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Surgery Section

Primary Anastomosis vs Creation of Stoma without Anastomosis in Surgical Management of Acute Intestinal Obstruction: A Cross-sectional Study

ARUNIMA MUKHOPADHYAY[1], RAJU MITRA[2], SOURAV KUNDU[3], SUDHANSU SEKHAR BHOJ[4], RAMPRASAD DEY[5]

ABSTRACT

Introduction: The surgical management of Acute Intestinal Obstruction (AIO) may require resection of non viable gut in presence of strangulated bowel. After gut resection, the surgeon has to choose between a primary anastomosis and a creation of stoma only without anastomosis, to attain an uneventful recovery.

Aim: To evaluate and compare the early postoperative outcome of patients of AIO treated with either primary anastomosis or with stoma only, without anastomosis following intestinal resection and to identify the factors associated with postoperative morbidity and mortality in both groups of patients.

Materials and Methods: A cross-sectional study was conducted from July 2018 to June 2019 in a teaching hospital with tertiary care facility, on first 100 adult patients of AIO treated surgically within the study period with either primary anastomosis or with stoma formation only following gut resection. Patients undergoing primary anastomosis were placed in Group A (N=48) while patients undergoing stoma formation only were placed in Group B (N=52). Preoperative and postoperative data were collected and final outcome within the first two weeks of postsurgery was noted. The primary outcome was postoperative recovery or death of the treated patients. The secondary outcome was determined using parameters like time taken to resume oral diet, time of discharge from hospital and presence of postoperative complications in both groups of patients. Chi-square test and Mann-Whitney U tests were applied using confidence interval of 95% and p-value <0.05 considered as statistically significant.

Results: Mean age in Group A was 44.5 years and in Group B was 38 years. Number of deaths was more in the stoma group and it was statistically significant (p-value=0.029). Among the factors related to death in both the groups, preoperative and postoperative leucocytosis, preoperative and postoperative hypoalbuminemia, preoperative uraemia and hyperkalaemia were more severe in the stoma group and these were statistically significant. Intraoperative presence of feculent peritoneal fluid was significantly higher in the group treated with stoma formation. Diabetes mellitus as a co-morbidity was significantly higher in the stoma group (p-value <0.001). Patients with stoma tolerated oral diet earlier and were discharged home earlier which were statistically significant (p-value <0.001). Wound infection and dehiscence were comparable in both groups. None of the procedure related specific complications were statistically significant in either group.

Conclusion: Both procedures have their own benefits and limitations. Irrespective of the surgical procedure, early postoperative outcome is actually governed by factors controlling perioperative sepsis and presence of medical co-morbidities like diabetes. Patients with stoma formation have a better early postoperative outcome. Therefore, stoma formation without anastomosis is comparatively superior to primary anastomosis in AIO.

Keywords: Anastomotic leak, Postoperative outcome, Stomal complications

INTRODUCTION

Acute Intestinal Obstruction (AIO), is a mechanical or functional obstruction of the intestine, preventing the normal aboral transit of intestinal contents, regardless of aetiology [1,2]. Reported by medical practitioners as early as 350 BC, AIO continues to be a diagnostic and therapeutic challenge even today [2]. AIO is one of the most common intraabdominal emergencies faced by general surgeons [1,2]. It comprises of a major part of emergency caseloads and admissions to the Surgical Department [3,4]. A study conducted in 2010 on the global burden of disease reported bowel obstruction and ileus to be responsible for 2.1 deaths, 54 years of life lost and 54 disability-adjusted- life-years and 54 disability-adjusted- life years per 100,000 population respectively placing intestinal obstruction in a second position among all abdominal conditions, the first being peptic ulcer disease [2]. Resources utilised and expenses incurred in the management of AIO are a substantial burden on the healthcare system. Worldwide, 1% of hospitalisation, 3% of emergency surgical admissions to general hospitals and 4% of major celiotomies are undertaken because of bowel obstruction [2,5].

