

Original Research Article

Factors That Predict The Morbidity of Colostomy in Patient with Ano-Rectal Malformation in Children in Baghdad

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Abstract

Colostomy is surgically fashioned colo-cutaneous fistula for the diversion of the feces and flatus away from distal pathology or a surgical site either temporary or permanent type, indication of colostomies in our study were ARM.

Identify the most common complication of colostomy in patient with ARM and how to be avoided, and which colostomy type carries a low risk of complication.

Prospective study of 100 cases ARM that underwent colostomy was conducted at Medical City Children Welfare Teaching Hospital of department of pediatric surgery between January 2014 – November 2015.

Most of colostomies (75%) were done in the neonatal period and mainly for recto urethral fistula in male (45%), the most common type of colostomy was a loop sigmoid colostomy (69%) this may be due to simplicity in creation and closure, in addition to surgeon's preference.

Divided colostomy was done in 26 patients, and mainly for male patients. Seventy patients (70%) develop different complications and the most common were prolapsed (39%). others were skin excoriation, UTI, wound sepsis, parastomal hernia and bleeding.

Prolapsed and skin excoriation were most in loop colostomies, while skin dehiscence was commonly seen in divided types. Associated anomalies were seen to be related to increase incidence of colostomy related complication. Mortality rate was (5%); the causes of death were septicemia, associated congenital anomaly and complex malformation.

To decrease the incidence of prolapsed, it better to created divide rather than loop sigmoid colostomy for complete diversion of feces. We recommend divided proximal sigmoid colostomy for complete diversion of feces for protect definitive PSARP.

Key words: Ano-Rectal malformation, colostomy.

الخلاصة

التعرف على المضاعفات الأكثر شيوعاً لمفاغرة القولون في المرضى الذين يعانون من انعدام المقعد وكيفية تجنبها، ولمعرفة نوع الفغر الذي يحمل مخاطر منخفضة من المضاعفات.

أجريت دراسات مستقبلية 100 حالة من المرضى الذين يعانون من انعدام المقعد الولادي أجريت لهم عملية ثغر القولون في مركز مدينة الطب مستشفى حماية الطفل قسم جراحة الأطفال، بين يناير 2014 – نوفمبر 2015.

وقد تم معظم فغر القولون (75%) في فترة ما بعد الولادة وأساساً للناسور المستقيم الإحليلي في الذكور (45%) وكان النوع الأكثر شيوعاً من فغر القولون هو فغر القولون السيني الحلقي (69%) وهذا قد يكون راجعاً إلى البساطة في إنشاء والإغلاق، بالإضافة إلى تفضيل الجراح.

وقد أجريت عملية فتح فغر القولون المنفصل إلى 26 مريضاً، وأساساً للمرضى الذكور و 5 مرضى أجري لهم فتح القولون المستعرض الحلقي في حالات خاصة.

سبعين مريضاً (70%) عانى من مضاعفات مختلفة، وكانت الأكثر شيوعاً منها هطول القولون (39%).

هطول القولون وسحجة الجلد كانوا الأكثر شيوعاً في فغر القولون الحلقي، في حين كان ينظر إلى تقرز الجلد شائعاً في نوع فغر القولون المنفصل.

واعتبر الشذوذ الخلقي المرتبطة تكون ذات صلة في زيادة نسبة حدوث المضاعفات في المرضى الذين يعانون من انعدام المقعد. وجد عدم تأثير التاريخ الطبي قبل الولادة وتاريخ العائلة الطبي في نسبة حدوث المضاعفات. كان معدل وفيات (٥٪)، وسبب الوفاة كانت تسمم الدم، تسمم الجرح، عيوب خلقية شاذة ومعقدة التشوه. للتقليل من حدوث هطول فغر القولون، من الأفضل إجراء عملية فغر القولون السيني المنفصل بدلاً من فغر القولون السيني الحلقي و ننصح بعمل فغر القولون الداني السيني المنفصل للتحويل الكامل للبراز ولحماية عملية تصنيع المقعد.

Introduction

Colostomy is a surgically fashioned colostomy cutaneous fistula for the diversion of feces and flatus away from distal pathology or a surgical site, although permanent colostomies are rarely indicated in childhood, common congenital colonic and ano-rectal conditions as well as a few acquired 'ones often need temporary colostomy as a lifesaving procedure in neonatal life and early infancy [1,2].

