


Comparison of Divided Versus Loop Sigmoid Colostomy in the Management of Anorectal Malformation

Naveed Haider^{1*}, Imran Hashim¹, Asif Iqbal¹, Armaghan Ahmad¹, Soban Hameed¹, Arsalan Raza Wasti¹, Muhammad Saleem¹

¹The Children's Hospital & institute of child health, Lahore, Pakistan

*Address for Corresponder: Dr. Naveed Haider, children's Hospital & Institute of Child health, Lahore, Pakistan (email: relucentstar1@gmail.com)

How to cite this article:

Haider N, Hashim I, Iqbal A, Ahmad A, Hameed S, Wasti AR, Saleem M. Comparison of Divided Versus Loop Sigmoid Colostomy in the Management of Anorectal Malformation. Iranian Journal of Pediatric Surgery 2019; 5 (2):54-59

DOI: <https://doi.org/10.22037/irjps.v5i2.23490>

Abstract

Introduction: Anorectal malformation (ARM) is a birth defect of the digestive tract in which the anus and rectum are not normally developed. Surgical procedure such as colostomy (loop or divided) is suggested as the initial treatment for high variety ARM. Our objective was to compare frequency of stoma related complications of loop sigmoid colostomy versus divided sigmoid colostomy for high variety anorectal malformations.

Materials and Methods: A randomized controlled trial was carried out at children's hospital and the institute of child health Lahore. A total of 180 patients were divided into two groups randomly using lottery method loop sigmoid colostomy (group-A) and divided sigmoid colostomy (group-B). After surgeries patients were followed weekly up till 4 weeks. Stoma related complications were noted.

Results: The mean age in group A and group B were 3.22 ± 1.26 days and 3.36 ± 0.97 days respectively. In group A there were 77 male & 13 were female, in group B there were 67 male & 23 female patients. In group A 24.5% patients had complications: 3.4% patients had retraction, 11.1% had prolapse, 2.2% had Obstruction, parastomal hernia was seen in 5.6%, stoma necrosis were seen in 2.2%. In group B 20% patients had different complications: 2.2% patients had retraction, 2.2% had prolapse, 5.6% had obstruction, parastomal hernia were seen in 2.2% and stoma necrosis were seen in 7.8%. The complications in group A were higher when compared to group B but were not significant, p-value > 0.05.

Conclusion: Divided sigmoid colostomy can be adopted to avoid stoma related complications in future.

Keywords

- Anorectal malformation
- Divided colostomy
- Loop colostomy

received: 26 November 2018

accepted: 18 August 2019

online submission: 01 November 2019

This open-access article is distributed under the terms of the Creative Commons Attribution Non Commercial 3.0 License (CC BY-NC 3.0).

Downloaded from: <http://journals.sbmu.ac.ir/irjps>

Introduction

Anorectal malformation (ARM) is a condition of the digestive tract in which the anus and rectum are not normally developed. This anomaly can also involve the urinary and genital tract.^{1,2} Reported incidence of ARM is 1 in 4000-5000 births and it is a big challenge in developing countries.¹ With the advent of new management modalities and a better understanding of anatomy and nature of these malformations, the outcome started improving.³

Arm is classified into low and high according to the anatomic location of the colon in relation to the skin: in low lesions, the colon is close to the skin; there may be a stenosis (narrowing) of the anus, or the anus may be missing altogether, with the rectum ending in a blind pouch.⁴ In high lesions, the colon is higher up in the pelvis and there is a fistula connecting the rectum and the bladder, urethra or the vagina.⁴

Initial treatment of ARM is colostomy for high lesions, whereas low lesions can be treated primarily with an anoplasty.⁵ A study in 2014 reported that the incidence of stoma-related complications (such as retraction, prolapse, obstruction, parastomal herniation, need for stoma revision, urinary tract infection and Megarectum) was seen 31.5% in loop and 15.5% in divided colostomy, respectively ($p=0.031$).⁶ Among them the incidence of prolapse was statistically higher in loop colostomy i.e. 17.8% when compared to divided colostomy i.e. 2.8% , $p=0.005$.⁶

Our aim was to compare stoma related complications in our population as no local study is available for guidelines to treat our patients

with loop or divided colostomy. Internationally the recent published data shows that loop sigmoid colostomy has fewer complications as compared to divided sigmoid colostomy. We in routine practice use loop colostomy without having any statistical evidence regarding stoma related complications and rarely use divided colostomy. This study can help us to open a new horizon and after this study we may motivate our pediatric surgeons to use divided colostomy to ensure lesser complications related to stoma.

