

COMPARATIVE ANALYSIS OF PRIMARY REPAIR VERSUS RESECTION AND ANASTOMOSIS IN JEJUNOILEAL PERFORATIONS IN SOUTHERN ODISHA

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ABSTRACT

BACKGROUND

Small intestinal perforation remains a major issue in this region of study. Most often, it is caused by either infections due to typhoid, tuberculosis or traumatic due to blunt or penetrating injuries. The mortality reported is related to various factors including age, delayed treatment, sepsis at presentation and inadequate treatment due to lack of resources. Management is therefore complex not only with regards to choose the most suitable surgical treatment, but also as regards an early diagnosis of complications, which is difficult in absence of diagnostic modalities that are often not available.

The aim of the study is to compare primary repair versus intestinal resection and anastomosis in case of jejunoileal perforations due to various aetiologies.

MATERIALS AND METHODS

60 patients with acute peritonitis underwent emergency laparotomy. Aetiology, number of perforations, size of perforations, site of perforations, surgical procedure undertaken and postoperative complications were recorded. The patients were divided into two groups according to the surgical procedure adapted at laparotomy; primary repair and intestinal resection and anastomosis. Clinical data, intraoperative findings and complications were evaluated and compared.

RESULTS

40 out of 60, we found jejunoileal perforations, gastroduodenal in 20 patients. 23 had undergone primary repair and 17 resection and anastomosis. Postoperative complications were compared among both groups in relation to various factors. Conclusion was drawn as to prefer, which surgery in which group of patients.

CONCLUSION

In our study, detailed analysis of the complication pattern shows primary closure is associated with less number of complications in traumatic cases and resection and anastomosis is associated with lesser complications in infective cases. Primary closure is less complicated for single perforations as compared to multiple perforations. Resection and anastomosis is less complicated for large size perforations. Perforations proximal to ileocaecal valve are better treated by primary closure than resection and anastomosis.

KEYWORDS

Peritonitis, Laparotomy, Primary Closure, Resection and Anastomosis.

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BACKGROUND

Small intestinal perforation remains a major issue in this region of study. Most often, it is caused by either infections due to typhoid, tuberculosis or traumatic due to blunt or penetrating injuries. The mortality reported is related to

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various factors including age, delayed treatment, sepsis at presentation and inadequate treatment due to lack of resources.¹ Management is therefore complex not only with regards to choose the most suitable surgical treatment, but also as regards an early diagnosis of complications, which is difficult in absence of diagnostic modalities that are often not available.

Objective- The purpose of this study was to analyse retrospectively the surgical treatment of patients with acute peritonitis resulting from jejunoileal perforations. Primary closure was compared with resection and anastomosis in order to provide guidelines for safer choice of treatment.



MATERIALS AND METHODS

Study type- Prospective study.
 40 patients with acute peritonitis due to jejunoileal perforation who underwent surgery between July 2016 to October 2017 at MKCG Medical College and Hospital, Berhampur, Odisha, form the basis for this study. Patients who had jejunoileal perforations undergoing one among the two procedures, i.e. primary closure or resection and anastomosis were included in this study. Perforations in other visceral regions or patients undergoing other surgical procedures were not included in this study. Patient's data were recorded throughout the study period. Persistent abdominal pain of sudden onset with abdominal distension was regarded as clinical evidence of intestinal perforation. Patients were resuscitated with intravenous fluids. Nasogastric tubes and urinary catheters were positioned in all cases. After all corroborative investigations, explorative laparotomy was performed in all cases under anaesthesia. Repair done after thorough lavage with warm saline. The aetiology, number, size and site of perforation and type of surgical procedures undertaken were recorded. Primary closure was done using 2-0 Vicryl suture with minimal edge excision. In cases of resection and anastomosis, 2-5 cm of intestine was resected from both ends of perforation sites and anastomosis was performed in continuous double-layered manner using 2-0 Vicryl. Two intraperitoneal drains given in all the cases, one in subhepatic and another in pelvic region. During postoperative period, patients were not allowed to take food or fluid and nasogastric tubes were maintained until the patient passed flatus. Medications like antibiotics, analgesics and antisecretory agents given along with intravenous fluids. Alternate day dressing was done to observe wound condition. Regularly, drains were observed to note quantity and quality of secretions, which were removed accordingly. All patients were observed until discharge. Clinical data, intraoperative findings, operative procedure, postoperative complications and mortality for each case were recorded, evaluated and compared. The prospective analysis was approved by the Ethics Committee of MKCGMCH, Berhampur, Odisha.

RESULTS

On the basis of criteria described above, 40 patients were studied and evaluated and the following observations were made.