Hirschsprung's disease (HD), high imperforate anus and neonatal necrotizing enter colitis (NNEC) are the commonest reasons for childhood colostomy, constituting 87.7-92% in some studies. Colostomy is frequently performed as part of stage management in children with ano-rectal malformation (ARM) to relieve obstruction, prevent fecal contamination of the urinary tract in those with recto urinary fistula, as well as avoid fecal contamination of the perineal wound after the definitive surgery [3,4,5].

In the last two decades however, many pediatric surgeons have advocated primary repair of ARM because of the problems associated with colostomy formation [6].

An imperforate anus is found in 1 of 4000–5000 births and represents a Wide variety of ARM, from anal stenosis/perineal fistula (low lesions) to Ano-rectal agenesis (high lesions) with or without a fistula (recto urethral in males, rectovaginal in females) [7,8].

The most frequent defect in males is imperforate anus with a recto urethral fistula, in females, it is a recto-vestibular fistula [9]. During the first 24 hours, the neonate should receive intravenous fluids, antibiotics, and nasogastric decompression, and be evaluated for associated defects that may represent a threat to life. These include cardiac malformations, esophageal atresia, and urinary defects [10,11].

A divided descending colon is ideal for the management of ARM when diversion is needed the completely diverting colostomy provides bowel decompression as well as protection for the final reconstruction. In addition, the colostomy is used for the distal colostogram, which is the most accurate diagnostic study to determine the detailed distal anatomy reconstruction is then performed when the baby is older, within the First year of life. The posterior sagittal approach originally described by DeVries and Pena can be used to repair nearly all anorectal malformations, ostomy closure after reconstruction becomes the third and final stage [12,13]. A colostomy placed too distally in the sigmoid can interfere with the future pull-through. Colostomy prolapsed is a significant problem, and occurs when the colostomy is created in a mobile portion of the colon, or if a loop-type of colostomy is used, loop colostomies can lead to urinary tract infections from incomplete diversion of the fecal stream and fecal impaction in the distal colon in a patient with ARM, the stomas must be separated enough as to allow the stoma bag to cover only the proximal stoma, isolating the mucus fistula to prevent contamination, a longer colonic segment can allow for more resorption of urine and lead to acidosis [14,15]. Stricture of the colostomy is due to a technical problem in which the bowel suffers from ischemia due to an inadequate manipulation of the colon's blood supply. Dehiscence, infections, and sepsis after colostomy closure are also related to technical problems or inadequate stoma care [14].

Coetaneous excoriation of the skin is by far the most common, most often troublesome, and least harmful complication; two method of management has evolved: keep the skin dry by fastidious care and exposure, or protect it by various creams [16]. Severe skin excoriations (irritation) may require treatment with steroid

spray because creams and ointments will interfere with proper adherence of the appliance[17]. Prolapse is common and frequent complication, is common in children and can occur in end or loop stomas. Both proximal and distal bowel segments can protrude many centimeters, although this complication more common in the distal limb [18,19]. Factors attributed to this high incidence are: high intestinal motility and redundancy, the short and thin omental layer and especially in infants, the increase intra-abdominal pressure from crying and thinness with the hypo tonicity of their abdominal wall [20]. The parastomal hernia is a frequent complication and increase with time although most occurred within 2 years from stoma formation .it develops because the abdominal wall aperture enlarges with time ,allowing colon, omentum or small bowel to herniated adjacent to the colostomy. There are many predisposing factor such as excision of rectus sheath, too wide tunnel, wound infection and aging with increase intra-abdominal pressure. [21] Fistula usually develops alongside or

near to the colostomy and it is due to a suture penetrating the complete colonic wall and abdominal muscle or rectus sheath, leading to persistent purulent or fecal leak. It is usually treated by lying open the fistula by fistulotomy[22]while Stomal stenosis result from in adequate skin incision or as a result of contraction secondary ischemia to the colonic vessels or trauma to the stoma by improper appliance or repeat prolapse. Stomal stenosis is usually associated with stomalretraction.Stoma Retraction usually occurring with stoma that is flushed with skin, and difficulty in controlling the effluent may result in significant skin break down, it can be resolved by dilation and sometime reoperation is necessary to create a new stoma [23,24].

The aim of this study is mainly to: 1- Characterize factors that predict incidence and rate of complication in colostomy with imperforate anus; 2-Identify which type of colostomy type carry a low risk of complication; 3-I identify the most common complication of colostomy in patient with ARM and how to be avoided.

