

# Intestinal Complications of Typhoid Fever and It's Treatment by Surgery

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## Abstract-

Typhoid fever is a severe febrile illness caused primarily by the gram negative bacillus *Salmonella enteritidis* serovar *Typhi*. The most lethal complication of it are bleeding and ileal perforation, both arising from necrosis of Peyer's patches in the terminal ileum. The present study was conducted in 172 adult patients of Typhoid perforation admitted in 2008- 2013 treated surgically. **The aim of the study to show simple repair of perforation is the justified surgical procedure in terms of morbidity, mortality and cost effectiveness.** Duration of perforation, number of perforation and development of faecal fistula are the factors which significantly affect mortality. Primary temporary ileostomy and ileo transverse anastomosis were performed in some patients with multiple perforations and/or with perforation situated near/on the ileocaecal junction having greater risk of "repair leak". Resection and anastomosis is considered in some cases of multiple perforations and unhealthy gut with or without defunctioning ileostomy. Common post-operative complications include wound infection (17%), bleeding (1.16%-2 cases out of 172), faecal fistula (2.9%-5 cases out of 172) and skin excoriation around ileostomy (6.4%).

**Key words-** Typhoid perforation, repair of perforation, primary ileostomy, repair with ileo transverse anastomosis.

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## I. Introduction-

Typhoid fever is an endemic disease in India and other tropical countries. Small intestinal perforations and gastrointestinal haemorrhage are the most common and dreadful complications of enteric fever. Enteric perforation among patients with Typhoid fever has been extremely rare in developed countries during the era of antibiotic use. The mechanism of intestinal perforation in typhoid fever is hyperplasia and necrosis of Peyer's patches of the terminal ileum. The lymphoid aggregates of Peyer's patches extend from the lamina propria to the sub mucosa, so that in the presence of hyperplasia the distance from the luminal epithelium to the serosa is bridged by lymphoid tissue. During the course of Typhoid fever *S. Typhi* is found within mononuclear phagocytes of Peyer's patches, and in cases with intestinal perforation, both this tissue and surrounding tissues show hemorrhagic areas, most often during the third week of the illness. Tissue damage in Payer's patches occurs, resulting in ulceration, bleeding, necrosis and in extreme cases full thickness perforation. The process leading to tissue damage is probably multifactorial, involving both bacterial factors and host inflammatory response. In the past enteric perforation was considered almost fatal and upto 1960, most surgeons favoured conservative management. 1970 onwards most surgeons have favoured surgical intervention in Typhoid perforations. [1, 2] Various operative procedures were advocated by different authors, such as simple repair of perforation, [2] repair of perforation with ileotransverse anastomosis (colostomy), primary ileostomy, single layer repair with an omental patch and resection and anastomosis. Even with such a variety of procedures, enteric perforation still has a high rate of morbidity and mortality. Age above 40 years, male, inadequate treatment, short duration of symptoms, high fever (>38.5 degree C), elevated transaminase level (>1.5 times of normal), hepatosplenomegali, leucopenia (<3000), anaemia (<8g %) and raise ESR are the most risk factors considered in this study. The aim of the present study was to evaluate the role of various operative procedures in cases of enteric perforation by comparing them in terms of morbidity, mortality and cost-effectiveness and to find out the ideal procedure. [3]

## II. Materials and Methods-

172 adult patients (Male-157 and Female-15) were operated during the period of 2013-2020 in the emergency surgical ward in Gauhati Medical College of Assam, India. Diagnosis of enteric perforation was based upon a history of fever followed by acute onset of pain in the abdomen, signs and symptoms of perforation peritonitis, a Widal test, usually supplemented by radiological findings of pneumoperitonium and per-operative findings. Information on demographic factors and clinical presentation was abstracted from all patients. Abdominal ultrasonography, paracentesis for perforation, free abdominal fluid, hepatosplenomegaly, air-fluid levels and gas under diaphragm are diagnostic aids in the study. We also considered the criteria as – constipation or diarrhea, anorexia, abdominal pain, abdominal rigidity, relative bradycardia and changes in consciousness. Either of two with persistent fever is diagnostic (**Huckstep RL-Ann Roy Coll Surg Engl**). Per-operative anti-mesenteric perforation with tissue diagnosis was confirmatory. Peritonitis due to other causes (tubercular, appendicular etc) was excluded in the study. Other major associated ailments were excluded. Pregnancy cases were excluded.

