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SALMONELLA TYPHI IN ENTERIC PERFORATION RISK FACTORS AND ITS ROLE

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ABSTRACT

Background: A bacterial infection caused by the Salmonella enterica serotype Typhi, typhoid fever is characterized by the subtle start of diarrhea, constipation, stomach pain, a severe headache, and a persistent fever in afflicted individuals.

Aim: The purpose of this study was to evaluate the function of salmonella typhi and risk factors for intestinal perforation.

Methods: During the specified study period, 240 patients of both genders and a mean age of 32.2 years were evaluated. Data from the Institute's medical records on the diagnosis of intestinal perforation and typhoid fever in the included participants was evaluated retrospectively. ICD (International Classification of Diseases) codes created especially for typhoid fever were used to identify the patients.

Results: According to the study's findings, of the 240 subjects evaluated, 50.8% (n=122) were female and 49.2% (n=118) were male. The length of the illness prior to admission at the institute varied, with 35% (n=84) of the subjects presenting within 7 days of the onset of symptoms, 65% (n=156) had a longer illness duration, and the maximum disease duration was 21 days.

Conclusion: The current study comes to the conclusion that it has successfully identified a number of important risk factors associated with the development of enteric perforation in individuals who had typhoid fever. These results highlight the critical role that early diagnosis and timely treatment play in reducing the likelihood of serious consequences.

Keywords: Enteric fever, enteric perforation, risk factors, salmonella typhi

INTRODUCTION

Salmonella enterica serotype Typhi causes typhoid fever, a bacterial infection that manifests as diarrhea, constipation, stomach pain, a severe headache, and a persistent fever in afflicted individuals. The feces of infected carriers or individuals can contaminate food and water, which is how salmonella typhi is spread. Globally, typhoid fever is a serious health hazard, particularly in places with poor access to clean water and sanitary services. Salmonella typhi bacterial infections are dangerous because they cause systemic symptoms such high temperature, gastrointestinal distress, and abdominal pain. Enteric perforation, a breach of the intestinal wall that allows intestinal contents to escape into the abdominal cavity, is one of the most serious side effects of typhoid fever. The mortality and morbidity rates associated with typhoid fever are greatly increased by this potentially fatal occurrence.[1]

Understanding the risk variables associated with intestinal perforation in typhoid fever patients is critical for both clinical management and public health interventions. Even while medicines can effectively treat typhoid fever, it is crucial to identify those who are more susceptible to intestinal perforation so that prompt intervention, such as surgery, can prevent potentially fatal outcomes. Typhoid fever-related enteric perforation is a dangerous occurrence that typically occurs in areas with low resources and access to sanitary facilities and medical care.

In impoverished countries with inadequate sanitation and tainted water supplies that facilitate the bacteria's fast spread, typhoid fever is very common. The burden of intestinal perforation is a serious problem for healthcare systems and local populations.[2]

When intestinal perforation occurs, enteric fever can have serious repercussions that, if left untreated, can result in septicemia, peritonitis, and multi-organ failure. Enteric perforation is a serious complication of typhoid fever and a major surgical concern in developing countries, where it is associated with high rates of morbidity and mortality due to delayed hospitalization, a lack of medical facilities, poor sanitization, and a lack of clean drinking water. Additionally, there is a financial burden associated with managing this condition.[3]

According to data currently available in the literature, the intestinal perforation rate ranges from 0.8% to 18%. Due to late disease detection and the advent of aggressive and multi-drug resistance strains of Salmonella typhi, the majority of developing countries have higher prevalence. The illness typically affects young people who make significant contributions to their countries' economies.4 The purpose of this study was to evaluate salmonella typhi's involvement and risk factors for intestinal perforation.

MATERIALS AND METHODS

The goal of the current retrospective cohort study was to evaluate salmonella typhi's involvement and risk factors in intestinal perforation. The study's participants came from different Institute departments. Verbal and written informed consent were taken from all the subjects before study participation.

120 individuals of both sexes who reported to the Institute within the specified study period with a suspicion of enteric fever and a confirmed salmonella typhi infection were included in the study. Participants with a diagnosis of typhoid fever, regardless of age, who exhibited the characteristic clinical pattern and whose laboratory tests revealed elevated Widal test titters and positive blood cultures met the study's inclusion criteria.

Participants having a history of prior abdominal surgeries, blood culture contraindications, insufficient medical records, and alternative diagnoses were excluded from the study. Data were collected retrospectively for each of the included participants by methodically extracting pertinent information from the prior medical records of the individuals who had been diagnosed with typhoid fever.

Using ICD (International Classification of Diseases) codes created especially for typhoid fever, subjects were identified. Demographic information, physical examination results, presenting symptoms, and length of illness prior to admission were all evaluated for each individual.

Blood culture reports and titers for the Widal test were collected from study participants in order to confirm the diagnosis of typhoid fever. Additionally, radiological reports evaluated X-rays and CT scan data to determine whether intestinal perforation was present. Malnutrition and other patient comorbidities were also evaluated. The information was obtained for statistical analysis in order to determine the risk factors associated with intestinal perforation in typhoid fever patients.

RESULTS

The goal of the current retrospective cohort study was to evaluate salmonella typhi's involvement and risk factors in intestinal perforation. The current study evaluated 240 participants in the age range of 8 to 70 years who came to the institute throughout the specified study period, with a mean age of 32.2 years. Data from the Institute's medical records on the diagnosis of intestinal perforation and typhoid fever in the included participants was evaluated retrospectively. ICD (International Classification of Diseases) codes created especially for typhoid fever were used to identify the patients. The study included 49.2% (n=118) males and 50.8% (n=122) females (Table 1).

