

NON-TRAUMATIC ILEAL PERFORATION- A RECENT EXPERIENCERajesh T. R¹, Biju P. R²¹Associate Professor, Department of General Surgery, Government Medical College, Thrissur, Kerala.²Associate Professor, Department of General Surgery, Government Medical College, Thrissur, Kerala.**ABSTRACT****BACKGROUND**

Typhoid is a major cause for non-traumatic ileal perforation in developing and under developed countries.^{1,2,3,4,5,6} Other causes of non-traumatic ileal perforations worldwide include intestinal tuberculosis,¹¹ Crohn's disease, Behcet's disease, radiation enteritis, adhesions, ischemic enteritis and nonspecific ulcer. The public health burden of enteric fever in India is huge. Typhoid burden in some states and union territories in India, like Kerala, Mizoram, Sikkim, Goa etc. are much lower than the national rate.¹⁶

The objectives of this study were- (a) To find out the causes of non-traumatic ileal perforations for which surgery is undertaken in our institution (b) To estimate the frequency of typhoid fever among non-traumatic ileal perforations. (c) To analyse the various surgical treatments offered and (d) To analyze morbidity and mortality among patients operated.

MATERIALS AND METHODS

This is a retrospective cohort study. During 2012 to 2017, a total of 62 patients with perforation peritonitis were identified as ileal perforations, at laparotomy. Data collected and analysed with the help of SPSS software Version 21.0. Basic statistical methods like percentage analysis were employed for the analysis of the data.

RESULTS

During the period 2012 to 2017, there were 62 patients with ileal perforations operated in our hospital. Age ranged from 17-76 years. Male: female ratio was 3.3: 1. Main symptoms were abdominal pain, vomiting and fever. Most patients had symptom duration 1 to 3 days. Only 4 patients had duration of more than 3 days. Pre-operative diagnosis was diffuse peritonitis in all these patients; ileal perforation was identified only on laparotomy. Gas under diaphragm was present only in 23% of patients. All patients underwent laparotomy under GA +/- Epidural anaesthesia, after initial resuscitation. Majority of patients had single perforation involving distal ileum.

CONCLUSION

Typhoid is not a common cause for non-traumatic perforation of ileum in Kerala in recent years. The common causes are nonspecific ulcers (66%) and tuberculosis (19%). Most common procedure was resection of affected segment with end to end anastomosis (74%). Overall morbidity was 19.2% and mortality 7.6%.

KEYWORDS

Non-Traumatic Ileal Perforation, Tuberculous Perforation of Ileum, Ileal Perforation, Typhoid Ileal Perforation.

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BACKGROUND

Non-traumatic Ileal perforation is a common cause for generalized peritonitis and mortality around the world. Typhoid is the major cause for non-traumatic ileal perforation in developing and under developed countries.^{1,2,3,4} Recent studies from various parts of India also shows that typhoid remains the commonest cause for ileal perforation in India.^{5,6} Other causes, worldwide, include intestinal tuberculosis,⁷ Crohn's disease, Behcet's disease, radiation enteritis, adhesions, ischemic enteritis and

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nonspecific ulcer. In the western countries, Crohn's disease, foreign bodies, perforated diverticula⁸ and radiation enteritis⁹ are important causes.

The public health burden of enteric fever in India is huge. Population based studies from urban population in India suggest that incidence of typhoid fever is 2730 per 100000 populations per year in 0-4 year old children, 1170 per 100000 per year in 5-19 year age group and 110 per 100000 per year in 20-40 year age group.¹⁰ Mortality rates associated with typhoid fever vary from region to region, with the highest (up to 12%–30%) reported from Indonesia, Nigeria, and India.¹¹ Typhoid burden in some states and union territories in India, like Kerala, Mizoram, Sikkim, Goa etc. are much lower than the national rate.¹²

Aims and Objectives

1. To find the causes of non-traumatic ileal perforations, for which surgery is undertaken, during the period 2012 to 2017 in government medical college Thrissur.

