

A Retrospective Study of Colostomy Complications in Ano-Rectal Malformation and Hirschsprung's Disease in Infants and Children in Children Welfare Teaching Hospital, Baghdad, Iraq

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Abstract

Background: A colostomy is an operation that creates an opening for the colon, or large intestine, through the abdomen. A colostomy may be temporary or permanent. Hirschsprung's disease is a birth defect in which nerves are missing from parts of the intestine. Ano-rectal malformations are a spectrum of abnormalities of the rectum and anus occurred at birth or problems that happen to an unborn baby are developing during pregnancy.

Aims of study: To analyzing the common colostomy complications, immediate, early and late. Taking into consideration the site, type of the colostomy performed and measures that should be taken to avoid this complication.

Patients and methods: A retrospective study on a total number of one hundred sixty temporary colostomies were performed for neonates, infants and children over one year old of age in the pediatric surgical department of Children Welfare Teaching Hospital in Baghdad in the period from January 2008 to January 2011. Seventy patients had Hirschsprung's disease and ninety patients had Ano-rectal malformations. A standardized data sheets were prepared for collection of information including age, sex, body weight, age, associated anomalies, type, site and the indication and the complications of colostomies.

Results: Most of the colostomies about 69.3% were done in the neonatal period and mainly for imperforate anus as 83.3%. Those performed in infancy period constituted about 26.2% of total operations and were done mainly for Hirschsprung's disease which represented 41.4%. The most common type of stoma in our study was right loop transverse colostomy for Hirschsprung's disease represented 71.4% and pelvic loop for imperforate anus as 75%. Hundred and seven different complications developed in 71 patients as a result of colostomy formation and the most common complications were stomal prolapse, skin excoriation, wound sepsis, para-stomal hernia, adhesive intestinal obstruction, bleeding and stomal stenosis. Stomal prolapse was the commonest complication in observed and developed in 32.7% of patients.

Conclusion: Hirschsprung's disease and imperforate anus were commonest indications of stoma formation in pediatric age group. The right transverse loop and pelvic loop colostomy was the commonest stoma used and had the higher rate of complications. Prolapses and skin excoriation were the most common complications obtained.

Introduction

A colostomy is a surgical procedure made in the large bowel to divert feces and flatus to an exterior, where it can be collected in an external appliance [1]. As a method of treating intestinal obstruction, colostomies date back to the latter part of the eighteenth century, and some of the first survivors of this procedure were children with imperforate anus [2]. There are numerous and frequent common complications following construction of large bowel stomas, which may lead to significant morbidity and mortality. The overall morbidity from colostomy has been reported to be as high as 42-75% [3, 4]. Complications may occur immediately after surgery or late, many months or years to appear. Early complications include wound infection, abscess, fistula, retraction, bleeding and small bowel obstruction [5-8] Late complications include a para-stomal hernia, prolapse, stricture and perhaps most importantly poor shape and location of the stoma leading to difficulties with fitting the appliance which may result in uncontrolled soiling and severe skin excoriation [6]. Complication included bleeding, necrosis of the distal end, peri-stomal fistula, stomal stenosis, stomal retraction, stomal dysfunction, colostomy diarrhea, para-stomal hernia, colostomy prolapsed and skin excoriation [1,6].

Patients and Methods

A retrospective study performed on cases noted of 160 consecutive neonate, infants and children undergoing surgery in the pediatric surgical department of Children Welfare Teaching Hospital in Baghdad, in a period from January 2008-January 2011. There were 70 patients with Hirschsprung's disease and 90 patients with anorectal malformations. Data collected from patient information included age, sex, weight, indications for colostomy, site of colostomy, type of colostomy, type of complications and management. The stoma site and type are differed according to the personal preference of consultant pediatric surgeons. The operation was performed by both junior surgeons and Consultants. Most of the colostomy done for anorectal malformations were pelvic colostomy and the most preferred type is loop colostomy. Most infants with Hirschsprung's disease underwent initial laparotomy with multiple colonic biopsies and then right transverse loop colostomy performed. From that colostomy, 152 were emergency and only eight were elective. Investigations were done for those patients included: CBP, blood urea, plain x-ray for abdomen, invertogram and ultrasonography. Data was collected and standard statistical methods were employed. By using sample independent t-test, DF and P values. All the results were discussed at 5% level of significance i.e. p-value <0.05 was considered significant.