It was seen that on assessing the clinical symptoms in study subjects, Diarrhea was the most prevalent clinical symptom, occurring in 91.66% (n=220) of the study participants. This was followed by high fever in 90.83% (n=218) of the participants, abdominal pain in 90% (n=216) of the participants, and vomiting in 89.16% (n=214) of the participants (Table 1). 84 study participants had a disease duration of less than seven days, 76 had a duration of seven to fourteen days, and 80 had a duration of fifteen to twenty-one days (Table 2).

The study's findings revealed that, in terms of comorbidities and diagnostic techniques, blood culture was used to diagnose the majority of the participants (170 study subjects), followed by elevated Widal test titers in 70 study subjects, and radiological techniques such as X-ray and CT (computed tomography) in 36 study subjects. Malnutrition was the most prevalent comorbidity observed in 54 study participants (Table 3).

When the risk factors for enteric perforation in subjects with salmonella typhi infection were evaluated, the most common risk factor was longer duration of illness (65% of 156 study subjects), followed by malnutrition (22.5% of 54 study

subjects), delayed medical intervention (15.8% of 38 study subjects), history of gastrointestinal surgery (10% of 24 study subjects), and age <10 years (7.5% of 18 study subjects).

DISCUSSION

240 participants who visited the institute during the designated study period and ranged in age from 8 to 70 were assessed for the current study. The average age of the participants was 32.2 years. Data from the Institute's medical records regarding the diagnosis of enteric perforation and typhoid fever in the included subjects was evaluated retrospectively. ICD (International Classification of Diseases) codes created especially for typhoid fever were used to identify the cases. The study included 49.2% (n=118) males and 50.8% (n=122) females. These results were similar to those of earlier research by Sarwar Khan J et al. (2002) and Osifo OD et al. (2010), in which the authors evaluated participants whose demographic information was similar to that of the current study.

According to the study's findings, the most prevalent clinical symptom among the participants was diarrhea, which affected 91.66% (n=220) of the participants. High fever, which affected 90.83% (n=218) of the participants, abdominal pain, which affected 90% (n=216) of the participants, and vomiting, which affected 89.16% (n=214) of the participants. 84 study participants had a disease duration of less than seven days, 76 had a duration of seven to fourteen days, and 80 had a duration of fifteen to twenty-one days. These findings were in line with those of Ekenze SO et al. (2008) and Qamar FN et al. (2015), who reported similar clinical symptoms and lengths of illness for typhoid fever.

In terms of comorbidities and diagnostic techniques, it was observed that blood culture was used to diagnose the majority of study participants (170 study participants), followed by elevated Widal test titers in 70 study participants, and radiological methods such as X-ray and CT (computed tomography) in 36 study participants. Malnutrition was the most prevalent comorbidity among the 54 study participants. These results were consistent with those of Contini S9 in 2017 and Singh et al. 10 in 2010, where the comorbidities and diagnostic techniques used in the current study to assess typhoid fever were similar.

The most frequent risk factor for enteric perforation in subjects with salmonella typhi infection was longer duration of illness, which was observed in 65% (n=156) of the study subjects. Malnutrition, which was observed in 22.5% (n=54) of the study subjects, delayed medical intervention, which was observed in 15.8% (n=38) of the study subjects, history of gastrointestinal surgery, which was observed in 7.5% (n=18) of the study subjects. These findings were consistent with those of Gedik E et al. (2008) and Hosoglu S et al. (2004), who also reported risk factors for enteric perforation that were similar to those in the current study.

CONCLUSION

The current study concludes that, within its limitations, it has successfully identified a number of important risk factors associated with the development of enteric perforation in individuals who had typhoid fever. These results highlight the critical role that early diagnosis and timely treatment play in reducing the risk of serious complications.

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S. No	Characteristics	Number (n=240)	Percentage (%)
1.	**Mea age (years)**	32.2	
2.	**Age range**	8-70	
3.	**Gender**		
a)	Females	122	50.8
b)	Males	118	49.2
4.	**Clinical symptoms**		
a)	Vomiting	214	89.16
b)	Diarrhoea	220	91.66
c)	Abdominal pain	216	90
d)	High fever	218	90.83

Table 1: Demographic and clinical data in study subjects with salmonella typhi and enteric perforation

S. No	Disease duration (days)	Number (n)
1.	**<7**	84
2.	**7-14**	76
3.	**15-21**	80

Table 2: Duration of illness in the study subjects

S. No	Parameter	Number (n)
1.	**Method of diagnosis**	
a)	Radiological (CT or X-ray)	36
b)	Elevated Widal test titers	70
c)	Blood culture	170
2.	**Comorbidity**	
a)	Malnutrition	54

Table 3: Comorbidities and diagnostic methods in study subjects

S. No	Risk factors	Number (n=240)	Percentage (%)
1.	**Age <10 years**	18	7.5
2.	**Delayed medical intervention**	38	15.8
3.	**History of gastrointestinal surgery**	24	10
4.	**Malnutrition**	54	22.5
5.	**Longer illness duration**	156	65

Table 4: Risk factors associated with enteric perforation in subjects with salmonella typhi infection