ARM=ano-rectal malformation,UTI=urinary tract infection,DC=descending colon, PSARP=posterior sagitalano-rectoplasty.

Materials and Methods

Prospective studies of 100 cases of ARM were conducted at Medical City Children Welfare Teaching Hospital department of pediatric surgery between January 2014 – November 2015. In our study a data collection form was prepared for collection of information including age, sex, body weight, antenatal history, and family history, age at presentation, associated anomalies, and type of ARM, type of stoma and its site and age at stoma formation. Data was collected from their 1st hospital admission than Data were extracting from follow up after the initial procedure until preoperative contrast study and closure colostomy. A full clinical examination and investigations were done according to the suspected disease. Specifically include abdominal radiography (invertogram or lateral table x ray), abdominal ultrasound, echocardiography and

later distal colostogram. Most of our patients presented with signs and symptoms of intestinal obstruction (failure of passage of meconium, abdominal distension, bile stained vomiting), other cases present with delay pass meconium, absent or abnormal position of anus, constipation and few cases with delay presentation i.e. sign and symptom of sepsis and perforated viscous. Most cases underwent resuscitation with N/G decompression, intravenous fluid, antibiotics and send for routine investigation (complete blood picture, blood urea, serum creatinine, serum electrolyte, and total serum bilirubin in neonate and plane X ray and general urine examination). In our study the stoma site and type different according to the personal preference of the specialist pediatric surgeon, As a rule we manage all cases with high type ARM in three stage 1st stage by formation of colostomy, 2nd stage was PASRP and 3rd

stage closure colostomy, except two male cases with perineal fistula that included in our study due to their presentation of perforated viscous and they need colostomy formation, most stoma done by juniors and few of them by surgeon in our hospital. In our study the commonest colostomy type that performed was of loop sigmoid colostomy (pelvic colostomy) as preference of senior.

Statistical Analysis

Each patient assigned a serial identification number. The data were analyzed using Statistical Package for Social Sciences (SPSS) version 20.

The continuous data were represented by mean, standard deviation, median and range.

- Differences between the means of age at presentation, stoma formation and weight of the cases were assessed using student t-test (two tailed).

- Differences between the medians of age at presentation and stoma formation were assessed using Mann-Whitney U non-parametric test (two tailed).

- The categorical data presented as frequency and percentage tables.

The Chi-square and its correction forms (Yates continuity correction test, Fisher's exact test and exact test) were used to assess the association between variables.

Results

In our study out of (100) cases ARM patients (58 male and 42 female) were included in this study. In our study, 76(76%) were neonates, (58 of them were male and 18 were female), While 24(24%) were infants and toddlers (all of them were female). The mean weight in our study (2.8 ± 0.4) for male patients and (5.1 ± 3) for female patients. (Table-1). Thirty eight patients presented with intestinal obstruction (failure to pass meconium, abdominal distention, bile stain vomiting) which is the most common presentation of our cases, the majority of patients with intestinal obstruction were male 30 cases while 4 male patients presented with perforated viscous which is the least common presentation (table-2). Out of 100 cases of ARM in our study 45 patients had recto-urethral fistula, which is the most

common type in male and 22 patients with vestibular anus was the most common type in female. (Figure 1). Out of 100 cases of ARM in our study 69 patients receive sigmoid loop colostomy, 26 patients receive divided sigmoid colostomy and 5 patients had loop transverse colostomy. Complications occur in 70 patients in this study, 39 cases complicated by colostomy prolapse, 33 patients complicated by skin excoriation, 25 patients with UTI, 16 patients with wound sepsis, 14 patients with skin dehiscence, 10 patients with parastomal hernia, 8 patients with stoma stenosis, 4 with bleeding from stoma, 4 other complication (evisceration of bowel loop, parastomal fistula and Para stoma abscess). (Figure-2). Of 100 cases enrolled in our study, loop type colostomy was done in 74 patients, 26 patients had divided type. 55 patient (74%) of loop type colostomy had complication, of those 45.9% had prolapse which is the most common complication in our study and is statistically proved by significant P value (0.016). urinary tract infection occur in 31.1% of patients with loop colostomy which was statistically proved to be significant (p value 0.018), 14 cases with divided stoma complicated by skin dehiscence which is statistically significant with p value (0.027). (Table 3) Of 100 cases enrolled in our study, (58 male patients and 42 female patients), 44(75.9%) of 58 male had complication, of those 26(34%) had colostomy prolapse, which is the most common complication in male. In female patients 26(61.9%) of 42 had complications, and the prolapse was also the most common complication. The significant relation was found between UTI and male sex in which the p value was 0.035. (Table- 4). Of 100 cases included in our study, 76 patients present at neonatal period and 24 present in infant and toddlers periods, 55 (72.4%) out of 76 (neonatal period) had colostomy complications, 27(35.5%) had stoma prolapsed which the most common complication in this age group, 4(5.3%) had bleeding was the less common complication. 15(62.5%) patients (infants and toddlers) had complication. The significant relation was found between UTI and neonate in which the p value was 0.031. (Table-5). Of 100 cases enrolled in our study, 13

