

ORIGINAL ARTICLE

Trends of Indications and Complications of Stoma in a Tertiary Care Hospital

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ABSTRACT

Objective: To identify the indications and complications of the stoma.

Methods: The study covered all patients who attended Outpatients department of General Surgery, Ziauddin Hospital in Karachi and met the inclusion criteria. After describing the study's process, hazards, and benefits, informed permission was obtained. The patients were followed after 4 weeks in the clinic and assessed for Indications (enteric perforation, intestinal tuberculosis, penetrating injury, intestinal obstruction, blunt abdominal trauma). Complications (excoriation, non-functioning stoma, retraction, prolapsed, stenosis of Stomas, wound infection). The proforma that is supplied at the end was filled out with all the acquired data and utilised electronically for research.

Results: The mean age of patients was 38.5 ± 7.4 years and the body mass index was 26.8 ± 6.2 kg/m². The most common indication for stoma was intestinal tuberculosis (41.0%) followed by enteric perforation (27%). The most common complications of stoma were non-functioning stoma (34.4%) followed by excoriation (23.9%). Stoma indication due to enteric perforation was significantly more common in patients aged between 16 and 40 years ($p=0.003$). Other indications were not significantly associated with age, BMI, and age. The rate of excoriation was 52 (20.1%) in patients with BMI of more than 24 kg/m² which is significantly higher as compared to patients with lower BMI ($p=0.029$). The other complications were not significantly different between the age groups, BMI categories, and gender.

Conclusion: The most frequent indications and consequences, respectively, were determined to be non-functioning stomas and intestinal tuberculosis. Reduced stoma development and related problems can be achieved with early detection and treatment of TB and enteric fever.

Keywords: Indications, Complications, Stoma, Management, Intestinal Stoma, Ostomy, Colostomy

INTRODUCTION

An intestinal stoma involves creating an opening in the intestines through surgery of the anterior abdominal wall.^{1,2} Stomas may be used as a temporary or permanent way to redirect the fecal stream away from the distal colon while facilitating any distal anastomosis to heal and remove any blockages in emergency cases.³ There are several factors that favor utilizing stoma formation rather than primary repair, and these include hypovolemia, blood loss, considerable fecal contamination, concomitant accidents, delayed presentation, and injury multiplicity.^{4,5} Moreover, while stomas are considered a life-saving treatment, they also cause considerable complications. Subsequently, these adverse events are classified as early (up to 30 days after surgery) or late (greater than 30 days after surgery).⁴ In cases when the framework of a bowel anastomosis is crucial, a diverting (de-functioning) loop ileostomy may be employed with the intent to reduce morbidity as well as the occurrence of any anastomotic leak.⁶

Furthermore, a diversion loop ileostomy can be used to treat and prevent persistent perineal sepsis, typhoid ileal perforation, caecal and sigmoid volvulus, and intestinal obstruction.^{6,7} Diversion can be utilized in case of obstructed tumor or inguinal and umbilical hernia, intestinal tuberculosis, a perforated appendix, refractory pelvic floor disorders^{8,9}, and other conditions. In addition, it is necessary to create an ileostomy (EI) in people with malfunctioning or irreparable anal sphincters and in situations when an anastomosis is risky.⁹ Although the creation of an ileostomy carries great benefit in these scenarios, it is also a source of other types of morbidity. These range from abdominal pain, vomiting, pouching difficulty, hernia, and prolapse to dehydration, acute renal failure, skin excoriation around the stoma, and electrolyte imbalance.⁸⁻¹⁰

On the other hand, a procedure that can be used to treat colonic blockage (usually caused by cancer of the distal colon or rectum), perforation with peritonitis, rectovaginal fistulas, and perianal infection is a colostomy. Although the indications and complications of stoma formation are known, in this study, we

identified common indications and complications associated with an intestinal stoma in our population at a tertiary care hospital.¹⁰ In a study conducted by Qamar According to AQ et al., causes like diversion were estimated to be 5.5%, but intestinal TB (58%), enteric perforation (31%), and trauma (5.5%) were the primary reasons for ileostomy. Colostomy was most frequently necessary in cases of intestinal blockage (28%), blunt trauma (23%), and piercing injuries (33% each). Furthermore, in this study the most complications were Skin excoriation and ulceration (25%); they were more in ileostomy than colostomy. Besides this, notable complications in laparotomy include wound infection (9.4%), stoma diarrhea (7%), stoma retraction (6%) and prolapse (6%).¹⁰

The aim of this study was to detect early indication and its related complication and to get control of it as early as possible. Early diagnosis and detection of complications will help us to provide better surgical outcomes, i.e. with decreased mortality, morbidity and less hospital stay of the patient. It also saved the patient from getting unnecessary procedures secondary to any complication. It also reduced hospital burden as a cost and also help other patient for cost effectiveness. Thus, the present study identified the trends of indications and complications of the stoma.