In this study, 27 were males and 13 were females with M:F ratio of 2.07.

Age Group	Number of Patients	Percentage
0-20	12	30
21-40	17	42.5
41-60	7	17.5
≥61	4	10

Table 1. No. of Patients in Different Age Groups

As shown in table 1, maximum perforations occurred in 3rd to 4th decade. Youngest age at presentation was 12 years and oldest 67 years. Average age at presentation was 31.5 years.

Symptoms	Number of Patients	%
Pain abdomen	40	100
Abdominal distension	33	82.5
Vomiting	24	60
Fever	24	60
Trauma	16	40

Table 2. Symptoms at Presentation

As shown in table 2, all 40 patients presented with pain abdomen (100%), which started in the umbilical region and later became diffuse. Abdominal distension was present in 82.5% cases. 60% patients presented with fever with an average duration of fever for 7 days. Vomiting was present in 60% patients. 16 patients (40%) had traumatic perforations mostly due to blunt and penetrating injuries.

Time Since Symptoms Appeared (in Hours)	Number of Patients	Percentage
≤12	4	10
13-24	10	25
25-48	14	35
49-72	6	15
73-96	5	12.5
>96	1	2.5

Table 3. Duration at Presentation

Most of the patients presented within 72 hours of duration of onset of symptoms of perforation (Table 3).

Pneumoperitoneum was present in 87% patients. In rest, abdominal radiogram was nonspecific. Blood count data was available in all cases before laparotomy. White blood count showed leucocytosis in (TLC >10,000/cmm) in 28 cases (70%), normal (TLC - 4000-10,000) in 8 cases (20%) and neutropenia (TLC <4000) in 2 cases (10%). Haemoglobin level <10 gm% was seen in 46% cases. Blood requisitions were given to patients with less haemoglobin. Serum urea and creatinine were elevated in 85% cases. Widal test was performed in 24 cases. Antibody titre (TO/TH) greater than 1:160 or raising titre on subsequent tests were considered to be positive. 13 patients were positive for Widal reaction and in 4 patients where clinical findings and biopsy were suggestive of typhoid perforation, the test was considered false negative. Past history of tuberculosis was present in 6 patients. But, histopathological study reported 4 cases (10%) due to abdominal tuberculosis. Rest of the patients with negative Widal test and inconclusive histopathological study reports were considered as nonspecific.

Aetiology	Number of Patients	%
Typhoid	17	42.5
Trauma	16	40
Tuberculosis	4	10
Nonspecific	3	7.5

Table 4. Aetiology of Perforation

As shown in table 4, typhoid fever accounted for 42.5% cases, in 16 patients (40%) abdominal trauma was the cause. Tuberculosis accounted for 10% perforations. In 3

patients (7.5%), investigations were inconclusive, hence placed in nonspecific group.

After proper resuscitation, all patients underwent explorative laparotomy under anaesthesia of choice. Pus was

present in 5 cases (12.5%). Enteric contents were found in the peritoneal cavity in 12 cases (30%). Lavage was done with warm normal saline in all cases.

Operative Findings		Number of Patients	Percentage
Number of perforations	1	22	55
	≥2	18	45
Size of perforations (length in greatest dimension)	<2 cm	28	70
	≥2 cm	12	30
Site of perforations (distance in cm from IC valve)	<30 cm	14	35
	≥30 cm	26	65

Table 5. Operative Findings

As shown in table 5, out of 40 patients who underwent laparotomy, single perforation was found in 55% cases and multiple in 45% cases. Size of perforation in its greatest dimension was <2 cm in 70% cases and ≥2 cm in 30% cases. Distance of perforations from ileocaecal valve was measured. In 14 patients (35%), the distal most perforation was within 30 cm from IC valve, whereas 26 patients had the perforation ≥30 cm from IC valve.

Operative Procedure	No. of Patients	%
Primary closure	23	57.5
Resection and anastomosis	17	42.5

Table 6. Operative Procedure

As shown in table 6, out of 40 patients who underwent surgery, 23 patients (57.5%) had primary closure and 17 patients (42.5%) had resection and anastomosis. It was decided on table by the surgeon to choose one of these two procedures to carry on based on OT findings with his best knowledge to have less possible postoperative complications.

Primary closure was done using continuous two-layered suturing (mucosal and seromuscular) using 2-0 Vicryl. Resection of intestine was done 2-5 cm away from both ends of pathological segment of intestine. Anastomosis was done in 4 layers using 2-0 catgut continuous suturing along with intermittent suturing by 2-0 Vicryl. In every case, healthy omentum was laid over the anastomotic or closure sites.

