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Original Research Article

A Clinical Study of Colostomies in Infancy and Childhood

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Abstract:

Background: The Greek term stoma, which means mouth or entrance, is where the name stoma comes from. An intestinal stoma is a surgically made aperture that joins the anterior abdominal wall with a portion of the gastro-intestinal tract. The usage of different colostomies can save lives. This clinical investigation was carried out because colostomies are frequently performed at our facility to treat a variety of problems in children.

Methods: This clinical study was conducted in the Department of General Surgery at KMCH, Katihar, Bihar. The study was conducted during the period from January 2020 to June 2020. The patients aged day 1 to 12 years were admitted.

Results: 33 pediatric colostomies were carried out during the duration of the six-month trial period. Males made up 17 (51.5%) while females made up 16 (48.5%). The majority of the patients were in the early neonatal stage at the time of the colostomy. At our hospital, colostomies were performed on a total of 22 (66.6%) cases, while just 11 (33.4%) patients had done so elsewhere. The majority of colostomy cases were of the sigmoid loop form, while 9 individuals (27.3%) had transverse loop colostomies. Twelve individuals (or 36.36%) had significant post-colostomy problems that required medical treatment.

Conclusion: The child is a socio-psycho-biological unit, and having a colostomy causes both the child and parents significant psychological pain. The first step in diagnosis and treatment is a thorough examination. It is usually unavoidable and life-saving to have a properly indicated, properly created temporary stoma.

Keywords: Colostomies, Anorectal malformations, Hirschsprung's disease, Loop colostomy.

Introduction

The Greek word for mouth or aperture, stoma, is the source of the English word "stoma." [1] An intestinal stoma is a surgically made aperture that joins the anterior abdominal wall with a portion of the gastro-intestinal tract. Colostomies have been used to treat intestinal obstruction since the latter half of the 18th century, and some of the first patients to survive this treatment had imperforated anuses. Despite patchy early success, the use of stomas in children's large and then small intestines evolved gradually. [2] Given the serious risks involved in these radical treatments, surgeons were understandably reluctant to carry them out. [3,4]
When Litre saw a 6-day-old dead newborn with an imperforated anus in 1970, he initially proposed the notion of performing colostomies and indicated that they might have been life-saving. [5,6]

Technically, there are two types of colostomies: loop colostomies, which include delayed colostomies and defunctional loop colostomies, and end colostomies, which include intraperitoneal, extra peritoneal, eversion, and trephine end colostomies.

Colostomies may be performed primarily for decompression, diversion, or evacuation. Colostomy types include sigmoid, right transverse, and left transverse, according to the website. [2,7] Small and large intestine stomas, both temporary and occasionally permanent, are used to treat a variety of surgical and non-surgical pathologic problems in newborn babies and young children. More than half of stomas, with the exception of feeding access, are implanted during the neonatal period, and a further one-fourth are done so in infants under the age of one year. Frequently necessary and lifesaving, a properly indicated, adequately built temporary stoma is required. High types of imperforate anus with complex pelvic malformations, Hirschsprung's disease, colonic atresia, colonic or anorectal injuries, and malignant diseases are the typical reasons for colostomies.

[2,7] The usage of different colostomies can save lives.

This clinical investigation was carried out because colostomies are frequently performed at our facility to treat a variety of problems in children.

Material and Methods

This clinical study was conducted in the Department of General Surgery at Katihar Medical College and Hospital, Katihar, Bihar. The study was conducted during the period from January 2020 to June 2020. This study included patients who had colostomies for a variety of reasons and were admitted through general surgery OPD or emergency. It also included patients who had colostomies performed outside of our institution and who were then sent to us. Patients ranged in age from 1 day to 12 years.

Each patient admitted to this trial underwent a full clinical examination, detailed history taking, tests, and pre-operative work-up. Operative procedures were performed on the instances, and the outcomes were collected and analyzed.

According to the illness, a colostomy was created. when a patient had symptoms of an acute intestinal obstruction in an emergency situation. They had resuscitation treatment first, then pre-op evaluations, and lastly colostomy.

