World Journal of Pediatric Surgery

Postoperative complications of umbilical loop colostomy for anorectal malformations in neonates compared with the conventional abdominal stoma: a non-randomized study

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To cite: Sakaguchi T, Hamada Y, Shirai T, *et al*. Postoperative complications of umbilical loop colostomy for anorectal malformations in neonates compared with the conventional abdominal stoma: a non-randomized study. *World Jnl Ped Surgery* 2019;**2**:e000031. doi:10.1136/wjps-2018-000031

Received 23 December 2018
Revised 4 February 2019
Accepted 5 February 2019

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ABSTRACT

Background We previously reported a pilot study of temporary umbilical loop colostomy for neonates with intermediate-type anorectal malformations (ARM) and recommended this technique because of its cosmetic excellence. We herein report the postoperative complications of umbilical stomas (US) compared with traditional abdominal stomas (AS).

Methods From our institutional prospective database, we analyzed the patients with ARMs who underwent stoma creation at Kansai Medical University Hospital from January 1995 to November 2016. The surgical technique used to create the US had been performed since 2004.

Results US and AS were made for 12 and 27 patients with ARMs, respectively. The postoperative complication rates in patients who underwent US and AS had no significant difference (17% and 11%, p=0.6). The complications comprised a wound infection (one case of US), ileus (one case each of US and AS), mucosal prolapse (one case of AS), and depression (one case of AS). No emergency surgery was required for these complications.

Conclusion For patients with ARMs, the umbilicus appears to be a safe alternative site for temporary loop colostomy.

INTRODUCTION

The conventional abdominal stoma (AS) leaves an extra and often unattractive scar in the right or left lower abdomen. Cameron and Lau[1] reported the umbilicus as a site for temporary colostomy, and Fitzgerald *et al*[2] reviewed 47 cases of umbilical stomas (US) among infants and older children undergoing enterostomies. They recommended using the umbilical site for a temporary stoma in light of its cosmetic excellence and better application of ostomy appliances. Recent advances in the umbilical approach have enabled its use in the surgical treatment of various neonatal diseases, and use of this approach is considered to be a feasible and safe procedure with excellent cosmetic outcomes.[3] Sauer *et al*[4] created an umbilical loop stoma as a preliminary procedure for complicated Hirschsprung's disease. They recommended the method because it has the same advantages as the laparoscopic approach; that is, clear visualization of the bowel, excellent cosmetic results, a short hospital stay, little postoperative pain, early return to bowel function, and early enteral feeding. However, US are still not widely used.[5] Precise data regarding their complications are required.

We previously reported a pilot study of temporary umbilical loop colostomy for neonates with intermediate-type anorectal malformations (ARM) and recommended this technique for the following reasons: minimal surgical complications, secure attachment of the stoma bag, easy stoma care, excellent appearance of the umbilicus, and no other abdominal wound.[6] We herein report the postoperative complications of US compared with those of AS.

PATIENTS AND METHODS

Patients

From a prospective clinical database at Kansai Medical University Hospital, Department of Pediatric Surgery, we analyzed the patients with ARMs who underwent stoma creation from January 1995 to November 2016. The surgical technique of US creation had been performed since 2004. All surgeries were performed after obtaining informed consent from the patients.

Surgical technique for US

The surgical technique for US has been described elsewhere.[6] Briefly, the skin,

Table 1 Characteristics of patients and stoma site

	Total number of patients (n=39)	US number of patients (n=12)	AS number of patients (n=27)	P value
Sex				
Male	21 (54%)	6 (50%)	15 (56%)	0.7
Female	18 (46%)	6 (50%)	12 (44%)	
Birth weight (g)				
1500–2500	4 (10%)	1 (8%)	3 (11%)	0.8
>2500	35 (90%)	11 (92%)	24 (89%)	
Stoma site				
Transverse colon	21 (54%)	7 (58%)	14 (52%)	0.7
Sigmoid colon	18 (46%)	5 (42%)	13 (48%)	

subcutaneous tissue, and fascia were vertically cored out at the base of the umbilical cord, and the umbilical vessels and urachal remnant were individually ligated. A loop stoma was created in a double-barreled fashion. The loop was divided 7 days postoperatively, and diversion of the oral bowel was completed.

