(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Analysis of risk factors for enteric perforation in patients of typhoid fever

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ABSTRACT:
Background: Typhoid fever is a bacterial infection caused by Salmonella enterica serotype Typhi. It primarily spreads through contaminated food or water and is more common in areas with poor sanitation and hygiene. The present study was conducted to assess risk factors for enteric perforation in patients of typhoid fever. **Materials & Methods:** 75 patients of enteric fever of both genders were selected. A history of fever, acute abdominal discomfort, signs and symptoms of perforation peritonitis, and a Widal test were used to diagnose enteric perforation. Following surgery, a tissue specimen from the perforation's margin was examined histopathologically. **Results:** Out of 75 patients, 45 were males and 30 were females. Clinical features were abdominal pain in 61, constipation in 27, diarrhoea in 43, vomiting in 52, air fluid level in 62, gas under diaphragm in 58, anaemia in 40, leukopenia in 58 and thrombocytopenia in 49 cases. The difference was non-significant (P> 0.05). Common risk factors for enteric perforation was male gender in 72%, age (>40 years) in 57%, high fever (>38.5°C) in 85%, elevated transaminase levels in 64%, short duration of treatment in 23%, anaemia in 59%, and hepatosplenomegaly in 35%. The difference was non- significant (P> 0.05). **Conclusion:** Common risk factors for enteric perforation was male gender, age (>40 years), high fever (>38.5°C), elevated transaminase levels, short duration of treatment, anaemiaand hepatosplenomegaly.
Keywords: Enteric perforation, Fever, Typhoid

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This article may be cited as: Unkeshwar P, Kanjibhai NS. Analysis of risk factors for enteric perforation in patients of typhoid fever. J Adv Med Dent Scie Res 2017;5(2):257-260.

INTRODUCTION

Typhoid fever is a bacterial infection caused by Salmonella enterica serotype Typhi. It primarily spreads through contaminated food or water and is more common in areas with poor sanitation and hygiene.[1] The infection can lead to serious illness if not treated promptly.In underdeveloped nations and those with unfavorable environmental circumstances, salmonella typhoid infection is a major systemic illness. The two most frequent side effects of this illness are hemorrhage and intestinal perforation.[2] Typhoid enteric perforation (TEP) is the most deadly type of typhoid fever, and its incidence ranges from 0.5 to 78.6% in typhoid fever patients. TEP continues to have exceptionally high rates of morbidity and mortality. TEP mortality rates range from 3 to 72%, whereas TEP morbidity rates range from 50 to 81%. According to reports, persistent severe peritonitis, sepsis, malnourishment, and fluid electrolytes are the causes of postoperative problems.[3]

The two most deadly complications are intestinal bleeding and ileal perforations, which both result from the hyperplasia and necrosis of Peyer's patches in the terminal ileum and often happen two to three weeks after the disease first manifests.[4] Intestinal perforation is the complication linked to the highest morbidity and fatality rates from typhoid fever, despite intestinal bleeding being the most frequent.[5] According to reports, the mortality rate for intestinal perforation during typhoid illness ranges from 5% to 62%. In nations with limited resources, managing typhoid intestinal perforation presents a diagnostic and treatment challenge for general surgeons.[6] For these individuals, who typically arrive late, surgery is seen to be the best course of action. There is disagreement, nevertheless, over the proper course of action in this situation. In impoverished nations, treatment outcomes are subpar. This is caused by a number of things, such as the disease's delayed onset, inadequate healthcare services, poor sanitation, and a lack of diagnostic facilities, particularly in rural regions.[7]The present study was conducted to assess risk factors for enteric perforation in patients of typhoid fever.