In postoperative period, moist oxygen inhalation was administered for 2-4 hours; antibiotics varied from single pre-operative dose to 1-5 days course; IV fluids were infused to correct dehydration and to maintain adequate urine output, till patient's colostomy began to function or return of peristalsis; intermittent nasogastric suctioning; Oral feeding was initiated when peristalsis returned or colostomy functioned or nasogastric suction was nil; dressing was removed on 2nd or 3rd day and local antibiotic ointment applied for 5-7 days.

A thorough colon cleansing was required before colostomy patients could be discharged. On the seventh or tenth postoperative day, the patients were typically released. After the original disease was treated and the colostomy closure was completed after 6–8 weeks of this treatment on an elective basis, the patients were typically readmitted after 3-6 months.

Follow-up was carried out on an OPD basis, with special attention paid to any surgical complications, colostomy care, upkeep of local hygiene, vaccination, and child growth.

The data collected was entered in MS Excel 2016. The data was analyzed by IBM SPSS version 22.0 (licensed). Proportions were calculated.

Results

In the one year study period, 33 cases of paediatric colostomies performed were studied. Total number of patients in the study was 33, of which 22 were performed primarily in our hospital and 11 were performed elsewhere.

Out of the 33 patients included in the study, 17 (51.5%) were male and 16 (48.5%) were females. Hirschsprung's disease had a mean age of 6 months, while anorectal agenesis without fistula had a mean age of 2 days. The findings indicate that many abnormalities manifested within the first three days of birth. As the stool solidifies after about six months, an anorectal fistula later developed. Except for one child who showed on the seventh day after birth, Hirschsprung's illness typically presents between 3 and 6 months following diagnosis (Table 1). The majority of patients were in the early neonatal phase at the time of colostomy (Table 2).

Table 1: Average age at initial presentation

Pathological condition	Average age
Recto urethral fistula	3 days
Recto vesical fistula	2.2 days
Anorectal agenesis without fistula	2 days
Anovesibular fistula	2.1 months
Cloacal anomaly	8.5 days
Hirschsprung's disease	6 months

Table 2: Age distribution

Age	Number of patients N(%)
Early neonatal period (1-7 days)	14(42.4)
Neonatal period (1 week – 1 month)	3(9)
Post neonatal infant (1 month – 1 year)	11(33.3)
Children (>1 year)	4(12.1)

Early new-born colostomies were performed 40% of the time for anorectal abnormalities (ARM). In the post-neonatal period, Hirschsprung's illness accounted for 50% of colostomies.

Table 3: Clinical features in anorectal malformations

Type of ARM condition	Total N (%)	Clinical feature	No. of patients with clinical feature
Recto urethral fistula	5(15.5%)	No anal opening	5
		Passage of meconium per urethra	5
		Acute distension of abdomen	2
Recto vesical fistula	3(9%)	No anal opening	3
		Passage of meconium per urethra	3
Anovesibular fistula	7(21.1%)	Passage of stool through vesibule	7
		Abdominal distension	2
Anorectal agenesis without fistula	3(9%)	No anal opening	3
		No Passage of meconium	3
		Acute distension of abdomen	3
Cloacal anomaly	4(12.1%)	Single anal opening	4
		Passage of urine, meconium through a single opening in the perineum	4

22 patients presented with clinical features representing ARM (66.7%) (Table 3).

Table 4: Clinical features in Hirschsprung's disease

Presenting clinical feature	Number of patients
Delayed passage of meconium	10
Constipation	11
Passage of hard beaded stool after enema	10
Failure to thrive	5
Abdominal distension	6
Fever	2
Diarrhoea	1

Hirschsprung's disease, which affected 11 (33.3%) individuals, was characterized by constipation, a delay in meconium transit, and the passing of hard, beaded feces following an enema.

There was only one patient who had diarrhoea (Table 4). A total of 22 (66.6%) cases underwent colostomy at our hospital and 11 (33.4%) patients had undergone colostomy elsewhere.

Majority of the cases who had underwent colostomy were of sigmoid loop variety and 9 patients (27.3%) had transverse loop colostomy (Table 5).