AIO has a wide international and regional variation in prevalence, aetiology and presentation [1-6]. Independent of the underlying aetiology, mortality rates of bowel obstruction range from 3% for simple obstruction upto as much as 30% for strangulated or perforated bowel [2]. Therefore, early prompt surgery is recommended before the onset of perforation or irreversible ischaemia [1-4]. After resection of non viable bowel, the decision for attempting primary anastomosis or performing stoma only, without anastomosis is a subject of debate [7-12].

Stoma is a surgically designed exteriorisation of small or large bowel for temporary or permanent diversion of faeces [11,12]. Introduced in surgical practice more than 200 years ago, formation of an intestinal stoma is one of the most common procedures performed in emergency gastrointestinal surgery [2-4,10-12]. Considered to be a safe and simple procedure, formation of stoma results in dramatic improvement in cases of peritonitis and generalised sepsis, situations associated with a high incidence of anastomotic dehiscence [2-4,10-15]. A surgeon therefore needs to balance the risk of anastomotic dehiscence in a septic environment against the inconvenience of bowel exteriorisation

while relieving the obstruction, with an aim of achieving uneventful recovery and minimal postoperative mortality and morbidity [10-20].

Traditionally, the standard therapy of complete bowel obstruction has been expeditious surgery with the dictum that 'the sun should never rise and set on a complete bowel obstruction' [21]. The rationale for early surgery in bowel obstruction is to avoid irreversible bowel strangulation when gut resection becomes mandatory and the surgeon has to choose between a primary anastomosis and creation of stoma [10-20]. Though both procedures are widely practised, it is relevant in the present era to study the postoperative course and early postoperative outcome regarding efficacy, and safety of either technique. Hence, with this background the present study was conducted with an aim to evaluate and compare the early postoperative outcome of patients of AIO treated with either primary anastomosis or with stoma formation only, without primary anastomosis following intestinal resection. The study also aimed to identify the factors associated with postoperative morbidity and mortality in both groups of patients.

MATERIALS AND METHODS

A cross-sectional study was carried out in the Department of Surgery of Calcutta National Medical College, Kolkata, West Bengal, India, having tertiary care facility. The study period extended from July 2018 to June 2019. Sample size was decided as the first 100 adult patients of AIO requiring intestinal resection within that period followed by either primary anastomosis or with stoma formation only without anastomosis. Informed consent was obtained from all patients included in the study. The study was approved by the Institution Ethics Committee (CNMC/20 dated on 9/11/2017).

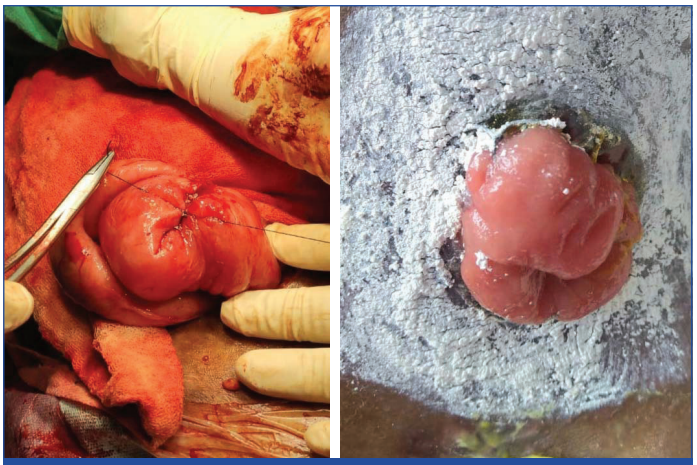
Inclusion and Exclusion criteria: Hundred adults presenting with AIO within the study period undergoing intestinal resection followed by either primary anastomosis, or with stoma formation only were included in the study. Paediatric cases and adults treated with primary anastomosis and diverting stomas were excluded from the study.

For convenience of data analysis, patients undergoing primary anastomosis were placed in Group A while patients undergoing stoma formation only were placed in Group B. Data were collected regarding patients' age and sex, intraoperative findings like presence of feculent peritoneal fluid and gangrenous bowel, preoperative and postoperative parameters like haematology, electrolytes, serum biochemical markers. Postoperative complications like wound infection, stoma complications, medical comorbidities and final outcome within the first two weeks postsurgery were noted. Patient data were collected from hospital records, patients' bed head tickets, operating room registries and discharge certificates.

