Original Research Paper

General Surgery

## SHORT TERM OUTCOME OF DIVERSION LOOP COLOSTOMY IN CHILDREN OF ANORECTAL MALFORMATION.

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**ABSTRACT**

**Purpose:** Colostomy for patients with anorectal malformations decompresses an obstructed colon, avoids fecal contamination of the urinary tract, and protects a future perineal operation. The procedure is associated with several significant complications.

**Objective:** To study relation of various demographic factors, clinical features, complications and patient related factors with outcomes.

**Methods-** All necessary data of these 50 patients were obtained from case sheets and attendants of patients admitted in SNCU, NICU and wards of department of paediatrics and surgery. All the details (demographic, patients related, surgery) of patient was filled in predesigned structured proforma.

**Results-** More than half of babies were males (68%). The male to female ratio was 2.1:1. The mean weight at post-operative 7 days was $4.74\pm0.21$ kgs which increased to $5.19\pm0.41$ kgs at post-operative 1 month, $5.73\pm0.88$ kgs at post-operative 2 months and $6.28\pm0.6$ kgs at post op 3 months. There was significant (p=0.001) increase in weight from post-operative 7 days to post-operative 1 month, 2 months and 3 months. Peri stomal skin excoriation was seen in 8% at post-operative 7 day, 14% at post-operative 1 month, 12% at 2 months and 4% at 3 months. Stomal prolapse was seen in 2% patients at post-operative 7 days and in 4% patients at 1 month & 2 months and became nil at 3 months post-operatively. There was significant (p=0.001) difference in weight gain from 7 days to 3 months post-operative between groups of age <30 days ($1.67\pm0.33$ kgs) and ≥30 days ($1.08\pm0.65$ kgs).

**Conclusion-** Minimal post-operative complications of diversion loop colostomy in children of anorectal malformation and hence we can conclude that loop colostomy is safe in patients with anorectal malformations. we recommend, a study with a large sample size and longer duration of follow up, needs to be done to have a more effective and rationale conclusion.

**KEYWORDS :** Colostomy, stoma, anorectal malformation.

### INTRODUCTION-

An Anorectal malformation (ARM) comprises a term used to encompass the wide range of defects involving the development of the rectum and anus. The incidence worldwide varies from 1 in 1500 to 1 in 5000 [1]. The high and intermediate, occasionally low ARM in boys and girls require diversion colostomy. Our institute (S.G.M.H.) is situated in the central part of Vindhya region and is a government tertiary care hospital which is taking care of all patients seeking health care from Sidhi, Satna, Singhroli, Chhatarpur, Damoh, Panna, Shahdol, Anuppur and Umaria districts. Our hospital has high numbers of ARM patients.

This study was conducted in our institute to determine the short term outcome (occurring within a period of 3 months of creation) of diversion loop colostomy in children with anorectal malformation.

**AIMS AND OBJECTIVES-** To study outcomes of diversion loop colostomy in ARM patients. To study relation of various demographic factors and patient related factors with outcomes. To study associated other congenital structural anomalies.

### MATERIAL AND METHODS-

**Study Design :-** Descriptive study done prospectively

**Study Duration** - 1st June 2019 to 31st May 2020 (12 months)

**Setting-** Department of General Surgery

Department of Paediatrics
SSMC and Associated SGMH and GMH, Rewa

**Inclusion Criteria-** All children of anorectal malformation who underwent diversion loop colostomy

**Exclusion Criteria** - All Patients who died because of some other structural anomalies like Congenital heart disease.
- All patients who did not come for 3 month follow-up.
- If patients that had other associated bowel anomalies (such as atresia of the small bowel) that require additional surgery(like ileostomy)

**Sample Size-** 50

**Method Of Data Collection-**

This study was conducted on 50 out of 62 children of anorectal malformations who underwent diversion loop colostomy (either sigmoid or transverse) after approval form the institutional ethical committee, between 1st May 2019 and 31st June 2020 who fulfilled the inclusion criteria. All necessary data of these 50 patients were obtained from case sheets and attendants of patients admitted in SNCU, NICU and wards of department of paediatrics and surgery. Post-operatively all these patients were followed in wards and outdoor department at the following time intervals, at 7 days, at 1 month, at 2 months and at 3 months by calling the patients on their respective phone numbers.