patients had positive prenatal history of polyhydramnios, 9(69.2%) of them had complication and 87 without prenatal history of polyhydramnios, 60(69.8%) of them had complication, according to these results the relation between

stoma complication and prenatal history of polyhydramnios is found to be statistically insignificant (p value 0.969) (Table-6).

Of 100 cases enrolled in our study, 8 had positive family history of child with ARM, 5(62.5%) of them had complication and 92 with negative family history, 65(70.7%) of them had complication, so it is statistically

insignificant of family history affect the stoma complication that proved by p value (0.694). (Table-7).

Of 100 cases enrolled in our study, 44 patients had positive associated anomaly, 36(81.8%) of them had stoma complication that is statistically significant which is proved by P value (0.022) and 20(45.5%) of them complicated by skin excoriation which show common in patient with associated anomaly, it show significant and statistically proved by p value (0.019).(table-8).Of 100 cases enrolled in our study, 5(5%) cases were died.

Table 1: Distribution of the included patients, according to their sex and age and weight (at presentation and stoma formation), N=100

M:F ratio = 1.4:1

M:A Ratio = 1:4.1

Age groups	Sex No. (%)		Total N=100 No. (%)	P value
	Male N=58	Female N=42		
At present				
Neonates	58 (100%)	18 (42.9%)	76 (76%)	<0.0001*
Infant & toddlers	0 (0%)	24 (57.1%)	24 (24%)	
At stoma formation				
Neonates	58 (100%)	17 (40.5%)	75 (75%)	<0.0001*
Infant & toddlers	0 (0%)	25 (59.5%)	25 (25%)	
Yates Continuity Correction test, * Significant at 0.05 level				
Parameters	Sex Mean ± Standard deviation		p value	
	Male	Female		
Age at presentation (days)	4±3	117±176	<0.0001*	
Age at stoma formation (days)	4±3	119±178	<0.0001*	
Weight (kg)	2.8±0.4	5.1±3	<0.0001*	
Student t-test, * Significant at 0.05 level				

Table 2: Distribution of patients' presentation, according to their sex, N=100

<i>Presentation</i>	<i>Sex No. (%)</i>		<i>Total N=100 No. (%)</i>
	<i>Male N=58</i>	<i>Female N=42</i>	
Intestinal obstruction	30 (51.7%)	8 (19%)	38 (38%)
Perforated viscous	3 (5.2%)	1 (2.4%)	4 (4%)
Delay pass meconium	22 (37.9%)	7 (16.7%)	29 (29%)
Absence or abnormal location of anus	3 (5.2%)	11 (26.2%)	14 (14%)
Constipation	0 (0%)	15 (35.7%)	15 (15%)

