

Complications of Colostomy in Infants and Children

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This article analyzes the course of 267 paediatric patients with gut stomas. Colostomy was most commonly created for imperforate anus (130 cases) and Hirschsprung's disease (120 cases). A transverse colostomy was performed in 156 cases (58.42%) and sigmoid colostomy in 99 patients (37.07%). Loop colostomy was performed 1.5 times higher than divided colostomy. Early complications occurred in 45 patients (16.85%). Stoma complications occurred in 70 patients (26.21%) and were more common with loop colostomies. Sigmoid colostomy had significantly lower complication rate. Colostomy revision was needed in 28 patients (10.48%). A total of 51 patients underwent closure of colostomy. The major complication with closure of colostomy was seen in 10 patients (19.60%). Total 12 patients (4.49%) died due to complications of colostomy and only one patient died after closure of colostomy. The formation of abdominal stomas should not be regarded as minor surgical procedure especially in paediatric age group. A divided sigmoid colostomy should be performed whenever possible.

KEY WORDS: Colostomy complications in infants and children, Stoma, Colostomy Prolapse.

Colostomy plays a vital role in the management of children with many congenital and acquired colorectal-anal disorders^{1,2}. Even with careful techniques, there is marked morbidity and mortality associated with formation and subsequent closure of colostomy¹. In spite of this fact this procedure usually relegated to minor importance and usually performed by junior residents.

This report analyzes the course of 267 paediatric patients to evaluate the problems seen with creation of colostomy, interim management of stoma, and subsequent closure.

Materials And Methods

This study was carried out at Mayo Hospital Lahore from 1988 to 1993, Postgraduate Medical Institute Lahore from 1995 to 1996, and The Children's Hospital Lahore from Jan. 1997 to Dec. 1997. A total of 267 neonates, infants and children underwent creation of colostomy during this period for various congenital and acquired disorders of colon, rectum and anus. Out of these 202 (75.65%) were males and 65 (24.35%) females with mean age less than one year (range 1 day to 15 years). The most frequent indications were imperforate anus (48.68%), Hirschsprung's (44.94%) and only in 6.36% of cases, colostomies were performed for other reasons (Table 1)

Table 1: indications of colostomy.

Disease	No. of patients (n=267)	%age
Imperforate anus	130	48.68%
Hirschsprung's disease	120	44.94%
Volvulus neonatorum	03	1.12%
Meconium ileus	03	1.12%
Intussusception	01	0.37%
Trauma	03	1.12%
Colonic atresia	01	0.37%
Necrotizing enterocolitis	02	0.74%
Malignant teratoma	02	0.74%
Others	02	0.74%

In 70% of cases colostomy was performed within first month of life. The types and sites of colostomies are shown in Tables 2. Congenital anomalies were seen in 40 patients (14.98%) (table 3).

Table 2: Types & sites of colostomy. Types & Level of colostomy

	n=267	Total no of pts	%age
Transverse			
Loop			
Divided	145		
11	156	58.42%	
Sigmoid			
Divided			
Loop	90		
09	99	37.07%	
Descending colon	06	6	2.24%
Caecostomy	01	01	0.37%
sSplenic flexure	05	05	1.87%

Table 3: Associated anomalies. no=40

Associated anomaly	n=40	Associated anomaly	n=
Tracheoesophageal atresia	09	Absent	02
		sacral	
		vertebrae	
Ileal atresia	02	clef lip	04
Down's syndrome	12	UDT	04
Umbilical fistula	03	Hypospadias	05
TEV	08	unilateral	01
		renal	
		agenesis	
Hydrocephalus+meningocele	02	multicystic kidney	03

Closure of colostomy was performed in 51 patients. In a large number of patients with Hirschsprung's disease with sigmoid colostomy a single stage Endorectal pullthrough was performed, so excluding the closure of colostomy in these patients. Closure of colostomy was performed, usually 6 to 15 months after creation of stoma, when it was no longer needed in care of patients.

Closure of colostomy was performed with primary resection of stoma and end to end anastomosis in 30 patients (58.82%) and simple turn in of antimesenteric opening without resection in 21 patients (41.17%).

Results:

Early complications of stoma creation were seen in 45 patients with 43(15.98%) considered to be major complications. The common complications seen in this series were wound infection(15), paracolic evisceration of gut(6), retraction of stoma (5), post operative sepsis (6) and episodes of diarrhoea (13). Complications directly attributed to stoma were seen in 70 patients (26.21%). More frequent were skin excoriation(45) and troublesome recurrent prolapse of stoma(48). Interestingly stoma prolapse was seen on the operation table just after its creation in one patient. Late adhesion obstruction was seen in 5 patients [Table 4].