Procedure

All the patients were adequately resuscitated after admission with intravenous fluids, continuous nasogastric aspiration, urethral catheterisation and intravenous antibiotics. Preoperative blood investigations like haematology, electrolytes, liver and renal function tests and imaging were carried out before surgery. In all the cases, exploratory laparotomy was performed under general anaesthesia and intraoperative findings were noted. After resecting a diseased segment of bowel in each case, the emergency surgeon then took the decision of either performing primary anastomosis or creating a stoma only without anastomosis. Primary bowel anastomosis was created in a double layer, an inner layer with haemostatic full thickness continuous sutures using absorbable 2-0 polyglactin (vicryl) and an outer seromuscular layer with interrupted sutures using non absorbable 2-0 silk [Table/Fig-1].

Stoma was created using a standard technique of circular skin opening of 2 cm diameter, allowing two fingers to pass through. After intestinal resection, the distal end of the proximal segment and proximal end of the distal segment of bowel were exteriorised through the same opening to create proximal end ileostomy/colostomy and a distal mucous fistula [Table/Fig-2]. Both groups of patients were followed-up postoperatively for two weeks. Postoperative blood investigations like haematology, electrolytes, liver and renal function were performed. Wound conditions were reviewed and time of resumption of normal diet was noted. The final outcome at the end of two weeks was noted as either recovery or discharge from the hospital or as death within the specified postoperative period.



[Table/Fig-1]: Primary anastomosis after intestinal resection; **[Table/Fig-2]:** Stoma formation without anastomosis after intestinal resection. (Images from left to right)

STATISTICAL ANALYSIS

Data analysis were carried out using Microsoft excel 2010 spreadsheet and Statistical Package for the Social Sciences (SPSS) version 20.0 software. Descriptive statistics were expressed in terms of absolute number, percentage, mean along with standard deviation, median with inter-quartile range and were presented using tables. Inferential statistical procedures like Chi-square test, non parametric tests like Mann-Whitney U test were also applied using confidence interval to be 95% and p-value <0.05 as statistically significant.

RESULTS

Patients treated with primary anastomosis were placed in Group A (N=48) and those treated with stoma formation only were placed in Group B (N=52). Both groups were comparable as far as demographics were concerned. All the patients were followed-up in the entire study period and none of them were lost during follow-up. Intraoperative presence of feculent peritoneal fluid was significantly higher in the group treated with stoma formation. Several patients were hypertensive and were on oral medication. Uncontrolled diabetes mellitus as a co-morbidity was significantly higher in the stoma group [Table/Fig-3].

Characteristics	Group A N=48	Group B N=52	p-value
Age (in years) Median (IQR)	44.5 (32)	38 (20)	0.65[a]
Sex: Male (%)	30 (62.50)	29 (55.77)	0.545[b]
Concomitant diabetes (%)	0 (0.00)	11 (21.15)	0.001[b]*
Concomitant hypertension (%)	6 (12.50)	11 (21.15)	0.295[b]
Concomitant COPD (%)	6 (12.50)	6 (11.54)	1.000[b]
Concomitant hypothyroidism (%)	0 (0.00)	17 (32.69)	0.001*
Presence of feculent peritoneal fluid on exploration (%)	18 (37.50)	34 (65.38)	0.009[b]*
Presence of gangrenous bowel segment on exploration (%)	30 (62.50)	40 (76.92)	0.131[b]

[Table/Fig-3]: Demographic, preoperative and intraoperative parameters of patients. IQR: Interquartile range; COPD: Chronic inflammatory lung disease; a: Mann-whitney U test; b: Chi-square test; *p-value significant (less than 0.05)

Patients treated with stoma formation tolerated oral diet earlier and it was statistically significant (p-value <0.001). Duration of hospital stay was also less in the stoma group which was also statistically significant

(p-value <0.001). Number of deaths was more in stoma group and it was statistically significant (p-value=0.029) [Table/Fig-4].