Results

Age at stoma formation

The age of patients at which the stoma was performed ranging from one day to 9 years. The first group composed off 111 cases during the neonatal period in the 1st month of their life, 75 patients from which presented with anorectal malformations and 36 patients presented with Hirschsprung's disease. The second group aged ranging from 1-11 months, which consisted of 42 patients, in which 13 patients presented with anorectal malformations and 29 patients with Hirschsprung's disease. The last group aged more than 1 year as only seven patients, in whom 2 patients presented with anorectal malformations and 5 patients with Hirschsprung's disease, table 1.

Table 1: A frequency of stoma formation conditions and patients age.

Age	Ano-rectal malformations No (%)	Hirschsprung's disease No (%)	Total
1-28 days	75(83.3%)	36(51.4%)	111
1-11 months	13(14.4%)	29(41.4%)	42
Over 1 year	2(2.2%)	5(7.1%)	7
Total	90	70	160
$X^2=18.8786, df=2, P=0.0001$			

Table 2: Sex distributions among stoma formation diseases.

Diseases	Male No (%)	Female No (%)	Total	M:F
Ano-rectal malformations	40(44.4%)	50(55.5%)	90	1:1.25
Hirschsprung's disease	54(77.1%)	16(22.8%)	70	3.3:1
Total	94	66	160	
$X^2=17.3717, df=1, P=0.00001$				

Sex distributions and colostomy indication

There were 90 patients presented with anorectal malformations, forty of them male and the remainder was female. While the rest of patients were Hirschsprung's disease in which 54 of males and 16 were females, table 2.

Colostomy sites and types

A pelvic colostomy is done to 91 patients in whom 86 patients presented with anorectal malformations as 68 patients had loop type and 18 patients were double barrel type colostomy used. The other five Hirschsprung's disease patients were all double barrel colostomies. A transverse colostomy is done to 69 patients, four of them with anorectal malformations. One patient with loop colostomy and other three patients was a double barrel. The other 65 patients with Hirschsprung's disease, fifty patients with loop types and the remain 15 patients had double barrel colostomies. All patients with the pelvic colostomy in anorectal malformations was done by left grid iron incisions, table 3.

The complication of colostomy formation

One hundred and seven different complications were seen in 71 patients due to colostomy formation, table 4, which include:

Colostomy prolapsed: It occurred in 35 patients, 26 patients of them developed prolapsed in loop transverse colostomy, one patient developed prolapsed after a double barrel transverse colostomy and eight patients developed prolapsed after pelvic loop colostomy. Distal loop prolapsed occurred in 27 colostomies, while proximal loop prolapsed occurred in five colostomies, the last three colostomies complicated by both loop prolapsed, table 5.

Skin excoriations: It occurred in 26 patients of performed colostomies, 12 patients suffered from this complication after loop transverse colostomies and six patients after double barrel transverse colostomy, while other six patients suffered from this complication loop pelvic colostomy and last two patients after used of a double barrel.

Wound Sepsis: It has occurred in 13 patients with performed colostomies. Local infection occurred in two patients with transverse loop colostomy and two patients with the transverse double barrel, while other four patients included two patients with pelvic loop and the last two patients with a double barrel. Abscesses occurred in two patients, one who presented with Hirschsprung's disease and had divided transverse colostomy, the last patient with pelvic double barrel colostomy for a patient with anorectal malformations. Fistula occurred only in one patient with double barrel transverse colostomy

Table 3: Percentage of colostomy regarding sites and types.