Materials and Methods

This was a randomized controlled trial conducted in the Pediatric Surgery department of the children's hospital and the institute of child health Lahore. After approval from hospital ethical committee the study was conducted for 1.5 years from September 2015 to March 2017. Children from 1 day to 1 month of age with anorectal malformation were included. Patients having intestinal perforation, infection at anus & operated or referred for either definitive surgery or with complications of colostomy were excluded. Sample size of 180 cases was calculated with 80% power of test and a 5% level of significance. Patients of anorectal malformation meeting inclusion criteria were taken in this study. All the patients were admitted through emergency or outpatient department of Pediatrics Surgery department of the children's hospital and the institute of child health Lahore. Basic demographic (name, age and sex) and clinical history (type of anorectal malformation) was obtained after taking informed consent form attendants / parents. Patients were divided into two groups randomly using lottery method loop sigmoid colostomy (group-A) and divided sigmoid

colostomy (group-B). Both procedures were explained to parents /attendants by the surgeon. For loop sigmoid colostomy (group-A), the stoma was brought out as a loop and retraction was prevented by using a skin bridge passed under the mesenteric border. For divided sigmoid colostomy (group-B), a small V shaped gap was made in the mesentery, preserving the marginal artery; bowel was divided and fixed to the peritoneum and fascia. The two separate ends were brought to the surface. The proximal stoma was placed in the lateral part of the incision and distal stoma in medial part of the incision. After surgeries patients were followed weekly up till 4 weeks. Stoma related complications such as (Retraction, Prolapse, Stenosis, Parastomal hernia & necrosis of the stoma) were noted. Data was analyzed using SPSS version 21. Quantitative variables i.e. age was summarized as mean \pm standard deviation. Qualitative variables i.e. sex, stoma related complications of colostomy was

presented as frequency and percentage. Chi square test was applied to compare complications (as per operational definition) in both study groups. P value ≤ 0.05 was taken as statistically significant.

Results

The mean age of patients in this study was 3.34 ± 1.12 days at the time of surgery with minimum and maximum age of 1 and 6 days. The mean age in group A and group B were 3.22 ± 1.26 days and 3.36 ± 0.97 days. There were 144 (80%) male and 36 (20%) female patients in this study. In group A there were 77(85.6%) male and 13(14.4%) were females, in group B there were 67(74.4%) male and 23(25.6%) female patients. According to gestational age, 61(33.9%) infants were preterm while 119(66.1%) were born term. In group A there were 29(32.2%) preterm and 61(67.8%) were term while in group B there were 32(35.6%) preterm and 58(64.4%) were born term **Table 1**.

Table 1: Comparison of age, Gender and Gestational age in both study groups.

| | Group A (Loop Sigmoid colostomy) | | Group B (Divided Sigmoid colostomy) | |
|-----------------------------------------------------------|----------------------------------|------------|-------------------------------------|------------|
| Age (Mean \pm SD) (In days) | 3.34 \pm 1.12 | | 3.22 \pm 1.26 | |
| Gender | n=90 | Percentage | n=90 | Percentage |
| Male | 77 | 85.6 | 67 | 74.4 |
| Female | 13 | 14.4 | 23 | 23 |
| Gestational Age | | | | |
| Term | 61 | 67.8 | 58 | 64.4 |
| Preterm | 29 | 32.2 | 32 | 35.6 |

Regarding complications: in group A 3(3.3%) and in group B 2(2.2%) patients had retraction, p-value = 0.65. Prolapse was seen in 10 (11.1%) in group A and 2 (2.2%) in group B, Prolapse was significantly higher in group B as compared to group A, p-value=0.017. In 2 (2.2%) patients of group A and 5 (5.56%) of group B developed Obstruction. There was no significant difference

between obstruction in both groups, p-value = 0.0247. A total of 5(5.6%) patients in group A and 2 (2.2%) patients in group B had parastomal hernia which was a insignificant difference, p-value = 0.247. Stoma necrosis was seen in 2 (2.2%) patients in group A and 7(7.8%) patients of group B **Table 2**.

Table 2: Comparison of Stoma related complications in both groups.

| Complications | Group-A | | Group-B | | P value |
|--------------------------|-------------|------------|-------------|------------|-------------|
| | No | Yes | No | Yes | |
| | % | % | % | % | |
| Stoma retraction | 96.1 | 3.3 | 97.8 | 2.2 | 0.65 |
| prolapse | 88.9 | 11.1 | 97.7 | 2.2 | 0.017 |
| Obstruction | 97.8 | 2.2 | 94.4 | 5.6 | 0.247 |
| Parastomal hernia | 94.4 | 5.6 | 97.8 | 2.2 | 0.247 |
| Stoma necrosis | 97.8 | 2.2 | 92.2 | 7.8 | 0.87 |

Regarding overall complication, 22 (24.4%) patients in group A and 18 (20%) patients in group B were seen.

Statistically there was no significant difference of complications in both groups, p-value = 0.473.