S. No.	Characteristics	Group A N=48	Group B N=52	p-value
1.	Tolerance of oral feed after surgery (days): Median (IQR)	5 (1)	3 (1)	0.001[a*]
2.	Presence of wound site infection 48 hours postoperative (%)	6 (12.50)	6 (11.54)	0.883[b]
3.	Wound site infection 7 days after surgery (%)	18 (37.50)	23 (44.23)	0.631[b]
4.	Wound site gaping 10 days after surgery (%)	18 (37.50)	12 (23.07)	0.176[b]
5.	Duration of hospital stay (days): Median (IQR)	16 (17)	14 (6)	0.001[a*]
6.	Number of death (%)	2 (4.16)	10 (19.2)	0.029[b*]
7.	Causes of death (Number)	Postoperative peritonitis with septicaemia (2)	1. Septic shock with acute organ dysfunction (5) 2. Diabetes mellitus with hypoglycaemia with coma (1) 3. Acute myocardial infarction (2) 4. Acute renal failure (2)	

[Table/Fig-4]: Comparison of outcome parameters between two groups.
[a]Mann-Whitney U Test, [b]Chi Square test, *p-value significant (less than 0.05)

In the anastomosis group, 6 out of 48 i.e., 12.5% patients developed anastomotic leak of which four patients developed low output enterocutaneous fistula which could be managed conservatively. The other two patients developed high output fistulas with peritonitis who had to be re-explored (with subsequent stoma creation) and died soon after re-exploration. However, none of the procedure related specific complications were statistically significant in either group [Table/Fig-5].

Groups	Complications	N (%)
Group A (n=48)	Anastomotic leak	6 (12.5)
	Enterocutaneous fistula	6 (12.5)
Group B (n=52)	Stomal necrosis	1 (1.92)
	Stoma retraction	3 (5.77)
	Stoma obstruction	2 (3.84)

[Table/Fig-5]: Operative procedure related complications.

In first postoperative week, preoperative and postoperative serum albumin were found to be significantly lower in the stoma group and preoperative values of serum urea, creatinine and potassium were significantly higher in the stoma group among patients with wound site infections [Table/Fig-6]. In the second postoperative week, preoperative serum albumin was significantly less and serum potassium significantly higher in the stoma group. Postoperative serum potassium was significantly higher in the anastomosis group [Table/Fig-7].

S. No.	Characteristics	Group A N=18	Group B N=23	p-value
1.	Sex: Male (%)	12 (66.67)	12 (52.17)	0.524[a]
2.	Concomitant diabetes (%)	0 (0.00)	11 (47.83)	0.001[a*]
3.	Concomitant hypertension (%)	6 (33.33)	5 (21.74)	0.489[a]
4.	Concomitant hypothyroidism (%)	0 (0.00)	11 (47.83)	0.001[a*]
5.	Concomitant COPD (%)	0 (0.00)	0 (0.00)	-
6.	Preoperative features of peritonitis (%)	12 (66.67)	17 (73.91)	0.734[a]
7.	Presence of feculent peritoneal fluid on exploration (%)	12 (66.67)	17 (73.91)	0.734[a]
8.	Presence of gangrenous bowel segment on exploration (%)	12 (66.67)	17 (73.91)	0.734[a]
9.	Postoperative blood product transfusion within 72 hours of surgery (%)	12 (66.67)	23 (100.00)	0.004[a*]
10.	Time lag for presentation (in hours): Median (IQR)	48 (24)	48 (36)	0.133[b]
11.	Preoperative haemoglobin (in gm%): Median (IQR)	11 (2.4)	11.8 (1.3)	0.748[b]
12.	Preoperative TLC (in cells/mm^3): Median (IQR)	9200 (2100)	15300 (12700)	0.067[b]
13.	Preoperative serum albumin (in gm/dL): Median (IQR)	3.8 (0.7)	2.9 (1.1)	0.001[b*]
14.	Preoperative serum potassium (in mEq/L): Median (IQR)	4.1 (0.7)	4.8 (0.6)	0.032[b*]
15.	Preoperative serum urea (in mg/dL): Median (IQR)	27.0 (23.0)	38.0 (11.0)	0.009[b*]
16.	Preoperative serum creatinine (in mg/dL): Median (IQR)	0.8 (0.6)	1.1 (0.4)	0.008[b*]
17.	Postoperative TLC 72 hours after surgery (in cells/mm^3): Median (IQR)	10200 (1200)	15400 (11200)	0.811[b]
18	Postoperative serum albumin 72 hours after surgery (in gm/dL): Median (IQR)	3.1 (0.5)	3.0 (0.8)	0.001[b*]
19.	Postoperative serum potassium 72 hours after surgery (in mEq//L): Median (IQR)	4.2 (0.2)	4.1 (1.0)	0.195[b]