Table 4: Complications of colostomy (n=267)

Complications early	n=	%age
Wound infection	15	5.61
Paracolic evisceration	06	2.24
Retraction of stoma	05	1.87
Burst abdomen	05	1.87
Bleeding from stoma	10	2.74
Episodes of diarrhoea	13	4.86
Sepsis	06	2.24
LATE		
Recurrent prolapse	48	17.97
Skin excoriation	45	16.85
Chronic bleeding	11	4.11
Faecoloma formation in distal loop	10	3.74
Stenosis of stoma	04	1.49
Intestinal obstruction	05	1.87
Death	12	4.49

Revision of colostomy was needed in 28 patients (10.48%). The indications for revision of colostomy are shown in Table 5.

Table 5: Revision of colostomy (n=28)

Cause of revision	n=	%AGE
Paracolic evisceration	06	21.42%
Retraction of stoma	05	17.85%
Stenosis and stricture	03	10.71%
Recurrent prolapse	11	39.28%
Adhesion obstruction	03	10.71%

Recurrent prolapse of stoma was a troublesome complication and most frequently seen with transverse loop colostomy, so in 11 patients we ultimately decided to revise and divide the colostomy. Paracolic evisceration was also frequently seen with loop colostomies.

Table 6: Complications : comparison by type.

Complications	Loop colostomy n=154		Divided colostomy no=112	
	n=	%age	n=	%age
Paracolic evisceration	06	3.89	0.0	0.0
Recurrent prolapse	40	25.97	08	7.14
Faecoloma formation in distal loop	08	5.19	02	1.78

Total 23 (45.09%) complications were seen with closure of colostomy [Table 6]. One patient died after closure due to sepsis. Wound infection was seen in 9 patients. There was no difference in the incidence of wound infection if closed primarily with or without drainage of wound.

The over all complication rate associated with creation of stoma was 70.03%(195/267). Neither the age of child nor the primary indication of colostomy was a factor in these complications. However paracolic evisceration, skin excoriation and recurrent prolapse of stoma were more frequently seen with loop colostomies as compared to divided colostomy.

Table 7: Complications of closure of colostomy (n=51)

Complications	n=	%age
Wound infection	09	17.64%
Incisional hernia	06	11.76%
Sinus	04	7.84%
Leak, faecal fistula	02	3.92%
Intestinal obstruction	01	1.96%
Death	01	1.96%

Total 33 patients (12.35%) died in this series. Out of these 33, 12 patients died due to complications of colostomy. The reasons of death were sepsis in 6, fluid and electrolyte imbalance in two patients, paracolostomy evisceration one, pneumonia one, burst abdomen one and aesthesia problem in one patient. Twenty other patients (7.49%) died due to associated congenital anomalies and various other reason unrelated to colostomy formation. One patient died due to sepsis after closure of colostomy.

Discussion:

The colostomy is usually performed as an emergency procedure in the neonatal and paediatric age group^{1,2}. The common indications in children and neonates for colostomy are temporary and non malignant in nature².

Although high incidence of complications with colostomy in paediatric age group has been reported in literature^{1,2,3,4} but no due attention was paid to its prevention and treatment of these complications. A colostomy is a serious, delicate operation that must be done with care. It should be regarded as major surgical procedure and proper attention should be paid to technical details in proper construction of colostomy, stomal management, and subsequent closure^{1,2,5}.

The most common indications for colostomy in this series are the imperforate anus and Hirschsprung' disease. The basic purpose of performing the colostomy is simply to divert the faecal stream till the definitive operation is performed. For both these indications care must be exercised to select the appropriate site for stomas. For imperforate anus a colostomy should precede the entire spectrum of anorectal malformations with exception of low lying lesions⁶. The segment of colon to be used

should be carefully examined and sufficient length of colon must be left distal to stoma so that subsequent definitive operation can be carried out with out tension^{5,6,7,8}.

Previously we performed transverse loop colostomy but due to high incidence of complications with transverse loop colostomies especially recurrent prolapse, paracolic evisceration, faecoloma in distal loop and high incidence of urinary tract infection now we prefer to perform a completely divided high sigmoid colostomy^{6,8,9}. This is the reason that the number of completely divided sigmoid colostomies is more in the latest years in our series. We prefer right transverse colostomy only for the patients under going reoperations.

Choosing the level of colostomy in case of Hirschsprung's disease demand special facilities¹⁰. The ideal position for a colostomy is at the most distal normally ganglionic zone just 3 to 4 cm proximal to the transitional zone.^{2,8,10}

In late 80's and early 90's we mostly performed transverse loop colostomy but due to high incidence of faecoloma formation and recurrent prolapse of distal loop^{2,3,4,11} now we prefer to perform divided colostomy at the most distal ganglionic zone. Transverse colostomy has other disadvantages also. The colon become attached to anterior abdominal wall and there may be insufficient length of distal ganglionic segment available to be pulled down to perineum at definitive operation especially in case of long segment disease. The distal segment become fibrotic and small in size due to non use and anastomotic stricture can result.

