

Our Experience with Typhoid Ileal Perforation at Tertiary Care Centre Over a Period of 2 Years

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How to cite this article:

Pradeep Kumar J, Our Experience with Typhoid Ileal Perforation at Tertiary Care Centre over a Period of 2 Years .New Indian J Surg. 2020;11(3)387–392.

Abstract

Background: Ileal perforation is a common problem seen in tropical countries; the commonest cause being typhoid fever. The aim of this study is to assess clinical presentation, investigations, diagnosis, the management and postoperative complications of typhoid ileal perforation. The study also aims to assess the outcomes in these patients and the factors affecting prognosis.

Methods and Material: This prospective study was conducted by selection of consecutive 50 cases presenting with symptoms and signs suggestive of typhoid ileal perforation. The data in the study was collected by the use of a pretested proforma to collect relevant information from individual patient after the inclusion and exclusion criteria applied by a meticulous clinical examination, relevant investigations and appropriate management.

Results: In our series, typhoid perforation commonly occurred in second and third decade of life (70%) with male preponderance and 44% of cases occurred 8-14 days of onset of fever. Pain abdomen and dehydration being the most common presentation occurring in all patients. Pneumoperitoneum in chest X ray and erect x ray abdomen was seen in 78% of patients. Widal was positive in 86% of patients of typhoid perforation in this series.

In our study lag period was between 1 hour and 96 hours with average of 31.66 hours. Over

96% of perforations were within 2 feet from ileocaecal junction. Simple two layer closure is the commonest procedure done. Wound infection is the commonest postoperative complication seen in 31.1% of patients.

Conclusions: We found typhoid fever as the most common etiology for ileal perforation. Widal test is useful in diagnosis of typhoid fever. Ileal perforations have significant morbidity and mortality despite adequate operative intervention and postoperative care. Lag period, hypoalbuminemia, azotemia and shock on admission were found to be significantly contributing to morbidity and mortality.

Keywords: Typhoid; Intestinal perforation; Small intestine; Prognosis; Fecal fistula.

Introduction

Typhoid fever remains a pressing clinical problem in the developing countries of the tropics. Complications occur in about 30% of untreated cases and frequency of perforation varies between 0.8% and 18%.¹ Ileal perforation is most likely to occur during 3rd week and it is most frequently encountered complication of typhoid. Peritonitis following perforation of the small intestine especially the terminal part of the ileum is a common abdominal emergency faced by general surgeon. It affects all age groups and the disease indicates that the incidence, features and course not only vary with the standards of the hygiene and health care delivery, but may be also vary with age, sex climate and geographical location.

In the third week of illness, the two most serious complications of typhoid fever e.g. the perforation

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of the bowel and intestinal hemorrhage occurs. Sudden, acute abdominal pain followed by rigidity and guarding of the abdomen, cessation of bowel sounds, obliteration of the liver dullness and vomiting is the typical syndrome of intestinal perforation.

The diagnosis of typhoid fever can be made by Widal test, culture of organism from blood, bone marrow, urine and stools. Newer diagnostic techniques have been introduced to enable rapid diagnosis of typhoid fever. Histopathology of the specimen might reveal etiology of perforation.

Conservative management of typhoid ileal perforation is associated with a substantial mortality. Arigbabu and Badejo reported 66% mortality with this modality. Presently all authors recommend surgical management. Operative management has been generally accepted as the treatment of choice, as survival rates are higher with surgical intervention (74%) than if only antimicrobials administered (34%).² but the type of surgical repair is still debated.

Typhoid perforation is associated with a very high morbidity. Complication rates of 28.5% to 81% have been reported. The common complications are wound infection, wound dehiscence and respiratory complications. Intestinal fistulae have been reported in 3-10% of patients.³ Mortality rates ranging from 9-22% are most commonly reported for typhoid ileal perforation.⁴ Rates as low as 3-9% have been reported from areas in the development world with better economic conditions. Such mortality rates have been achieved by the addition of close electrolyte and blood gas monitoring, intensive care unit nursing, central venous pressure monitoring and use of total parenteral nutrition. Most of these measures are beyond the reach of the majority of hospitals in the developing world, especially in rural areas. Variables that can be manipulated to improve survival in such locations include more aggressive fluid and electrolyte resuscitation, the type of surgical procedure and antibiotic regimen.

The present study aims to look at the clinical presentation, investigations, diagnosis, the management and postoperative complications of typhoid ileal perforation.

