



Prevalence of Intestinal Perforation Due to Typhoid Fever in the General Surgery Department of Nangarhar Regional Hospital

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ABSTRACT: Typhoid is a systemic disease caused by *S. Typhi* and *S. Paratyphi*, and its specific clinical features include fever, abdominal pain, diarrhea and nausea. Typhoid is still a major problem in developing countries, mostly caused due to poor sanitation and improper drainage system.

This study is conducted in descriptive form, and all the patients admitted to the General Surgery Department of Nangarhar Regional Hospital had intestinal perforation due to typhoid. The number of patients was 30, who were included in this research. To diagnose the disease, radiological and laboratory tests were done.

The results of the research showed that the incidence of intestinal perforation due to typhoid was (3.3%) in less than 10 years old, 26.6% in the group age 11-20 years old, 23.3% were 21-30 years old, 13.3% in 31-40 years old, 13.3% in 41-50 years old, 13.3% in 51-60 years old and 6.9% were the patients had more than 60 years of age. The occurrence of incidence was based on sex, 18 cases (60%) were male, and 12 cases (40%) were female patients. After the analysis and interpretation of the data, it was found that the ratio of cases in males was higher than in females. According to the clinical record, 100% of the patients had abdominal pain and fever, 80% had abdominal distension, 36.6% had vomiting, 16.6% had diarrhea, and 13.3% had constipation. The results of diagnosis of typhoid-based examination, the cases by abdominal x-ray were 90% and ultrasound 83.4%. Based on the results, it is clear that the abdominal x-ray gave better results than the ultrasound. It is worth mentioning that the incidence of intestinal perforation was 96.6% in the distal ileum and 3.4% in the jejunum.

In conclusion, stomach pain, fever, and abdominal distension were more common than all other symptoms in cases of intestinal perforation due to typhoid. The most important method for diagnosis is an abdominal X-ray, and most cases occur in the terminal part of the ileum.

KEYWORDS: Intestinal Perforation, Prevalence, Typhoid Disease.

INTRODUCTION

Typhoid is a systemic disease caused by *S. Typhi* and *S. Paratyphi*, and its specific clinical form is fever and abdominal pain. This disease is called typhoid, as its clinical form is similar to Typhus. In the early 1900s, typhoid pathology was identified by Payer's patch and mesenteric lymph node enlargement, and in 1969, the anatomical site of infection was determined (Cohen, 2000). From about 2000 *Salmonella* serotypes, each can cause salmonellosis. The taxonomy of *Salmonella* species is confusing. Each serotype of *Salmonella* has a single species of *S. enterica*. Humans are only infected by the *Salmonella enterica* of Subsp *enterica*, which has three serotypes. Those serotypes include Typhi, Typhimurium and Choleraesuis. And so for infection, three types of clinical features have been identified: Enteric Fever, Acute enterocolitis and Septicemic type. *Salmonella* Gram-negative is an aerobic and dynamic organism which does not have a spore and cannot ferment lactose but causes the production of H₂S. These properties are used for laboratory research (Tierney, McPhee, & Papadakis, 2005). Typhoid is still one of the main problems in developing countries. Its occurrences are mostly due to poor sanitation and improper drainage system. Its occurrences are decreased with the improvement of sanitation. In the United States, a highly industrialized country, Typhoid perforation has an annual incidence of 500, where children and young people are more affected (Courtney, Townsend, Beauchamp, Evers, & Mattox, 2007). Using contaminated water and filthy food, *Salmonella* organisms enter the gastrointestinal system, pass through the small intestine and sometimes by the mucosa of the large intestine, make their way to the lymphatic, and become systemic. It causes hyperplasia, including the RES, lymph nodes, liver, and spleen, characterized by typhoid fever. It creates a colony at the Peyer's patches of Terminal ileum, which causes hyperplasia of lymphoid follicles, then creates Necrosis and Ulcers. Microscopically, Erythrophagocytosis is seen with