All the details (demographic, patients related, surgery) of

patient was filled in predesigned structured proforma. All the possible complications (wound infection, prolapse, peristomal excoriation, stomal stenosis revision surgery for stoma, readmission to hospital for stoma related problems) was recorded on this proforma along with photographs.

Two Dimensional Echocardiography, USG KUB, X RAY /USG OF SPINE was carried out to rule out other VACTERAL anomalies.

## Statistical Analysis:-
All this data was tabulated in master chart in MS Excel sheet for further detailed descriptive analysis and this data was later analyzed using the Statistical software namely SPSS 22.0 and R environment ver.3.2.2 to generate graphs, tables etc. Result and conclusions were drawn after discussion with review of literature.

## RESULTS-
A total of 50 patients were included in the study, the data was collected, analysed and following observations were made:

## Table-1: Characteristic Distribution Of Patients

| Age | No. (n=50) | % |
|---|---|---|
| <30 days | 39 | 78.0 |
| ≥30 days | 11 | 22.0 |
| **Gender** | | |
| Male | 34 | 68.0 |
| Female | 16 | 32.0 |
| **Diagnosis** | | |
| High | 22 | 44.0 |
| Intermediate | 22 | 44.0 |
| Vestibular fistula | 6 | 12.0 |
| **Pre-term/term birth** | | |
| Pre-term | 9 | 18.0 |
| Term | 41 | 82.0 |
| **Antenatally diagnosed** | | |
| Yes | 0 | 0.0 |
| No | 50 | 100.0 |
| **Associated anomalies** | | |
| Radial dysplasia | 2 | 4.0 |
| ASD | 3 | 6.0 |
| Meningocele | 1 | 2.0 |
| Spina bifida occulta | 5 | 10.0 |
| Tracheo-oesophageal fistula | 2 | 4.0 |
| U/l Hydronephrosis | 3 | 6.0 |
| VUR | 1 | 2.0 |
| PDA | 2 | 4.0 |
| None | 31 | 62.0 |
| **Birth weight** | | |
| <2.5 kgs | 16 | 32.0 |
| ≥2.5 kgs | 34 | 68.0 |
| **Site of stoma** | | |
| Sigmoid | 17 | 34.0 |
| Transverse | 33 | 66.0 |
| **Hospital stay** | | |
| <10 days | 38 | 76.0 |
| ≥10 days | 12 | 24.0 |

The majority of patients were below 30 days of age (78%), more than half of babies were males (68%). The male to female ratio was 2.1:1. More than two thirds of patients (88%) had high & intermediate type of ARM (44% each). Vestibular fistula was in 12% patients. spina bifida occulta associated anomaly was in 10% patients. ASD and U/l Hydronephrosis each constituted 6%. Radial dysplasia, Tracheo-oesophageal fistula and PDA each constituted 4%. Overall 38% patients had some or the other associated anomalies and 62.0% had no such associated structural anomalies. birth weight ≥2.5 kgs was among more than half of patients (68%). The mean

birth weight was 2.64±0.52 kgs. the duration of hospital stay was <10 days in majority of patients (76%). The mean hospital stay was 8.32 days. (Table-1)

## Table-2- Clinical Features

| Immediate post-op complications (Within 1 week) | No. (n=50) | % |
|---|---|---|
| Excoriation | 4 | 8.0 |
| None | 46 | 92.0 |
| **Revision surgery required** | | |
| Revision of prolapsed stoma | 5 | 10.0 |
| None | 45 | 90.0 |
| **Feeding started post-operative days** | | |
| 1st day | 10 | 20.0 |
| 2nd day | 26 | 52.0 |
| ≥3rd day | 14 | 28.0 |
| **Late complications** | | |
| Excoriation | 8 | 16.0 |
| Fecaloma | 4 | 8.0 |
| Parastomal herniation | 1 | 2.0 |
| Prolapse | 5 | 10.0 |
| Stenosis | 2 | 4.0 |
| UTI | 3 | 6.0 |
| None | 27 | 54.0 |
| **Time period/complications** | | |
| **Post-operative 7 days** | | |
| Excoriation | 4 | 8.0 |
| Prolapse | 1 | 2.0 |
| None | 45 | 90.0 |
| **Post-operative 1 month** | | |
| Excoriation | 7 | 14.0 |
| Fecaloma | 2 | 4.0 |
| Prolapse | 2 | 4.0 |
| UTI | 3 | 6.0 |
| None | 36 | 72.0 |
| **Post-operative 2 months** | | |
| Excoriation | 6 | 12.0 |
| Fecaloma | 2 | 4.0 |
| Prolapse | 2 | 4.0 |
| Stenosis | 2 | 4.0 |
| None | 38 | 76.0 |
| **Post-operative 3 months** | | |
| Excoriation | 2 | 4.0 |
| Parastomal hernia | 1 | 2.0 |
| Stenosis | 2 | 4.0 |
| None | 45 | 90.0 |

