IJMPR 2024, 8(2), 67-71

International Journal of Modern Pharmaceutical Research
www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Research Article
SJIF Impact Factor: 5.273

PERFORATIVE PERITONITIS DUE TO SALMONELLA INFESTATION: A RECENT EVOLUTION

Dr. Parikh Choudhury*[1] and Dr. Purujit Choudhury[2]

[1]PGT, Surgery, Gauhati Medical College.
[2]Professor of Surgery, Gauhati Medical College.

Article Received on: 21/12/2023
Article Revised on: 11/01/2024
Article Accepted on: 01/02/2024

***Corresponding Author**
Dr. Parikh Choudhury
PGT, Surgery, Gauhati Medical College.

ABSTRACT

Introduction and Aim: Intestine perforation is one of the most dreaded and common complication of typhoid fever remarkably so in developing world; it usually leads to diffuse peritonitis, requiring early surgical intervention. Despite various measures such as safe drinking water supply and safe disposal of waste, intestinal perforation from salmonellosis remains the most common emergency surgery performed. The incidence continues to rise, so also the mortality, despite new antibiotics and improvement in surgical technique. More disturbing is that we now see increasing number of ileal perforations and colonic involvement. Typhoid fever is a systemic and severe febrile illness caused primarily by the gram negative bacillus **Salmonella enteritidis serovar Typhi**. Hence it is an infective disorder with fatal outcome if the disease is not treated properly. The most lethal complication of it are bleeding and ileal perforation, both arising from necrosis of Peyer's patches in the terminal ileum. Complications are to be controlled as and when infection is cured. **The aim of this study** to know the best treatment protocol for this emergency disease after a thorough genesis. Also to to show whether simple repair of perforation is the justified surgical procedure in terms of morbidity, mortality and cost effectiveness. **Materials and Methods:** The present study was conducted in 195 adult patients of Typhoid perforation admitted during 2014 to 2018 and treated surgically at Gauhati Medical College. Double layer simple closure of perforation done in majority. In this study enteric perforation was more common in males than in females with a ratio of **6.8:1**.Their ages ranges from 14 to 65 years. Duration of perforation, number of perforation and development of faecal fistula are the factors which significantly affect mortality. Primary proximal 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. **Results:** Common post-operative complications include wound infection (21%), bleeding (1.02%-2 cases out of 195), faecal fistula (1.9%)-4 cases out of 195 and skin excoriation around ileostomy (9.4%). Primary closure(two layer) of perforation satisfactory result in terms of complications and resection is preferred in selected patients. **Conclusions:** Ileal perforation following typhoid fever is not unusual. Resuscitation followed by emergency surgery is the appropriate to manage. Quinolone is the drug of choice. Usually two layer primary closure is the procedure of choice though resection and anastomosis is reserved for special situation. Prognosis is much better if appropriately managed.

KEYWORDS: Typhoid perforation, repair of perforation, ileostomy, repair with ileo transverse anastomosis.

INTRODUCTION

Typhoid ileal perforation still remains a very severe condition in tropical countries. Mortality is high if mal-treated and not treated early due to sepsis and peritonitis. Its incidence ranges from 0.9% to 39%, with a mortality rate, which remains very high. Primarily, the mortality and the morbidity rate do not depend on the surgical technique, but rather on the general status of the patient, the virulence of the salmonella and the duration of disease evolution before surgical treatment. That is why, it is so important to provide adequate pre-operative management associating aggressive resuscitation with antibiotic therapy. In the literature, it is usually advocated that the last 60 cm of the ileum presents a high

concentration of Peyer's patches whose infection is a source of intestinal perforation.

Typhoid fever is an endemic disease in India and other tropical countries. Highest incidence has been reported in India. It is a disease involving multi organ and multisystem. 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. From 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, 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), hepatosplenomegaly, leucopenia (<3000), anaemia (<8g %) and raised 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]

MATERIALS AND METHODS

Total 195 adult patients (Male-166 and Female-29) were operated during the period of 2018-2023 in the emergency surgical ward at Gauhati Medical College Hospital. 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) were excluded in the study. Other major associated ailments were excluded. Pregnency cases were excluded from this study.