MATERIALS & METHODS

The present study consisted of75 patients of enteric fever of both genders. All patients gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Clinical signs were noted, including fever, vomiting/nausea, stomach pain, abdominal distension, and the time it took for symptoms to appear. Age (>40 years), gender, lack of treatment, length of symptoms, high fever (>38.5°C), elevated transaminase levels (>1.5 times normal), hepatosplenomegaly, and leukopenia were all noted as risk factors. The x-ray chest PA view or x-ray abdomen upright view was performed, along with a general and abdominal

examination. Additionally, a complete abdominal ultrasound (USG) was performed. A history of fever, acute abdominal discomfort, signs and symptoms of perforation peritonitis, and a Widal test were used to diagnose enteric perforation. Radiological evidence of pneumoperitoneum and intraoperative results were also used. Following surgery, a tissue specimen from the perforation's margin was examined histopathologically. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 75		
Gender	**Males**	**Females**
Number	45	30

Table I shows that out of 75 patients, 45 were males and 30 were females.

Table II Assessment of clinical symptoms and signs

Clinical features	Number	P value
Abdominal pain	61	0.86
Constipation	27	
Diarrhoea	43	
Vomiting	52	
Air fluid level	62	
Gas under diaphragm	58	
Anaemia	40	
Leukopenia	58	
Thrombocytopenia	49	

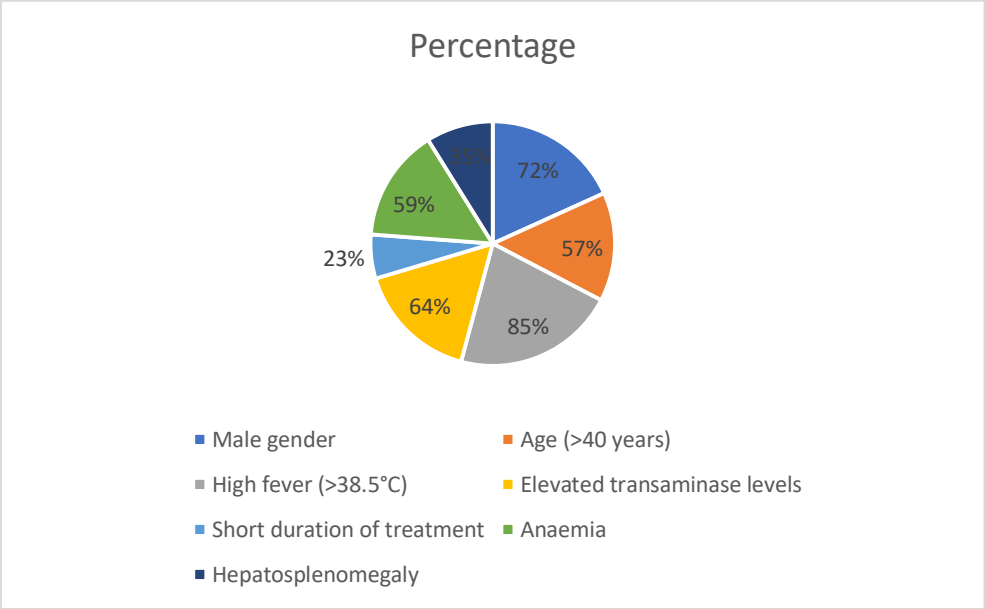
Table II shows that clinical features were abdominal pain in 61, constipation in 27, diarrhoea in 43, vomiting in 52, air fluid level in 62, gas under diaphragm in 58, anaemia in 40, leukopenia in 58 and thrombocytopenia in 49 cases. The difference was non- significant (P> 0.05).

Table III Evaluation of risk factors for enteric perforation

Risk factors	Percentage	P value
Male gender	72%	0.64
Age (>40 years)	57%	
High fever (>38.5°C)	85%	
Elevated transaminase levels	64%	
Short duration of treatment	23%	
Anaemia	59%	
Hepatosplenomegaly	35%	

Table III, graph I shows that common risk factors for enteric perforation was male gender in 72%, age (>40 years) in 57%, high fever (>38.5°C) in 85%, elevated transaminase levels in 64%, short duration of treatment in 23%, anaemiain 59%, andhepatosplenomegaly in 35%.The difference was non- significant (P> 0.05).