As evident from the above table, excoriation as immediate post-op complication was in 8% patients. feeding was started at 2nd day of post-operative period in 52% patients followed by ≥3rd day (28%) and 1st day (20%). Excoriation was most common late complication (16%) and Prolapse was second most common late complication (10%). Parastomal herniation was least common late complication (2%). In total 23 patients (46%) had some or the other late complications. Excoriation complication was in 8% at post-operative period of 7 days which became 14% at post-operative 1 month, 12% at 2 months and 4% at 3 months. Prolapse complication was in 2% patients at post-operative 7 days and in 4% patients at 1 month & 2 months and became nil at 3 months post-operative. (Table -2)

## Table-3: Comparison Of Weight Gain From Post-operative 7 Days To 3 Months According To Age And Gender

| Age in year | Weight gain |
|---|---|
| <30 days | 1.67±0.33 |
| ≥30 days | 1.08±0.65 |
| p-value[1] | 0.001* |
| **Gender** | |
| Male | 1.68±0.41 |

| Female | 1.25±0.50 |
| p-value[1] | 0.002* |

[1]Unpaired t-test, *Significant

As evident from the above table, there was significant (p=0.001) difference in weight gain from 7 days to 3 months between age <30 days (1.67±0.33 kgs) and ≥30 days (1.08±0.65 kgs). Difference in weight gain from 7 days to 3 months between male (1.68±0.41 kgs) and females (1.25±0.50 kgs).

## DISCUSSION-

ARM (incidence of 1 in 1500 to 1 in 5000 live births)[2] comprises a term used to encompass the wide range of defects involving the development of the rectum and anus. Even with the emergence of a new trend of primary repair without colostomy in high-type and intermediate type ARM, most paediatric surgeons prefer a protective diversion colostomy before performing the definitive surgery.

In our study, majority of patients were below 30 days of age (78%) and the rest were in the post neonatal age group (22%). More than half of babies were males (68%). The male to female ratio was 2.1:1.In the British Columbia Hospital study comprising 120 patients of ARM, in which 105 (87.50%) patients presented in neonatal period and 15 (12.50%) in post neonatal period[3].

Our study found that more than two third of patients had high & intermediate ARM (88%). Vestibular fistula (low ARM) was in 12% patients. The incidence of high variety anorectal malformation was more common than other varieties in the study done by Chen series (1999)[4].

In our study, we found that majority of patients were term babies (82%) and remaining were pre term (12%). None of the patients were antenatally diagnosed in this study. Similar to our study, Hagras et al (2019)[5] found that majority of birth was full term (94.1%) in their study group.

In our study, it was observed that 38.0% (i.e. 29 out of 50) of the total patients had some or the other associated anomalies. 10% patients (i.e. 5 patients) had spina bifida occulta, ASD and unilateral Hydronephrosis each constituted 6%. Radial dysplasia, Tracheo-oesophageal fistula and PDA each constituted 4%. In a study by Rattan et al (2004)[6], ARMs were associated with urogenital anomalies (39%), gastrointestinal anomalies (9%) and vertebral (28%), cardiac (10%) and trachea-esophageal fistula (7%) and 4% cases were associated with other anomalies.

In a study by Kumar et al (2004)[7], associated Esophageal Atresia and Tracheooesophageal Fistula (TEF) with left amastia and multiple congenital anomalies was seen in association with high variety of anorectal malformation and hypospadias.

In our study, birth weight ≥2.5 kgs was seen in more than half of patients (68%). The mean birth weight was 2.64±0.52 kgs. In the study by Gubbi et al (2018)[8], the mean birth weight was 2.3±0.33 kg in ARM patients (range 700 g–3.3 kg).