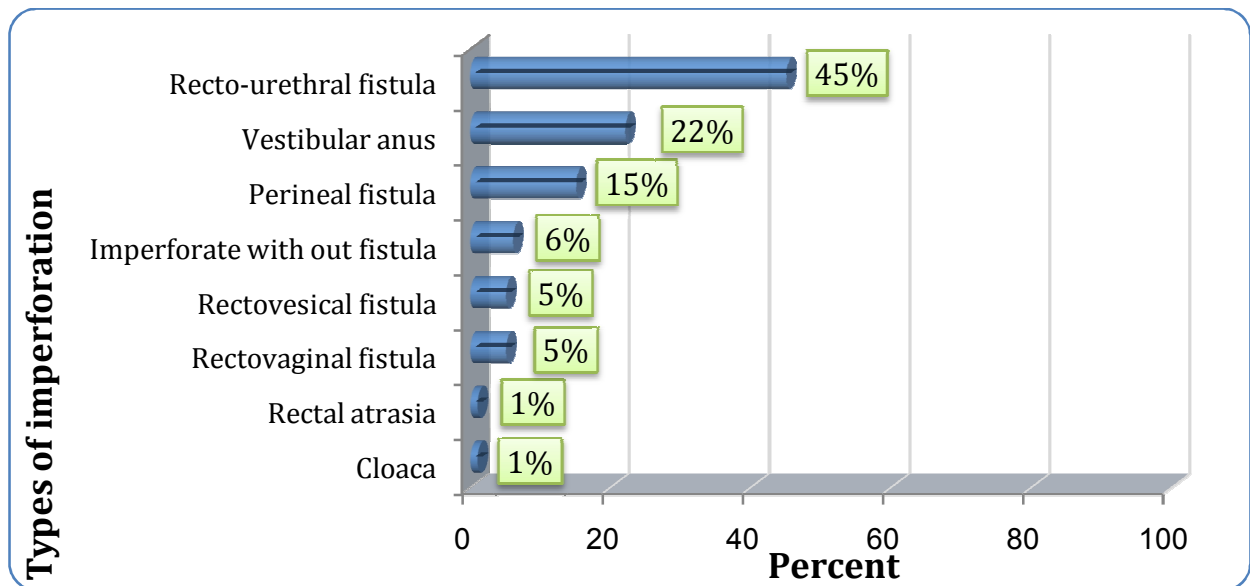
**Figure 1:** Percent of patients with imperforated anus, according to types of imperforation

Table 3: Relation between stoma type and site with patients' sex and complications, N=100

Variables	Stoma type No. (%)		p value
	Loop colostomy (N=74)	Divided colostomy (N=26)	
Sex			
Male	38 (65.5%)	20 (34.5%)	0.023*
Female	36 (85.7%)	6 (14.3%)	
Stoma prolapse	34 (45.9%)	5 (19.2%)	0.016*
Skin excoriation	28 (37.8%)	5 (19.2%)	0.083
Wound sepsis	12 (16.2%)	4 (15.4%)	0.921
Dehiscence skin	7 (9.5%)	7 (26.9%)	0.027*
Para-stoma hernia	7 (9.5%)	3 (11.5%)	0.717F
Stoma stenosis	5 (6.8%)	3 (11.5%)	0.724
Bleeding	3 (4.1%)	1 (3.8%)	0.99
UTI	23 (31.1%)	2 (7.7%)	0.018*
Others	4 (5.4%)	0 (0%)	0.53
Refashion of colostomy	3 (4.1%)	2 (7.7%)	0.834
Death	4 (5.4%)	1 (3.8%)	0.99
Total complications	55 (74.3%)	15 (57.7%)	0.111

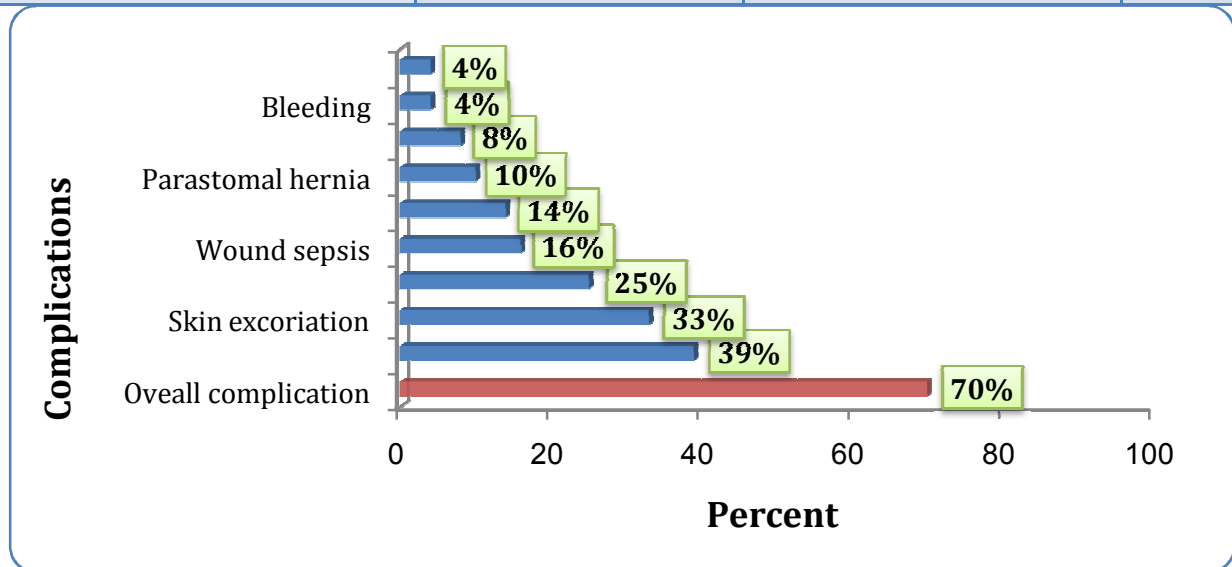
**Figure 2:** Number of patients with imperforated anus, according to complications, N=10