[Table/Fig-6]: Factors related to wound site infection after 7 days of operation.
IQR: Interquartile range; TLC: Total leukocyte count; COPD: Chronic inflammatory lung disease; [a]Chi-square test, [b]Mann-Whitney U Test, *p-value <0.05 significant

S. No.	Characteristics	Group A N=18	Group B N=12	p-value
1.	Sex: Male (%)	12 (66.67)	12 (100.00)	0.057[a]
2.	Diabetes (%)	0 (0.00)	6 (50.00)	0.002[a*]
3.	Hypertension (%)	6 (33.33)	0 (0.00)	0.057[a]
4.	Preoperative features of peritonitis (%)	12 (66.67)	6 (50.00)	0.458[a]
5.	Presence of feculent peritoneal fluid on exploration (%)	12 (66.67)	6 (50.00)	0.458[a]
6.	Presence of gangrenous bowel segment on exploration (%)	12 (66.67)	6 (50.00)	0.458[a]
7.	Postoperative blood product transfusion within 72 hours of surgery (%)	12 (66.67)	12 (100.00)	0.057[a]
8.	Time lag for presentation (in hours): Median (IQR)	48 (24)	54 (36)	0.465[b]
9.	Preoperative haemoglobin (in gm%): Median (IQR)	11 (2.4)	12.0 (0.4)	0.134[b]
10.	Preoperative TLC (in cells/cmm): Median (IQR)	9200 (2100)	9800 (11000)	1.000[b]
11.	Preoperative serum albumin (in gm/dL): Median (IQR)	3.8 (0.7)	2.650 (1.1)	0.001[b*]
12.	Preoperative serum potassium (in mEq/L): Median (IQR)	4.1 (0.7)	4.9 (0.6)	0.002[b*]
13.	Preoperative serum urea (in mg/dL): Median (IQR)	27.0 (23.0)	38.5 (1.0)	0.134[b]
14.	Preoperative serum creatinine (in mg/dL): Median (IQR)	0.8 (0.6)	1.2 (0.2)	0.134[b]
15.	Postoperative TLC 72 hours after surgery (in cells/cmm): Median (IQR)	10200 (1200)	12000 (11200)	1.000[b]
16.	Postoperative serum albumin 72 hours after surgery (in gm/dL): Median (IQR)	3.1 (0.5)	2.9 (0.8)	0.134[b]
17.	Postoperative serum potassium 72 hours after surgery (in mEq/L): Median (IQR)	4.2 (0.2)	3.75 (0.7)	0.002[b*]

[Table/Fig-7]: Factors related to wound site gaping after 10 days of operation.
IQR: Interquartile range; TLC: Total leukocyte count; COPD: Chronic inflammatory lung disease; [a]Chi-square test, [b]Mann-whitney U Test; *p-value <0.05 significant

Among the factors related to death in both the groups, increased preoperative and postoperative total leucocyte count, decreased preoperative and postoperative serum albumin, preoperative uraemia and hyperkalaemia were more severe in the stoma group and these were statistically significant [Table/Fig-8].