Table 5: Type of colostomy

	No. of patients (N)	Percentage
Sigmoid loop colostomy	24	72.7%
Transverse loop colostomy	9	27.3%

26 patients (78.8%) had been operated on emergency basis while 7 patients (21.1%) underwent elective colostomy. A total of 12 patients (36.36%) experienced serious post-colostomy problems that required medical treatment. However, no one passed away during the research period. Immediate, early, and late complications following colostomies were distinguished. Surgery site infections were the most common early complication in 7 individuals (23.1%), and prolapse was the most common late consequence in 7 patients (23.1%) (Table 6).

Table 6: Post colostomy complications

		N (%)
Immediate	Bleeding	Nil
	Ischemia	Nil
Early	Postoperative sepsis	3(9.9)
	Ischemia	1(3.3)
	Small bowel herniation	Nil
	Wound infection	7(23.1)
	Intestinal obstruction	Nil
	Skin excoriation	14(46.2)
Late	Prolapse	7(23.1)

	Stenosis	2(6.6)
	Colocutaneous fistula	Nil
	Retraction	1(3.3)
	Wound hernia	1(3.3)
	Bleeding	1(3.3)
	Suture sinus	2(6.6)

No immediate complications such as bleeding or ischaemia have been seen in 33 patients.

Three patients developed postoperative sepsis, and all three patients recovered with the use of intravenous fluids, nasogastric suction, intravenous antibiotics, moist oxygen inhalation, indwelling catheterizations, IV/IM analgesics, and H2 blockers. We identified one patient who had a loop colostomy that had been detected with ischaemia in the late afternoon of the surgery day, and whose colostomy had to be reshaped that night in an emergency. Patient had a good recovery. Seven patients experienced postoperative wound infections, which were managed with antibiotics based on the isolate organism's sensitivity.

In 14 patients, cutaneous excoriation caused by the stoma effluent or the appliance itself was the most prevalent late consequence. The region was treated by switching out the appliance and exposing it to the air to keep it dry. Localized application of cortisone cream for a brief period of time, together with topical application of an antifungal drug. Transverse colostomies were the most common site of colostomy prolapse. Two individuals had their colostomies refashioned due to stenosis. One patient experienced retraction, which needed surgical correction to be treated. There was one patient who had an asymptomatic hernia at the site of the wound. Nothing was done to intervene right away. Two patients had suture sinus. Colostomies were performed on both patients outside and non-absorbable silk was used for the sutures. Since neither of these patients had any signs of a systemic infection, the suture material was removed along with the application of a local antibiotic ointment. Following local trauma, one patient experienced late bleeding, who was conservatively handled.

Two individuals with ileus, abdominal distension, fever, and accelerated breathing rates were found to have sepsis. They received cautious treatment. There were no visible fistulas. Two Hirschsprung's disease patients exhibited intestinal obstruction-like symptoms. The first case was a 15-month-old boy who had his transverse colostomy closed after two months of definitive surgery (Soave's operation), at which point he started experiencing stomach distension and frequent vomiting on the fourth postoperative day. Straight abdominal X-rays revealed numerous fluid and gas levels, and the patient responded to conservative treatment. However, the patient experienced the same symptoms after a month and went to the emergency room, where admission was recommended. The parent declined entry and was impossible to find. The second patient was a 3-year-old girl who was given conservative treatment after showing signs of intestinal obstruction for three months after having her colostomy closed. Investigations turned up no cause.

No late complications such as hernia, chronic sepsis due to non-absorbable suture or stitch sinus were noted in the study group.

Functional evaluations were performed on patients who were older than 3 years old and had their ultimate repair and colostomy completed.

A total of 18 individuals could be evaluated for functional outcomes in ARM. Nine patients with Hirschsprung's disease in all had their functional outcomes evaluated (Table 7).

Table 7: Post colostomy closure bowel habitus

Disease type	Good continence (%)	Constipation (%)
Anorectal malformations	N = 15 (83.3%)	N = 3 (18.8%)
Hirschsprung’s disease	N = 8 (88.8%)	N = 1 (11.1%)

Discussion

Colostomies have been used to treat intestinal obstruction since the latter half of the 18th century, and some of the first patients to survive this treatment had imperforate anus. [8] Despite rare early successes, children's large intestine stomas were only gradually adopted. The use of enterostomal construction techniques in children, particularly newborns with congenital intestinal obstruction, was refined and adapted from adult techniques developed at the turn of the century. [9,10]