Site type	Pelvic		Transverse		Total
	Loop No (%)	Double barrel No (%)	Loop No (%)	Double barrel No (%)	
ARM	68 (75.5%)	18 (20%)	1(1.1%)	3 (3.3%)	90
H.D.	0(0%)	5 (7.1%)	50 (71.4%)	15 (21.4%)	70
Total	68	23	51	18	160
$X^2=15.4621, df=1, P=0.0001$		$X^2=5.2687, df=1, P=0.0217$			

Table 4: Complications of colostomy frequency in relation to sites and types.

Stoma type	Prolapsed	Skin excoriation	Wound sepsis	Bleeding	Stenosis	Retraction	Intestinal obstruction	Dysfunction	Para-stomal hernia	Total	Mean	SD	Independent comparison ratios	
Transverse colostomy	Loop	26	12	2	2	3	4	1	2	0	52	5.7777	8.3483	t-test= -1.886 DF= 68 P= 0.0636
	Double barrel	1	6	6	1	1	2	1	0	0	18	2	2.3452	
Pelvic colostomy	Loop	8	6	2	4	1	2	1	0	0	24	2.6666	2.7838	t-test= -1.486 DF= 35 P= 0.1462
	Double barrel	0	2	3	1	4	1	0	1	1	13	1.4444	1.3333	
Total		35	26	13	8	9	9	3	3	1	107			

Table 5: Relation of stoma types among site of prolapse.

Stoma type	Proximal loop	Distal loop	Both loop	Total	Mean	SD	Independent comparison ratios	
Transverse	Loop	0	25	2	27	9	13.8924	t-test= -1.272 DF= 33 P= 0.2122
	Double barrel	0	0	0	0	0	0	
Pelvic	Loop	5	2	1	8	2.6667	2.0816	
	Double barrel	0	0	0	0	0	0	
Total		5	27	3	35			

Table 6: Relation of stoma types among wound sepsis.

Stoma type	Infection	Abscess	Fistula	Dehiscence	Total	Mean	SD	Independent comparison ratios	
Transverse	Loop	2	0	0	0	2	0.5	1	t-test= 1.837 DF= 6 P= 0.1158
	Double barrel	2	1	1	2	6	1.5	0.5773	
Pelvic	Loop	2	0	0	0	2	0.5	1	t-test= 0.282 DF= 3 P= 0.7964
	Double barrel	2	1	0	0	3	0.75	0.9574	
Total		8	2	1	2	13			

and represented Hirschsprung’s disease. Wound dehiscence occurred in two patients both of them Hirschsprung’s disease with double barrel transverse colostomy, table 6.

Bleeding: It occurred in eight patients after colostomy performance, six patients with loop colostomy and two patients had a double barrel.

Colostomy stenosis: Nine patients presented after colostomy performance with proximal limb stenosis, six patients controlled by repeated dilatation and three patients required re-fashioning.

Intestinal obstruction: It occurred in three patients, one patient had loop transverse colostomy and other patient had double barrel transverse colostomy. Both of them were Hirschsprung’s disease, the other last one is loop pelvic type of anorectal malformation.

Stoma retraction: Nine patients developed colostomy retraction, six patients suffered from Hirschsprung’s disease in which four patients were loop transverse colostomy and two patients were double barrel transverse colostomy. The rest patients were anorectal malformation, two of them were loop type and one was double barrel type colostomy.

Stoma dysfunction: Three patients developed this complication; all these patients were Hirschsprung’s disease. Two patients managed

by loop transverse colostomy and other treated with double barrel colostomy.

A para-stomal hernia: It occurred only in one patient of Hirschsprung’s disease and pelvic double barrel colostomy.

Discussion

Temporary colostomies are an important surgical step in the initial management of a variety of diseases in neonates, infants, and children. The most common indications in our study were Hirschsprung’s disease and imperforate anus. The study analyzing 160 colostomies, 90 patients of anorectal malformation with a male:female ratio, 1:1¼ and 70 patients of Hirschsprung’s disease with a male: female ratio, 3.3:1, there were similar and dissimilar in compared with other studies [3,9-11] (Supplementary Table 1).