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 183 patients. Inner layer with vicryl 2-0 and outer layer with silk 2-0. The abdomen was explored through the mid right paramedian (55%) or midline incision(45%). The abdomen was closed in a single layer by no.1 PDS loop 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 performed in **7 (Seven)** patients with an unhealthy gut having multiple perforations (2– 4 in number), repair primarily situated on/near the ileocaecal junction and repair with greater risk of repair leak. Primary ileostomy was done in **5 (five)** patients having multiple perforations with unhealthy gut. Ten patients underwent resection and end to end anastomosis who had multiple perforations and unhealthy gut with adhesion.[5,6,7]

RESULTS AND OBSERVATIONS

In this study enteric perforation was more common in males than in females with a ratio of **6.8:1**.Their ages ranges from 14 to 65 years, the maximum number of patients (40.5%) were in their 3rd decade followed by 32% of patients in their 2nd 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. 105 patients (54%) presented within 48 hours of perforation,74 patients **(38%)** presented with a 3-4 days old perforation while 8%(16 patients) had more than 4 days old perforation with a mortality rate of. 5% (1 out of 195), 1.53% (3 out of 195) and 2.1%(4 out of 195) 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 toxaemia/septicaemia. In this series perforation occur in Ist week of fever is 40.8% and in 2nd week of fever is 48% patients. 95.% of cases had pneumoperitoneum in PA view of chest 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 **91%** (177of patients) perforation(s) was /were located in the terminal ileum within 2 feet of the ileocaecal junction. **89% (174 patients)** of cases had a single perforation and the rest had more than one perforation.

Total morbidity recorded was **48%.** Major complications were wound infection (21%), Overall incidence of fecal fistula **(2.1%),** wound dehiscence (4%), bleeding diathesis (1.02%) and skin excoriation around ileostomy (9.4%).Mortality was more in multiple perforations in compare to single. Duration of hospital stay was more in other procedures (10-28 days) as compared to simple closure. Development of faecal fistula is unrelated to the number of perforations. It developed in. 6% (1 out of 174) in single and 14%(3 out of 21) in multiple perforations. There were 2 deaths out of 4 patients with fistula. Development of fistula significantly affected the mortality. Faecal peritonitis, septicaemia and bleeding were the main causes of death. Other causes were bronchopneumonia, aspiration pneumonia, DVT and uraemia.

DISCUSSION

Enteric perforation is more common in male than females.[8,9,10] In the present series male female ratio was was **5.7:1(166 male and 29 female)**. 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.[10,11,12] 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 2nd and 3rd decades of life. The high percentage of cases **(47%)** amongst the age group **of 21-30 years** in the present series is similar to that reported by Vyas, Olurin et al, Eggleston, Santoshilo and K.P. Singh and Kohli.[12] Typhoid perforation usually occurs in the 2nd and 3rd week of fever.[11] 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[13] and Purohit[14] 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.

Purohit[14] 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.[14] 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.[15] 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.

Gas under diaphragm in X-ray is an important finding and is helpful in diagnosis. In typhoid perforation cases, leucopenia, (4000/cu.mm.) was present in the majority (65%) of cases in spite of peritonitis. It may be due to bone marrow depression by enteric toxaemia.

Enteric perforation is best managed surgically[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.[15,16] 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] Factors significantly 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[18,19] 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.[20]

Post-operative faecal fistula formation due to repair leak or new perforation was recorded in 1.9% 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.[21,22,23]

The best possible way to decrease the morbidity and mortality of Typhoid perforation is to prevent Typhoid fever by improved sanitation and immunization programmes.[23]

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.[24]

Simple repair of perforation should be done followed by proper medication is accepted treatment of Typhoid perforation as because pathologically lesions is progressive and skip type so resection is avoided.[25]

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 toxaemia.
- Ileostomy is a secondary procedure should be considered once faecal fistula develops in order to avoid peritoneal contamination.
- Despite global scientific development typhoid fever and its complications continue to be a great health problem especially in developing country. The management of salmonella enteric perforation needs appropriate early surgical intervention, effective resuscitation in the pre-operative period, post-operative care, and use of proper antibiotics. In our study, there is no evidence of decreased immunity of patient, so increased virulence of bacteria might be probable cause of such complication of typhoid enteritis. The key to improved survival in this deadly disease lies not in a better operation or improved perioperative care, but in the prevention of typhoid fever by providing safe drinking water and improved sanitation methods for all of the global community.