- To estimate the frequency of Typhoid fever among those with non-traumatic ileal perforation.
- To analyze the surgical treatments offered and the results of surgical treatment.

MATERIALS AND METHODS

This is a retrospective cohort study conducted in Govt. Medical College, Thrissur, located in central Kerala. During 2012 to 2017, a total of 62 patients with perforation peritonitis were identified as ileal perforations, at laparotomy. Analysing records, data collected included details of clinical symptoms, duration of symptoms, laboratory data, imaging (X-Rays, ultrasound abdomen), operative findings, surgical treatment offered, postoperative outcome, morbidity and mortality. Histopathology of specimens collected during surgery was also collected. The collected data were subjected to statistical analysis with the help of SPSS software Version 21.0. Basic statistical methods like percentage analysis were employed for the analysis of the data. Data were organized and presented in the form of table and graphs.

Inclusion Criteria

Patients operated for perforation peritonitis and diagnosed to have ileal perforation at laparotomy during the study period.

Exclusion Criteria

All patients with history of recent trauma were excluded. Those without complete medical records also excluded.

RESULTS

During the period 2012 to 2017, there were 62 patients with ileal perforations operated in our hospital. Age ranged from 17-76 years. Male: female ratio was 3.3:1. Main symptoms were abdominal pain, vomiting and fever. Most patients had symptom duration 1 to 3 days. Only 4 patients had duration more than 3 days. Pre-operative diagnosis was diffuse peritonitis in all these patients, ileal perforation was identified only on laparotomy. Gas under diaphragm was present only in 23% of patients. All patients underwent laparotomy under GA +/- Epidural anaesthesia, after initial resuscitation. Majority of patients had single perforation involving distal ileum.

Most frequent procedure done was resection of the involved segment of small bowel with end to end anastomosis (46 patients), summarized in table 1.

Procedure	Number of patients	Percent
Segmental Resection	46	74.2
Ileostomy	6	9.6
Simple Closure	10	16.1

Table 1. Procedure Done

Thirty-nine patients had a Widal test for typhoid done after identifying the ileal perforation, all results were negative. None had stool culture or blood culture done. Overall morbidity was 19%, mortality was 7.6% (Table 2).

Results of pathological examination of the specimens is summarized (Table 3).

Parameters	Number of Patients	Percent
Morbidity	10	19.2
Mortality	4	7.6

Table 2. Morbidity and Mortality Rate

Aetiology	Number of Patients	Percent
Non-Specific Inflammation	41	66.1%
Tuberculosis	12	19.4%
Lymphoma (NHL)	8	12.9%
Sclerosing Peritonitis	1	1.6%

Table 3. Results of Histopathological Examination

DISCUSSION

Age and sex ratio of patients were similar to that reported in the literature. Most common and prominent symptoms were diffuse abdominal pain, Fever and vomiting. Duration of symptoms ranged one to 3 days in majority of patients. (Figure 1)

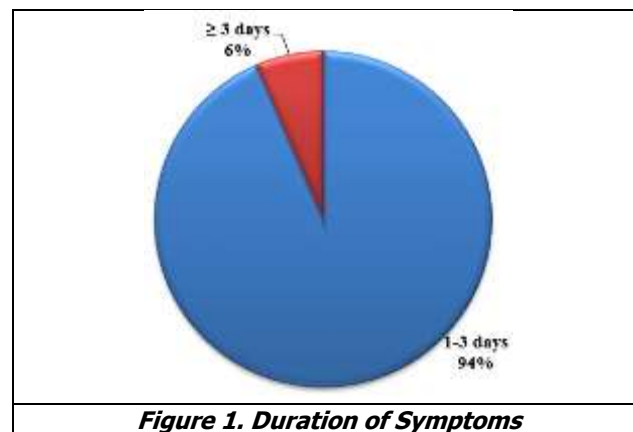


Figure 1. Duration of Symptoms

There was no history of prolonged fever of many days' duration, as we see in typhoid fever, in any of them. All of them had polymorpho-nuclear leukocytosis. X- ray abdomen showed gas under diaphragm, in only 23% of patients, much less compared to the rate in the literature. Ultrasound scan abdomen showed free fluid with particles in all patients. Feculent fluid was present in all of them. Most perforation were single, few had multiple perforations involving ileum.

