

A study on patterns, indications, and complications of an enteric stoma

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ABSTRACT

Introduction: Stoma could be a surgically created opening within the abdominal wall. The main purpose of the stoma is to divert the excreta off from the distal intestinal loops to relieve an obstruction or protect anastomosis. The indications for stoma creation are intestinal obstruction due to benign or malignant tumors, perforation peritonitis, inflammatory bowel disease, colorectal malignancies, and anorectal malformations. **Aim of the study:** The study aimed to identify the patterns, indications, and complications that occur following the creation of enteric stomas. **Materials and Methods:** It is a prospective observational study conducted from May 2012 to October 2015 on a hundred patients, who were admitted in the department of general surgery, surgical gastroenterology, and pediatric surgery, Government Stanley Medical College and Hospital. The sampling method followed here is the non-probability convenience sampling technique. The data is collected from all the patients who come under the inclusion criteria. **Results:** Of 100 patients, the majority of the patients belonged to 26–35 years and 46–55 years ($n = 25$). Based on the study, loop colostomy is more common with age less than one year and loop ileostomy is more common in 26–55 years. The foremost common indication of an enteric stoma is a gastrointestinal malignancy (25%) followed by abdominal trauma (22%). In our study, an ileostomy (80%) is the most common type of stoma created followed by colostomy. Within the ileostomy, loop ileostomy is the more common (60%) followed by end ileostomy (20%). Among the complications related to an enteric stoma, skin excoriation (54.4%) is most common followed by surgical site infections (8.5%). **Conclusion:** Our study shows stoma creation is higher in the adult and old age group, mostly done as an emergency procedure compared to an elective procedure. So, better preoperative planning in both emergency and elective settings can reduce the number of stoma and its related complications. The duration of hospital stay is higher in stoma patients. So, the reduction in stoma creation leads to a reduction in complication, duration of hospital stays and indirectly reduces expenditure related to it. In our study, most of the stoma is created for obstruction in malignancy and perforation in trauma patients. From our study, we can observe early diagnosis of intestinal malignancy with a well-planned elective procedure or bride procedure like colonic stenting in malignant obstruction can reduce the number of stoma creation. Skin excoriation is the most complication followed by surgical site infections. These complications can be reduced by better postoperative stoma care and early reversal of stoma.

Keywords: Colostomy, complications, enteric stoma, ileostomy, indications, patterns

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Received: 18-01-2021

Accepted: 01-07-2021

Published: 30-09-2021

Introduction

The stoma is a surgically created opening in the anterior abdominal wall. The purpose of the stoma is to divert the feces away from the distal bowel loops to relieve an obstruction or protect anastomosis.^[1] A stoma is classified into temporary stoma and permanent stoma.^[2] Even though stoma creation is

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How to cite this article: Pandiaraja J, Chakkarapani R, Arumugam S. A study on patterns, indications, and complications of an enteric stoma. J Family Med Prim Care 2021;10:3277-82.

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_123_21

a lifesaving procedure for the patient, it can produce numerous complications.^[3] Most of the complications are minor and can be managed with conservative measures. A major complication requires intervention using surgery, which has high morbidity and mortality.

An indication of stoma creation varies from a benign disease like complex fistula to a malignant disease like colorectal malignancy. The Indications for an ileostomy include intestinal obstruction due to benign and malignant disease, perforation peritonitis, ulcerative colitis, or Crohn's disease, and mesenteric ischemia.^[4] The indication for colostomy includes colonic growth, colorectal malignancies, anorectal malformations, and high anal fistula.

There are multiple factors involved in the creation of a stoma. It may excessive blood loss during surgery, peritonitis, and associated comorbid condition, and associated hollow viscus injuries. The following are the factors responsible for complications in intestinal stoma.^[5] They are the timing of surgery (elective or emergency), preoperative hemodynamic condition, location of stoma,^[6] ileostomy or colostomy,^[7] comorbidity of the patient,^[8] and quality of life.^[9-11]

The complications of stoma include prolapse, retraction, parastomal hernia, stomal bleeding, stomal stenosis, abscess formation, diarrhea, distal end gangrene, skin reaction around the stoma, and electrolyte imbalance.^[11]

Aim of the Study

The study aimed to identify the patterns, indications, and complications that occur following the creation of enteric stomas.