Statistical analysis

Univariate analysis was performed using the χ^2 test, and p values <0.05 were considered statistically significant.

RESULTS

US and AS were made for 12 and 27 patients, respectively. The patients' characteristics are shown in table 1. The ratios of sex, birth weight, and stoma site between patients in the US and AS groups were not significantly different.

The data of complications are shown in (table 2). The postoperative complication rates in the US and AS groups were 17% and 11%, respectively (p=0.6). Complications occurred almost equally among the listed stoma features. Symptoms of complications comprised a wound infection (one case of US), ileus (one case each of US and AS), mucosal prolapse (one case of AS), and depression (one case of AS). These complications did not require emergency surgeries.

Two representative cases of complicated US are described below.

Case 1: A female neonate diagnosed with Kabuki make-up syndrome and accompanying intermediate-type ARMs underwent creation of a transverse colostomy at the umbilicus 11 days after birth. Intestinal malrotation and a hiatal hernia were also present. She underwent a second laparotomy for treatment of ileus at 3 months of age. The surgical diagnosis was adhesive obstruction of the small bowel. The stoma was closed after 8 months. She also had persistent diarrhea and unclassifiable immunodeficiency.

Case 2: A male neonate with intermediate-type ARMs underwent creation of a sigmoid colostomy at the umbilicus 1 day after birth. He underwent surgical repair at 5 months of age and stoma closure at 7 months. After closure, he developed a wound infection at the umbilicus, which was cured in a few weeks by simple open drainage.

DISCUSSION

In this study, we have reported the results of 12 US compared with 27 AS in neonates with ARMs, focusing on their complications. Our results suggest that the umbilicus is acceptable as an alternative site for temporary colostomy for patients with ARMs because the

Table 2 Data of complicated stomas

	Total number of patients (n=39)	US number of patients (n=12)	AS number of patients (n=27)	P value
Total Complications	5 (13%)	2 (17%)	3 (11%)	0.6
	Total number of complications (n=5)	**US number of complications (n=2)**	**AS number of complications (n=3)**	**P value**
Birth weight (g)				
1500–2500	2 (40%)	1 (50%)	1 (33%)	0.7
> 2500	3 (60%)	1 (50%)	2 (67%)	
Stoma site				
Transverse colon	2 (40%)	1 (50%)	1 (33%)	0.7
Sigmoid colon	3 (60%)	1 (50%)	2 (67%)	
Symptoms				
Wound infection	1 (20%)	1 (50%)	0	0.3
Ileus	2 (40%)	1 (50%)	1 (33%)	0.7
Prolapse	1 (20%)	0	1 (33%)	0.4
Depression	1 (20%)	0	1 (33%)	0.4

AS, abdominal stoma; US, umbilical stoma.

complications were limited and curable. A limitation of this study is the lack of randomization. The patients underwent operations in different periods of time; the US were performed from 2004 to 2016, while the AS were performed from 1995 to 2016. Our analysis was limited to colostomies for ARMs, and 90% of our patients had a normal birth weight. Necrotizing enterocolitis or other sepsis-related diseases were not included because their complication rates are remarkably increased regardless of the stoma location. A US would not be recommended for neonates with a life-threatening disease such as perforated necrotizing enterocolitis because although its use is temporary, its utmost purpose is lifelong cosmesis. One may argue that there is a high risk of wound infection at the umbilicus. Yang *et al*[7] reported that among 20 patients with high ARMs, they did not encounter umbilical wound infection after successful transumbilical colostomy following laparoscopic-assisted anorectoplasty. We experienced one case of umbilical wound infection that was cured by simple open drainage.

CONCLUSION

Our results suggest that the umbilicus is acceptable as an alternative site for temporary colostomy in patients with ARMs.

Contributors TS wrote the major part of the manuscript. YH and TD were both mentors to create umbilical stoma, and planned the study. TS, HH and YS assisted surgeries and extracted data. YN conducted statistical analysis.

Funding This study was supported by the research fund of the Department of Surgery of Kansai Medical University.

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval This study was performed in accordance with 'Kansai Medical University Policy Concerning the Maintenance of High Ethical Standards in Research and Other Scholarly Activities'.

Provenance and peer review Not commissioned; externally peer reviewed.

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