At laparotomy segmental resection of the involved ileum was the most common procedure done (74%); followed by simple closure (16%). Ileostomy was performed in (9.6%) of patients. Overall morbidity was (19.2%). Morbidity included respiratory complications (Figure 2) (pneumonia pleural effusion (5.7%) wound infections (7.6%) abdominal dehiscence (1.9%) anastomotic leak requiring re-laparotomy (1.9%) and ascites leak in a cirrhotic patient, and mortality was (7.6%). Of the 4 patients died, 3 patients had resection of the bowel. One with simple closure of perforation also died.

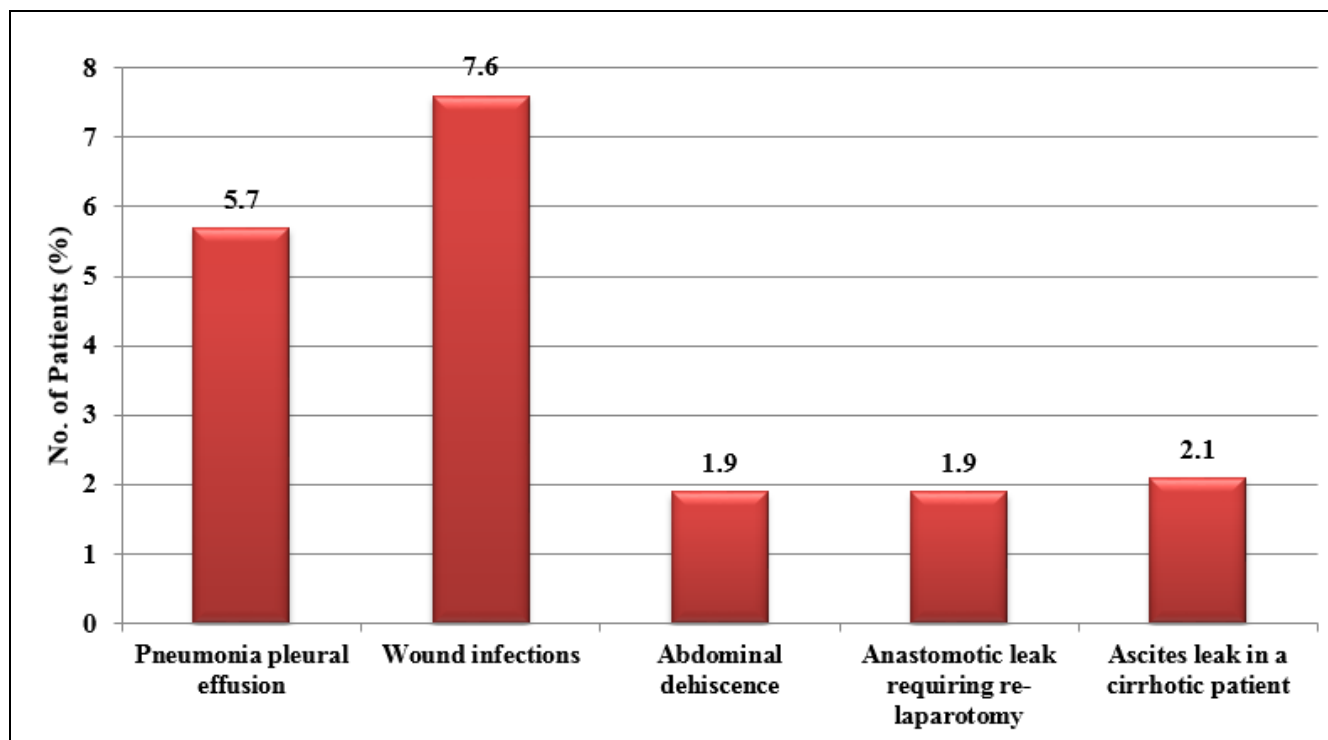


Figure 2. Overall Morbidity Status

Histopathology of the specimens, (Table 3) shows that most of the patients were having non-specific ulcer. All of the nonspecific ulcers were single perforations. Second common diagnosis was tuberculosis. Tuberculosis was identified by the presence of caseating granulomas in the bowel wall and/or in the lymph nodes. There were two cases of lymphomas (NHL) and one case of sclerosing peritonitis. There were none with histopathology features suggestive of typhoid perforation.

Typhoid fever is predominant cause of non-traumatic ileal perforation in developing countries. Typhoid fever, a severe febrile infectious disease caused primarily by *Salmonella typhi* occurs in areas where poor socioeconomic levels and unsanitary environmental conditions prevail. After ingesting contaminated food, multiplication of bacteria occurs in the reticulo-endothelial system during an incubation period of 1–14 days; later the bacteria become localized in Peyer's patches. These undergo swelling and ulceration that can progress to capillary thrombosis and subsequent necrosis. These ulcerations are always located on the anti-mesenteric border of the intestine and may perforate, usually in 3rd week of disease. Rate of small bowel perforation in typhoid patients varies, 0.8 to 39%.^{13,14} There may be one or several perforations and many other impending perforations, which makes the surgery difficult. During surgery treatment options include resection of involved segment, simple closure, or ileostomy. Severity of the disease rather than the surgical option had a significant impact on the outcome in patients with ileal perforations.

In cases of perforation, laboratory confirmation of a clinical diagnosis of typhoid fever is difficult, because blood and bone marrow cultures often show no growth.¹⁵ This highlight the need for multiple cultures and demonstrate the value of cultures of stool, peritoneal fluid, and bowel tissue