Methods

Ethical committee clearance and institutional permission are taken to conduct the study. It is a prospective observational study conducted from May 2012 to October 2015 on a hundred patients, who were admitted in the department of general surgery, surgical gastroenterology, and pediatric surgery, Government Stanley Medical College and Hospital. The sampling method followed here is the non-probability convenience sampling technique. The data is collected from all the patients who come under the inclusion criteria. Both male and female patients up to the age of 70 years are included. Patients undergoing urinary stoma creation, stoma creation as a part of gynecological disorders are excluded from the study.

Patients are followed up at 4 weeks, 8 weeks, 12 weeks, 18 weeks, and 24 weeks. Descriptive analysis has been carried out in this study. Significance is analyzed by using the Chi-square test. The statistical software used is the SPSS 22.0 version.

Results

The maximum number of patients are in the age group of 26–35 years and 46–55 years ($n = 25$). All the patients are

analyzed in the correlation between stoma creation and the age of the patients. It shows there is a significant correlation between the age of the patient and stoma creation ($P < 0.01$). Based on the study, loop colostomy is more common in less than one year and loop ileostomy is more common in the age group of 26–55 years. The group of patients belongs to the age of more than 55 years are commonly undergone end ileostomy with mucous fistula [Tables 1 and 2].

In this study, 61 are male patients and 39 are female patients, and the male: female ratio is 6:4. The correlation between stoma creation and the sex of patients is analyzed [Tables 1 and 2]. It shows there is no significant correlation between the sex of the patient and stoma creation ($P > 0.05$). Of 100 patients, 79 patients underwent stoma creation as an emergency procedure and 21 underwent stoma creation as an elective procedure. It shows there is a significant correlation between the time of surgery and stoma creation ($P < 0.01$). The above findings show most of the stoma is created as an emergency procedure rather than an elective procedure. In the emergency setting, loop ileostomy is the most preferred procedure than end ileostomy [Tables 1 and 2].

The duration of hospital stay is analyzed for all patients. Most of them stayed in the hospital for approximately 16–20 days (32%) [Table 1]. The most common indications for stoma creation are gastrointestinal malignancy (25%) followed by abdominal trauma (22%). All are analyzed for correlation between the type of stoma and the primary cause for the stoma. It shows there is a significant correlation between indication for stoma and stoma creation ($P < 0.01$) [Tables 2 and 3]. In our study, an ileostomy (80%) is the most common type of stoma. Within the ileostomy, a loop ileostomy was more common (60%), followed by end ileostomy (20%). The next to ileostomy, the more common stoma created is colostomy (19%). In the colostomy most common is loop sigmoid colostomy (7%), followed by loop transverse colostomy (6%) [Tables 2 and 4].

Of 100 patients, 82 patients developed complications. The most common complication observed was skin excoriations (52.4%), followed by surgical site infections (8.5%). Most of the complications occurred within a week, mostly from the 4th to the 5th day (68.3%). The correlation between indication for stoma and complication of the stoma is analyzed. It shows there is a significant correlation between indication for stoma and complications due to stoma creation ($P < 0.05$). Within the stoma complications, skin excoriation is more common in loop ileostomy [Tables 2 and 5].

Another important factor that is responsible for stoma-related complications is the duration of stoma retained before it's a reversal. Most of the patients retained stoma for 1-2 months duration (57%). Analysis of the above data shows there is a significant correlation between indication for stoma and duration of stoma retained ($P < 0.01$). A loop ileostomy is retained for a longer duration than any other stomas [Tables 1 and 2].

Table 1: Patient characters

Characters	Number
Age (years)	
<1	3 (3.0%)
2-15	5 (5.0%)
16-25	10 (10.0%)
26-35	25 (25.0%)
36-45	18 (18.0%)
46-55	25 (25.0%)
56-65	8.0%
>65	6.0%
Sex	
Male	61 (61.0%)
female	39 (39.0%)
Mode of surgery	
Emergency	79 (79.0%)
Elective	21 (21.0%)
Duration of hospital stay (days)	
<10	2 (2.0%)
11-15	28 (28.0%)
16-20	32 (32.0%)
21-25	15 (15.0%)
26-30	10 (10.0%)
>30	13 (13.0%)
Duration of stoma	
<1 month	10.0%
1-2 months	57.0%
3-4 months	23.0%
More than 4 months	6.0%
Lifelong	4.0%
Onset of complications (days)	
<3	14.6%
4-7	68.3%
8-10	8.5%
>10	8.5%

