



STUDY OF INDICATIONS AND COMPLICATIONS OF SMALL AND LARGE INTESTINAL STOMAS IN EMERGENCY SITUATIONS

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ABSTRACT **Background:** Stoma is a surgically created opening in the anterior abdominal wall with a purpose to divert the feces away from the distal bowel loops in order to relieve obstruction or product anastomosis (1) in emergency situations. Stomas may produce multiple complications (2). Most of the stoma complications are minor, can be managed with proper care, only little complications require intervention by means of surgery which may produce high morbidity and mortality (3). **Aims & Objectives:** To study the various types and indications of small and large intestinal stomas in emergency situations. To identify the various early complications encountered after the construction of emergency intestinal stomas. To assess the ways in which these complications can be minimized and managed in a better way. **Methods:** Observational Prospective Study of 40 patients undergoing emergency small and large intestinal stoma construction in tertiary care government hospital from March 2020-August 2021 according to inclusion and exclusion criteria with a follow up of 3 months post-operation. Data is analyzed using descriptive statistics. **Results & Conclusion:** Out of 40 patients underwent emergency small and large intestinal stoma construction, males were 34 and females were 6 with mean age of 45.38 years. The most common indication for stoma construction was Intestinal obstruction followed by Enteric perforation. The most common stoma constructed was loop ileostomy followed by loop sigmoid colostomy. The most common early complication of stoma was skin excoriation followed by stoma retraction. Most stoma complications are managed conservatively.

KEYWORDS : intestinal, stomas, emergency, indications, complications, small, large

INTRODUCTION

Stoma is a surgically created opening in the anterior abdominal wall. The purpose of stomas is to divert the faeces away from the distal bowel loops in order to relieve obstruction or product anastomosis⁽¹⁾. Stomas are classified into temporary stoma or permanent stoma based on the need. After construction, stoma may produce multiple complications. Most of the stoma complications are minor, can be managed with proper care, only little complications require intervention by means of surgery which may produce high morbidity and mortality⁽³⁾.

The basic type of stoma derive their name from the gastrointestinal segment from which they are sited. For example, gastrostomy in stomach, jejunostomy in jejunum, ileostomy in ileum, caecostomy in caecum and colostomy in colon. Indications for emergency ileostomy are intestinal obstruction due to benign or malignant disease, perforation with peritonitis, ulcerative colitis or Crohn's disease and mesenteric ischemia. Indications for emergency colostomy are intestinal obstruction due to colonic growth, colorectal malignancies, and peritonitis due to perforation, perianal abscess, blunt and penetrating abdominal trauma and high anal fistula. Multiple factors play a role in construction of stoma rather than primary resection anastomosis. They are blood loss, peritonitis, co-morbidities of the patient, contamination, and other injuries associated with bowel injuries.

Many factors are responsible for different type of complications⁽⁴⁾. They are patient's presentation, timing of surgery, preoperative education, location of stoma⁽⁵⁾, ileostomy vs colostomy, co morbidity⁽⁶⁾, and quality of life.

Complications of ileostomy include Prolapse, retraction, parastomal hernia, stenosis of ileostomy orifice, skin reaction around the stoma. (Excoriation, erosion, sloughing), distal end gangrene, fluid and electrolyte imbalance (ileostomy flux) and ileostomy diarrhoea. Complications of colostomy include Prolapse, retraction, parastomal hernia, bleeding and stenosis of colostomy orifice, peri colostomy abscess, colostomy diarrhoea and distal end gangrene. Our purpose in this study is to identify various indications and complications of small and large intestinal stomas in emergency situations.

AIMS & OBJECTIVES:-

1. To study the various types and indications of small and large intestinal stomas in emergency situations.
2. To identify the various early complications encountered after the construction of emergency intestinal stomas.
3. To assess the ways in which these complications can be minimized and managed in a better way.

METHODS:

This is an Observational Prospective study of 40 patients done in tertiary teaching hospital from March 2020 to August 2021. All patients of this study group are subjected to preoperative standard investigations and resuscitative measures and emergency exploratory laparotomy with construction of small or large intestinal stomas were made and post-operatively followed up for a period of 12 weeks.

Inclusion Criteria:

1. All male and female patients of 18-80 years.
2. All emergency cases undergoing small and large intestinal stoma construction.

Exclusion Criteria:

1. Age <18 years and >80 years
 2. Patients in who elective stomas were made.
 3. Patients who refuse to give consent to participate in the study
- Data is entered in Microsoft excel and analyzed using descriptive statistics like percentages and proportions.