A children's colostomy causes a significant interruption in regular life and frequently causes the child and parents to experience severe psychological anguish. In contrast, the majority of intestinal stomas in children are transient. The standard management strategy entails fixing the underlying issue before closing the diverting stoma. An medically suggested, correctly constructed

temporary stoma is frequently necessary and lifesaving, despite the fact that surgeons are constantly looking for alternatives to intestine exteriorization. [2] Enterostomal therapy has developed over the last few decades into a distinct specialty that makes up a sizeable percentage of contemporary paediatric surgical practice. [11]

In 1961, Bishop from Philadelphia recommended a temporary abdominal colostomy for a baby who was born with Hirschsprung's illness and an imperforate anus. [3]

Gauderer claims that complex pelvic deformity, high forms of imperforate anus, Hirschsprung's disease, colonic atresia, colonic or anorectal trauma, and malignancies affecting the big intestine and rectum are all indications for colostomies in infants.

In male children with recto urethral bulbar fistula, recto urethral prostatic fistula, rectovesical fistula (bladder neck), imperforate anus without fistula, and rectal atresia and stenosis, Prof. Alberto Pena, the world authority in anorectal malformations, recommended emergency or elective colostomy before 2 weeks of definitive surgery. Vestibular fistula, vaginal fistula, imperforate anus without fistula, rectal atresia and stenosis, and persistent cloaca are symptoms in female children. He stated that the most frequent fistulas in female children are anovestibular and rectourethral in male children. [7]

Except in cases of extremely short Hirschsprung's illness (also known as Anorectal achalasia), a diverting Loop colostomy is done in the ganglionated segment directly above the transition zone. Anorectal myectomy is the recommended course of treatment for a patient with unambiguous ultra-short Hirschsprung's disease. In order to keep the protective stoma in place following the pull-through technique, a diverting loop colostomy was previously positioned proximally in the right transverse colon. The third stage of a three stage procedure was when it was closed. But a two-stage process is currently the favored method. [12]

Anorectal abnormalities (22 patients, or 66.7% of the 33 colostomy patients in our sample) and Hirschsprung's disease (11 patients, or 33.3%) were the two most frequent causes of colostomies. Male children with anorectal anomalies were more likely to have rectourethral fistula (5 patients, 15.1%), followed by vesical fistula (3 patients, 9%), while female children were more likely to have anovestibular fistula (7 patients, 21.1%), followed by cloacal anomaly (4 patients, 12.1%), with Hirschsprung's disease (patient 11-33.3%) in both cases. The results are essentially the same as those of Pena et al. and Teitelbaum et al. [7,12] With a mean age of 2.8 days, ARMs needing colostomies in our series typically manifested within the first week after delivery. The anovestibular fistula showed up later than typical, at roughly 2.1 months of age.

Hirschsprung's illness often affects only fully developed, otherwise healthy newborns. Over the past several decades, the median age at which children are diagnosed with Hirschsprung's disease has gradually declined, from 2-3 years of age in the early decades of this century to a mean age of 3-6 months in the 1950s and 1960s. [12] The average patient age upon presentation in our group of 11 patients was 6 months.

We found that just 18.0% of patients presented in the early neonatal period in our hospital, despite the fact that nearly 42% of cases were diagnosed during this time. On the other hand, over half of the patients (48.4%) began showing symptoms after infancy, indicating that they began showing symptoms after an early diagnosis. This demonstrates that the parents' knowledge of the disease's implications is low, or that there may have been some errors in the referral process.

Pena first suggested dividing loop colostomy with mucous fistula in 1996, and he demonstrated its benefits. These include better water absorption, completion by diverting, decompression of urine that might pass from the urinary tract back into the rectum, ease of preparation of the distal intestine prior to the main repair, and easier distal colostograms than when dealing with a more proxima colostomy. [7]

He notably denounced loop colostomies because they increase the risk of faecal impaction, mega rectum, and urinary tract infections by letting feces to enter the distal stoma. After the primary repair, there is also a chance of contamination and infection. Gauderer divided the majority of colostomies into sigmoid, right transverse, and left transverse in 1998. [2] In children with imperforate anus, he advised performing a high sigmoid loop colostomy. Separating the colon's ends, particularly in boys, has recently gained popularity. Less pollution of the urinary tract and a lower rate of prolapse, especially in the distal limb, are benefits of separation. The lengthier incision, increased risk of wound issues, and difficulty administering a stoma device to small infants are all disadvantages.

