Feasibility of Robotic Double Yang-Monti Ileal Conduit With Bladder Augmentation: Surgical Technique

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OBJECTIVE To report the feasibility of a novel robotic technique for intracorporeal construction of a double Yang-Monti ileal conduit with bladder augmentation in an adult patient.

METHODS The Yang-Monti procedure can be considered as an alternative to Mitrofanoff appendicovesicostomy when the appendix is not available or in obese patients. To date, the robotic approach has not been described. We have described all the steps of our surgery, performed on a 35-year-old obese patient with post-traumatic paraplegia and a neurogenic bladder. We focused on the technical tips and highlighted all the differences with the standard open technique.

RESULTS Our technique provided satisfactory results. No intraoperative complications occurred. The operative time was 250 minutes, and the intraoperative blood loss was 200 mL. The clinical course was uneventful.

CONCLUSION We have shown that robotic intracorporeal realization of a double Yang-Monti ileal conduit with bladder augmentation is feasible, extending the potential indications of robot-assisted surgery. The evaluation of more cases is advised. UROLOGY 82: 480–484, 2013. © 2013 Elsevier Inc.

In the setting of continent urinary diversions, the Mitrofanoff appendicovesicostomy[1] still stands as the most popular diversion method adopted. Nevertheless, the appendix is not always available, such as in the case of previous appendectomy, chronic inflammation, obstruction, and reduced mobility or length. In these cases, a Young-Monti procedure can be performed, using small pieces of ileum to create a cutaneous ileovesicostomy.[2] With the recent development of laparoscopic and robotic techniques, a minimally invasive approach can now be considered for this type of surgery, with the potential benefits of decreased bleeding, decreased postoperative pain, quicker recovery, and improved cosmesis.[3-5] Nevertheless, these advantages must be balanced against the technical difficulties and the risk of longer operative times. To date, to our knowledge, a laparoscopic or robotic Yang-Monti procedure has not been described. We report a novel robotic technique for the construction of a double Yang-Monti ileal conduit with bladder augmentation in an adult patient.

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SURGICAL TECHNIQUE

The patient was a 35-year-old woman with severe obesity (weight 127 kg, height 162 cm, body mass index 48 kg/m^2). She had developed T10 post-traumatic paraplegia with a neurogenic bladder that was treated with intermittent self-catheterization. Intermittent self-catheterization had become more and more difficult owing to her body habitus. Urinary incontinence in between the catheterizations was refractory to anticholinergic therapy. Urodynamic studies showed a low-capacity (100 mL), high-pressure bladder with poor compliance. She had normal renal function and no hydronephrosis on renal ultrasound. Because she had refused incontinent urinary diversion and had already undergone appendectomy, we proposed a double Yang-Monti procedure with bladder augmentation. Because of her obesity, a simple Yang-Monti conduit would have been too short, considering the thickness of the abdominal wall. A robot-assisted laparoscopic approach was performed to achieve the benefits of minimally invasive surgery in terms of decreased bleeding, decreased postoperative pain, quicker recovery, and improved cosmesis. After inducing general anesthesia, the patient was placed in a modified lithotomy position, with the legs abducted and parallel to the level of the bed. A 30° Trendelenburg position was obtained to displace the small bowel from the pelvic area. An 18F Foley catheter was inserted. The

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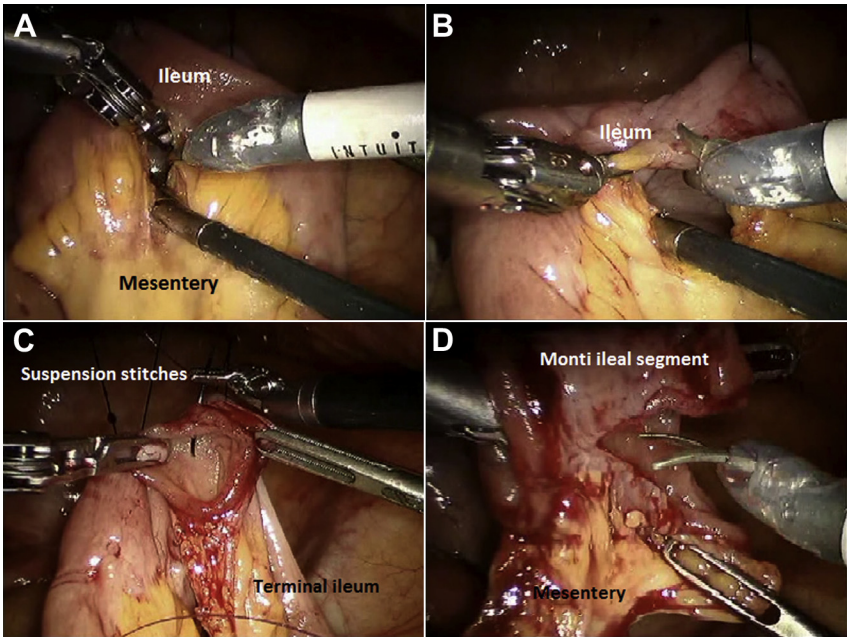