METHODS AND MATERIALS

A descriptive cross-sectional study was conducted at the Department of General Surgery, at a tertiary care center, Sindh, Pakistan between December 2019 and June 2021. After the ethical approval of synopsis from the institutional review board, the study was initiated.

By using WHO sample size calculator taking statistics for penetrating injury¹⁰, as 5.5%, margin of error 4%, the calculator sample size came out as 125. A non-probability, consecutive sampling was used to recruit the participants. All patients who underwent stoma formation at our department, aged between 16 to 50 years, irrespective of gender, and in-patients where primary repair was not possible were included in the study. Patients who were lost to follow up after stoma formation were excluded.

Patients with metastatic disease in whom stoma was not possible or with primary repair were also excluded.

Informed consent was taken by the patients fulfilling the inclusion criteria. The proforma was filled, noting the demographic details including name, age, sex and contact, indication for stoma formation, on the day of admission. Then the patients were followed 4 weeks in the clinic and assessed for indications (enteric perforation, intestinal tuberculosis, penetrating injury, intestinal obstruction, blunt abdominal trauma). Complications (excoriation, non-functioning stoma, retraction, prolapsed, stenosis of stomas, wound infection). All the information was collected on predesigned forms (attached) and confidentiality was maintained.

Data was entered and analyzed by SPSS version 20. Mean and Standard deviation were calculated for age, BMI, gender, indications (enteric perforation, intestinal tuberculosis, penetrating injury, intestinal obstruction, blunt abdominal trauma). Complications (excoriation, non-functioning stoma, retraction, prolapsed, stenosis of stomas, wound infection) were measured in frequency and percentages. Stratification was done for indication and complications with respect to age, gender and BMI. Post stratification, chi square test was applied P value < 0.05.

RESULTS

A total of 259 participants were included in the study. The mean age of patients was 38.5 ± 7.4 years and the body mass index was 26.8 ± 6.2 kg/m². The most common indication for stoma was intestinal tuberculosis (41.%) followed by enteric perforation (27%). The most common complications of stoma were non-functioning stoma (34.4%) followed by excoriation (23.9%) (Table 1).

Stoma indication due to enteric perforation was significantly more common in patients aged between 16 and 40 years (p=0.003). Other indications were not significantly associated with age, BMI, and age (Table 2).

The rate of excoriation was 52 (20.1%) in patients with BMI of more than 24 kg/m² which is significantly higher as compared to patients with lower BMI (p=0.029). The other complications were not significantly different between the age groups, BMI categories, and gender as illustrated in Table 3.

Table 1: Sociodemographic and clinical parameters of study participants

Parameter	N=259
Gender	
Male	191 (73.7%)
Female	68 (26.3%)
Indication of stoma	
Enteric Perforation	70 (27.0%)
Intestinal Tuberculosis	108 (41.7%)
Penetrating Injury	33 (12.7%)
Intestinal Obstruction	10 (3.9%)
Blunt Abdominal Trauma	37 (14.3%)
Complications of Stoma	
Excoriation	62 (23.9%)
Non-functioning Stoma	89 (34.4%)
Retraction	23 (8.9%)
Prolapsed	19 (7.3%)
Stenosis of Stoma	31 (12.0%)
Wound Infection	35 (13.5%)

Table 2. Association of age, BMI, and gender with indications of stoma

INDICATION	AGE GROUP (years)		P-Value
	16 - 40	> 40	
Enteric Perforation			0.003
Yes	52 (20.1%)	19 (7.3%)	
No	83 (32.0%)	106 (40.9%)	
Intestinal Tuberculosis			0.15
Yes	64 (24.7%)	44 (17.0%)	
No	70 (27.0%)	81 (31.3%)	
Penetrating Injury			0.716
Yes	19 (7.3%)	15 (5.79%)	
No	116 (44.8%)	110 (42.5%)	
Intestinal Obstruction			0.538
Yes	6 (2.3%)	4 (1.5%)	
No	128 (49.4%)	121 (46.7%)	
Blunt Abdominal Trauma			0.744
Yes	21 (8.1%)	17 (6.56%)	
No	144 (44.0%)	107 (41.3%)	
	Body Mass Index (BMI) (kg/m ²)		
INDICATION	18 - 24	> 18	P-Value
Enteric Perforation			0.179
Yes	29 (11.2%)	41 (15.8%)	
No	54 (20.8%)	135 (52.1%)	
Intestinal Tuberculosis			0.359