Anorectal malformations were represented 56.2% of all patients, while 43.8% was Hirschsprung’s disease. Most of the stoma formation was performed in the neonatal period especially for imperforate anus while in Hirschsprung’s disease was less because the patients with imperforate anus presented as an emergency with intestinal obstruction immediately after birth while in Hirschsprung’s disease,

some patients responding to conservative with rectal stimulation and irrigation [6,8,9].

In our hospital most surgeons prefer to do right loop transverse as 71.4% colostomy for Hirschsprung's disease rather than pelvic as 7.1% colostomy to avoid creating a protective transverse colostomy while doing definitive procedure, while in cases of imperforate anus, preferred to do pelvic colostomy, a loop in 75.5% or double barrel in 20%, because off most cases of imperforate anus doesn't need laparotomy and in pelvic colostomy complications are less and also easy to do distal colostogram to delineate the level of rectum end [7,10].

The most common complication in observed was colostomy prolapse as 32.7% and it was most commonly occurred in right loop transverse colostomy and accounted 74.2% of prolapse that happened. It was less frequent in double barrel colostomy 2.8% in compared to loop colostomy. Prolapse most commonly affect distal limb as 77.1% more than proximal one 14.2% because distal limb is dilated and hypertrophy especially in Hirschsprung's disease and with time decrease in size and return to the normal caliber that facilitates prolapse, also in transverse colostomy the distal limb represent transverse colon which is redundant and liable for prolapsed. The second most common complication in this study was skin excoriation which was occurred in 24.2%. The causes for a high incidence of skin excoriation in our study were due to poor compliance of our patients with colostomy appliance especially those from rural areas and there is a shortage in the supply of colostomy appliances in our hospital and it is expensive outside the hospital. Wound sepsis which includes local wound infection, peristomal abscess (stitch abscess) and fistula occurred in 12.1% of patients and this complication most likely occurred due to imperfect nursing care only. Stomal stenosis occurred in 8.4%, the 44.4% of them had double barrel stoma which most common type. The reasons for stenosis were due to a small opening that was created for colostomy and ischemia of margins of stoma which end with stenosis. Six patients responded to dilatation under general anesthesia and three patients needed the revision of stoma. Stomal retraction occurs in 8.4%, mostly occurred in transverse loop type colostomy as 44.4%, revision of operation was done for six patients and three patients (divided type) are confounded to the mucous fistula. All retracted colostomy associated with skin problems. Bleeding occurred in 7.4% of our patients, it was higher in double barrel type colostomy and was usually technical. Intestinal obstruction observed in 2.8%. One patient (patient with Hirschsprung's disease and double barrel), explored and adhesion around the wound identified and the other two patients treated conservatively. Stomadys function occurred in 2.8%, all those patients had Hirschsprung's disease, this complication occurred due to lack of leveling colostomy and frozen section. A parastomal hernia developed in 0.9% and usually occurred in that patient with poor abdominal wall muscle and with local infection [6,10-14] (Supplementary Table 2).

In general, seventy-one patients developed different complications directly related to stoma formation that was high in comparison to other studies [10,11,14]. The causes for this high rate of complication probably related to poor and bad care for colostomy and also due to frequent prolapse and skin excoriation.

Conclusion

Hirschsprung's disease and anorectal malformation were the most common indications for temporary colostomy in pediatric age group. Right loop transverse colostomy had the highest rate of complications and double barrel carry less complication. Prolapse was the most common complication after right loop transverse colostomy and was more common in Hirschsprung's disease. It was the least to develop in a double barrel.

Recommendations

The measures should be taken to avoid the stoma complications are:

1. Colostomy creation must be done by a well-trained surgeon.
2. Right loop transverse colostomy should not be done routinely in Hirschsprung's disease and imperforate anus as it has a high rate of complications, double barrel instead of a loop should be done. Double barrel descending colostomy is a procedure of choice for imperforate anus because of complete fecal diversion and low incidence of complications.
3. Definitive surgery for Hirschsprung's disease and imperforate anus should be done as early as possible to reduce the length of time that child having the stoma.
4. Single-stage repair for Hirschsprung's disease and imperforate anus must be the goal in the future.

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