Figure 1. **(A)** Ileum exposed and cut. **(B)** Minimal dissection of mesentery. **(C)** Digestive anastomosis. **(D)** Detubularization of ileal segment. (Color version available online.)

pneumoperitoneum was established with 12 mm Hg insufflation pressure. We placed 6 trocars: a 12-mm camera port 5 cm above the umbilicus; two 8-mm robotic ports bilaterally at a distance at least 8 cm from the camera port; a third 8-mm robotic port 5 cm above the left anterior superior iliac spine; and two 5-mm assistant ports triangulated above the right robotic port. After trocar placement, the robot (4-arm Da Vinci Si Surgical System, Intuitive Surgical, Sunnyvale, CA) was docked. The procedure started with individuation of the ileocecal valve and the terminal ileum. At 30 cm from the ileocecal valve, the ileum was suspended to the abdominal wall by straight needles to expose its mesentery for dissection, and a 5-cm ileal segment was taken for the construction of the double Yang-Monti conduit. Afterward, the ileum was re-exposed, and another 25-cm segment was taken for the bladder augmentation patch (Fig. 1A,B). The intracorporeal approach made it unnecessary to perform a large dissection of the mesentery; thus, the vascular supply of the bowel was not jeopardized. Ileal exposition using the straight needles allowed the opened ileal extremities to be lifted, thereby preventing stool spillage and facilitating the digestive suture. We manually performed the end-to-end ileal anastomosis with 2 running 3-0 Monocryl sutures (Ethicon, San Angelo, TX), starting with the posterior wall, from the farthest corner to the nearest corner (Fig. 1C). We avoided excessive traction in the suture to reduce the risk of stenosis. A similar running suture was made for the anterior wall. The ileal segments were passed through the mesenteric hole to prevent the crossing of the conduits with the ileum. We then proceeded to the construction of the double Yang-Monti conduit. The 5-cm ileal segment was completely detubularized with an incision close to the mesentery (Fig. 1D). We performed a modified technique, without dividing the ileal segments in 2. We sutured the mesenteric side of the opened segment (Fig. 2A). The suture had to be tight to prevent local rupture during conduit catheterization. The antimesenteric side was then sagittally sectioned up to the mesentery to obtain the T-shaped double Yang-Monti conduit (Fig. 2B). With our novel technique, we used 1 ileal segment, instead of dividing it into 2 parts, such as is usual in open surgery. Afterward, we placed three 4-0 Monocryl stitches within the segment to properly hold the 12F catheter during retubularization of the conduit, which was performed with 2 running sutures. The sutures were well tightened to avoid false passage during the catheterization and to provide a watertight seal. We fixed the catheter to the conduit with resorbable 3-0 Vicryl Rapid suture (Ethicon) to avoid its accidental displacement during the maneuvers. After retubularization, the conduit was about 8 cm long. Afterward, we proceeded with preparation of the ileal patch for bladder augmentation. The 25-cm ileal segment was incised on the antimesenteric border over its entire length and sutured in a U-shape with Monocryl 3-0 running suture, obtaining a square patch (Fig. 2C). The bladder wall was suspended with 2-0 Nylon stitches to provide the best posterior exposure. The bladder was filled with 200 mL of saline solution and incised on its right posterior wall to exposure of the mucosa to create a submucosal tunnel that would receive the conduit, with the catheter inside it (Fig. 2D). The Yang-Monti conduit was anastomosed to the bladder muscular layer using 3 interrupted 3-0 Monocryl stitches. We chose the muscular layer, because it can hold more tension than the