Discussion

Age

In our study, age 26–35 years and 46–55 years ($n = 25$) are undergone a higher number of stomas. In the stoma, loop ileostomy is a more common form of stoma created at the age of 26–55 years, mainly due to inflammatory disease. In the pediatric population, loop colostomy is created as a part of a rescue procedure before planning for permanent treatment. A patient who belongs age group of more than 55 years is undergone an end ileostomy with a mucous fistula. Similar age distribution was reported by Adnan Aziz *et al.*^[12] (24–48 years), Ahmad Z. *et al.*^[13] (12–85 years), Syed Asad Ali *et al.*^[14] (15–60 years), Hosamath Vijaykumar *et al.*^[15] (14–65 years), Akram Rajput *et al.*^[16] (12–61 years), Qamar A. Ahmed *et al.*^[17] (12–70 years), P. Nastro *et al.*^[18] (19–100 years). Based on the above findings elder patient with better preoperative planning can reduce complications related to end ileostomy. Most of the stoma created in the geriatric population might be permanent stoma due to advanced malignancy detected at a later stage.

Sex

In our study, the sex ratio for stoma creation is 6:4 (male: female). This indicates the male population

underwent more stoma creation than the female population due to a higher incidence of malignancy, abdominal trauma, and intra-abdominal infections. But there is no significant correlation between the type of stoma creation with sex. That means that even though data shows a higher number of stomas in male patients, the same proportionate stoma was created in female patients. Similar findings were reported by Ahmad Z. *et al.*^[13] (male—70% and female—30%), Syed Asad Ali *et al.*^[14] reported (male—74.53% and female—25.47%), Akram Rajput *et al.*^[16] reported (male—69.65% and female—30.35%) and P. Chaudhary *et al.*^[19] reported (male—64.44% and female—35.56%).

Timing of surgery

In our study shows 79 patients underwent stoma creation as an emergency procedure and 21 patients underwent stoma creation as an elective procedure. From our study, we can observe a higher number of stoma creations during an emergency setting. It is due to hemodynamic instability, inability to perform a definitive procedure in the presence of peritoneal contamination. From our study, we can observe well-planned procedures are less likely to create a stoma. So better preoperative planning reduces the number of stoma creation. The elective stoma has a smaller number of complications compared to stoma which is created in an emergency setting. In contrast to our study, a lower incidence of emergency stoma creation was reported by Qamar A. Ahmad *et al.*^[17] as emergency 66% and elective 34%, A.M. Redha *et al.*^[20] reported as emergency 46.25% and elective 53.75%. Hosamath Vijaykumar *et al.*^[15] reported a higher incidence of emergency ileostomy (87.5%) and a lower incidence of emergency colostomy (43.2%).

Duration of hospital stay

The duration of hospital stay is analyzed and it shows, most of the patients have stayed in the hospital for 16–20 days (32%). This is due to complications associated with stoma creation and it indirectly increases hospital and personal expenditure. So, the reduction in stoma creation leads to a reduction in complications, duration of hospital stays and indirectly reduces expenditure. Sometimes minor stoma-related complications can be treated by a primary care physician if a better understanding of the type of complications and management of complications. This can also help the patient to reduce the financial burden. Similar findings reported by Syed Asad Ali *et al.*^[14] showed an average duration of 10–20 days and Hosamath Vijaykumar *et al.*^[15] reported a mean duration of 20.24 days. In contrast to our study higher duration of hospital stay was reported by Qamar A. Ahmad *et al.*^[17] (10–62 days).