The ideal location for a colostomy in children with Hirschsprung's disease, according to Gauderer and Teitelbaum et al., is the dilated segment that is immediately proximal to the transition zone and contains normal ganglion cells. [2,12] A loop colostomy is typically used due to how easy it is to set up and take down. This left quadrant stoma is removed during the definitive corrective procedure because the sigmoid colon contains the majority of the transition zones. The distal intestine should not be operated on if the stomas are separated because

mucus cannot be properly evacuated or cleaned off, especially in long segment Hirschsprung's disease.

In our series, we have carried out 22 colostomies (66.6%) at our facility and have seen 11 (33.3%) patients who had their colostomies performed elsewhere before being referred for final surgery. Out of 33 patients, 24 patients (72.7%) had sigmoid loop colostomies, while 9 patients (27.3%) had left transverse loop colostomies. In order to provide sufficient intestinal length for the permanent repair, we conducted left transverse loop colostomies in 4 female patients (12.1%) with cloacal anomalies and 1 male patient with anorectal agenesis without fistula.

Mollitt et al. examined the frequency of colostomy complications in 146 kids back in 1980. [4] The two most common reasons for colostomies were Hirschsprung's disease (70) and imperforate anus (46). 120 patients (82%) had transverse loop colostomies, and the remaining patients had sigmoid loop colostomies. The most common early consequence was sepsis, which affected 24 individuals (18%). Skin excoriation was the most frequent of the late stomal problems, which were reported in 48% of cases. Stenosis occurred in 6% of cases, and prolapse in 12%. Colostomy revision was necessary in 24 cases (18%), with appliance issues and prolapse being the main causes. Complication rates were considerably lower with sigmoid colostomies. In 16 cases (15%), there were significant difficulties. No one passed away as a result of colostomy closure. Similar results were found by Grant et al. and Mac Mohan et al. on the prevalence of complications. [13,14] The use of a transverse colon as opposed to a sigmoid colon and the preference for loop stomas over divided stomas were two factors that appeared to be associated with a higher risk of problems. Age and the underlying condition were not discovered to be significant contributors.

In our study, out of 33 colostomies, postoperative sepsis occurred in 3 patients (9.9%) and would infect 7 individuals (23.1%), with ischaemia occurring in 1 patient (3.3%), necessitating refashioning of the colostomy. Prolapse, which was seen in 7 patients (23.1%) and was more frequently observed in transverse loop colostomies, was the most frequent late consequence, occurring in 14 patients (46.2%). Other late problems included wound hernia in one patient (3.3%), retraction in two patients (6.6%), suture sinus in two patients (6.6%), and stenosis in two patients (6.6%). The outcome is less favorable than that of Mottill et al. and Mohan et al., which may be attributable to better patient management, effective antibiotics, and knowledge of colostomy maintenance. [4,13]

27 colostomy closures have been completed to date following final repair, with another 6 patients still awaiting such repair. Sepsis occurred in 2 patients (9%) and acute intestinal blockage in 1 patient (3.3%) as immediate postoperative complications following colostomy closure. The outcome agrees with Mottill et al. [4]

An analysis of the functional data revealed that 83.3% of cases had satisfactory continence and that 18.8% of ARM patients had constipation. Constipation affected 11.1% of those with Hirschsprung's illness while good continence affected 88.8%. These findings concur with those made public by Pena, Rintala, and Lindhal et al, Teitelbaum et al, and Puri. [12,15–17]

Conclusion

Rectourethral fistula and anovestibular fistula are the most typical signs that a youngster needs a colostomy in a male child. The sigmoid colostomy is most frequently utilized for its simplicity, harder stools, reduced prolapse risk, and ability to support normal growth and development. Although transverse loop colostomies have a high prolapse incidence, they provide a sufficient length of bowel for permanent healing. Skin excoriation was the most frequent consequence. After colostomy closure, functional outcomes are good. The key to diagnosis and first management is careful investigation. Oftentimes, a correctly recommended, built temporary stoma is necessary and lifesaving.

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