Table 4: Relation between patients' complications and their sex, N=100

<i>Complications</i>	<i>Sex No. (%)</i>		<i>p value</i>
	<i>Male (N=58)</i>	<i>Female (N=42)</i>	
Stoma prolapse	26 (34.2%)	13 (54.2%)	0.081
Skin excoriation	21 (36.2%)	12 (28.6%)	0.423
Wound sepsis	10 (17.2%)	6 (14.3%)	0.691
Dehiscence skin/complete	11 (19%)	3 (7.1%)	0.093
Para-stoma hernia	8 (13.8%)	2 (4.8%)	0.185
Stoma stenosis	5 (8.6%)	3 (7.1%)	0.99
Bleeding	3 (5.2%)	1 (2.4%)	0.852
UTI	19 (32.8%)	6 (14.3%)	0.035*
Others	3 (5.2%)	1 (2.4%)	0.852
Refashion of colostomy	3 (5.2%)	2 (4.8%)	0.99
Death	4 (6.9%)	1 (2.4%)	0.577
Overall complications	44 (75.9%)	26 (61.9%)	0.133
Chi-square test, * Significant at 0.05 level			

Table 5: Relation between patients' complications and age groups at presentation, N=100

<i>Complications</i>	<i>Age groups No. (%)</i>		<i>p value</i>
	<i>Neonates (N=76)</i>	<i>Infants & toddlers (N=24)</i>	
Stoma prolapse	27 (35.5%)	12 (50%)	0.205
Skin excoriation	23 (30.3%)	10 (41.7%)	0.3
Wound sepsis	14 (18.4%)	2 (8.3%)	0.392 ^Y
Dehiscence skin/complete	11 (14.5%)	3 (12.5%)	0.808 ^Y
Para-stoma hernia	9 (11.8%)	1 (4.2%)	0.482 ^Y
Stoma stenosis	6 (7.9%)	2 (8.3%)	0.945
Bleeding	4 (5.3%)	0 (0%)	0.583 ^Y
UTI	23 (30.3%)	2 (8.3%)	0.031* ^Y
Others	4 (5.3%)	0 (0%)	0.583 ^Y
Refashion of colostomy	3 (3.9%)	2 (8.3%)	0.747 ^Y
Death	5 (6.6%)	0 (0%)	0.542 ^Y
Overall complications	55 (72.4%)	15 (62.5%)	0.385
Chi-square test, ^Y Yates Continuity correction test, ^F Fisher's exact test, * Significant at 0.05 level			

Table 6: Relation between patients' complications and perinatal events, N=100

<i>Complications</i>	<i>Perinatal events</i> <i>No. (%)</i>		<i>p value</i>
	<i>Positive</i> <i>(N=13)</i>	<i>Negative</i> <i>(N=87)</i>	
Stoma prolapse	3 (23.1%)	36 (41.4%)	0.207 ^Y
Skin excoriation	5 (38.5%)	28 (32.6%)	0.755 ^F
Wound sepsis	2 (15.4%)	13 (15.1%)	0.99 ^Y
Dehiscence skin/complete	3 (23.1%)	11 (12.8%)	0.312 ^Y
Para-stoma hernia	1 (7.7%)	9 (10.5%)	0.757 ^Y
Stoma stenosis	0 (0%)	7 (8.1%)	0.627 ^Y
Bleeding	1 (7.7%)	3 (3.5%)	0.473 ^Y
UTI	2 (15.4%)	23 (26.4%)	0.391 ^Y
Others	1 (7.7%)	3 (3.5%)	0.473 ^Y
Refashion of colostomy	1 (7.7%)	4 (4.7%)	0.641 ^Y
Death	2 (15.4%)	3 (3.5%)	0.252 ^Y
Overall complications	9 (69.2%)	60 (69.8%)	0.969
Chi-square test, ^Y Yates Continuity correction test, ^F Fisher's exact test			