All patients were operated as a surgical emergency. Pre-operatively all the patients had broad-spectrum antibiotic coverage, nasogastric suction and management of fluid and electrolyte imbalance. Anaemic patients required blood transfusion. Post-operatively parenteral antibiotics (Broad spectrum with Quinolone) were continued and after that oral quinolones were given for 10-14 days in every patient.

Double layer simple closure of the enteric perforation(s) was done [4] in 150 patients. Inner layer with vicryl 2-0 and outer layer with silk 2-0. Almost all the cases, the abdomen was explored through the right paramedian or midline incision. The abdomen was closed in a single layer by no1 PDS and in addition to interrupted skin clips by stapling. One or two intraabdominal drains were put in the pelvis and/or in the right subhepatic space. Defunctioning ileostomy and ileo transverse bypass were usually performed in 7 (**Seven**) patients with an unhealthy gut having multiple perforations (2– 4) in number repaired primarily situated on/near the ileocaecal junction and a greater risk of repair leak. Primary ileostomy was done in 5 (**five**) patients having multiple perforations with unhealthy gut and repaired primarily with omental patch. 10 (**ten**) patients underwent resection and end to end anastomosis who had multiple perforations and unhealthy gut with adhesion. [11, 15, 17]

### Opinion of different observer as-

**Purohit** reported a series 41 patients, out of these 31 were treated by double layer closure and 10 by single layer closure and an omental patch.[4,16] Eggleston and Santoshi reported a series of 78 cases of enteric perforation in which repair of perforation was done in 43 patients. 29 patients were treated by repair of perforation with bypass and 3 patients underwent resection anastomosis. A.R.K. Adesunkanmi and O.G. Ajao treated 50 cases of enteric perforation with edge excision and double layer closure.[12] Athie, Guizar and Alcantara recommend that resection anastomosis with a 10 cm margin from the site of perforation should be the choice of treatment in enteric perforation cases.

## III. Results and Observations-

Enteric perforation was more common in males than in females with a ratio of **6.8:1**. Their ages ranges from 8-65 years, the maximum number of patients (40.5%) were in their 3<sup>rd</sup> decade followed by 32 % of patients in their 2<sup>nd</sup> decade. Majority (95.5%) of patients presented with a history of fever followed by sudden onset of pain in the abdomen. Other common findings were of abdominal distension (95%), constipation, diarrhea and vomiting. Clinically generalized guarding, rigidity and tenderness were found in all the patients. 98 patients (49%) presented within 48 hours of perforation, 68 patients (**39.5%**) presented with a 3-4 days old perforation while 17% patients had more than 4 days old perforation with a mortality rate of .6 % (1 out of 172), 1.74% (3 out of 172) and 2.32% (4 out of 172) respectively. Mortality was unaffected by the duration of perforation in the present series though slightly higher mortality was seen when duration is more with high toxemia/septicaemia. In this series perforation occur in 1<sup>st</sup> week of fever 40.8% and in 2<sup>nd</sup> week of fever 48% patients. 91.7% of cases had pneumoperitoneum in X-ray. Widal test was positive in 80.5%. Leucopenia was present in 87 patients and leucocytosis present in 39 patients. Peritoneal contamination with intestinal fluid was found in all the cases. In about **87%** of patients perforation(s) was /were located in the terminal ileum within 2 feet of the ileocaecal junction. **87.3%** of cases had a single perforation and the rest had more than one perforation.

Total morbidity recorded was **42%**. Major complications were wound infection (17%), fecal fistula (**2.9%**), wound dehiscence (7%), bleeding diathesis (1.16%) and skin excoriation around ileostomy (6.4%). Mortality was more in multiple perforations in compare to single. Hospital stay more in other procedure (10-28 days) in compare to simple closure. Development of faecal fistula is unrelated to the number of perforations. It develop in 1.3% (2 out of 150) in single and 13.6% (3 out of 22) in multiple perforations. There were 3 death over 5 patients with fistula and development of fistula significantly affect the mortality. Faecal

peritonitis, septicæmia and bleeding were the main causes of death. Other causes were bronchopneumonia, aspiration pneumonia, DVT and uraemia.