Yes	39 (15.1%)	68 (26.3%)	
No	44 (17.0%)	108 (41.7%)	
Penetrating Injury			0.614
Yes	12 (4.6%)	21 (8.1%)	
No	70 (27.0%)	155 (59.8%)	
Intestinal Obstruction			0.485
Yes	2 (0.8%)	8 (3.1%)	
No	81 (31.3%)	168 (64.9%)	
Blunt Abdominal Trauma			0.453
Yes	10 (3.9%)	27 (10.4%)	
No	73 (28.2%)	149 (57.5%)	
	GENDER		
INDICATION	Male	Female	P-Value
Enteric Perforation			0.356
Yes	48 (18.5%)	23 (8.9%)	
No	142 (54.8%)	46 (17.8%)	
Intestinal Tuberculosis			0.477
Yes	83 (32.0%)	25 (9.7%)	
No	107 (41.3%)	44 (17.0%)	
Penetrating Injury			0.42
Yes	23 (8.9%)	10 (3.86%)	
No	168 (64.9%)	58 (22.4%)	
Intestinal Obstruction			0.397
Yes	6 (2.3%)	4 (1.5%)	
No	184 (71.0%)	65 (25.1%)	
Blunt Abdominal Trauma			0.471
Yes	25 (9.7%)	12 (4.6%)	
No	166 (64.1%)	56 (21.6%)	

Table 3. Association of complication with age, BMI, and gender

INDICATION	AGE GROUP [Years]		P-Value
	16 - 40	> 40	
Excoriation			0.065
Yes	41 (15.8%)	21 (8.1%)	
No	93 (35.9%)	104 (40.2%)	
Non-functioning Stoma			0.537
Yes	50 (19.3%)	39 (15.1%)	
No	85 (32.8%)	85 (32.8%)	
Retraction			0.556
Yes	12 (4.6%)	10 (3.9%)	
No	122 (47.1%)	115 (44.4%)	
Prolapsed			0.287
Yes	12 (4.6%)	6 (2.3%)	
No	122 (47.1%)	119 (45.9%)	
Stenosis of Stoma			0.175
Yes	21 (8.1%)	10 (3.9%)	
No	114 (44.0%)	114 (44.0%)	
Wound Infection			0.193
Yes	23 (8.9%)	12 (4.6%)	
No	112 (43.2%)	112 (43.2%)	
	BMI [kg/m ²]		
INDICATION	18 - 24	> 24	P-Value
Excoriation			0.029
Yes	10 (3.9%)	52 (20.1%)	
No	73 (28.2%)	124 (47.9%)	
Non-functioning Stoma			0.366
Yes	33 (12.7%)	56 (21.6%)	
No	50 (19.3%)	120 (46.3%)	
Retraction			0.491
Yes	8 (3.1%)	15 (5.8%)	
No	75 (29.0%)	161 (62.2%)	
Prolapsed			0.405
Yes	4 (4.5%)	15 (5.8%)	
No	79 (30.5%)	161 (62.2%)	
Stenosis of Stoma			0.479
Yes	12 (4.6%)	19 (7.3%)	
No	70 (27.0%)	158 (61.0%)	
Wound Infection			0.523
Yes	10 (3.9%)	25 (9.7%)	
No	73 (28.2%)	151 (58.3%)	
	GENDER		
INDICATION	Male	Female	P-Value
Excoriation			0.362
Yes	50 (19.3%)	12 (4.6%)	
No	141 (54.4%)	56 (21.6%)	
Non-functioning Stoma			0.481
Yes	62 (23.9%)	27 (10.4%)	
No	128 (49.4%)	42 (16.2%)	
Retraction			0.595
Yes	17 (6.6%)	6 (2.3%)	
No	174 (67.2%)	62 (23.9%)	
Prolapsed			0.56
Yes	15 (5.7%)	4 (1.5%)	
No	176 (68.0%)	64 (24.7%)	
Stenosis of Stoma			0.598
Yes	23 (8.9%)	8 (3.1%)	
No	168 (64.9%)	60 (23.2%)	
Wound Infection			0.517
Yes	27 (10.4%)	8 (3.1%)	
No	164 (63.3%)	60 (23.2%)	