The site of colostomy in other cases not requiring subsequent pullthrough should be most distal normal gut usually the sigmoid colon. Some authors recommend the use of umbilical site for temporary ostomies in infants and children with good results¹², but we do not practice it.

Early postoperative complications in this series were primarily related to infection, sepsis and burst abdomen. These complications are more frequently encountered in neonates and in those patients who presented late for their primary pathology. As neonates have poorly developed immunological and complement system they cannot compete properly to infection².

Paracolic evisceration was more commonly seen with loop colostomy in this series. The reported incidence of paracolic evisceration is between 2.73%² and 31.10%¹¹. It was 2.24% in this series. The probable cause is one itself loop colostomy and second performed by resident staff with poor technique. Interposition of omentum between the loop and abdominal wall may also be one of the factor resulting in poor fixation. Careful circumferential suture fixation of the colon to peritoneum and abdominal wall fascias with interrupted fine, non absorbable suture material should be done.

A "U stitch" should be placed to approximate the proximal and distal limb of the loop colostomy with peritoneum and fascial edges. It will minimize the morbidity related to evisceration, colostomy prolapse and paracolic evisceration². Recurrent prolapse of stoma was seen in 17.98% of patients. The reported incidence in different series is 1.62%⁶, 6.81%¹¹, 11.64%², 21.7%¹³ and 58%¹⁴ with average of 11.3%¹⁵. It is a troublesome complication and causes major psychological imbalance to the parents and patients. Different techniques are described to prevent the recurrent prolapse but still no satisfactory solution is available.

Krasna in 1979 described a single purse string suture technique around the stoma passed subcutaneously¹⁶. Later in 1985 Gauderer and Izant advised a simple technique for post reduction bowel fixation without stoma revision¹⁵. The bowel is attached to parietal peritoneum using a U type suture a few cm from stoma. Two latex tubing were used to prevent the thread from cutting through. In 1990 Golladay et al described double purse string suture technique at both fascial and skin level¹⁷. We attempted the last both techniques with variable results.

The retraction of stoma(1.87%) seen in this series is quit comparable to reported series which are 2.93%⁶, and 3.42%². The reported incidence of stomal stenosis is 1.95%⁶, 6.0%¹⁵, 6.16%², and 10.2%¹¹ which is 1.49% in this series.

An other major complication encountered in this series was skin excoriation in 45 (16.85%) patients. The reported incidence of skin excoriation in other series is 19.86%². Skin excoriation can be reduced or avoided by careful cleaning and drying of skin and use of skin barrier(such as stomahesive and zinc oxide paste) and properly fitting appliances(0.3cm, 1/8" lager than stoma). Steroid ointments are helpful to clear a persistent rash⁵. The bag should be changed whenever seal become ineffective.

Stomal complications are major cause of morbidity in the patients with colostomy, so particular attention should be given to stoma care. These complications can be minimized by early training of parents and application of properly fitting appliances. Moreover a stoma care centre should be established and paediatric enterostomal therapist or a properly trained nurse specialist should supervise all the work^{2,8}. Before discharge of patients, the parents should be given proper instructions and patient should be followed up in the stoma care centre regularly.

Twenty eight(10.48%) patients needed revision of colostomy in this series which correlates well with reported incidence in the literature which is 6.80%³ and 16%².

The overall complication rate in this series is 73.03%. The reported incidence is 27.5%⁴, 66.8%¹¹, 68%²

and 74.6%³. Our results are quite comparable to these series. Loop colostomies especially transverse has a quite higher complication rate as compared to divided colostomy.

The complication rate with closure of colostomy in this series is 45%. Closure of colostomy also need diligence to technical details and proper postoperative care. The stoma must be properly mobilized from surrounding skin, fascia and peritoneum and edges should be freshened and either simple turn in technique or resection and anastomosis should be performed as needed. Delayed primary closure of wound is probably the best option to prevent the wound infection.

Conclusions:

The performance of colostomy should not be taken as minor surgical procedure. At least one senior surgeon should supervise this operation in infants and children as it carry substantial morbidity and mortality in this age group.

As stomal complications are more common with loop especially transverse colostomy, loop transverse colostomy should be avoided when ever possible. A divided sigmoid colostomy is ideal.

A proper attention should be paid to technical details. An aggressive and diligent postoperative care is needed.

A stoma care centre should be established in every hospital under paediatric enterostomal therapist and nurse specialist. Parents should be given proper instruction before discharge.

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