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ORIGINAL ARTICLE

Outcome of Colostomy Closure without Prior Conventional Bowel Preparation

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ABSTRACT

Objective: To determine outcome of colostomy closure without prior conventional bowel preparation.

A cross-sectional study was conducted at the department of pediatric surgery, Nishtar Hospital, Multan between May 2020 to February 2021.

Results: Out of these 102 study cases, 66 (64.7%) were boys and 36 (35.3%) were girls while male to female ratio was 1.83:1. Mean age of our study cases was 6.19 ± 2.64 years (with minimum age was 2 years while maximum age was 12 years). Mean duration of surgery in our study cases was 105.88 ± 18.55 minutes (with minimum duration of the surgery was 65 minutes while maximum duration of the surgery was 145 minutes). Obesity was noted in 15 (14.7%) of our study cases. Anastomotic leakage was noted in 10 (9.8%), wound infection in 15 (14.7%) and prolonged hospital stay in 30 (29.4%) of our study cases.

Conclusion: The results of this study indicate that colostomy closure without prior conventional bowel preparation is a safe, reliable and cost effective mode of treatment. It can be applied to children of different age groups without any significant side effects and it provides less pre-operative hospital stay which is beneficial not only for the parents but also for the hospital authorities. So our study results recommend the use of colostomy closure without prior conventional bowel preparation with desired outcomes.

Keywords: Colostomy closure, wound infection, anastomotic leak.

INTRODUCTION

Colostomy aims to create an opening in the colon for the purpose of expulsion of the fetus and flatus [1]. Colostomy is very common among children. The procedure is indicated in cases of both congenital and acquired conditions, where expulsion of fecal matter is not possible via the natural route [2]. Congenital indications for colostomy are more common, with anomalies of the anus and or Hirsschsprung's disease [3]. Other less common congenital conditions requiring colostomy include rectovesical fistulas, cloacal exstrophy and spina bifida associated with incontinence.

Surgical resection of congenital intra pelvic mass may also require colostomy. Additionally, acquired disorders such as intestinal perforation, perineal and rectal trauma may also need prior colostomy. Creation of a colostomy and its termination are both linked with high mortality and morbidity rates [4-7]. Closure of a colostomy is done when the primary disease has been dealt with. A stoma can be closed at any point, however, the psychological and financial stresses warrant its early closure in most patients [8]. Generally, closure is done between two to three months following the resolution of the underlying disease. Closure of colostomy requires an in-hospital admission for five to six days.

Colostomy is closed after three days of gut preparation. Patient is shifted to a non-stool forming diet three days prior to surgery. Broad spectrum antibiotics are started two days prior to the surgery. Mechanical gut wash is performed the day prior to the surgery. The conventional preparation is difficult to perform in children as it requires prolonged preoperative NPO. It also prolongs the hospital stay of the patient and overburdens the parents socioeconomically. The objective of the present study is to assess the results following closure of stoma with bowel preparation time of one day instead of three days [9].

Chandramouli B in his study has shown 7.1% anastomotic leak in those patients who had a long conventional bowel preparation [10]. As majority of the patients in our area belong to poor socioeconomic class, prolonged hospital stay due to extra time spent for gut preparation will cause an extra burden of expenses on them.

Upon extensive research on Pakmedinet and google scholar, it was revealed that no such study has been done in Pakistan to document the results following stoma closure after a minimal duration of bowel preparation. The lack of such study among our population warranted an approach for more in detail research on the matter. The results of this study will generate a useful baseline database of our population. The results will help to manage these patients properly which will lead to decreased morbidity among the targeted population. The results will also help our local researchers to design their future more advanced studies.

METHODS AND MATERIALS

The study design was cross-sectional in nature, and was conducted in the Department of Pediatric Surgery, Nishtar Hospital Multan. The duration of time was between May 2020 up until February 2021. Participants were selected via non-probability sampling. An approval was sought from the ethical review committee of Nishtar Medical College and

Hospital, which was granted and the data collection procedures were initiated. Open EPI sample size calculator was used, with a confidence interval of 95%, rate of anastomotic leak 7.1%. The margin of error was set at 5%, and the sample size was calculated to be 102.

All the patients having a colostomy done for more than 3 months aged between 2-12 years, irrespective of gender were included. All patients with poor nutrition status as assessed by BMI and who had low weight were excluded. Patients with incomplete recovery from the underlying condition i.e. the disease for which the initial stoma was made or those in whom the colostomy closure had previously been attempted in any other unit were also ineligible.

All patients' legal guardians were asked to sign a well-informed written consent after explaining to them the nature of study and risk/benefit of the modification. Patients were assessed and thoroughly examined for any other disease. In each patient, conventional three days long mechanical and chemical bowel preparation was replaced with one day bowel preparation.

All the operations were performed under the supervision of the same consultant (fellow in pediatric surgery and has 5 years of post fellowship experience) and each patient was assessed daily by researcher for assessment of outcome as per operational definition and final outcome was noted prior to discharge and were called for follow up visits, every week for one month. All the data was noted on a pre-designed proforma which contains two parts, the 1st part was about the patient's personal particulars and the 2nd part contained study variables.

SPSS version 20 was used for the assessment of the data collected. Values of standard deviation and mean were determined for the age of patients and the length of hospital admission. Qualitative variables included wound infection, anastomotic leak and longer hospital stay, and the frequency and percentages of these variables were determined. Modifying factors such as age, gender and total time of surgery were controlled via stratification, a chi-square test was used to study their impact on the outcome variables. P values of 0.05 or below were considered to be statistically significant.

RESULTS

A mean age of 6.19 ± 2.64 years was observed in the study with the majority of the patients being males. The majority of the patients belonged to the age group 2-7 years. The mean duration of surgery was 52.88 ± 5.07 minutes. 14.7% of the patients were obese (Table 1).