DISCUSSION

In Surgery, the most frequently made intestinal stoma procedures are ileostomy and colostomy. The first stomas were mostly accidentally created, enterocutaneous fistulas brought on by abdominal injuries that penetrated the skin, or side effects of

intestinal illness such as incarcerated hernias.¹¹ Likewise, the pioneer surgical stoma to be ever made was more than 200 years ago.

Like every Surgery, undergoing a surgical procedure for stoma formation carries a risk of complications.¹² Subsequently, many factors can contribute to stoma complications. These include high body mass index, inflammatory bowel disease, use of steroids and immunosuppressants, diabetes, older age, emergency surgery, surgical technique, and surgeon experience.¹³

The most common indication of stoma formation in our study was intestinal tuberculosis in 52 cases (41.6%), followed by enteric perforation in 34 cases (27.2%) cases, blunt abdominal trauma in 18 cases (14.4%), penetrating injury in 16 cases (12.8%) and intestinal obstruction in 05 cases (4%).

Our findings are similar to a study done by Akram Rajput et al.¹⁴ According to the study, intestinal perforation is the primary predictor of stoma development in 60% of cases. The most frequent causes of stoma development, according to a research by Adnan Aziz et al.¹⁵, were typhoid perforation (66%) and TB. Contrarily, Safirullah et al study's¹⁶ identified colorectal cancer (22%) as the most typical reason for stoma development. Trauma (20%) and typhoid perforation (20%) came next. Ileal perforation from typhoid generally happens in the second or third week of disease. Improves survivability when performed quickly as opposed to lengthy duration of surgery.

In our investigation, simple closure with proximal ileostomy and loop ileostomy were used for multiple typhoid perforations. Further study is necessary in light of the alarmingly high frequency of abdominal TB and typhoid that go undiagnosed and cause acute abdomen in the Indian subcontinent.

The most common complication reported in our study was nonfunctioning stoma followed by excoriation, wound infection, stenosis of stoma, retraction and prolapsed. Safirullah et al [72] reported prolapsed in 6% and retraction in 4%. In our study, the mean age was 38.5±7.4 years. Ahmad Z, et al¹⁷ reported the mean age as 50.5±29.01 years. Another study of Engida A, et al¹⁸ noted the mean age 50.8 years. Massenga A, et al¹⁹ 82 also noted the mean age as 36.7±15.8 years. The study of Satpal SS, et al [20] found the mean age as 43.52±14.55 years. In this study, the mean body mass index was 26.8±6.2 kg/m². In present study, there were 92 (73.6%) were male while 33 (26.4%) were female. Ahmad Z, et al¹⁷ further reported the gender distribution as 70 (70%) males and 30 (30%) females. The study of Engida A, et al¹⁸ noted males as 151 (68.9%) against 68 (31.1%) females. There were 90 (53.9%) males and 77 (46.1%) females in the study of Massenga A, et al¹⁹. Satpal SS, et al²⁰ in his study noted 76% males and 24% females. Ahmad QA, et al¹⁰ reported 62 (73%) and 23 (27%) females in his study. In current study, stratification of age group, body mass index and gender were done with respect to indications and complications of stoma and no-significant difference was noted i.e. (P > 0.05). Significant difference was only noted in complication of excoriation with BMI. In present study main indications of stoma included abdominal trauma, intestinal tuberculosis and enteric perforation. Important complications include non-functioning stoma, excoriation, wound infection and stenosis. Reduced stoma development and its related consequences can be achieved by avoiding trauma, early detection and treatment of TB, and treatment of enteric fever.

CONCLUSION

In hindsight, intestinal tuberculosis was seen as the most common indication of surgery for a stoma, while a non-functioning stoma was observed to be the most frequent complication. In order to reduce stoma formation and its associated complications, it is important to carry out early identification and treatment of tuberculosis and enteric fever. In addition to this, for the purpose of confirming the findings of the present study, there is a need to conduct more epidemiological studies for evaluating the indications

and complications of stoma with larger sample sizes and more parameters in multiple study centers across Pakistan.