RESULTS & DISCUSSION:-

This observational study consisted of 40 patients who were admitted to Department of general surgery, in a government tertiary care teaching hospital and undergone emergency small or large bowel stoma formation and a follow up of around 3 months were made. Informed and written consent was taken and proper confidentiality of the patient records were maintained as per protocol. The following observations were derived and discussed as follows :

Age Distribution:

Table/Fig-1 : Age distribution

Age (years)	No. of patients	Percent
18-26	3	7.5

27-34	4	10
35-42	11	27.5
43-50	8	20
51-58	10	25
59-66	2	5
67-74	1	2.5
75-82	1	2.5
Total	40	100

The maximum number of patients undergoing emergency small and large intestinal stomas were in the group of 35-42 years followed by the age group of 51-58 years and the mean age of the patients is 45.38 years.

Sex Distribution:

Table/Fig2: - Sex distribution of patients

Sex of patient	Number	Percentage (%)
Female	6	15
Male	34	85
Total	40	100

In this study, 34 were male patients (85%) and 6 were female patients (15%). This indicates male patients underwent more stoma construction compared to female population.

Table/Fig-3: Sex distribution among various studies were:-

Name	Author	Results
Ostomy in Acute Abdominal Conditions: A Study of 30 Cases	DR Arvind Kumar Prabhat et al	Male-87% Female-13%
A prospective audit of post operative complications of construction of loop ileostomy	SYED ASAD ALI et al	Male-74.52% Female 25.47%

Types of stomas:

Table/Fig-4: Type stoma

The most common type of stoma constructed was loop ileostomy (55.0%). The next most common stoma constructed was colostomy (25%). In colostomy most common is loop Sigmoid colostomy (15%), followed by loop Transverse colostomy (10%). Around 12.5% patients underwent Hartmann procedure and in around 7.5% patients double barrel stoma was made. Types of stoma according to various studies are:-

Table/Fig-5: Type of stoma in various studies are:-

Ostomy in Acute Abdominal Conditions: A Study of 30 Cases	DR Arvind Kumar Prabhat et al	Ileostomy- 40 % Colostomy- 60 %
Indications and Complications of Stoma Formations in Emergency Surgery	Mürşit Dincer et al	Ileostomy-87% Colostomy-13%

Indication for emergency intestinal stoma

Table/Fig-6: Indications :-

INDICATION	Frequency	Loop ileostomy	Loop Colostomy	Double barrell	Hartmann's
ENTERIC PERFORATION	15				
TYPHOID(ILEAL)	5	5	0	0	0
KOCH'S ABDOMEN (ILEAL)	3	3	0	0	0
ILEAL PERFORATION (NON-SPECIFIC)	2	2	0	0	0
COLONIC PERFORATION	4	2	0	1	1
AMOEBIC COLITIS	1	1	0	0	0
INTESTINAL OBSTRUCTION	16				
MALIGNANCY	8	2	2	0	4
KOCH'S ABDOMEN	3	3	0	0	0
STRANGULATED INGUINAL HERNIA	2	1	1	0	0

BENIGN STRICTURE	2	0	0	2	0
DIVERTICULITIS	1	0	1	0	0
PERIANAL ABCESS	6	1	5	0	0
TRAUMA	3				
IATROGENIC	2	2	0	0	0
PENETRATING	1	0	1	0	0
TOTAL	40	22	10	3	5

Out of 40 patients undergoing emergency small and large bowel stoma construction, the most common indication for stoma construction was Intestinal Obstruction (n=16,40%) followed by Enteric perforation (n=15,37.5%) followed by Perianal abcess (n=6, 15%), followed by trauma (n=3,7.50%). Among patients of intestinal obstruction, lower GI malignancy(n=8,20%) accounts for majority of cases followed by Koch's Abdomen (n=3, 7.5%), Strangulated inguinal hernia (n=2,5%) and benign ileal stricture (n=2,5%). In patients of lower GI malignancy presenting with intestinal obstruction, Hartmann's procedure was more commonly performed (50%) owing to the factors like improperly prepared bowel in emergency situations, extensive metastatic cancer with adhesions where resection of the entire tumor was not possible, or poor general condition of patient not favoring primary anastomosis.

In all patients of Koch's abdomen (n=3) presenting as intestinal obstruction, loop ileostomy was made as all of them presented as small bowel obstruction owing to the most common involvement of ileum and ileo-cecal junction in Tuberculosis.

In patients of strangulated inguinal hernia(n=2), one patient presented early and had only necrosis of a small portion of sigmoid colon and a loop sigmoidostomy was performed, whereas another patient presented very late because of en-mass reduction of inguinal hernia that led to extensive small bowel necrosis leading to resection of a large portion of ileum and a loop ileostomy was performed.

Among patients of Enteric Perforation(n=15), incidence of ileal perforation(n=10) is two times greater than that of colonic perforation(n=5).