Two drains were given in subhepatic and pelvic regions. Abdomen was closed in layers. Rectus including peritoneum was closed continuously using 1-0 Vicryl and skin intermittently using 2-0 polyamide. For histopathological study, the resected specimens were sent to the Department of Pathology, MKCGMCH, Berhampur, Odisha.

All postoperative patients were followed up every day up to they were discharged or any mortality occurred to them.

Complications	Number of Patients	%
Wound dehiscence	3	7.5
Intra-abdominal collection	5	12.5
Early postoperative obstruction	3	7.5
Septicaemia	6	15
Mortality	3	7.5

Table 7. Complications

As shown in table 7, five complications were taken as a measure to compare the effectiveness of both the chosen surgical procedures. They were identified and noted in all cases. Presence of any one of the above was regarded as a complication related to the surgical technique applied. Many patients had developed more than one complications. In total, 13 patients developed complications, whereas rest patients had a smooth postoperative period. Three patients (7.5%) died postoperatively. 15% patients developed septicaemia.

	Primary Closure (Number of Patients Out of 23 and %)	R and A (Number of Patients Out of 17 and %)
Morbidity	6 (26.08%)	4 (23.53%)
Mortality	1 (4.35%)	2 (11.76%)
Total	7 (30.43%)	6 (35.30%)

Table 8. Morbidity and Mortality Patterns

Table 8 shows the morbidity and mortality patterns in both of these surgical procedures. Overall, 7 out of 23 patients (30.43%) and 6 out of 17 patients (35.3%) were complicated.

Operative Findings (Number of Patients)	Surgical Procedure Undertaken		Complications Occurred	
	Primary repair * (a+b)	R and A * (c+d)	Primary closure * (a/a+b%)	R and A * (c/c+d%)
Aetiology				
Infective (21)	10 (5+05)	11 (3+8)	50%	27.27%
Traumatic (16)	13 (2+11)	3 (1+2)	15.38%	33.33%
Nonspecific (3)	0 (0+0)	3 (2+1)	0%	66.66%

Number of Perforations				
Single (28)	20 (5+15)	8 (3+5)	25%	37.50%
Multiple (12)	3 (2+1)	9 (3+6)	66.66%	33.33%
Size of Perforation (Length in Greater Dimension)				
<2 cm (22)	17 (3+14)	5 (2+3)	19.23%	40%
≥2 cm (18)	6 (4+2)	12 (4+8)	66.66%	33.33%
Site of perforation (Distance from Ileocaecal Valve)				
<30 cm	5 (2+3)	9 (5+4)	40%	55.55%
≥30 cm	18 (5+13)	8 (0+8)	27.78%	12.50%
Table 9. Complication Pattern as per Surgical Procedures in Different Conditions				

*a-number of complications in primary closure group, b-number of uncomplicated cases in primary closure group, c-number of complications in R and A group, d-number of uncomplicated cases in R and A group relation of aetiology with closure technique and complications- Among 21 infective cases, 5 out of 10 undergoing PC (50%) were complicated, whereas 3 out of 11 undergoing R and A (27.27%) were complicated. Among 16 traumatic patients, 2 out of 13 undergoing PC (15.38%), whereas 1 out of 3 undergoing R and A (33.33%) were complicated. In nonspecific group, 66.66% complication found in R and A group comparison to primary closure group.

Relation of number of perforations with technique and complications- Among 28 patients with single perforation, 5 out of 20 undergoing PC (25%) and 3 out of 8 undergoing R and A (37.5%) were complicated. Among 12 patients with multiple perforations, 2 out of 3 undergoing PC (66.66%) and 3 out of 9 undergoing R and A (33.33%) were complicated.

Relation of size of perforation with technique and complications- Among 22 patients with size of perforation <2 cm in greatest dimension, 4 out of 17 undergoing PC (19.23%), whereas 2 out of 5 undergoing R and A (40%) were complicated. Among 18 patients with size ≥2 cm in greatest dimension, 4 out of 6 undergoing PC (50%) and 4 out of 12 undergoing R and A (33.33%) were complicated.

Relation of site of perforation (distance from IC valve) with technique and complications- Among 14 patients with perforation <30 cm from IC valve, 2 out of 5 undergoing PC (40%) and 5 out of 9 undergoing R and A (55.55%) were complicated. Among 26 patients with perforation, ≥30 cm from IC valve, 5 out of 18 undergoing PC (27.78%) and 1 out of 8 undergoing R and A (12.50%) were complicated.