Anastomotic leak in postoperative patients was significantly associated with female gender (p=0.003). Age, duration of surgery, and obesity did not have a correlation with anastomotic leak (Table 2).

Upon assessing the relationship between the wound infection and patient characteristics, it was found that younger aged patients were more likely to get wound infection, postoperatively (p=0.002). In patients with a longer surgery duration, the rate of wound infection was also significantly higher (p=0.01) (Table 3).

Age was significantly associated with prolonged hospital stay (p<0.0001) (Table 4).

Table 1: Sociodemographic and Clinical characteristics of study Participants

Parameters	N (%)
Gender	
Male	66 (64.7%)
Female	36 (35.3%)
Age groups	
2 – 7 Years	70 (68.6%)
>7 Years	32 (31.4%)
Duration of surgery (mins)	
Equal to or less than 50 minutes	26 (25.5%)
Greater than 50 minutes	76 (74.5%)
Obesity	
Yes	15 (14.7%)
No	87 (85.3%)
Anastomotic leak	
Yes	10 (9.8%)
No	92 (90.2%)
Wound infection	
Yes	15 (14.7%)
No	87 (85.3%)
Prolonged hospital stay	
Yes	66 (64.7%)
No	36 (35.3%)

Table 2: Association of Anastomotic leak with respect to patient characteristics

Parameters	Anastomotic Leak		p-value
	Yes	No	
Gender			0.003
Male	2 (20%)	64 (69.6%)	
Female	8 (80%)	28 (30.4%)	
Age groups			0.165
2 –7 Years	9 (90%)	61 (66.3%)	
>7 Years	1 (10%)	31 (33.7%)	
Duration of surgery			0.445
Equal to or less than 50 minutes	1 (10%)	25 (27.2%)	
Greater than 50 minutes	9 (90%)	67 (72.8%)	
Obesity			1
Yes	1 (10%)	14 (15.2%)	
No	9 (90%)	78 (84.8%)	

Table 3: Association between Wound Infection and Patient Characteristics

Parameters	Wound infection		p-value
	Yes	No	
Gender			1
Male	10 (66.7%)	56 (64.4%)	
Female	5 (33.3%)	31 (35.6%)	
Age			0.002
2 – 7 Years	15 (100%)	55 (63.2%)	
>7 Years	0 (0%)	32 (36.8%)	
Duration of surgery			0.01
Equal to or less than 50 minutes	0 (0%)	26 (29.9%)	
Greater than 50 minutes	15 (100%)	61 (70.1%)	
Obesity			0.043
Yes	5 (33.3%)	10 (11.5%)	
No	10 (66.7%)	77 (88.5%)	

Table 4: Association of Hospital stay with Patient Parameters

Parameters	Prolonged hospital stay		p-value
	Yes	No	
Gender			0.068
Male	15 (50%)	51 (70.8%)	
Female	15 (50%)	21 (29.2%)	
Age			<0.0001
2 – 7 Years	30 (100%)	40 (55.6%)	
>7 Years	0 (0%)	32 (44.4%)	
Duration of surgery			0.221
Equal to or less than 50 minutes	5 (16.7%)	21 (29.2%)	
Greater than 50 minutes	25 (83.3%)	51 (70.8%)	

Obesity			0.763
Yes	5 (16.7%)	10 (13.9%)	
No	25 (83.3%)	62 (86.1%)	

DISCUSSION

Massive progress has been made in the past few years with regards to creation of a stoma and its subsequent closure. Regardless, procedural complications are a common occurrence. Pediatric stomas are mostly created for a short period of time, and the complications are limited by early stoma closure. In order to provide pediatric patients with the best possible care, understanding the construction and physiology of stoma construction is essential.

Zahra et al. in their study found that closure of colostomy with no previous bowel preparation is a safe and effective method [11]. This method can be used on children of all ages with no known side effects and since it is not a costly procedure it was easier on the parents. Harries et al. studied the comparison of the rate of surgical site infections between linear and purse-string closure groups on stoma reversal and found no difference in complications post colonoscopy [12]. However a low rate of surgical site infections was seen in patients who underwent purse-string closure and compared to linear but no increased hospital day. Amamo et al. in their study discovered primary closure with a drain to be the standard method for stoma reversal surgery [13]. Bismar et al. found no difference in recovery of appetite, complications or continence once bowel continuity was established [14]. Children who were treated with refractory ulcerative colitis who were treated with both TIPAA and NIPAA had the same outcomes with only minimal differences. Similarly, Sayuen et al. found a lower rate of surgical site infections in the the technique of purse-string closure as compared to the linear closure group with no significant increase in hospital stay duration [15]. Uzair et al. found the average hospital day to be 6.65 days with complications related to surgery to be wound infection, injury of the posterior vaginal wall and wound dehiscence [16]. Furthermore, Anterior sagittal anoretopexy and Posterior sagittal anorectopexy was considered for primary single stage procedure to treat rectovestibular fistula in females. Kauffman et al. in their study found surgical site infections to be the most common complication after which unplanned reintubation and bleeding were also seen with a mortality rate of 0.4% after ostomy takedown [17]. In a study conducted by Kamil et al. complications were more likely to be seen in double layer or continuous technique of closure colostomy versus the single layer [18].

CONCLUSION

The results of this study indicate that colostomy closure without prior conventional bowel preparation is a safe, reliable and cost effective mode of treatment. It can be applied to children of different age groups without any significant side effects and it provides less pre-operative hospital stay which is beneficial not only for the parents but also for the hospital authorities. So our study results recommend the use of colostomy closure without prior conventional bowel preparation with desired outcomes.

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