In our study, 66% patients underwent transverse colostomy and 34% patient underwent sigmoid colostomy. In a study by Almosallam et al, out of 55 loop colostomies constructed, 12 were transverse (21.8%) and 43 were sigmoid/descended (78.2%)[9].

Eight percent of our patients had skin excoriation around the stoma as immediate (<1 week) post op complication. In our study, we observed that excoriation was most common late complication (1 week to 3 months) 16% of cases and Prolapse

was second most common late complication in 10% of cases. Stenosis was seen in 4% patients. Parastomal herniation was least common late complication seen in 2% cases. Overall excoriation was most common early complication (8.0%) and late complication (16.0%). In the study by Oda et all, Prolapse was the most common complication at 13 cases (32.5%) among 40 loop colostomies followed by 12 cases of UTI (30%), need for stoma revision in 7 cases (17.5%), megarectum in 5 cases (12.5%), parastomal hernia in 2 cases (5%), retraction in 1 case (2.5%) and 0 cases of obstruction[9].

In a study by Almosallam et all, among 55 loop colostomies, skin excoriation around the stoma was the most common complication at 10 cases (18.2%), prolapse and megarectum (fecoloma) were each at 5 cases (9.1%),UTIs were seen in 2 cases(3.6%),stoma necrosis, stenosis, peristomal hernia, bleeding were all seen in 1 case each(1.8%) and no cases of obstruction and retraction were seen[9].

Our study revealed that the mean weight at post-operative 7 days was 4.74±0.21 kgs which increased to 5.19±0.41 kgs at post-operative 1 month, 5.73±0.88 kgs at post-operative 2 months and 6.28±0.6 kgs at post-operative 3 months. There was significant (p=0.001) increase in weight from post-operative 7 days to post-operative 1 month, 2 months and 3 months.

We have found in our study, that skin excoriation around stoma in 8% of cases at 7th post-operative day, which became 14% at 1 month post-operatively, 12% at 2 months post-operatively and 4% at 3 months post-operatively. Stomal prolapse was seen in 2% of patients at 7th post-operative day and in 4% of patients at 1 month and 2 months post-operatively. At 3 months post-operatively, no stomal prolapse was seen. Revision surgery was required in 10% patients who developed prolapse over a period of 1st 2 months follow up.

In a study by Mirza et al (2011)[10] in 100 patients with ARM, 15% developed post-operative complications after colostomy which included wound infection in 10 patients, parastomal herniation in 2 patients and gangerene and colostomy retraction in one patient each. Four patients had to be re-operated for these complications.

In another study by Fiqueroa et al (2007)[11] in 185 patients of ARM, colostomy complications included retraction (7 patients), Prolapse (7 patients), closure of distal opening (5 patients), proximal stenosis (3 patients), ostomy necrosis (1 patient) parastomal hernia (2 patients).

Van den Hondel et al conducted a study that compared loop and divided (split) colostomy in ARM patients and they observed no difference in complications between the two groups (23% and 16%, respectively, P=0.389) and commonest complication reported was prolapse, however all prolapses occurred in the transverse colon group[12]. Another study showed that the incidence of skin excoriation as well as prolapse was more in the loop colostomy when compared to the divided colostomy group, and the site of colostomy was loop transverse in majority of the cases[13].

Divided sigmoid colostomy has excellent results in babies more than 2.5kg weight but in context of the developing world and in a scenario of limited critical care availability, transverse loop colostomy under local anaesthesia may save lives[14].

In spite that it is not free of problems, the loop colostomy has been acclaimed as ideal for most temporary indications which, luckily, are quite common in childhood [15,16,17].

It has been suggested that divided sigmoid colostomy with

enough skin bridge between proximal stoma and distal mucous fistula allows the stoma bag to be fixed on the proximal stoma, which further prevents the development of urinary tract infection, megarectum, and wound infection. Divided sigmoid colostomy might result in better radiological studies and a lower incidence of prolapse. On the other hand, a loop colostomy has better cosmesis owing to a smaller incision and is comparatively much easier to create and close [18].

The stoma duration has been taken into consideration by many surgeons to be a more important factor than the type of the stoma with regard to complications, and thus, a short-lived well-constructed stoma is less likely to cause any problems regardless of its type. One study had shown no difference is there between loop and divided stomas when the loop stoma was closed early (2-4 months)[19].

