileal segments were used to construct the neobladder (Fig. 2C):

- 8 cm for the right plate
- 10 cm for the neck configuration
- 8 cm for the left plate
- 16 cm folded in a "U" configuration to create an 8-cm dome

2.4. Detubularisation and configuration of the neobladder

A 10-cm inverted U-shaped neobladder neck was created with a stay suture approximating the ileum segment at 8 cm and 18 cm from the distal ileum border. After detubularising the 8 cm of distal ileum along the antimesenteric border, motorised stapler arms were introduced through the two branches of the inverted U to approximate them and create the neobladder neck (Fig. 2B).

One 60-mm or two sequential 45-mm stapler loads were applied to detubularise and simultaneously suture 10 cm (5 cm + 5 cm) of ileum, creating the neck of the neobladder. The remaining 24 cm of the ileum were subsequently detubularised starting at the proximal ileal edge (Fig. 2D). The neobladder was then shaped as a triangle with 8-cm sides and the vertex at the inverted U-shaped neobladder neck (Figs. 2E and 2F).

The 16-cm folded segment at the left horn was finally approximated to the proximal ileal cut point (right neobladder horn) with a transverse fold, and the inner borders of the created pouch were hand-sewn, completing the posterior aspect of the neobladder (Figs. 2G and 2H).

2.5. Urethroneoneck anastomosis

After cutting the reservoir at the most sloped part of the neoneck, the urethroileal anastomosis was performed with two end-knotted 2-0 Monocryl Visi-Black running sutures. A 22-French haematuria catheter was used, and the balloon was inflated with 5 ml of saline solution.

2.6. Ureteroileal anastomoses

Ureters were passed through the posterior aspect of the neobladder and spatulated. Ureteroileal anastomoses were performed according to the modified split-nipple technique with 4-0 Monocryl (Ethicon, Somerville, NJ, USA) interrupted sutures. Guidewires and 6/7-French double-J stents

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