DISCUSSION

Perforation peritonitis is a common surgical emergency in India. The spectrum of aetiology differs across different regions. In contrast to the western literature where lower GIT perforations predominate, upper GIT perforations constitute the majority of cases in Indian subcontinent.² A recent retrospective study done in India shows perforations of the gastroduodenum are the most common cause of peritonitis. Generalised peritonitis due to perforation of the small bowel is seen more commonly in the developing countries where it is usually secondary to perforation of typhoid ulcers seen in enteric fever. The rising rate of road traffic accidents and civil violence has contributed to the increased incidence of trauma-induced perforations.

Nonspecific or idiopathic ulcer formation and tubercular ulcer perforation are the next common cause in most of the series.³

Most common cause in our study causing jejunoileal perforation was typhoid fever seen in 42.5% cases. It accounted for 56.6% of cases in the series by Karmakar.⁴ A retrospective study by Jain B K et al involved analysis of 192 patients treated for non-traumatic perforation of small intestine where the commonest cause was typhoid (46.4%) and tuberculosis (12.8%),⁵ which has also reported in our study. Tuberculosis-induced perforation is 10% in our study group. Abdominal trauma-induced intestinal perforations are seen in 40% cases. It is more as compared to the study done by Mukhopadhyaya.⁶ In our study, males were more affected and they belonged to 2nd and 3rd decades of their lives. Most of the patients presented with abdominal pain with distension. In our study, 85% patients presented within 72 hours and 15% after that delayed presentation resulted in increased morbidity. This has also been reported in other studies.⁷ After doing haemodynamic stabilisation, all the patients were sent for radiological investigations. After clinically correlating the radiological findings with clinical findings, patients were decided to undergo explorative laparotomy. All necessary laboratory investigations were done in every patient prior to the surgical procedures.

After laparotomy, in our study group, it was observed that proximal jejunum and distal ileum were the most common sites of perforation. This has also been reported in earlier studies.^{8,9} Majority of the patients had single perforation (55%), size <2 cm in largest dimension (70%), site ≥30 cm away from ileocaecal junction (75%). Proper lavage with warm normal saline was done in all patients. Various methods in use are flank drains, primary closure, ileostomy, resection and anastomosis. In present study, the outcomes following primary closure, resection and anastomosis were evaluated and compared with respect to wound dehiscence, intra-abdominal collection, early postoperative obstruction, septicaemia and mortality. Primary closure was done in 23 patients (57.5%) and resection and anastomosis in 17 patients (42.5%). Morbidity and mortality was studied in cases. Overall mortality was 7.5%. 7 out of 23 patients undergoing primary closure (30.43%) and 6 out of 17 patients undergoing resection and anastomosis (35.30%) were found to be complicated.

We can say that among various surgical options, the two prevalent procedures are- primary closure, resection and anastomosis. Shah et al in their study found the rate of mortality and morbidity in typhoid perforation patients

undergoing resection and anastomosis is lower than in primary repair patients.¹⁰ This is similar to our findings.

Different studies propose single perforations to be closed primarily and segmental resection and anastomosis is to be preferred for multiple perforations.¹¹ We have got similar results in our study in terms of complications.

Texts mention to undergo resection and anastomosis for perforation involving 50% circumference of intestine, whereas for perforation of less dimension, primary closure is preferable. We also found similarity in our study where primary closure group of patients with perforation of <2 cm had less complications, whereas for greater dimension, resection and anastomosis was the preferred method with less complications.

Another factor to be relevant in choice of surgical treatment is the distance of the perforation from the ileocaecal valve. In fact, the valve can develop a condition of hypertension above it, that is, precisely in correspondence to the area perforated and repaired, which could be a risk factor for dehiscence. In our study, 35% of perforations were within 30 cm of the ileocaecal valve. If we correlate the distance of perforation from the ileocaecal valve with the type of surgery performed (Table 9), we see that primary repair was the most frequently adopted technique, regardless the distance of perforation from the valve, while resection and anastomosis was mostly performed for perforations less than 30 cm from valve. We found primary closure better for perforations nearer to valve rather than resection and anastomosis, which is better option for distant site from the valve.

Larger study groups and randomised control trials are needed to reach at conclusive results.

CONCLUSION

Most common cause of jejunoileal perforation is enteric fever. Irrespective of cause, jejunoileal perforation is predominantly seen in 3rd decade of life predominantly in males. In our study, detailed analysis of the complication pattern shows primary closure associated with less number of complications in traumatic cases and resection and anastomosis is associated with lesser complications in infective cases. Primary closure is less complicated for single

perforations as compared to multiple perforations. Resection and anastomosis is less complicated for large size perforations. Perforations proximal to ileocaecal valve are better treated by primary closure than resection and anastomosis.

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