#### **IV. Discussion-**

Enteric perforation is more common in male than females.[5,6,7] In the present series M: F was **6.8:1**. That is consistent with 3.8:1 reported by Baliga; 5.25:1 reported by N.M. Swadia and 4:1 reported by A.R.K. Adesunkanmi. This is due to the fact that enteric fever is more common in males, possibly because of more exposure to infection. This perforation is more common in 2<sup>nd</sup> and 3<sup>rd</sup> decades of life. The high % of cases (**40.5%**) amongst the age group of **21-30 years** in the present series is similar to that reported by Vyas, Olurin et al, Eggleston and Santoshilo and K.P. Singh and Kohli. Typhoid perforation usually occurs in the 2<sup>nd</sup> and 3<sup>rd</sup> week of fever.[5] In the present series the maximum incidence of perforation was in the second week of fever followed by those in the first week. Dickson and Cole, Olurin et al and Purohit reported that majority of perforations occurred in the first week of fever and Eggleston and Santoshi reported 33% incidence in the second week of fever.[8]

Gas under diaphragm in X-ray is an important finding and helpful in diagnosis. In typhoid perforation cases, leucopenia, (4000/cu.mm.) was present in the majority (61%) of cases in spite of peritonitis. It may be due to bone marrow depression by enteric toxæmia.

Enteric perforation is best managed surgically [14, 15, 16] as it prevents further peritoneal contamination by intestinal contents. After a proper peritoneal toilet, correct management of perforation should be done. A wide variety of operative procedures are tried in enteric perforation cases but all have a high morbidity and mortality. Development of faecal fistula due to reperforation or perforation from another ulcer is a significant factor affecting mortality and every effort should be done to avoid this. Repair of perforation should be the choice of treatment in enteric perforation because this is a simple, quick and cost effective procedure. [15] Ileostomy is more expensive as all the patients have to undergo re-operation for closure of ileostomy and it further needs specialized care prior to closure. Ileostomy should be considered as a secondary procedure. The mortality was unrelated to the duration of perforation and type of operation performed. [16, 17, 18] Factors significant affecting mortality were number of perforations and the development of faecal fistula.

In previously published studies mortality reported with repair of perforation was 48% by Bhansali, 14.6% by Purohit and 28% by A.R.K. Adesunkanmi. K. P. Singh and Kohli reported no mortality in 8 patients of enteric perforation treated with temporary ileostomy while overall mortality was 14.2 %. Prasad et al reported 20% mortality with repair of perforation and ileo- transverse bypass. Shah.A.A wani and Wazir reported 37.5% mortality with resection anastomosis. Thus in comparison with previous studies our mortality rates were lower, especially in patients treated with a repair of the perforation.

Post-operative faecal fistula formation due to repair leak or new perforation was recorded in 2.9% of the total cases. Incidence of faecal fistula was reported as 16.6% by Olurin et al, 10% by Talwar S and Sharma. R. K. and 8% by A.R.K. Adesunkanmi. Faecal fistula is a very sinister complication as it increases the morbidity and mortality. Development of faecal fistula was unrelated to the operative procedure performed. [18]

The best possible way to decrease the morbidity and mortality of Typhoid perforation is to prevent Typhoid fever by improved sanitation and immunization programmes. [9, 10,12]

Primary Closure is discouraged even in single perforation and 10cm from the margin of the perforation is justified in resection and end to end anastomosis-**Athie.C.G (Surgery-1998 Jun; 123 (6); 632-6).**

Simple repair of perforation should be done followed by proper medication is accepted treatment of Typhoid perforation [12, 13] as because pathologically lesions is progressive and skip type so resection is avoided- **V.K. Shukla et al (Dig Dis Sci.2004 Jan; 49 (1): 161-4).**

#### **V. Conclusions-**

- **Simple repair of perforation in two layers is the choice of treatment for typhoid perforation with application of Quinolone.**
- Typhoid fever is a bacterial disease and surgical treatment of enteric perforation is just a palliative and life saving operation.
- Early diagnosis and adequate treatment can reduce the complication rate of Typhoid fever.
- Typhoid perforations continue to have high morbidity and mortality rates irrespective of type of operation.
- Mortality is significantly affected by the number of perforations and the development of post-operative faecal fistula.
- Mortality and morbidity are unaffected to the type of operation done.
- Primary ileostomy and repair of perforation with ileotransverse colostomy should be considered selectively in patients with multiple perforations, matted bowel loops and an unhealthy gut due to oedema and inflammation.

- Extensive procedure such as resection and anastomosis and right hemicolectomy should be usually avoided in this type of patients with poor general condition and toxemia.
- Ileostomy is a secondary procedure should be considered once faecal fistula develops in order to avoid peritoneal contamination.

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