One of the limitations of our study was small sample size and short duration of study period. The studies with larger sample size and long duration of study period are required to have more robust findings.

## CONCLUSION-
This study found minimal post-operative complications of diversion loop colostomy in children of anorectal malformation and hence we can conclude that loop colostomy is safe in patients with anorectal malformations. Although a colostomy is considered to be simple, it remains a delicate surgical procedure that requires good surgical skills and proper postoperative care to prevent complications. Moreover, early definitive repair of ARM and thus early closure of the colostomy may minimize morbidity.

One of the limitations of our study was a small sample size and short duration of study period. Hence we recommend, a study with a large sample size and longer duration of follow up, needs to be done to have a more effective and rationale conclusion.

## REFERENCES:-
1. Levitt MA, Pena A. Anorectal Malformations. Orphanet J Rare Dis. 2012; 7: 98.
2. Bhatnagar S. Anorectal Malformation. J Neonatal Surg. 2015; 4: 1.
3. Kim HLN, Gow KW, Penner JG. Presentation of low anorectal malformation beyond the neonatal period. Pediatrics. 2000;105(5):68.
4. Chen CJ. Treatment of imperforate anus- experience with108patients. Journal Ped Surg. 1999;34(11):1728-32.
5. Hagras IM, Mansour MA, Shalaby MM, El-Attar AA and Abdalla AE. Loop versus Divided Colostomy in Patients with High and Intermediate Anorectal Malformations: Randomized Controlled Study. The Egyptian Journal of Hospital Medicine 2019; 77 (1): 4675-4680.
6. Rattan SK, Rattan KN, Pandey RM, Mittal A, Magu S, Sodhi PK. Associated congenital anomalies in patients with anorectal malformations- A need for developing a uniform approach. Journal of Pediatric Surgery. 2004;39(11):1706-11.
7. Kumar V, Apte AV, Gangopadhyay AM, Singh S. Tracheoesophageal fistula and amastia with other anomalies- an unusual association. Pediatr Surg Int. 2004;20:378-79.
8. Gubbi S, Gupta R, Gupta AK, Shukla AK. Left transverse loop colostomy versus high sigmoid loop colostomy for high-type anorectal malformations: Early outcome analysis. J NTR Univ Health Sci 2018;7:249-53.
9. Almosallam OI, Aseeri A, Shanafey SA. Outcome of loop versus divided colostomy in the management of anorectal malformations. Ann Saudi Med 2016; 36(5): 352-355.
10. Mirza B, Ijaz L, Saleem M, Sharif M, Sheikh A. Anorectal malformations in neonates. Afr J Pediatr Surg. 2011;8:151-54.
11. Fiqueroa M, Bailez M, Solana J. Colostomy morbidity in children with anorectal malformations. Cir Pediatr. 2007; 20(2):79-82.
12. van den Hondel D, et al. 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 (01): 061-069.
13. Murat KC¸ ig˘dem, et al. The mechanical complications of colostomy in infants and children: analysis of 473 cases of a single center. Pediatr Surg Int 2006, 22: 671–676.
14. Chowdhary SK, Chalapathi G, Narasimhan KL, et al: An audit of neonatal colostomy for high anorectal malformation: the developing word perspective 2004.
15. Dode CO., Gbodo LI. Childhood colostomy and its complications in Lagos. East and Central African Journal of Surgery. 2001; 6(1): 25-29.
16. Al Salem AH., Grant C., Khawaja S. Colostomy complications in infants and children. Int Surg., 1992; 77(3): 164-6.
17. Parks SE., Hastings PR. Complications of clostomy closure. Am J Surg., 1985; 149(5): 672-5.
18. Peña A, Levitt MA. Anorectal malformations. In: Grosfeld JL, O'Neill JA, Fonkalsrud EW, Coran AG, editors. Pediatric Surgery. 6th ed. Philadelphia: Mosby Elsevier; 2006. p. 1566-89
19. Gardikis S, Antypas S, Mamoulakis C, Demetriades D, Dolatzas T, Tsalkidis A, Chatzimicael A, Polychronidis A, Simopoulos C. Colostomy type in anorectal malformations: 10-years experience. Minerva Pediatr 2004, 56(4): 425-429.