Discussion

Anorectal malformations (ARM) are amongst the most common birth defects in the world.⁷ Their surgical management has changed considerably since 1980.⁹ Constructing a colostomy is a crucial part of management in newborns with high type ARMS^{10, 11} and should not be regarded as a minor

procedure. Our experience shows that occurrence of complications after creating a colostomy is high.¹³ Most colostomy complications are preventable.¹⁴ Loop colostomies result in urinary tract infections due to spillage of fecal matter into the distal loop and also the presence of rectovesical or rectourethral fistula, distal fecal impaction, and prolapse.¹⁵

In a study in 2014 two groups of patients (44 patients, 37.5% female) were compared, first group had a loop colostomy for ARM management (50.7%), the other had a divided colostomy (49.3%). stoma-related complications occurred more commonly in the loop colostomy group ($P=0.031$). Regarding individual complications only stoma prolapsed was more common in the loop colostomy group [OR 8.75, 95%CI (1.74, 44.16), $p=0.009$].⁶ In group A there were 77(85.6%) male and 13(14.4%) were females, in group B there were 67(74.4%) male and 23(25.6%) female patients. The higher portion of male is the same as reported in above study.

We also found that in group A 22 (24.5%) patients had complications [3 (3.4%) patients had retraction, 10 (11.1%) had prolapse, 2 (2.2%) had obstruction, parastomal hernia were seen in 5 (5.6%), stoma necrosis were seen in 2 (2.2%)] and in group B, 18 (20%) patients had different complication [2 (2.2%) patients had retraction, 2 (2.2%) had prolapse, 5 (5.6%) had obstruction, parastomal hernia were seen in 2 (2.2%), stoma necrosis were seen in 7 (7.8%)], the complications in group A were higher when compared to group B but were not statistically significant. Our findings are almost similar to the above study.

In another study on 49 neonates with anorectal malformations, thirty-nine loop colostomies and 7

divided colostomies were created. Sixteen patients (32%) developed mechanical complications related to colostomy (including: prolapsed, intestinal obstruction and skin dehiscence). One case developed necrotizing enterocolitis (NEC). Urinary tract infection (UTI) occurred in 14 infants (29%) following colostomy formation and there was no difference between the loop colostomy or the divided colostomy group regarding UTI.¹³

Conclusion

In this study fewer complications were seen in group B when compared to group A, but were not statistically significant except stoma prolapse which was significantly more in group A. So, divided sigmoid colostomy must be adopted to avoid stoma related complications in future.

Ethical Consideration

This study was approved by Institutional Review Board (IRB)/ Ethical Committee of The Children's Hospital & the Institute of Child Health, Lahore.

Acknowledgements

Not applicable

Funding/Support

Not applicable

Conflict of interests

There is no conflict of interests.

References

1. Beudeker N, Broadis E, Borgstein E, et al: The hidden mortality of imperforate anus. *Afr J Paediatr Surg* 2013;10(4):302-6.
2. Zwink N, Jenetzky E, Brenner H: Parental risk factors and anorectal malformations: systematic review and meta-analysis. *Orphanet J Rare Dis* 2011;6:25-42.
3. Mirza B, Ijaz L, Saleem M, et al: Anorectal malformations in neonates. *Afr J Paediatr Surg* 2011;8(2):151-4.
4. Iwai N, Fumino S: Surgical treatment of Anorectal Malformations. *Surg Today* 2013;43:955-62.
5. Meier DE, Hesse AA: Anorectal malformations. *Paediatr Surg: A Comprehensive Text for Africa* Seattle: Global Help 2011:455-60.
6. Oda O, Davies D, Colapinto K, et al: Loop versus divided colostomy for the management of anorectal malformations. *J Pediatr Surg* 2014;49(1):87-90.
7. Holschneider A, Hutson J, Peña A, et al: Preliminary report on the International Conference for the Development of Standards for the Treatment of Anorectal Malformations. *J Pediatr Surg* 2005;40(10):1521-6.
8. Levitt MA, Peña A: Anorectal malformations. *Orphanet J rare Dis*. 2007;2(1):33: DOI: 10.1186/750-72-2-33.
9. Goldblum JR: Rosai and Ackerman's Surgical Pathology E-Book. Elsevier Health Sciences 2017.
10. Chirdan LB, Uba FA, Ameh EA, et al: Colostomy for high anorectal malformation: an evaluation of morbidity and mortality in a developing country. *Pediatr Surg Int* 2008;24(4):407-10.
11. Shrivastava D, Jain S, Kuldeep AC, et al: Colostomy related morbidity and mortality in neonates with anorectal malformation. *J. Evolution Med. Dent. Sci* 2016;5(68):4882-4.
12. Pena A, Migotto-Krieger M, Levitt MA: Colostomy in anorectal malformations: a procedure with serious but preventable complications. *J Pediatr Surg* 2006;41(4):748-56.
13. Patwardhan N, Kiely EM, Drake DP, et al: Colostomy for anorectal anomalies: High incidence of complications. *J Pediatr Surg* 2001;36(5):795-8.
14. Nasar GN: Indications & Complications of Colostomy in Children. *Annals of Punjab Medical College (APMC)* 2017;11(2):110-2.
15. Yang L, Tang ST, Li S, et al: Two-stage laparoscopic approaches for high anorectal malformation: Transumbilical colostomy and anorectoplasty. *Journal of pediatric surgery* 2014;49(11):1631-4.