Out of patients of ileal perforation (n=10), half of the patients were diagnosed with Typhoid (n=5,50%), and in all patients of typhoid ileal perforation loop ileostomy was done, and in 3 patients due to multiple perforations, closeness to the ileo-caecal junction, inflamed bowel, primary anastomosis was done and a proximal diverting ileostomy was made.

Among the other 2 patients of typhoid ileal perforation owing to single perforation, distant from ileo-caecal junction along with oedematous inflamed bowel, the segment with perforation itself was brought out as loop ileostomy.

Among the 3 patients diagnosed with Abdominal TB the perforations were single, distant from ileo-caecal junction along with surrounding lymph nodes and edematous bowel and the perforation segment itself is brought out as loop ileostomy.

In patients of colonic perforation (n=4), three patients had cecal perforation where primary repair was done and a proximal diverting loop ileostomy was done and one patient had multiple perforations in distal transverse colon, descending colon and sigmoid colon in whom left hemicolectomy was performed and Hartmann procedure was done with transverse colostomy.

There are 6 patients of Perianal abcess in whom diverting stoma was made alongside perianal debridement for fecal diversion to control local sepsis and facilitate healing. Among all the patients of perianal abcess, loop sigmoid colostomy was made in 4 patients and loop transverse colostomy was made in other 2 patients as the skin involvement extended further higher in these two patients.

Among the 3 patients of trauma (7.5%) in whom stoma was made, 2 patients had iatrogenic trauma. One patient had post-colonoscopy colonic perforation for which primary repair was done and proximal diverting loop ileostomy was made. Another patient had injury to cecal base while performing open appendectomy and a double barrel stoma was made.

Another patient had penetrating trauma to rectum for which proximal diverting loop sigmoid ostomy was made. Indications for stoma formation according to various studies include:-

Table/Fig-7: Indications in various studies:-

Ostomy in Acute Abdominal Conditions: A Study of 30 Cases	DR Arvind Kumar Prabhath et al	Malignancy- 47% Sigmoid volvulus- 17%
Indications and Complications of Stoma Formations in Emergency Surgery	Mürşit Dincer et al	Malignancy- 42.6% Iatrogenic- 11.1%

Complications of stoma in various stoma

Out of 40 patients 4 patients expired in the immediate post-operative period, not related to stoma related complications and 3 patients were lost to follow up. The remaining 33 patients were followed up for a period of 3 months and observed for any stoma related early complications. Out of 33 patients, 21 patients (63.6%) developed complications. The most common complication observed was Skin excoriation (51.51%), followed by Stoma retraction (12.09%), Stoma blackening (6%), and mucocutaneous separation (3%).

Table/Fig-8: Early complications of stoma

COMPLICATION	LOOP ILEOSTOMY	LOOP COLOSTOMY	DOUBLE BARR ELL	HARTMAN	TOTAL
Skin Excoriation	11	3	2	1	17
Stoma blackening	1	0	0	1	2
Stoma Retraction	2	1	1	0	4
Mucocutaneous separation	0	1	0	0	1
TOTAL	14	5	3	2	24

Out of the 4 patients expired, one patient was HIV positive with active Abdominal Koch's and expired due to postoperative hypotension leading to cardiac and respiratory failure on the same day. Another patient was of Chronic Renal Failure with active Abdominal Koch's and expired due to post-operative kidney failure who was also on ongoing dialysis support expired during dialysis on day 5. Another patient expired due to intractable post-operative ventricular arrhythmias on day 2. The fourth patient had strangulated inguinal hernia and extensive gangrene of small bowel and is in severe sepsis and hypotension and succumbed to septic shock on first post-operative day.

Out of 33 patients under follow up for a period of 3 months, skin excoriation around the stoma was the most common complication that occurred in 51.51%(n=17), which was more seen in ileostomy than colostomy owing to the greater amount of effluent in ileostomy compared to colostomy. Most of the patients with skin excoriation are managed conservatively with appropriate pouching system that provides a secure, predictable wear time and protects the peristomal skin from effluent and skin barrier powder applied to the skin to absorb moisture and provide a dry pouching surface.

In 2 patients with stoma blackening, both occurred within 24 hours post-operatively. First was a patient of strangulated inguinal hernia with extensive bowel gangrene in whom resection and loop ileostomy was done and post-operatively patient was in persistent hypotension and on inotropic support, re-exploration could not be possible.

In another patient of multiple left colonic perforations in whom left hemicolectomy was done with Hartmann procedure with transverse colostomy, stoma blackening was found within 6 hours post-operatively, patient had poor respiratory function and is on inotropic support and planned for re-exploration after resuscitation. Unfortunately patient couldn't be resuscitated and expired before re-exploration.

