18 Robotic Assisted Proctectomy and Ileal J-Pouch Anorectal Anastomosis

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18.1 Background

The reconstructive surgery plays a fundamental role in the quality of life of children with complicated ulcerative colitis (UC), and in recent years pediatric minimally invasive surgery is becoming a surgical standard (UC) [1–5].

Currently the main type of surgical reconstruction involves the use of a reservoir from an ileal pouch [6], with or without endorectal pull through (ERPT) and mucosectomy.

The original technique provided an open approach that has been translated to the minimally invasive surgery (MIS) during the years [7].

The cardinal principle of proctectomy is to leave the minor amount of rectal tissue guaranteeing sphincter preservation and fecal continence.

Proctectomy may cause fertility complications because of the proximity to the seminal vesicles in male and the vagina in female patients. Dissection in deep pelvis is largely considered at risk for the poor vision and limited space to operate with possibility of nerve, vascular, and urogenital injury.

In adult da Vinci robotic surgery (RS) has the main application for the deep pelvis site for prostate cancer treatment and gained popularity for the better nervous tissue visualization and the faster learning curve when compared to conventional minimally invasive laparoscopic surgery [8–10].

Based on promising results of the current application of RS in pediatric surgery and the recognized role in deep pelvis, this type of surgical approach may be used in reconstructive surgical step of patients with rectal disorders.

We describe for the first time the technical aspects of restorative proctectomy and ileal J-pouch anorectal anastomosis with robotic approach.

18.2 Technique

A 3-cm J-pouch ileal reservoir with vascular supply control was created using the stoma incision (Fig. 18.1). The head of the circular stapler is inserted and stabilized, then the J-pouch is replaced in abdomen, and a multichannel-access flexible SILS® Port (Covidien plc, Cherrywood Business Park, Loughlinstown Co. Dublin, Ireland) is placed in the ileostomy site and used for two 5 mm service instruments (for needle insertion and for suction) and one 8 mm da Vinci robotic port.

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Fig. 18.1 J-Pouch creation using single-port incision

Fig. 18.2 Robotic trocars setting

After the SILS® insertion a 12 mm port and three operative 8 mm ports are, respectively, placed in the umbilical, left paraumbilical, and right subcostal space (Fig. 18.2).

A 12 mm Hg CO_2 pneumoperitoneum is created and robotic docking is completed with utilization of four arms: one for the camera, two for operative instruments, and one for bladder/uterus retraction, which avoid the need of the assistant, who is involved only for introduction of the suture and anal manipulation through the anus.

First step of robotic time was the identification of the rectal stump, the ureters, and the vagina (Fig. 18.3). Proctectomy is performed using the monopolar hook, close to the rectum or inside the muscular rectal wall (ERPT), to preserve innervation and integrity of pelvic organs. The hook allows tissue traction and despite its fulguration action the rectal planes are well identified and easily dissected without bleeding. Mesorectal vessels are well identified too, as well as vaginal wall, and coagulated close to the rectum.

Dissection has gone up to the levator ani muscle and residual rectum stump is resected with a flexible linear stapler. The rectal stump is removed at the end of procedure through the previous stoma incision.

The circular stapler is used for the side-to-end anastomosis through the anus. Before connection of the head of the stapler previously placed in the J-pouch, a careful control avoiding any J-pouch torsion is performed which can compromise the vascular supply of the anastomosis and cause very important complication as pouchitis or anastomotic dehiscence (Fig. 18.4).

Reinforcement sutures in the deep pelvis are easily performed.

At the end of the procedure a terminal ileostomy is created in the preexisting SILS incision site in order to protect the J-pouch anal anastomosis.

Neither drainage nor nasogastric tube are necessary.