samples, all of which may yield *S. Typhi*, in patients with bone marrow and blood cultures, that show no growth.¹⁶ The hall mark histological finding in Typhoid fever is infiltration of tissues by macrophages (Typhoid cells) that contain bacteria, erythrocytes, and degenerated lymphocytes. Aggregates of these macrophages are called typhoid nodules, which are found most commonly in the intestine, mesenteric lymph nodes spleen and liver. The intestinal ulcers and focal areas of necrosis are bounded only by chronic inflammatory cells, the inflammatory infiltrate consists predominantly of macrophages and T lymphocytes and that it is most severe in the deeper tissues.¹⁶

A "non-specific" aetiology is attributed to small bowel perforations when the perforation cannot be classified on the basis of clinical symptoms, gross examination, serology, culture and pathological examination into any disease state such as enteric fever, tuberculosis or malignancy. These ulcers are usually single and commonly involve terminal ileum.¹⁷ It has been proposed that sub mucus vascular embolism¹⁸ chronic ischemia due to atheromatous vascular disease or arteritis⁸ or drugs such as enteric coated potassium tablets are responsible for them.⁹ In many of the Indian studies, non-specific perforation is the second common cause after typhoid fever.

All cases of tuberculous perforations in our series, had single or multiple strictures involving the perforation site. Tuberculosis accounts for 5-9 per cent of all small intestinal perforations in India, and is the second commonest specific cause after typhoid fever.¹⁹ Tubercular perforations are usually single and proximal to a stricture.²⁰ The most common site is the terminal ileum and intra-operative differentiation from Crohn's disease is difficult. It is well documented that the incidence of perforation in patients with intestinal tuberculosis varies from 1% to 11%, but the

majority of these perforations (70%–80%) are not truly perforations of such tubercular ulcers, but are 'blow outs' of the small bowel secondary to distension due to distal obstruction (strictures or adhesions). Recently, vasculitis of the mesenteric vasculature due to tuberculosis have been implicated as a contributory factor.²¹ The mesenteric vasculature (medium and small vessels, mostly) and endarteritis of sub-mucosal vessels was frequently involved by granulomatous inflammation, with intravascular organizing thrombus being present in 30.0% of the resected specimens with perforation.²²