Indication for stoma creation

Our study shows the more common indications for stoma creation are gastrointestinal malignancy (25.0%) followed by abdominal trauma (22.0%), hollow viscus perforation (12.0%), enteric fever (8.0%). The indication for stoma creation varies with each study. Similar findings were reported by A.M. Redha

Table 2: Common indications for performing stoma

Indication for stoma	Percentage
Abdominal sepsis	3.0%
Abdominal trauma	22.0%
Adhesive intestinal obstruction	4.0%
Anastomotic leak	2.0%
Congenital anomalies	3.0%
Enteric fever	8.0%
Enterocutaneous fistula	4.0%
Gastrointestinal malignancies	25.0%
Hollow viscus perforation	12.0%
Mesenteric ischemia	2.0%
Necrotizing pancreatitis	3.0%
Refractory ulcerative colitis	2.0%
Strangulated hernia	4.0%
Tuberculosis abdomen	6.0%

Table 3: Types of stomas performed

Type of stoma	Percentage
Cecostomy	1.0%
End ileostomy with mucous fistula	20.0%
Loop ileostomy	60.0%
End sigmoid colostomy	5.0%
End transverse colostomy	1.0%
Loop sigmoid colostomy	7.0%
Loop transverse colostomy	6.0%

Table 4: Distribution of complications associated with stoma

Stomal complication	Percentage
Burst abdomen	1.2%
Enterocutaneous fistula	2.4%
Gangrene of distal end	1.2%
Intestinal obstruction	7.3%
Wound infection	8.5%
Mucosal prolapse	4.9%
Parastomal abscess	1.2%
Parastomal hernia	2.4%
Skin excoriation	52.4%
Stomal bleeding	1.2%
Stomal diarrhoea	1.2%
Stomal necrosis	2.4%
Stomal prolapse	2.4%
Stomal retraction	8.5%
Stomal stenosis	2.4%

et al.^[20] showed a higher incidence of stoma creation for colorectal malignancy (37.5%) and P. Nastro *et al.*^[18] reported malignancy as a cause of stoma creation in 44.7%. In contrast, a low incidence of stoma for malignancy was reported by Akram Rajput *et al.*^[16] (5.35%), Ahmad Z *et al.*^[13] (11.0%), and Qamar A. Ahmed *et al.*^[17] reported 5.5%. From our study, we can observe early diagnosis of intestinal malignancy with a well-planned elective procedure or bride procedure like colonic stenting in malignant obstruction can reduce the number of stoma creation.

In our study, abdominal trauma is the second most common cause of stoma creation. A similar finding was reported by P. Chaudhary *et al.*^[19] (12.5%). In contrast, the low incidence was reported by Akram Rajput *et al.*^[16] (3.57%), Ahmad Z *et al.*^[13] reported 6%, Qamar A. Ahmad *et al.*^[17] reported 5.5% and P. Nastro *et al.*^[18] reported 2.1%. Most of our patients underwent stoma creation in an emergency setting due to hemodynamic instability or peritoneal contamination. Proper preoperative stabilization of hemodynamics with damage control surgery can reduce the higher number of stoma in abdominal trauma.

In contrast to our study, Syed Asad Ali *et al.*^[14] reported a high incidence of stoma for typhoid perforation (81.13%), Akram Rajput *et al.*^[16] reported 62.5%, Ahmad Z *et al.*^[13] reported 38.0%, Qamar A. Ahmad *et al.*^[17] reported 31.0%, Adnan Aziz *et al.*^[12] reported 66.0% and P. Chaudhary *et al.*^[19] reported 63.8%.

Type of stoma

In our study, an Ileostomy (80%) is the most common type of stoma. Within an ileostomy, loop ileostomy is more common (60%), followed by end ileostomy (20%). The second most common type of stoma created is colostomy (19%). Within the colostomy, loop sigmoid colostomy is more common (7%), followed by loop transverse colostomy (6%). Similar findings were reported by Ahmad Z *et al.*^[13] which showed ileostomy around 76%. In contrast, Hosamath Vijayakumar *et al.*^[15] reported a high incidence of colostomy (82.22%) and a low incidence of ileostomy (17.78%). A similar study conducted by Qamar A. Ahmad *et al.*^[17] showed loop ileostomy around 78%.