S. No.	Characteristics	Group A N=2	Group B N=10	p-value
1.	Sex: Male (%)	1 (50)	10 (100)	0.167[a]
2.	Concomitant diabetes (%)	0	5 (50)	0.470[a]
3.	Concomitant hypertension (%)	1 (50)	0	0.167[a]
4.	Concomitant COPD (%)	0	5 (50)	0.470[a]
5.	Preoperative features of peritonitis (%)	2 (100)	10 (100)	NA
6.	Presence of feculent peritoneal fluid on exploration (%)	2 (100)	10 (100)	NA
7.	Presence of gangrenous bowel segment on exploration (%)	2 (100)	10 (100)	NA
8.	Postoperative blood product transfusion within 72 hours of surgery (%)	1 (50)	5 (50)	1.000[a]
9.	Presence of wound site infection 48 hours postoperative (%)	0	5 (50)	0.470[a]
10.	Presence of wound site infection 7 days postoperative (%)	2 (100)	5 (50)	0.470[a]
11.	Presence of wound gaping 10 days postoperative (%)	2 (100)	5 (50)	0.470[a]
12.	Requirement of re-exploration of abdomen	2 (100)	0	NA
13.	Preoperative haemoglobin (in gm%): Median	10.8	12.4 (1.2)	0.030[b]*
14.	Preoperative TLC (in cells/cmm): Median	10000	13500 (3600)	0.030[b]*
15.	Preoperative serum albumin (in gm/dL): Median	3.95	2.4 (0.6)	0.030[b]*
16.	Preoperative serum potassium (in mEq/lit): Median	4.4	5.05 (0.3)	0.030[b]*
17.	Preoperative serum urea (in mg/dL): Median	24.5	45.5 (13.0)	0.030[b]*
18.	Preoperative serum creatinine (in mg/dL): Median	0.6	1.2 (0.2)	0.008[b]*
19.	Postoperative TLC 72 hrs. after OT (in cells/cmm): Median	10400	16450 (2300)	0.030[b]*
20.	Postoperative serum albumin 72 hrs. after OT (in gm/dL): Median	3.35	2.65 (0.3)	0.030[b]*
21.	Postoperative serum potassium 72 hrs. after OT (in mEq/lit): Median	4.1	4.2 (0.2)	0.364[b]

[Table/Fig-8]: Factors associated with death of patients.
IQR: Interquartile range; TLC: Total leukocyte count; COPD: Chronic inflammatory lung disease; [a]Chi-Square test; [b]Mann-Whitney U test; *p-value <0.05 significant

DISCUSSION

In present study, age and gender distribution in both groups were comparable. Intraoperative presence of feculent peritoneal fluid was higher in the stoma group which was probably the reason why stoma was preferred over primary anastomosis by the operating surgeon. Patients in the stoma group easily tolerated their regular diet within 2-3 days postoperatively. On the other hand patients with primary anastomosis were slower to resume oral diet, many developed postprandial abdominal distention, ileus and few developed anastomotic leak and enterocutaneous fistula formation after resumption of oral diet. Patients with stoma could be discharged home earlier and were fit to resume their usual daily activities.

Both groups of patients developed few specific procedure related complications. Literature has reported that anastomotic dehiscence is the main cause of morbidity and mortality following resection and anastomosis in presence of peritonitis [10-15, 21-24]. A surgeon has to consider several parameters like aetiology, anatomical site, severity of peritonitis, patients general conditions etc., before attempting anastomosis [1-5,10-15]. The most difficult to evaluate out of those above parameters is the severity of peritonitis which cannot be assessed quantitatively, being related to the subjective analysis and judgement of the surgeon [4,10,11,22-24]. Further in presence of peritonitis, even when the technical principles of anastomosis are followed meticulously, anastomotic leak may still occur due to several local or systemic, sometimes even unexplained or unexpected factors [1-4,10-12,25-28]. Other studies have reported an anastomotic leak ranging from 2%-20% [5,10,12,14,25,26]. In the stoma group, three patients developed mild stomal retraction and did not require repositioning of stoma. Two cases of stomal obstruction responded to liberal stomal lavage. The most dreaded complication was one case of stomal necrosis, patient expired early postoperatively due to generalised sepsis

The incidence of postoperative wound infection did not show any statistically significant difference between the two groups. However, when the factors related to wound healing in the first postoperative week were considered, it was found that certain factors were statistically significant like concomitant diabetes (in the stoma group), preoperative and postoperative serum albumin (comparatively lesser values in the stoma group) and preoperative urea, creatinine and potassium (higher in the stoma group). Diabetes as co-morbidity has been strongly associated with incidence of wound site infection as reported by other studies [29,30].

