Two-Port Laparoscopic Descending Colostomy with Separated Stomas for Anorectal Malformations in Newborns

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Abstract

Introduction We describe a two-port laparoscopic technique to create a colostomy in the descending colon with separated stomas for newborns with anorectal malformations.

Material and Methods Six patients with an anorectal malformation underwent this procedure in the early-neonatal period. The surgical technique was performed with two ports, which allows for an accurate inspection of the abdominal contents. The first loop of the sigmoid colon is grasped through the first port and exteriorized while the attachments to the left retroperitoneum and direction of the loop are checked with the scope introduced in the second port. The division of the colon is performed extracorporally, the colon irrigated of meconium, and the distal colon moved to the second port incision. Both stomas are then fixed to the abdominal wall.

Results The time of the procedure ranged from 50 to 90 minutes. A Mullerian duplication was noted in one case. Oral intake was started during the first 12 to 24 hours. No complications were seen during or after the procedure.

Conclusions This technique allows for the precise localization of the colostomy with direct visualization, provides for the inspection of the internal genitalia, eliminates the incision between the two stomas and its complications, allows for painless stoma bag changes immediately after surgery, avoids twisting of the colostomy, and permits a cosmetically pleasing incision at the colostomy closure.

Keywords
- anorectal malformation
- colostomy
- laparoscopy

Introduction

The aims of the colostomy in anorectal malformations (ARM) are to completely divert the fecal stream from the urological and genital systems, allow for a distal site to do a colostogram, and to leave enough length of distal colon to perform the pull through. Using the first loop of sigmoid colon for the proximal stoma prevents prolapse due to the attachments of the descending colon to the left retroperitoneum. Shaping the distal stoma as a mucous fistula, tiny and flat, permits the distal colostogram, and makes prolapse less probable. A descending colostomy with separate stomas seems to be the ideal technique for most patients with an ARM.[1]

This standard open procedure is performed by an oblique incision in the left lower quadrant (LLQ) leaving both stomas at each edge of the laparotomy. Several complications may arise from this incision during the early postoperative period,

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such as wound infection and discomfort and pain during changes of the colostomy bag. Other reported complications are a twisted colostomy, the short distance between the stomas that make it difficult to isolate the proximal one into the colostomy bag, and an incorrect choice of stoma location.[1]

We describe a two-port laparoscopic technique of descending colostomy with separate stomas that preserves the principles of open surgery, minimizes complications, and adds some advantages.

Patients and Methods

Six full-term neonates with ARM underwent a two-port descending colostomy with separated stomas.

Surgical Technique

With the patient in supine position, a circular skin incision is made in the LLQ where the proximal stoma will be, equidistant from the umbilicus and iliac crest, to provide a comfortable positioning of the colostomy bag (►Figs. 1 and 2). This circular incision progresses to the muscle layer and peritoneum, allowing the insertion of the first 5 mm trocar. A ballooned trocar permits the CO_2 pneumoperitoneum infusion, and then the scope is introduced for inspection of the abdominal cavity.

The second 5-mm trocar is introduced in the suprapubic midline at the skin fold, where the mucous fistula will be placed. The scope is switched to this port and the proximal sigmoid colon is mobilized with a grasper forceps introduced through the first trocar in LLQ, identifying the attachments of descending colon to left retroperitoneum.

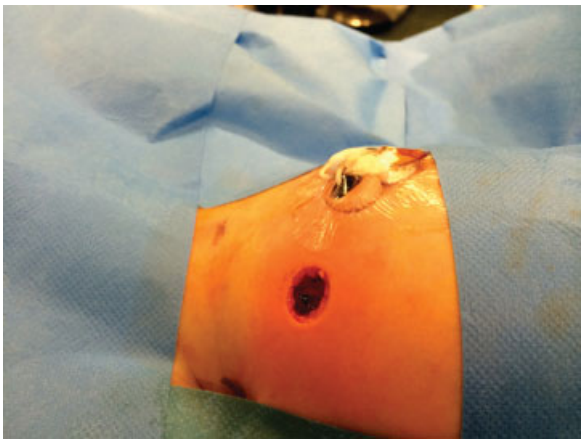

Fig. 2 Circular incision.

The progression of the sigmoid colon distally to the pouch of Douglas is checked and the colon is then exteriorized. The correct orientation is confirmed laparoscopically. An enterotomy is performed to allow an aggressive washout of the distal pouch and the colon is then divided with stapler extra corporally. The corner of the distal colon is brought out as a mucous fistula. The proximal stoma is then attached to the abdominal wall and the colostomy bag is placed over the stoma.

The final appearance is identical to the open technique, but without a surgical incision between the stomas (►Fig. 3). The distance between them needs to be wide enough to isolate the proximal stoma in the colostomy bag.

Fig. 1 Anatomic references for the surgery.

Fig. 3 Final appearance 2 months after surgery.

