

Umbilical site for temporary colostomy in anorectal malformations: is it cosmetically preferable?

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Purpose In an attempt to minimize the scars and improve the cosmetic outcome in children, the umbilical site has been chosen for colostomy formation in patients with anorectal malformations.

Methods A retrospective review of the medical records of patients who had undergone umbilical colostomy with anorectal malformations from January 2006 to January 2012 was carried out. These patients were reviewed to evaluate intraoperative or postoperative complications, functional outcome, as well as cosmetic appearance after colostomy reversal.

Results A total of 105 patients with anorectal malformations underwent temporary umbilical colostomy. There were 43 boys and 62 girls. The age at colostomy formation ranged from 2 days to 12 months (mean 18 days). The mean operating time was 41 min. The mean follow-up period was 38.3 months (range, 6–72 months). Peristomal skin excoriations were the most common complication, occurring in 15 patients (14%). Partial retraction occurred in three patients. None of the patients developed stenosis or prolapse. Surgical revision

of the colostomy was not required in any of the cases. All umbilical colostomies were reversed, with no postoperative complications such as wound infection, incisional hernia, or bowel obstruction. The cosmetic appearance after colostomy closure was similar to that of a normal umbilicus.

Conclusion The use of the umbilical site for temporary colostomy in neonates and infants with anorectal malformations is feasible and efficient functionally, and after stoma reversal, appears to be cosmetically superior to stomas created in other parts of the abdomen. *Ann Pediatr Surg* 9:16–19 © 2013 Annals of Pediatric Surgery.

Annals of Pediatric Surgery 2013, 9:16–19

Keywords: anorectal malformations, colostomy, umbilical ostomy

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Received 3 June 2012 accepted 11 October 2012

Introduction

The umbilicus is a very attractive site in the abdomen for use by surgeons. Pediatric surgeons have always used the umbilicus in a variety of intra-abdominal treatment procedures, including pyloromyotomy [1,2], multiple bowel biopsies for Hirschsprung's disease, bowel resection, and stoma formation [3]. Moreover, Soutter *et al.* [4] have reported on 42 infants who had undergone transumbilical laparotomies, in whom they had performed major surgeries through the umbilicus for a wide variety of surgical diseases. In laparoscopic procedures, the umbilicus is used as a trocar site, and the trocar sites are extended to remove specimens and to perform more laparoscope-assisted procedures such as bowel resection and anastomosis.

Patients and methods

From January 2006 to January 2012, the umbilicus was used as a site for temporary colostomy in children with anorectal malformations. Data collected for each patient included age, sex, medical and family history, type of anorectal malformations, type of colostomy, operative time, length of hospital stay, complications, and outcomes. Information on definite surgical repair of anorectal malformations and colostomy closure was also collected.

This research was approved by the ethical committee board.

Technique

The child was placed in a supine position and secured to the operating table using tapes. The table was tilted in the Trendelenburg position to allow the small bowel to

fall out of the way. The umbilicus was grasped using Allis forceps and a circumferential skin incision was made at the umbilical cord stump by electrocautery. The incision was further deepened down by electrocautery through the fascia. Individual division between ligatures of the umbilical vein, umbilical arteries and urachus. The abdominal wall muscles were incised longitudinally up and down along the midline for about 5–7 mm, depending on the opening in the defect, which was created by removing the umbilicus. The fascial and peritoneal openings were dilated to admit the operator's index finger up to the proximal interphalangeal joint (approximately 2 cm in diameter).

A loop of sigmoid colon was identified and pulled outside the abdomen. By pulling on the sigmoid colon, we can easily identify the distal and proximal portions of the bowel. The site at which the colostomy is created is the uppermost proximal part of the sigmoid colon, which can reach the umbilicus easily. A 6 Fr feeding tube was introduced through a window in the mesentery of the sigmoid colon just underneath the bowel wall to aid in retraction of the bowel. The colonic loop was sutured to the deep fascia with interrupted 4/0 vicryl seromuscular stitches in all quadrants. An incision was made by electrocautery transversely in the sigmoid colon, cutting through its anterior half at the level of the skin distally.

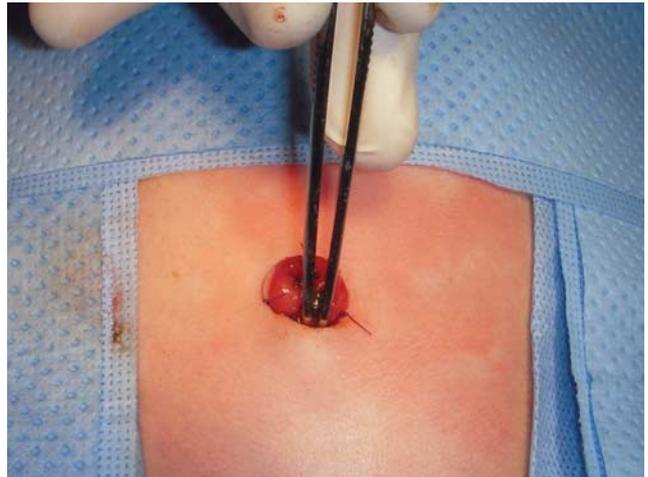
The distal stoma was sutured at the level of the skin at about one-fourth of the circumference, using 4/0 vicryl. (Fig. 1). The proximal stoma was everted and protruded out by about 2 cm; it was sutured to the skin for the

Fig. 1



The distal stoma is sutured at the level of the skin at about one-fourth of the circumference.

Fig. 2



Forceps are introduced inside the hidden distal mucous fistula.

remaining three-fourth of the circumference (Figs 2 and 3). The feeding tube was removed. The distal pouch was irrigated and cleaned with warm saline. A stoma bag was applied.