Graph I Evaluation of risk factors for enteric perforation



DISCUSSION

Gram-negative Salmonella enteritidis serovar Typhi is the main cause of typhoid fever, a severe febrile illness. It is a worldwide health issue that can severely affect nations with limited resources.[8] Typhoid fever is more common in areas with polluted water sources and poor waste management. Typhoid fever is still a serious health issue in poorer nations due to unsanitary circumstances.[9] The two most deadly complications are intestinal bleeding and ileal perforations, which both result from the hyperplasia and necrosis of Peyer's patches in the terminal ileum and often happen two to three weeks after the disease first manifests. Intestinal perforation is the complication linked to the highest morbidity and fatality rates from typhoid fever, despite intestinal bleeding being the most frequent.[10] According to reports, the mortality rate for intestinal perforation during typhoid illness ranges from 5% to 62%.[11]The present study was conducted to assess risk factors for enteric perforation in cases of typhoid fever.

In present study, out of 75 patients, 45 were males and 30 were females.In their investigation, Hosoglu et al[12] used logistic regression modeling to identify risk factors for perforation. Eighty control patients and forty case patients who underwent surgery due to typhoid intestinal perforation were compared. Male sex (p = 0.01), age (p = 0.01), leukopenia (p = 0.01), insufficient antibiotic medication before admission (p = 0.01), and brief illness duration (p = 0.01) were all significantly linked to perforation in univariate analysis. The following factors were significant predictors of perforation in multivariate analysis: leukopenia, male sex, inadequate treatment before admission and short duration of symptoms. In individuals with typhoid fever, leukopenia, male sex, short symptom duration, and insufficient antibiotic therapy are independent risk factors for intestinal perforation.

We found that clinical features were abdominal pain in 61, constipation in 27, diarrhoea in 43, vomiting in 52, air fluid level in 62, gas under diaphragm in 58, anaemia in 40, leukopenia in 58 and thrombocytopenia in 49 cases. Edino et al[13] in the study, fifty-three consecutive patients with typhoid perforation managed surgically. There were 26 (49.1%) males and 27 (50.9%) females, with age range of 2-55 years and a mean +/- SD of 12.2 +/- 10.2 years. The morbidity was 49.1% and the most common postoperative complications included wound infection, wound dehiscence, burst abdomen, residual intra-abdominal abscesses and enterocutaneous fistula. Mortality was 15.1% and was significantly affected by multiple perforations, severe peritoneal contamination and burst abdomen (p value <0.05, odds ratio >1). The mean duration of hospital stay for survivors was 16.1 days with a range of 8-57 days.

We observed that common risk factors for enteric perforation was male gender in 72%, age (>40 years) in 57%, high fever (>38.5°C) in 85%, elevated transaminase levels in 64%, short duration of treatment in 23%, anaemia in 59%, and hepatosplenomegaly in 35%. Ahmad et al[14] found out significance of perforation-operation interval (POI) in relation to early prognosis in patients with peritonitis due to typhoid ileal perforation (TIP).Out of 92 patients, 75 were males (81.5%) and 17 (18.5%) females, with male to female ratio of 4.4:1. The ages ranged between 15 to 50 years. The most common symptoms were fever (100%), abdominal pain (100%), constipation (81.5%), vomiting (76%) and distension of abdomen (69.5%). The most common signs elicited on abdominal examination were tenderness (100%), guarding (72.8%) and absent gut sounds (65.2%). Out of 92 patients 12 patients (13%)

presented within 24 hours of onset of severe abdominal pain (Group A). Among late presenters, fifty- nine (64.1%) patients presented 25-72 hours after severe abdominal pain (Group B) and twenty-one patients (23%) presented after 72 hours (Group C). Mortality was highest among group C patients (8/21;38%), while the mortality among the late presenters (Group B) was 10.2% (6/59). There was no mortality in the early presenters (Group A). Overall mortality was 15.2% (14/92). The average perforation operation interval in survivors was 44.2 hours as compared to average of non-survivors - 63.9 hours ($p < 0.01$).

The shortcoming of the study s small sample size.

CONCLUSION

Authors found that common risk factors for enteric perforation was male gender, age (>40 years), high fever (>38.5°C), elevated transaminase levels, short duration of treatment, anaemiaand hepatosplenomegaly.

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