Four out of 12 patients with tuberculous perforation in our series were undergoing anti-tuberculous treatment (2 weeks to 3 months). Perforation occurs after starting anti-tuberculous therapy,^{23,24} and has been reported as occurring between 2 days and 4 months after the initiation of anti-tuberculous therapy. Increased incidence of perforation with anti-tubercular treatment has been noted by (Bahari, 1978).²⁵ When perforation occurs shortly after the institution of anti-tuberculous therapy, it may merely be representing the natural progression of the disease. Alternatively, it has been suggested that a reduced inflammatory response as a result of anti-tuberculous treatment results in impaired ulcer healing and a reduced tendency to reinforcement by the mesentery. Some patients have had clear documentation of initial improvement with anti-tuberculous treatment before the occurrence of intestinal perforation, and such deterioration could be attributed to the paradoxical response phenomenon.²⁶ Paradoxical deterioration during anti-tuberculous therapy refers to the clinical or radiological worsening of pre-existing tuberculous lesions or the development of new lesions not attributable to the normal course of disease in a patient who initially improves with anti-tuberculous therapy.²⁷ The pathogenesis of paradoxical deterioration during effective anti-tuberculous therapy is not fully understood. Possible mechanisms include a strengthening of the host's delayed hypersensitivity response, and an increased exposure to mycobacterial antigens released from dying bacteria on therapy.²⁸ This phenomenon has been increasingly reported in HIV-positive patients being treated for TB, especially among those receiving highly active anti-retroviral therapy.²⁸ Paradoxical deterioration has also been reported to occur in up to 11.1% of HIV-negative patients during treatment for TB, and it is seen more frequently in patients with extra-pulmonary TB, and among those with low baseline lymphocyte counts.²⁹ Nevertheless, an inadequate response to anti-tuberculous therapy as a result of drug resistance or poor drug compliance should be excluded. In a review of 122 episodes of paradoxical responses, the median time from commencement of anti-tuberculous treatment to development of the paradoxical response was 60 days (range, 14-270 days).

The treatment of choice for perforation in intestinal TB is resection of the affected bowel segment followed by an end-to-end anastomosis.³⁰ Simple closure of the lesion is not recommended as it is associated with a high incidence of leakage and fistula formation.³⁰

Primary intestinal lymphoma with spontaneous perforation and after systemic chemotherapy is rare.³¹ Perforation remains a significant complication of GI lymphomas and is more frequently associated with aggressive than indolent lymphomas.³² The frequency of perforation due to intestinal lymphoma was reported as 1–25%. There might appear small intestine perforation spontaneously or as a chemotherapy complication.³³ In a previous study, a period of 37 years was investigated, and it was determined that perforation developed in 9% of the patients with gastrointestinal lymphoma, and perforation developed after chemotherapy in 55% of these patients.³²

Sclerosing encapsulating peritonitis (SEP) is a rare condition referring to complete or partial encapsulation of the small intestine by a fibro-collagen membrane, forming a cocoon appearance, which may lead to complications such as obstruction, bleeding and perforation.³⁴ It is more common in young adult women living in tropical areas.³⁵ Owtshinnikow first defined this entity as "peritonitis chronica fibrosa incapsulata" in 1907. Its preoperative diagnosis is very difficult and is usually diagnosed during surgery. Among all SEP associated complications, small bowel perforation has rarely been reported.³⁵ The pathophysiology of this rare complication has not been clarified yet. Mechanical obstruction secondary to encapsulation and vascular insufficiency may contribute to small bowel perforation.

CONCLUSION

Typhoid is not a common cause for non-traumatic ileal perforation in Kerala, in recent years. The most common cause is perforating nonspecific ulcers (66%). Most common procedure performed was resection of the affected segment with end to end anastomosis (74%). Overall morbidity and mortality were 19.2% and 7.6% respectively.

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