Materials and Methods

Data for this prospective Study was sourced from

those cases which admitted to tertiary care centre as emergency with following inclusion and exclusion criteria

Inclusion criteria:

- The patients presenting with signs of peritonitis and operative findings showing ileal perforation.
- Widal test positive.
- Blood culture positive

Exclusion criteria:

- The patients presenting with signs of peritonitis and widal test negative.
- Operative findings not supportive of typhoid perforation .i.e. perforated appendix, perforated duodenal ulcer, tuberculosis ulcers, primary bacterial peritonitis, perforated Meckel's diverticulum.
- Complications due to anesthesia and other pre existing renal, pulmonary and cardiac complications.

Study Method:

History with special reference to presence of fever, pain, vomiting, abdominal distension, constipation and treatment prior to admission was taken. Vital signs, hydration, abdominal distension, tenderness, guarding and presence of free fluid were noted.

All patients were resuscitated preoperatively with intravenous fluids and antibiotics. Most cases received cefotaxime or ciprofloxacin with metronidazole. In case of gross peritoneal contamination aminoglycosides were added. All patients underwent laparotomy under general anesthesia. Midline or Para median incisions were employed. The amount and type of peritoneal contamination, number, site and size of perforations and procedure employed were noted. The choice of procedure was based on surgeon's preference or unit policy. The following procedures were employed.

1. Simple two layer closure
2. Closure with free or pedicled omental patch
3. Resection and anastomosis

For both closure and anastomosis, the inner all-coats layer was performed with polyglactin 910 and the outer layer with silk. Antibiotics were routinely given for 7-10 days .A diagnosis of typhoid was made only if Widal test was positive, or Salmonellae were isolated from blood or urine

and if histopathological evidence of typhoid perforation was found. Postoperative complications were noted. The factors influencing mortality and morbidity and outcome were assessed.

The various parameters were recorded in a proforma and tabulated. Analysis was done using SPSS software v.10. The various tests used for statistical analysis were Chi square, ANOVA and binary logistic regression.

Results

Fifty consecutive patients of Ileal Perforation admitted over a period of 2 years were included in this study. The discussion is based mainly on the analysis and observation made regarding the symptoms, signs, operative findings, management and complications in 50 cases of typhoid ileal perforation.

The age of patients ranged from 8 to 58 yrs. The youngest was 8 yrs old female patient and oldest was 58 yrs old male patient. The peak incidence of perforation was in the 21 to 30 yrs age groups with 38%. Among 50 cases of typhoid ileal perforation 41 were males and 9 were females. A male to female ratio of 4.5:1. Peak incidence of perforation was in 8-14 days group. Maximum number of perforations i.e. 76% occurred in 1-14 days.

Most of the patients presented with symptoms and signs of peritonitis. The commonest symptoms were abdominal pain, fever and vomiting. The commonest signs were abdominal tenderness, guarding, intra-abdominal free fluid and dehydration. 12 % of patients were in shock. Pneumoperitoneum in chest and erect abdominal x-ray was seen in 78% of patients. Features of intestinal obstruction, including dilated bowel loops with air-fluid levels in erect abdominal x-ray were seen 24% of patients. Blood cultures were done in 5 patients and growth was obtained in all tested.

The time between the onset of pain and the surgical intervention was between 1 and 96 hours with an average of 31.66. The average operating time was 105 minutes. Resection and anastomosis took a longer time than the other procedures but the difference was not statistically significant. Median hospital stay was twenty four days. There was no significant difference in the hospital stay of patients undergoing different surgical procedures

36 patients underwent simple closure of

perforation in two layers. 3 patients underwent closure of perforation with omental patch. In 6 patients' resection and end-to-end anastomosis was done. In the present series of 50 cases, five cases were treated conservatively. It was mainly due to the poor general condition and severity of toxemia and peripheral circulatory failure that these patients were not subjected to surgery. Though they were contemplated for surgery they could not be resuscitated to make them "fit" for surgery. They died within 24 hours of admission to the hospital.

The distance from ileo-caecal junction to perforation varied from 0 cms to 50 cms. 60% of the cases presented within 10 cms, 13.3% of the cases presented between 11 and 20 cms. 15.5% of the cases presented between 21 and 30 cms. 4.4% of cases presented between 31 and 40 cms and 6.7% of the cases presented between 41 and 50 cms.

The size of the perforation varied from 5 mm to 10 mm. In all the perforations were situated in the antimesenteric border and the surrounding area was oedematous and lot of flakes were present. The ulcer was oval and the long axis of perforation was parallel to the long axis of the bowel. In 45 out of 50 cases of the typhoid ileal perforations operated, 37 had single perforation 6 had double perforation and 2 had more than two perforations.