The altered parameters of serum albumin, urea and creatinine point to disturbed homeostasis in the stoma group in presence of peritonitis and sepsis. When the wound dehiscence in the second week was considered, the same factors were prominent once again as concomitant diabetes, alteration of preoperative serum albumin and potassium continue to be statistically significant showing persistence of sepsis in the stoma group. Feculent peritoneal fluid on exploration and gangrenous bowel segment on exploration was not statistically significant as far as wound site infection and wound dehiscence in the postoperative period were concerned. Other studies have reported that presence of strangulation had no effect on complications, while presence of feculent peritonitis has been associated with higher incidence of complications [25-28].

Out of 10 patients in the stoma group, 5 patients died early in the postoperative period due to medical causes. Very importantly all 5 patients had diabetes as a co-morbidity. While many studies have reported the presence of medical co-morbidities as prognostic determinants of postoperative recovery, diabetes has been reported to be strongly associated with postoperative mortality and morbidity [22-24,27-32]. Indeed diabetes has been associated with increased risk of perioperative complications like higher rate of wound infections, dehiscence, and systemic sepsis [29,30]. Half of the deaths in the stoma group were related to diabetes and the rest of the patients died due to septic shock, after a variable interval postoperatively which was probably related to disease aetiology and peritonitis. Preoperative and postoperative leucocytosis, hypoalbuminaemia, increased preoperative urea, creatinine and potassium in the stoma group all point to persistence of generalised sepsis and poor general condition of patients in the stoma group which ultimately contributed to death. In our study, the overall mortality was 12%, while other studies have reported a mortality range of 2-12% [5,6,8,17,22]. Several other studies too have reported hypoalbuminaemia and leucocytosis as markers of sepsis, contributing to postoperative morbidity and mortality [27-32].

Primary anastomosis after resection of gut in AIO is a safe and effective procedure when patient is haemodynamically stable and peritoneum is not compromised [10-15]. The underlying aetiopathology can be treated by a single procedure and single hospital stay. Economic burden and morbidity related to stoma can be prevented [16-20]. However, an anastomotic leak may increase postoperative morbidity enormously and high output can also lead to reoperation and even death as seen in our study and several other studies [5,10,12,14,25,26]. Stoma formation without primary anastomosis may be a safer option in emergency setting [33].

Limitation(s)

The present study extended for a short time period involving only a limited number of patients. The choice of surgical procedure

depended on the decision of different emergency surgeons, treating respective patient at that point of time. Further studies are required with larger number of patients to establish the superiority of one procedure over the other.

CONCLUSION(S)

Conventionally, patients with favourable intraoperative findings with good haemodynamic stability are ideal candidates for primary repair while patients with adverse set of preoperative and intraoperative parameters are best managed with bowel exteriorisation only. Irrespective of the surgical procedure, early postoperative outcome is actually governed by factors controlling perioperative sepsis and presence of medical co-morbidities like diabetes. Patients with stoma formation have a better early postoperative outcome due to quicker tolerance of oral diet, shorter hospital stay and earlier resumption of normal activity. Therefore, stoma formation without anastomosis is comparatively superior to primary anastomosis in AIO.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of General Surgery, Calcutta National Medical College, Kolkata, West Bengal, India.
2. Medical Officer, Department of Paediatric Surgery, NRS Medical College, Kolkata, West Bengal, India.
3. Public Health Specialist, Department of Health and Family Welfare, Swasthya Bhavan, Kolkata, West Bengal, India.
4. Professor, Department of General Surgery, Calcutta National Medical College, Kolkata, West Bengal, India.
5. Professor, Department of Obstetrics and Gynaecology, Chittarajan Seva Sadan, College of Obstetrics Gynaecology and Child Health, Kolkata, West Bengal, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Arunima Mukhopadhyay,
836, Block-P, New Alipore, Kolkata-700053, West Bengal, India.
E-mail: ram_arunima@yahoo.co.in

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