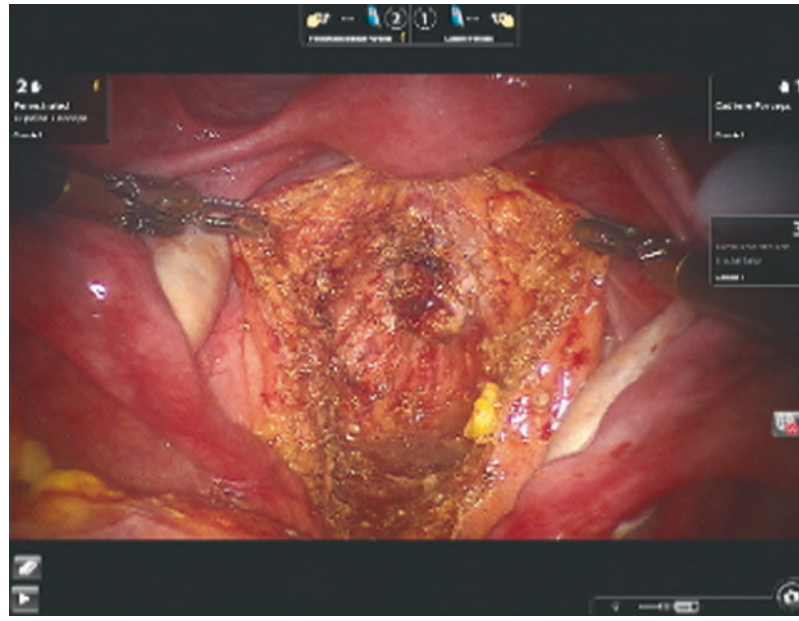

Fig. 18.3 Identification of the rectal stump, the ureters, and the vagina

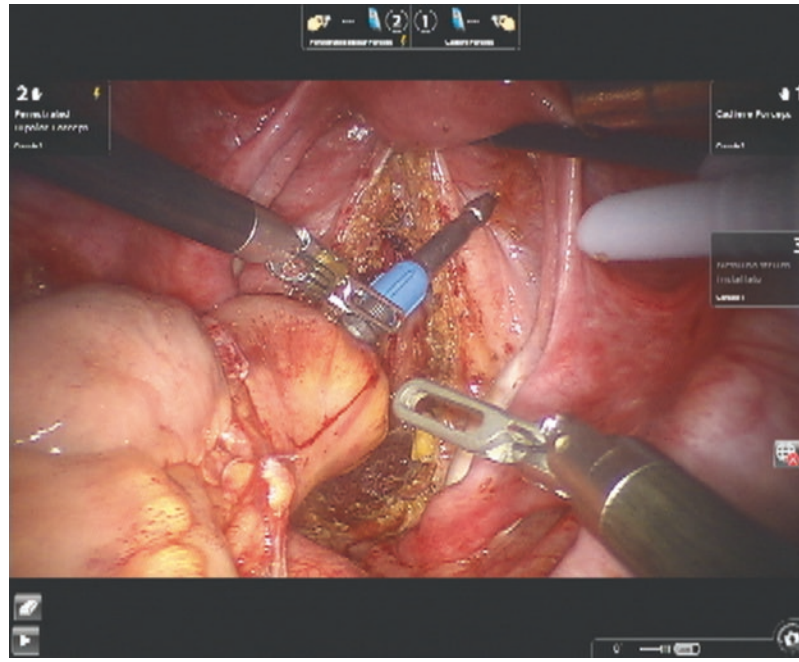

Fig. 18.4 Preparation of ilal-J-pouch anorectal anastomosis

18.3 Discussion

In recent years MIS gained a more recognized role for the treatment of pediatric UC [11] and the development of new technologies helped surgeons to reduce surgical invasiveness until the application of RS for the treatment of children disease.

Reconstructive surgery represents the more delicate process of the different surgical phases for UC treatment, and it is characterized by a series of potential complications that may irreversibly compromise the quality of life of children in their adult development as vaginal fistula, seminal vesicle damage, bladder fistula, J-pouch anastomotic leak, J-pouch torsion, pouchitis, and denervation of pelvic floor with risk of neurogenic bladder and fecal incontinence.

All these complications must be considered when pediatric surgeon performs residual proctectomy to leave the lesser intestinal tissue to avoid the risk of cancer.

It is well known that RS overcome several potential complications of deep pelvis conventional MIS in adult populations and some technical disadvantages as the lack of tactile feedback are compensated by 3-D visualization giving the possibility to play an important role also for the minimally invasive approach of rectal cancer and for radical prostatectomy [9, 10, 12, 13].

da Vinci® system gives the surgeons a better control of the entire phases of the second surgical step for UC: it allows a better manipulation of the intra-abdominal J-pouch in the anastomotic time, thanks to its major degrees of freedom compared to conventional MIS; proctectomy has several advantages in terms of anatomic 3-D visualization of rectum, bladder neck, prostatic, and vaginal plane during dissection; J-pouch anorectal anastomosis is better controlled, with the possibility to easily perform reinforced hand sutures.

The main limitation of RS is related to the higher cost for procedure compared to traditional MIS, but if robotic approach allows a better surgical control of all the delicate phases of reconstructive UC treatment, we can speculate that it avoids frequency of postoperative sequelae traducing with cost of surgical reinterventions and hospitalization, and of utmost importance, it can reduce the risk of complications.

A safety deep pelvis approach is appealing in pediatric surgery and could be applied to other pediatric diseases for the ERPT procedures as anorectal malformations or Hirschsprung's disease, thanks to the progressive miniaturization of robotic instruments. Considering this aspect, restorative proctectomy may be the initial procedure to introduce robotic assisted laparoscopic pull-through in children.

These considerations are possible only if pediatric diseases are centralized in selected centers that can offer a da Vinci robotic system. Centralization is a cornerstone to reduce the relevant costs of RS for the pediatric community.

Obviously, larger series is necessary to confirm the functional outcomes in patients treated with robotic reconstructive surgery for UC.

Conclusion

Pediatric da Vinci® robotic assisted laparoscopic restorative proctectomy and ileal J-pouch anal anastomosis offer advantages in terms of tissue visualization and a better working space; thanks to the robotic arms with more degrees of freedom, it is feasible, easy, and safe; provides good functional outcomes; and must be offered to all children.

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