Complications occurred in 33 (73.3%) of all cases. The common complications seen were wound infection, fecal fistula, wound dehiscence, intraabdominal collection, and respiratory complications. The highest complication rate was seen with simple closure and the least with resection and anastomosis though this difference was not statistically significant. The mortality rate in operated cases was 15.5%. The differences in mortality between surgical procedures were not found to be statistically significant. Septicemia, fecal fistula and respiratory complications were the commonest causes of death.

Increasing lag period was associated with increasing mortality and complication rate. The relationship of increasing lag period to both mortality and morbidity in ileal perforations was found to be significant with $p < 0.05$. This was also significant in patients of typhoid perforations with $p < 0.05$ for both mortality and complications. Mortality was affected significantly by azotemia and the presence of shock on admission. Sex, other biochemical parameters, number of perforations and type of peritoneal fluid were not statistically significant.

Table 1: Age and Sex incidence in Typhoid Ileal Perforation.

Age (years)	Male	Female	Total	Percentage (%)
1-10	3	2	5	10
11-20	13	3	16	32
21-30	17	2	19	38
31-40	4	1	5	10
41 and above	4	1	5	10
Total	41	9	50	100

Table 2: Symptoms in typhoid ileal perforation.

Symptoms	Number	Percentage (%)
Pain abdomen	50	100
fever	46	92
vomiting	20	40
constipation	23	46
diarrhea	8	16

Table 3: Signs in Typhoid ileal perforation.

Signs	Number	Percentage (%)
Dehydration	50	100
Tenderness	48	96
Guarding	47	94
Distension	47	94
Free fluid	31	62
Shock	06	12
Bowel sounds absent	43	86
Bowel sounds present	07	14

Table 4: Surgical procedures and complications.

Complications	Simple closure n=36	Omental patch n=03	Resection and anastomosis n=06	Total n=45
Wound infection	9 (25%)	2	3	14
Wound dehiscence	9 (25%)	2	0	11
Abdomen collection	3	1	1	5
Fecal fistula	7	1	2	10
Reperforation	2	1	1	04
Respiratory	22	1	1	10
Mortality	5	1	1	07

Table 5: Relation of lag period to mortality and complications.

Lag period	Number of cases	Complications	Death
<24	13 (28.8%)	5 (38.4%)	1 (7.1%)
24-48	24 (60%)	20 (83.33%)	2 (8.3%)
49-72	6 (13.3%)	6 (100%)	2 (33.3%)
>72	2 (4.4%)	2 (100%)	2 (100%)
Total	45	33 (73.3%)	7 (15.5%)

Table 6: Risk factors for morbidity in typhoid ileal perforation.

Risk factor	Morbidity (n=33)	No morbidity (n=12)
Age>50	01	02
Female sex	02	04
Male sex	31	08
Shock	02	00
Hb<8	07	06
Azotemia	10	04
Albumin<3.5	11	03
Multiple perforation	06	02

Table 7: Cause of death in ileal perforation.

Cause of death	No of cases (n=12)
Shock and dehydration	05
Septicaemia	03
Fecal fistula	02
Anastomosis leak	01
Re perforation	01

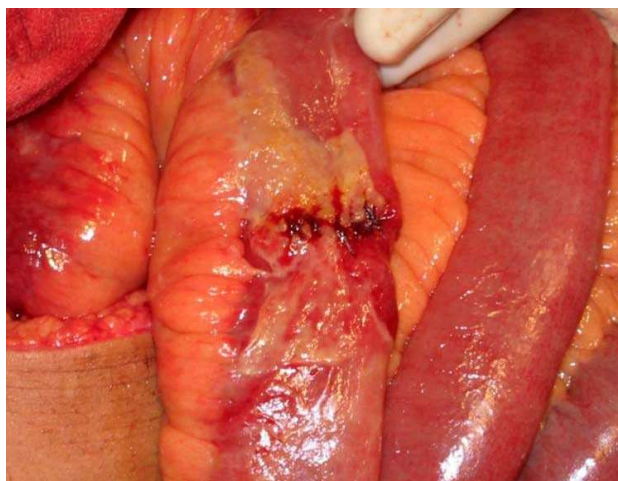
**Fig. 1:** Single typhoid ileal perforation.**Fig. 2:** Simple two layer closure of perforation.



Fig.3: Resection and anastomosis in ileal perforation.

Discussion

Typhoid fever was the commonest cause of ileal perforation in tropical countries. Typhoid fever accounted for 56.6% of cases of ileal perforation in the series by Karmakar.⁵ There was a male preponderance with the male: female ratio in this study being 4.5:1. 9 of typhoid perforations were seen in females. Published literature shows a similar finding with reported ratios from 2.3:1 to 6.1:1.

Typhoid perforations as reported by Kotan C occurred in the second and third decades of life.⁶ In this study 70% of typhoid perforations were in a similar age group. Perforation was commonly seen to occur in the second week following onset of illness. In this series majority of perforations i.e. 44% occurring 8-14 days of onset of fever.