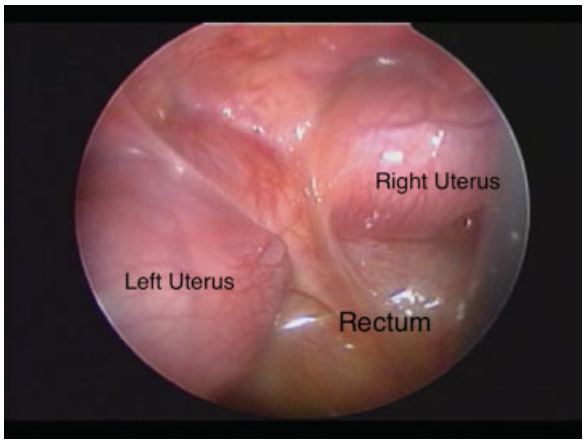

Fig. 4 Mullerian duplication.

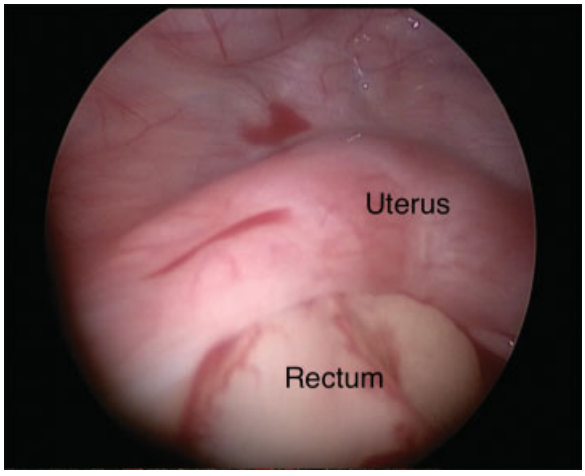

Fig. 5 Normal genitalia in female with rectovestibular fistula.

Results

The operative time ranged from 50 to 90 minutes. Inspection of the colon pointed the ideal localization of the colostomy in all cases. The inspection of the internal genitalia revealed a didelphys uterus with no hydrocolpos in a patient with short common channel cloaca (►Fig. 4). The proximal stoma was productive immediately after the surgery and the oral intake resumed in the first 12 to 24 hours in all newborns. None of the cases developed any complications during or after the procedure.

Discussion

The site (transverse, descending, or sigmoid) and type (loop vs. divided) of colostomy for ARM remains controversial. The laparoscopic-assisted colostomy for newborns with colorectal malformations has been previously reported[2,3] and one specifically focused on ARM,[3] but none of these groups advocate for separate stomas, although it seems that the split colostomy has a lower rate of the overall complications, including prolapse and urinary tract infections.[4,5]

We advocate for a descending colostomy with separate stomas as reported previously[1] in the majority of the cases. So the objective of the technique described here is to respect the principles of this type of colostomy for patients with ARM, minimizing complications, and using a minimally invasive approach. In comparison to the previous technical reports, the key difference of our procedure is the separated stomas.

Laparoscopy in the newborn with ARM is challenging due to the small cavity and bowel distention. However, inspection becomes clearer after the decompression of the colon. In terms of length of the surgery, we found our technique comparable to the open approach.

The main advantages of this technique over open surgery are: (1) to avoid the wound between the stomas, so complications derived from it are not expected; (2) determining the precise choice of colostomy site is easier; (3) the internal genitalia can be ascertained in detail (►Fig. 5); (4) the distance between stomas can be insured to isolate the proximal stoma into the colostomy bag; (5) it is easy and painless to change the stoma bag immediately after surgery; (6) the orientation of the sigmoid colon can be checked under direct vision minimizing the risk of a twisted colostomy; (7) it is easy to convert to the standard open surgical technique if needed; (8) at the time of colostomy closure, two transverse incisions can be done with good cosmetic results.

Conclusion

Despite the limitation of the small number of cases, the two-port laparoscopic descending colostomy with separated stomas is safe, feasible, minimizes complications and allows an accurate inspection of the abdomen for colostomy localization and examination of internal genitalia.

Conflict of Interest
None.

References

1 Pena A, Migotto-Krieger M, Levitt MA. Colostomy in anorectal malformations: a procedure with serious but preventable complications. J Pediatr Surg 2006;41(4):748–756, discussion 748–756
2 De Carli C, Bettolli M, Jackson CC, Sweeney B, Rubin S. Laparoscopic-assisted colostomy in children. J Laparoendosc Adv Surg Tech A 2008;18(3):481–483
3 Liem NT, Quynh TA. Single trocar laparoscopic-assisted colostomy in newborns. Pediatr Surg Int 2013;29(6):651–653
4 Oda O, Davies D, Colapinto K, Gerstle JT. Loop versus divided colostomy for the management of anorectal malformations. J Pediatr Surg 2014;49(1):87–90, discussion 90
5 van den Hondel D, Sloots C, Meeussen C, Wijnen R. To split or not to split: colostomy complications for anorectal malformations or hirschsprung disease: a single center experience and a systematic review of the literature. Eur J Pediatr Surg 2014;24(1):61–69