histiocytic proliferation. If the patient is not treated, it gives Ulcer, Perforation or Hemorrhage. Meanwhile, the intestines may be perforated in one or in several places, including the large intestine (Bailey, Bulstrode, Love, & O'Connell, 2008; Courtney et al., 2007). As food and water play a major role in spreading the disease, food made under healthy conditions and using clean water has reduced disease incidences in developed countries. Personal hygiene, such as washing hands and avoiding insects and mosquitoes, is vital in disease prevention. People who travel to endemic areas or have direct contact with a person having typhoid should be vaccinated to induce partial immunity (Cohen, 2000; Tierney et al., 2005). The small intestine has a tube-like structure that is about five meters long and is divided into three parts, which are the duodenum (about 25 cm), the jejunum (2 meters long) and the ileum (about 3 meters long) (Snell, 2011). The small intestine's wall comprises four layers: the mucosa, muscular, submucosa, and mucosalis layers. The mucosal and muscular layers' characteristics are similar to the other parts of the digestive tube. The submucosa layer also has similarities, except for the duodenum, where the layer has Brunner glands (Krstic, 2012). As our topic is related to the incidence of typhoid perforation in surgical complications of typhoid perforation, typhoid perforation will be briefly highlighted.

RESEARCH QUESTION

What is the frequency and pattern of intestinal perforation incidence due to Typhoid at Nangarhar Province Regional Hospital?

RESEARCH OBJECTIVES

- To determine the incidence of intestinal perforation due to typhoid based on age.
- To determine the incidence of intestinal perforation due to typhoid based on sex.
- Determine the incidence of intestinal perforation due to typhoid based on signs and symptoms.
- Based on the diagnostic system, we are determining the incidence of intestinal perforation due to typhoid.
- We are d
- Determining the incidence of intestinal perforation due to typhoid based on the anatomical location of the intestine.

LITERATURE REVIEW

A descriptive study was conducted at Jaipur, Rajasthan, India, on 88 patients from April 2012 to October 2013, and the result is presented below.

Among the 88 patients, 76 were male, and 12 were female, with a male-to-female ratio of 6.3:1. The age of all patients was between 15-62 years, and the average age was 36.4 years. Clinically, 100% of patients had abdominal pain, 100% had abdominal distention, 97.7% had constipation, and 21.6% of patients had vomiting and 3.4% had diarrhea. Among these patients (93.3%), 82 had free air under the diaphragm on X-ray, and (6.7%) 6 patients had free fluid in the peritoneal cavity on abdominal ultrasound. Of most patients (97.7%), 86 had perforations limited to the ileum, 3 patients had perforations in the jejunum, and 1 patient had perforations in the cecum. In the mentioned study, 58% of the patients underwent debridement with double-layer closure, 25% underwent ileostomy, and 18% underwent resection anastomosis. The complications were 44.3%, most of which were infections after surgery. The mortality rate was 17.1%, the main factors of which were the increase in the time from perforation to arrival at the hospital, more than 48 hours, the increase of perforations, and the occurrence of postoperative complications mentioned in the study (Jain, Meena, & Ram, 2017).

A study was conducted on 104 patients in the northwest of Tanzania from August 2006 to September 2011, and the results are given as follows:

Among the 104 patients who were hospitalized due to typhoid intestinal perforation, 75 were male, and 29 were female. The ratio between males and females is 2.6:1. Most cases were in the group aged (11-20). In the clinical record, fever was 100%, abdominal pain 100%, vomiting 90.4%, diarrhea 84.6%, constipation 76.9%, abdominal distention 73.1%, dehydration 69.2%, shock 60.6%, feculent gastric aspiration 11.5% and Jaundice 6.7% were present in patients who developed intestinal perforation due to typhoid. Clinical test for diagnosis, Widal test, presence of free air under the diaphragm in abdominal X-ray in 74.7% of patients and presence of free fluid in the peritoneal cavity in abdominal ultrasound in 85.7% of patients. From the point of view of perforation, 10.1% were in the jejunum, 86.2% in the ileum, 1.8% in the cecum, 0.9% in the appendix and 0.9% in the ascending colon. The perforation



existed. In the mentioned study, 78.8 % of patients underwent Simple Double Layer Closure, 9.6% of patients underwent Bowel Resection with Anastomosis, 7.7% of patients underwent Rt side hemi colectomy + ileo transverse anastomosis, 1.9% of patients underwent Exteriorization of perforation with ileostomy, and 1.9% underwent Appendectomy. Of the patients mentioned above, 16 recovered completely, 62 people recovered after complications, and 24 died. After the operation, the rate of complications was 39.4%, from which infections after surgery were the highest at 55.5%. The mortality rate was 23.1% (Chalya et al., 2012).

MATERIALS AND METHODS

Type of Research

This research was conducted descriptively.

Study Population and Size

All the patients admitted to the General Surgery Department of Nangarhar Regional Hospital in 2022. 30 of them were considered for this research having intestinal perforation due to typhoid.