Table 7: Relation between patients' complications and family history of imperforated anus, N=100

<i>Complications</i>	<i>Family history</i> <i>No. (%)</i>		<i>p value</i>
	<i>Positive</i> <i>(N=8)</i>	<i>Negative</i> <i>(N=92)</i>	
Stoma prolapse	3 (37.5%)	36 (39.1%)	0.928 ^Y
Skin excoriation	4 (50%)	29 (31.5%)	0.5 ^F
Wound sepsis	2 (25%)	14 (15.2%)	0.825 ^Y
Dehiscence skin/complete	1 (12.5%)	13 (14.1%)	0.899 ^Y
Para-stoma hernia	0 (0%)	10 (10.9%)	0.712 ^Y
Stoma stenosis	0 (0%)	8 (8.7%)	0.849 ^Y
Bleeding	0 (0%)	4 (4.3%)	0.99 ^Y
UTI	10 (12.5%)	24 (26.1%)	0.395 ^Y
Others	0 (0%)	4 (4.3%)	0.99 ^Y
Refashion of colostomy	0 (0%)	5 (5.4%)	0.98 ^Y
Death	1 (12.5%)	4 (4.3%)	0.866 ^Y
Overall complications	5 (62.5%)	65 (70.7%)	0.694 ^F

Table 8: Relation between patients' complications and associated abnormalities, N=100

<i>Complications</i>	<i>Associate abnormalities</i> <i>No. (%)</i>		<i>p value</i>
	<i>Positive</i> <i>(N=44)</i>	<i>Negative</i> <i>(N=56)</i>	
Male	31 (70.5%)	27 (48.2%)	0.025*
Female	13 (29.5%)	29 (51.8%)	
Stoma prolapse	19 (43.2%)	20 (35.7%)	0.447
Skin excoriation	20 (45.5%)	13 (23.2%)	0.019*
Wound sepsis	8 (18.2%)	8 (14.3%)	0.598
Dehiscence skin/complete	7 (15.9%)	7 (12.5%)	0.626
Para-stoma hernia	5 (11.4%)	5 (8.9%)	0.745 ^F
Stoma stenosis	2 (4.5%)	6 (10.7%)	0.449 ^Y
Bleeding	1 (2.3%)	3 (5.4%)	0.789 ^Y
UTI	14 (31.8%)	11 (19.6%)	0.163
Others	3 (6.8%)	1 (1.8%)	0.447 ^Y
Refashion of colostomy	3 (6.8%)	2 (3.6%)	0.782 ^Y
Death	4 (9.1%)	1 (1.8%)	0.23 ^Y
Overall complications	36 (81.8%)	34 (60.7%)	0.022*
Chi-square test, ^Y Yates Continuity correction test, ^F Fisher's exact test, * Significant at 0.05 level			

Discussion

In our study 100 patients of ARM 58male and 42 female, Male to female ratio were 1.4:1.this is consistent with patwardhan et al [22]. Muhammad Ali et al [23]. but male patients were high in Lofa et al[24] which was 3:1 male to female ratio. Most of colostomies performed in this study were performed in neonatal period (76%) due to the early presentation of ARM in both sex, this is inconsistent with other studies, Cigdem et al[25]and Noor et al[26]. The types of ARM, sex and specialist preference were very important to determine the type of colostomy whether loop or divided. In our study, sigmoid loop colostomy was observed as the most frequent site and type of colostomy(69%) and the 2nd most common was divided sigmoid colostomy (26%of all colostomy done in study), this is consistent with patwardhan et al[22]Muhammad Ali et al[23]but not with Shawn et al [27] were divided colostomy was