Results

A total of 105 patients with anorectal malformations underwent a temporary umbilical colostomy. There were 43 boys and 62 girls. The age at colostomy formation ranged between 2 days and 12 months (mean 18 days). The mean operating time was 41 min. The mean follow-up was 38.3 months (range, 6–72 months). Three patients required extension of the skin incision and fascia to the left side of the removed umbilicus for about 2 cm to identify the sigmoid colon. Peristomal skin excoriations were the most common complication, occurring in 15 patients (14%). Skin excoriations were mild to moderate. Topical treatment with zinc oxide resulted in satisfactory recovery in all patients.

Partial retraction of the proximal stoma occurred in 3 patients without any sequela. None of the patients developed stenosis or prolapse. Surgical revision of the colostomy was not required in any of the cases. With the placement of the colostomy in the umbilicus, no difficulties were encountered in performing laparoscopic anorectoplasty for rectourethral fistulas in boys. All umbilical colostomies were reversed, with no postoperative complications such as wound infection, incisional hernia, or bowel obstruction. The cosmetic appearance after colostomy closure was similar to that of a normal umbilicus (Fig. 4).

Discussion

A colostomy is usually indicated in the neonatal period for the management of anorectal malformations in boys and girls, excluding those with perineal fistula [5,6]. Colostomy formation and closure in neonates and infants are associated with considerable morbidity [6–8]. The reported complications in the literature of colostomy formation include mislocation, prolapse, stenosis, retraction,

Fig. 3



Umbilical colostomy after complete formation.

skin excoriation, stomal ulceration, and bleeding, and those after colostomy closure include anastomotic leak, intestinal obstruction, wound infection, incisional hernia, and stitch granuloma [6–10]. Because of the significant morbidity that can occur with colostomy, some pediatric surgeons would prefer to repair anorectal malformations without colostomy [11–13]. Yet, colostomy is the best way to prevent complications in anorectal surgery [5].

There are many locations in the abdomen that can be used for primary stomas in children. This will depend on which bowel has to be exteriorized and on surgeon preference. There is controversy with regard to the type and location of colostomy for anorectal malformations [6,8,10].

Fig. 4



Postoperative appearance after colostomy reversal.

The reported types of colostomy include: loop, separated stomas, stomas together but divided, and Hartmann's procedure [10].

Wilkins and colleagues recommend a divided colostomy in the mobile portion of the descending colon and making the mucus fistula small in the left lower quadrant of the abdomen [5,10]. Patwardhan *et al.* [6] have reported no significant difference in the complication rates between loop and divided sigmoid colostomy.

The reported locations for colostomy include: the left lower quadrant, the right lower quadrant, the left upper quadrant, and the right upper quadrant.

The umbilicus has been suggested as a colostomy site by Turnbull and Rombeau [14]. Cameron and Lau [15] reported the use of the umbilical site for temporary colostomy in seven infants with anorectal malformations or Hirschsprung's disease, with a scar that closely resembles a normal umbilicus after colostomy closure. Later, Fitzgerald *et al.* [16] reported the use of the umbilical site for temporary colostomy and ileostomy in 47 infants and children for a variety of indications, with excellent functional and cosmetic outcomes.

In 2006, we began to use a modified technique to perform umbilical colostomy. This modification entails making the proximal functioning part protruding outside the skin for about 2 cm and occupies about three-fourth of the circumference of the circle of the excised umbilicus. The remaining one-fourth of the circumference is left for the distal mucus fistula, which is fixed at the level of the skin. Therefore, the proximal bowel protrudes outside the skin and the distal bowel is hidden below the proximal stoma.

Transverse loop colostomy is reported to have a higher rate of prolapse [6,8–10]. In our series, the colostomy formations were of the loop type using the sigmoid colon in the umbilicus. Yet, our complication rate was considerably low, with no colostomy prolapse.

In the current series, the use of this technique of colostomy formation has shown that there is no overspill of the proximal bowel content or feces into the distal mucus fistula. There was no fecal impaction in the distal colonic pouch, megarectosigmoid, or urinary tract infections in any of the cases, indicating that our modified technique of umbilical colostomy is totally diverting.

We found the umbilicus site colostomy is easy to look after and manage by the parents. It is easy to apply the stoma bag, which will fit and stick properly. The wide area available around the centrally placed stoma will facilitate the application of ostomy appliances, especially in small neonates. The use of our modified umbilical colostomy technique, the stoma bag, will cover only the proximal stoma, therefore isolating the mucus fistula to prevent contamination.

We did not encounter any difficulties with umbilical colostomy in performing laparoscopic anorectoplasty or posterior sagittal anorectoplasty in our series of patients with anorectal malformations. Furthermore, we found that umbilical colostomy facilitated the laparoscopic procedure by providing extra spaces in the abdomen for the placement of the ports and laparoscopic instruments.

It is hard to perform surgical operations in the abdomen without scars. The creation of temporary stoma in the abdomen requires reversal after sometime. Closure of the abdomen at the previous stoma site away from the umbilicus will cause a scar that is usually very ugly. Furthermore, this unpleasant looking scar will increase in size as the child grows. With the use of the umbilicus in stoma formation and reversal of the stoma later, a large abdominal wound can be avoided at the time of colostomy closure and scarring in the abdomen will be minimized. After colostomy reversal, the umbilicus will almost look like a normal umbilicus later in life.

Conclusion

The use of the umbilical site for temporary colostomy in neonates and infants with anorectal malformations is feasible, functionally efficient, and, after stoma reversal, appears to be cosmetically superior to stomas created in other parts of the abdomen.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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