Sampling Method

This study was conducted using the universal method.

Inclusion Criteria

All the female and male patients had intestinal perforation due to typhoid.

Exclusion Criteria

Incidents of intestinal perforation without typhoid are not included.

Data Collection Method

A questionnaire was compiled, and the information was entered from the patients' dossier and the registration book of the operating room.

Data Analysis Method

The collected data was accurately analyzed and interpreted through Ms Excel, so the frequency and percentage were determined.

RESULTS

Incidences of Typhoid Perforation by Age

Intestinal Perforation or Typhoid Perforation was investigated at the surgery department of Nangarhar Public Health Central Hospital on 30 patients. The results of the research showed that the incidence of intestinal perforation due to typhoid was (3.3%) in less than 10 years old, 26.6% in the group age 11-20 years old, 23.3% were 21-30 years old, 13.3% in 31-40 years old, 13.3% in 41-50 years old, 13.3% in 51-60 years old and 6.9% were the patients had more than 60 years of age. (Table 1, Fig. 1).

Table 1: Incidences of Typhoid Perforation by Age

Age	Frequency of Patients	Percentage (%)
> - 10	1	3.3 %
10-20	8	26.6 %
21-30	7	23.3 %
31-40	4	13.3 %
41-50	4	13.3 %
51-60	4	13.3 %
< - 60	6	6.9 %
Total	33	100 %

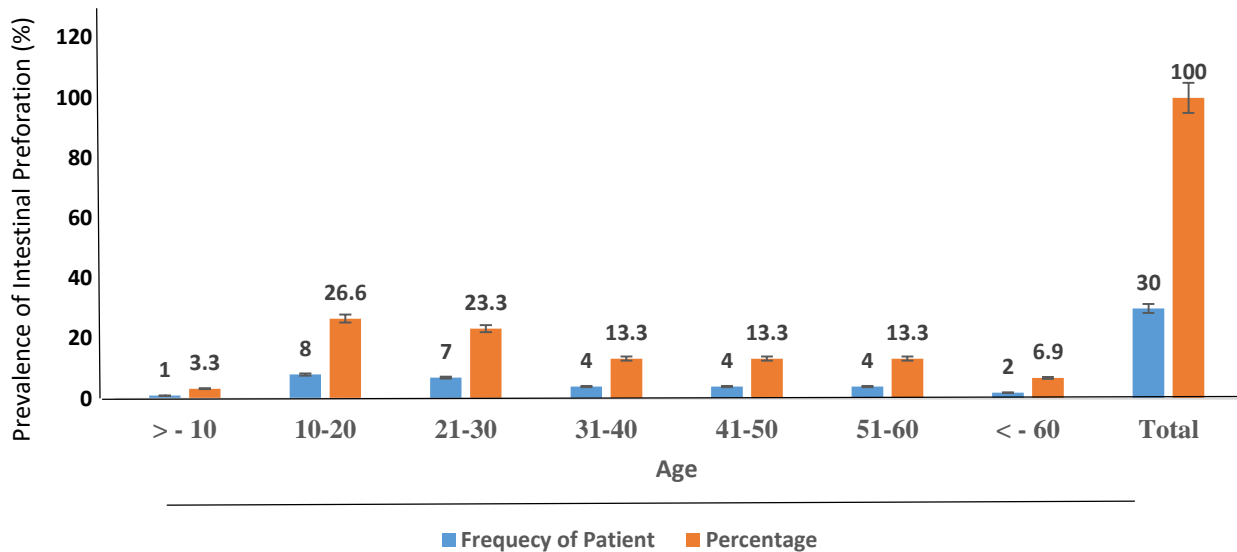


Fig. 1. The incidences of intestinal perforation due to typhoid are shown in terms of age. The above figure describes that most cases were present in the age group of (11-30 Y), and just one case existed in the age group who were less than 10 years old.

Incidences of Typhoid Perforation by Sex

A total of 30 patients were studied, of which 18 (60%) were male and 12 (40%) were female. After the data analysis, it was found that the incidences of intestinal perforation due to typhoid were higher in males than females. (Table 2, Fig. 2).