the most type, in our study most patient present as intestinal obstruction and need emergency operation, we prefer loop on divided colostomy technique because the later taken more time. In our study we prefer divided colostomy in male (76.9% of total divided colostomy were male) due to divided type had low risk of complication and to complete divert the stool to protect the definitive operation and decrease the risk of UTI which was in consistent with other studies[22,23].The difference in rate of overall complications between loop and divided colostomy were statistically insignificant(p value 0.111), that is consistent with Patwardhanet al[22],but it's statistically significant that stoma prolapse is more common in loop type, and in wound dehiscence is more common in divided type, this may be due to big incision used to create a divided colostomy which increased risk of wound infection due to direct contact with feces when

lack colostomy appliance. Urinary tract infection is also significantly higher in loop type colostomy (31.1% of total complication in loop type in compare of 7% in divided type) due to incomplete division of stool in loop type which is inconsistent with Shawn et al[27] and patwardhan et al [22] who demonstrated that there is no significant difference in risk of UTI between loop and divided stomas.

Although there is a difference in total colostomy complications between male and female, but it is statistically insignificant (p value 0.133), this is consistent with Patwardhan et al[22]. There is statistically significant relationship between stoma complications and associated congenital anomalies of patients in this study (p value 0.022), that is consistent with other studies [27]. In this study, the rate of complication was 70% while the reported incidence of colostomy related complication range from (28%-74%) as reported by Al Saleem et al[28] and Chandramouli et al[29]. This high incidence of complication may be due to surgical technique, poor family care of colostomy and lack of social safety nets. So our policy of management is to admit those patients to the ward if we feel it is difficult to manage as out patients. Parents were also re-educated about colostomy care, hygiene, dietary advice and tips on skin care. The most common complication in our study was found to be stoma prolapse (39%), the reported incidence of prolapse was 12% to 73%.[28,30,31] this high incidence of prolapse in our study may be due to type of operative technique that prefer loop type stoma above divided type. Skin excoriation is found to be the second most common complications in this study (33%), which is more than the incidence reported by Khan et al. (14.4%) and Saleem et al[28](16.85%) but less Mollitt et al [48] (42%). The reason for high incidence of skin excoriation was that the colostomy bags for neonates and infants are not frequently available and costly. Most of the mothers in our study used pieces cloths for covering the colostomy. This problem can be less managed by application of ointments as skin barriers around the stoma. Incidence of UTI in our

study was 25% and it's significantly more in male with loop type of stoma due to present of urinary fistula in male sex, this incidence is constant with Patwardhan et al[22] that shows (29%). Stenosis of stoma was seen in 8% of cases, the reported incidence is 1.9% to 12 % [28,30,31] so our results are quite comparable to them. Skin dehiscence in our study was (14%) and it's significantly more in divided type stoma (26.9% of total patients are of divided type) while it's only (9.5%) in loop colostomy patients and this is constant with Lister et al [32]. This is mostly due to larger than incision in loop type colostomy, frequently unavailable appliance, and poor hygiene and may be due to surgical technique. Wound infection occurred in 16% of patients, which is inconsistent with the reported incidence which is 5.6 % [28,32,33]. This difference is mostly due to lack colostomy bag and poor hygiene because Low parental care.

The parastomal hernia in our study is found to be (10%) which is higher than that published by [23] (5%) and [26] (0.7%), this high incidence may be due to long time for patients with colostomy before closure, high incidence of wound infection (16%), and poor surgical technique of stoma formation since those operations done by junior doctors. Refashioning of stoma was done to 5 cases (5%) in our study, 2 of them was due to complete dehiscence after wound infection, and 1 of them was due to prolapse of distal stoma just after operation and the last two was due to evisceration of bowel, this is constant with Al-Saleem et al[28]. but lower than Mollitt et al [30]. and Lister et al[32]. In this study, mortality rate was (5%) and the cause of death due to either sepsis or associated congenital anomalies, it's like other studies [22,23] but lower than Lofa et al[24].

Conclusion

1. Incidence of complication in patient with ARM was high especially in loop colostomy.
2. The colostomy complication in our study was 70% mainly due to long period of patient with stoma and delay in colostomy closure.

3. The incidence of UTI was high in ARM patients especially in male due to incomplete fecal diversion.
4. The colostomy prolapsed and skin excoriation was high in ARM patients especially in loop colostomy due to infrequent availability of colostomy appliance and lack of colostomy care by companion and family.
5. The incidence of skin dehiscence were higher in patient with divided colostomy may be due to large incision with skin bridge that had direct contact with stool.
6. Most of colostomy complication occurs in male specially the UTI which depend upon the presence of recto-urethral fistula.

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