In 4 patients of stoma retraction, 2 patients were managed conservatively as the stomal appliance faceplate placed firmly against the skin maintained a satisfactory seal, whereas in the other two patient there was persistent soiling and soakage and one patient was taken for revision ileostomy where stoma is mobilized and fixed again to fascia (New Brooke Maturation is done) and in another patient of loop transverse colostomy stoma refreshment was done.

The single patient with mucocutaneous separation, is managed conservatively with proper pouching, and peristomal skin care. Stoma complications in various studies include:-

Table/Fig-9: Early complications of stoma in various studies:-

Ostomy in Acute Abdominal Conditions: A Study of 30 Cases	DR Arvind Kumar Prabhath et al	Skin excoriation- 63% Stoma retraction- 11.1%
Various Complications in Ileostomy Construction	AMBREEN MUNEER et al	Skin excoriations – 17.64%

CONCLUSIONS:-

The study was done with 40 patients in all surgical units of dept of general surgery, in a government tertiary care teaching hospital from March 2020 to August 2021. The purpose of the study was to identify the various types of small and large intestinal stomas in emergency situations and their indications and identify the various early complications encountered and assess the ways in which these complications can be minimized and managed in a better way.

All adult patients both male and female between 18-80 years undergoing emergency small and large intestinal stoma construction were included in the study.

The observations of the study summarized below as:-

- The maximum number of patients were in the group of 35-42 years (n=11) followed by 51-58 years (n=10). The mean age for construction of emergency stoma is 45.38 years.
- Male: Female ratio among patients was 5.67:1 (34:6), implying males more likely to undergo emergency stoma construction.
- The most common type of stoma constructed was loop ileostomy (55.0%). The next most common stoma constructed was colostomy (25%). In colostomy most common is loop Sigmoid colostomy (15%), followed by loop Transverse colostomy (10%). Around 12.5% patients underwent Hartmann procedure and in around 7.5% patients double barrel stoma was made.
- The most common indication for emergency intestinal stoma construction was Intestinal Obstruction (40%) followed by Enteric perforation (37.5%)
- Among patients of intestinal obstruction, lower GI malignancy (n=8) accounts for majority of cases followed by Koch's Abdomen (19%) and majority of patients with lower GI malignancy (50%) are likely to undergo Hartmann procedure.
- Among patients of Enteric Perforation, incidence of ileal perforation (n=10) is two times greater than that of colonic perforation (n=5)
- Out of patients of ileal perforation (n=10), half of the patients were diagnosed with Typhoid (n=5), and 3 patients were diagnosed with Abdominal TB. Loop ileostomy was made in all patients of Typhoid and Tuberculous ileal perforation.
- The most common complication related to stoma observed was Skin excoriation (51.51%), followed by Stoma retraction (12.09%), Stoma blackening (6%), and mucocutaneous separation (3%).
- Complications like skin excoriation is more in ileostomy than colostomy.
- Most of the complications of stoma like skin excoriation, retraction, mucocutaneous separation can be managed conservatively by proper skin care, pouching devices, and patient counselling whereas complications like stoma necrosis needs immediate surgical re-exploration.
- With proper constructive technique, adequate counselling of patient and relatives, adequate stoma care, most stoma complications can be minimised.

Summary:-

Observational Prospective Study of 40 patients undergoing emergency small and large intestinal stoma construction in a tertiary care government hospital from March 2020- August 2021 according to inclusion and exclusion criteria with a follow up of 3 months post-operation. Data is analyzed using descriptive statistics.

- The maximum number of patients were in the group of 35-42 years followed by 51-58 years. The mean age for construction of emergency stoma is 45.38 years.
- Male: Female ratio among patients was 5.67:1 (34:6), implying males more likely to undergo emergency stoma construction.
- The most common type of stoma constructed was loop ileostomy (55.0%). The next most common stoma constructed was colostomy (25%).
- The most common indication for emergency intestinal stoma

construction was Intestinal Obstruction (40%) followed by Enteric perforation (37.5%)

- Among patients of intestinal obstruction, lower GI malignancy (n=8) accounts for majority of cases followed by Koch's Abdomen (19%) and majority of patients with lower GI malignancy (50%) are likely to undergo Hartmann procedure.
- Among patients of Enteric Perforation, incidence of ileal perforation (n=10) is two times greater than that of colonic perforation (n=5)
- The most common complication related to stoma observed was Skin excoriation (51.51%), followed by Stoma retraction (12.09%), Stoma blackening (6%), and mucocutaneous separation (3%).
- Complications like skin excoriation is more in ileostomy than colostomy.
- Most of the complications of stoma like skin excoriation, retraction, mucocutaneous separation can be managed conservatively by proper skin care, pouching devices, and patient counselling whereas complications like stoma necrosis needs immediate surgical re-exploration.

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