Complications of stoma

In our study, 82% of patients developed stoma-related complications. Among the complications, skin excoriation (52.4%) is a more common complication, followed by surgical site infections (8.5%). A study conducted by A.M. Redha *et al.*^[20] reported a similar incidence of skin excoriations (45.3%). In contrast to our study, the low incidence of skin excoriations is reported by P. Chaudhary *et al.*^[19] (20%), Ahmad Z *et al.*^[13] (36.2%), Qamar A. Ahmad *et al.*^[17] (39%), Akram Rajput *et al.*^[16] (21.4%) and Syed Asad Ali *et al.*^[14] (5.64%). In our study, surgical site infections are reported as the second most common complication. A similar finding was reported by Ahmad Z *et al.*^[13] (13.4%) and Qamar A. Ahmad *et al.*^[17] (14%). The complications between ileostomy and colostomy are different. The colostomy is associated with a high incidence of parastomal hernia and an ileostomy showed a higher incidence of skin-related complications. This complication can be reduced with proper preoperative planning, postoperative stoma care, and early reversal of stoma.^[21] Skin excoriations and surgical site infections can be managed at the primary care level if there is a proper understanding of stoma complications with the help of a stoma nurse or therapist.^[22]

Duration of stoma

Most of the patients retained stoma for 1–2 months duration (57%), which is very higher in loop ileostomy. In contrast

Table 5: Comparison of epidemiological variables

Characters	Caecostomy	End ileostomy	End sigmoid colostomy	End transverse colostomy	Loop ileostomy	Loop sigmoid colostomy	Loop transverse colostomy	Pearson Chi-square	P
Age (years)									
<45	1	13	3	0	39	4	1	64.126	0.016
>45	0	7	2	1	21	3	5		
Sex									
Male	0	10	5	0	41	3	2	11.598	0.072
Female	1	10	0	1	19	4	4		
Timing of surgery									
Emergency	1	14	2	0	52	4	6	15.325	0.018
Elective	0	4	3	1	8	3	0		
Indications for stoma	1	20	5	1	60	7	6	116.177	0.003
Stoma complications									
Yes	1	20	3	0	55	0	3	116.876	0.030
No	0	0	2	1	5	7	3		
Duration of stoma									
<2 months	1	10	1	1	45	5	4	61.077	0.000
>2 months	0	10	4	0	15	2	2		

to our study, Sier MF *et al.*^[23] reported a higher median duration of the stoma (3.8–8.9 months). Most of the complications related to stoma usually occur within the week (4th–7th days) (68.3%). So proper postoperative stoma care can reduce a significant number of complications. From our study we can observe, there are fewer complications if the stoma is managed better in the early period.^[24]

Role of primary care physicians

Most of the stoma is created in the adult and geriatric populations.^[25] Nearly two-third of the stoma will have some kind of complication before its closure. Stoma created for advanced malignancy might be permanent. Most of the complications are related to skin excoriation. Good knowledge about the stoma type, an indication of stoma creations, and its complications can help the primary care physician to take care of their patient.^[26] A better understanding of stoma-related complications can help primary care physicians to take care of stoma patients and the patient can be referred to tertiary care on time. If complications such as stoma necrosis, stoma prolapse can be identified in time will reduce the morbidity and mortality to the patient.^[27] Complications such as electrolytes disturbances and high out fistula can be managed by a primary care physician which may reduce the morbidity of the patient. The management of stoma is a multidisciplinary approach that includes surgeons, primary care physicians, stoma nurses, and stoma therapists.^[28]

Conclusions

Our study shows stoma creation is higher in the adult and old age group, mostly done as an emergency procedure compared to an elective procedure. So, better preoperative planning in both emergency and elective settings can reduce the number of stoma and its related complications. The duration of hospital stay is higher in stoma patients. So, the reduction in stoma creation leads to a reduction in complication, duration of hospital stays and indirectly reduces expenditure related to it. In our study,

most of the stoma is created for obstruction in malignancy and perforation in trauma patients. From our study, we can observe early diagnosis of intestinal malignancy with a well-planned elective procedure or bride procedure like colonic stenting in malignant obstruction can reduce the number of stoma creation. Skin excoriation is the most complication followed by surgical site infections. These complications can be reduced by better postoperative stoma care and early reversal of stoma.

Take-home points/key points

1. Most of the stoma is created in an emergency setting rather than an elective setting.
2. Nearly two-third of the stoma will have some kind of complication before its reversal
3. Early identification of complication will reduce the morbidity and mortality
4. In recent days, most of the stoma is created for malignancy rather than infections disease
5. Stoma care should be given by a multidisciplinary team which include a surgeon, primary care physician, stoma nurse, and stoma therapist

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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