Most patients presented with features suggestive of peritonitis. Patients with typhoid perforation had fever, abdominal pain and vomiting. Examination revealed tenderness, guarding, distension and intraperitoneal free fluid. 6 patients were in shock on admission. Eggleston reported that most patients had fever, malaise and sudden increase in abdominal pain in typhoid perforation. Gupta et. al.⁷ also reported diarrhoea in 75% of their cases, while only 16% of our cases had diarrhoea. Examination revealed signs of toxemia and acute abdomen.

Chest X-ray and erect x-ray abdomen are useful investigation to detect hollow viscus perforation. Free gas was seen under the diaphragm in 78% of typhoid perforation. Abdominal X-ray revealed features suggestive of ileus. Pneumoperitoneum has been reported in more than 70% in studies by Chalya LP, Mabula BJ et. al.^[4] which consistent with our study.

Widal was positive in 86% of patients of typhoid perforation in this series. In a study by Rahman et.

al., Widal was positive in 75.90% of cases.⁸ It was reported positive in 75.5% of cases by Jarrett and in 73% by Vaidyanathan. *Salmonella typhi* was grown in 4 patients with typhoid ileal perforation in whom blood cultures were done. All cultures were sensitive to piperacillin, Cefotaxime and ceftriaxone. Prior antibiotic therapy was probably responsible for the low isolation in the study. Histopathology was suggestive of typhoid in 4 patients. The presence of erythrophagocytosis virtually confirms the diagnosis of typhoid perforation. One case had both Widal and histopathology confirming the diagnosis whereas 3 did not have Widal positivity. Widal is the most useful test for typhoid. It is easily available and is less susceptible to prior therapy when compared to blood culture.

In the management of typhoid perforation some authors advocated conservative management. Presently there is no such controversy in treatment of typhoid perforation with the current recommendation being surgical management. The various surgical methods in use are local drains, simple closure, and closure with omental patch, wedge resection, resection and anastomosis, ileotransverse anastomosis and ileostomy. In this study 36 patients underwent simple closure, 3 patients underwent omental patch repair and 6 patients treated by resection anastomosis. 5 patients were treated by conservative measures. No patients were treated by wedge resection, ileotransverse anastomosis or ileostomy. Resection was employed in typhoid perforations wherein multiple perforations were found.

The surgical procedure did not influence either the morbidity or the mortality. Eggleston reported that the procedure done did not influence outcome. Ameh et. al. found mortality was highest with wedge resection and least with resection and anastomosis.⁹ The overall complication rate for all patients in this series was 73.3%. Perforations are associated with a high morbidity rate with literature reports between 28.5% and 81%.

The common complications were wound infection (31.1%), wound dehiscence (24.4%), fecal fistula (22.2%) and respiratory complications (22.2%). The mortality in this series was 24%. Though this rate has been on the decline, reported rates are between 9% and 22%.¹⁰

Typhoid analysis showed that the mortality and morbidity increased with increasing lag period. Increasing lag period was associated with increased mortality in series by Archampong, Eggleston, and Bose and Talwar. In this series most patients presented with peritonitis of greater than 24 hours

duration. Those cases who presented after 24 hours had more complications and mortality. The rate of mortality and morbidity were increasing with increasing lag period.

In patients of ileal perforation the significant factors influencing mortality are age greater than 50, female sex, feculent peritonitis, raised blood urea or creatinine as per the Mannheim peritonitis index. In this study azotemia and shock at presentation were significant factors influencing mortality. Factors increasing morbidity are HB <8 gm%, albumin <3.5 and azotemia.

Conclusion

Typhoid ileal perforation has male preponderance and is usually in the second and third decades of their lives. The presenting symptoms in the majority were pain abdomen and fever, dehydration, tenderness, guarding and rigidity were conspicuous by their presence in the majority. Widal serology is a useful test in the diagnosis of typhoid fever. But histopathology not very useful in the diagnosis of typhoid.

Exploratory laparotomy is definitely indicated whenever typhoid perforation is suspected. Typhoid perforations have a significantly higher morbidity rate. The type of surgical procedure did not influence outcome, either morbidity or mortality. Lag period significantly influenced outcome. Surgical treatment, immediately after perforation offers good chance of recovery. Morbidity was significantly influenced by azotemia and hypoalbuminemia. Mortality was significantly influenced by azotemia, hypoalbuminemia and shock on admission.

Key message: With advances in critical care and management of peritonitis due to intestinal perforations, typhoid ileal perforation still remain as challenging emergency for surgeons because of increased morbidity and mortality associated with it.

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