REFERENCES

1. Meier DE, Imediegwu OO, and Tarpley JL: Perforated **Typhoid** enteritis- operative experience with 108 cases; Am J Surg., 1989; 157: 423–7.
2. Butler T, Knight J, Nath SK, et al: **Typhoid** fever complicated by intestinal **perforation**- a persisting fatal disease requiring surgical management. Rev Infect Dis., 1985; 7: 244–56.
3. Santillana M: Surgical complications of **Typhoid** fever- enteric **perforation**. World J Surg., 1991; 15: 170–5.
4. Singh S, Singh K, Grover AS, et al.: Two-layer closure of **Typhoid** ileal **perforation**s- a prospective study of 46 cases; Br J Surg., 1995; 82: 1253.
5. Huckstep RL: Recent advances in the surgery of Typhoid fever; Ann Roy Coll Surg Engl., 1960; 26: 207-10.
6. Singh KP et al: Choice of surgical procedure in Typhoid perforation- An experience; J Indian Med Assoc, 1991; 89: 255-6.
7. Eggleston FC, Santoshi B: Typhoid perforation- Choice of operation; Br J Surg, 1981; 68: 341-2.
8. Chatterjee H, Jagdish S, Pai D, et al: Changing trends in outcome of **Typhoid** ileal **perforation** over three decades in Pondicherry; Trop Gastroenterol, 2001; 22: 155–8.
9. Adesunkanmi AR, Ajao OG, A.R.K. Adesunkanmi: The prognostic factors in **typhoid** ileal **perforation**- a prospective study of 50 patients; J R Coll Surg Edinb, 1997; 42: 395–9.
10. Van Basten JP, Stockenbrugger R: **Typhoid perforation**- a review of the literature since 1960; Trop Geogr Med., 1994; 46: 336–9.
11. Baliga AV: Perforated typhoid enteritis- operative experience with 108 cases. AM J Surg., 2008; 987: 507-22.
12. K.P. Sigh et al: Typhoid enteric perforation. Br J Surg, 1995; 2: 1512–15.
13. Dickson and Cole, Olurin et al: Influence of gender on clinical features, laboratory findings, and complications of typhoid fever. Am J Trop Med Hyg, 1999; 67: 351-53.
14. Purohit PG, N M Swadia: Surgical treatment of Typhoid perforation – An experience in an epidemic zone; Indian J Surg, 1978; 40: 227-38.
15. EA, Adesunkanmi AR, Fadiora SO, et al: A review of **Typhoid perforation** in a rural African hospital; West Afr J Med., 2003; 22: 22–5.
16. Sing J, Singh B: Enteric perforation in Typhoid fever- a study; Aust NZ J Surg, 1975; 45: 279-84.
17. Bailiga AV: Surgical complications of Typhoid; Indian J Surg., 1949; 11: 166-77.
18. Purohit PG et al: Emergency department presentation of typhoid fever. J Emerg Med, 2000; 19: 317-21.
19. A.R.K. Adesunkanmi, K. P. Singh, Kim JP et al: Ideal management of perforation due to Typhoid fever; Ann Surg., 1975; 181: 88-91.
20. Shah A.A. wani and Wazir: Risk factors predicting complications in blood culture-proven typhoid fever in adults. Scand J Infect Dis., 2000; 32: 201–5.
21. Talwar S, Sharma RK, Mittal DK, et al: **Typhoid** enteric **perforation**; Aust N Z J Surg, 1997; 67: 351–3.
22. Olurin K, Mock CN, Amaral J, Visser LE: Improvement in survival from **Typhoid** ileal

perforation- results of 221 operative cases; Ann Surg, 1992; 215: 244–9.
23. A.R.K. Adesunkanmi, Akgun Y, Bac B, Boylu S, et al: **Typhoid** enteric **perforation**; Br J Surg., 1995; 2: 1512–15.
24. Athie C.G. et al: Management of enteric perforation- A genesis; Surgery, Jun. 1998; 123(6): 632-6.
25. V.K. Shukla et al: The prognostic factors in typhoid ileal perforation- a prospective study of 50 patients; Dig Dis Sci., Jan. 2004; 49(1): 161-4.