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REFERENCES

1. Pine J, Stevenson L, On J. Intestinal stomas. *Surgery (Oxford)*. 2020 Jan 1;38(1):51-7.
2. Tonolini M. A closer look at the stoma: multimodal imaging of patients with ileostomies and colostomies. *Insights into imaging*. 2019 Dec;10(1):1-5.
3. Calik B, Toptay H, Dursun A, Demirli S, Esin H. Intestinal Ostomies. *InColon Polyps and Colorectal Cancer 2021* (pp. 379-407). Springer, Cham.
4. Matthiessen P, Henriksson M, Hallbook O, Grunditz E, Noren B, Arbman G. Increase of lan serum C-reactive protein is an early indicator of subsequent symptomatic anastomotic leakage after anterior resection. *Colorectal Dis*. 2008;10(1):75-80.
5. Mahmoud MH, Abd El Aziz MA, Ahmed Ali MM. A Comparative Study of Primary Colonic Repair versus Stoma in Emergency Cases. *The Egyptian Journal of Hospital Medicine*. 2018 Jul 1;72(4):4259-63.
6. Wallace B, Schuepbach F, Gaukel S, Marwan AI, Staerkle RF, Vuille-dit-Bille RN. Evidence according to cochrane systematic reviews on alterable risk factors for anastomotic leakage in colorectal surgery. *Gastroenterology Research and Practice*. 2020 Jan 3;2020.
7. Urooj B, Mehreen N, Laraibe M, Khan Z, Samreen Z, Aziz B, Mahjabeen B, Taj N, Taj G, Taj MK. The Causes of Gastrointestinal Tract Perforation and its Management.
8. Bugiantella W, Rondelli F, Mariani L, Boni M, Ermili F, Avenia N, Mariani E. Temporary percutaneous ileostomy for faecal diversion after intestinal resection for acute abdomen in elderly: how to avoid the conventional loop ileostomy. *International Journal of Surgery*. 2014 Oct 1;12:S144-7.
9. Duldulao MP, Kaiser AM. Creation of Ileostomy (Loop, End). *InChassin's Operative Strategy in General Surgery 2022* (pp. 373-380). Springer, Cham.
10. Ahmad QA, Saeed MK, Muneera MJ, Ahmed MS, Khalid K. Indications and complications of intestinal stomas-a tertiary care hospital experience. *Biomedica*. 2010;26(11):144-7.
11. Massenga A, Chibwae A, Nuri AA, Bugimbi M, Munisi YK, Mfinanga R, Chalya PL. Indications for and complications of intestinal stomas in the children and adults at a tertiary care hospital in a resource-limited setting: a Tanzanian experience. *BMC gastroenterology*. 2019 Dec;19(1):1-0.
12. McGrath A, Porrett T, Heyman B. Parastomal hernia: an exploration of the risk factors and the implication. *Br J Nurs* 2006;12:317-21
13. Murken DR, Bleier JI. Ostomy-related complications. *Clinics in colon and rectal surgery*. 2019 May;32(03):176-82.
14. Akram Rajput, Abdul Samad, Tariq Wahab Khanjada. *Rawal Med J* 2007;32:159-162.
15. Aziz A, Jawant ISM, Alam S, Saleem M. *J Surg Pak Int* 2009;14(3).
16. Safirullah, Mumtaz N, Jan MA, Ahmed S. Complications of intestinal stomas. *J Postgrad Med Inst*. 2005;19(4):407-11.
17. Ahmad Z, Sharma A, Saxena P, Choudhary A, Ahmed M. A clinical study of intestinal stomas: its indications and complications. *Int J Res Med Sci*. 2013;1(4):536-40. 74.
18. Engida A, Ayelign T, Mahteme B, Aida T, Abreham B. Types and indications of colostomy and determinants of outcomes of patients after surgery. *Ethiop J Health Sci*. 2016;26(2): 117-22.
19. Massenga A, Chibwae A, Nuri AA, Bugimbi M, Munisi YK, Mfinanga R, et al. Indications for and complications of intestinal stomas in the children and adults at a tertiary care hospital in a resource-limited setting: a Tanzanian experience. *BMC Gastroenterol*. 2019;19(1):157.
20. Satpal SS, Khalsa MS, Hamid M. *Int J Res Health Allied Sci. Tuberculosis*. 2020;6(2):28-32.