Table 2: Incidences of Typhoid Perforation by Sex

Sex	Frequency of Patients	Percentage (%)
Male	18	60 %
Female	12	40 %
Total	30	100 %

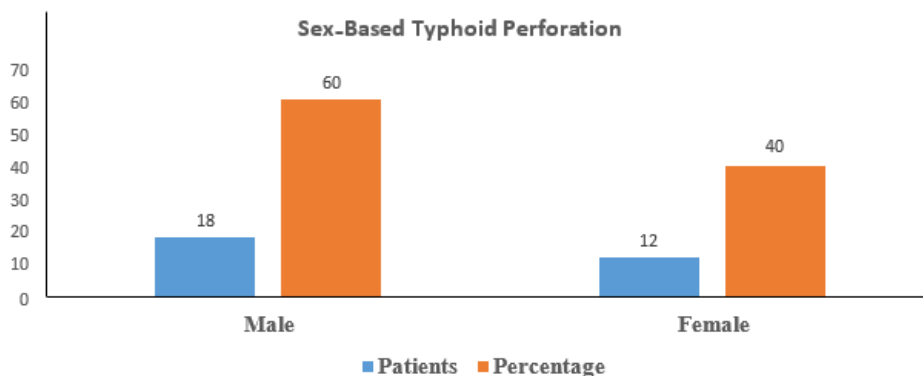


Fig 2. The incidences of intestinal perforation due to typhoid are shown in terms of sex. The above graph describes that most cases were present in male patients.

Incidences of Typhoid Perforation from the Point of View of Clinical Features

30 patients were taken into consideration in our research. From the point of view of clinical symptoms, fever was present in 30 patients, in which 100% of patients had a fever and abdominal pain, 24 patients (80%) had abdominal distention, 36.6% vomiting, 16.6% diarrhoea and 13.3% constipation (Table 3, Fig. 3).



Table 3: Incidences of Typhoid Perforation from the Point of View of Clinical Features

Symptoms	Frequency of Patients	Percentage (%)
Fever	30	100 %
Abdominal Pain	30	100 %
Abdominal Expansion	24	80 %
Vomiting	11	36.6 %
Diarrhoea	5	16.6 %
Constipation	4	13.3 %

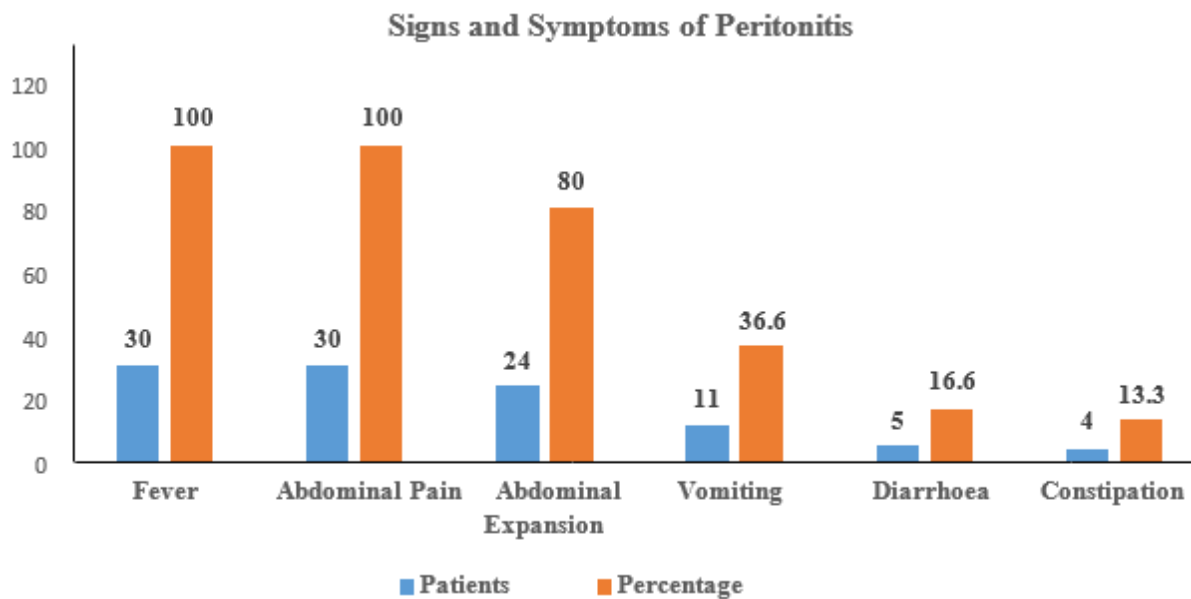


Fig 3. The above graph shows the signs and symptoms of Peritonitis in cases of intestinal perforation due to typhoid, fever, and abdominal pain more than other symptoms.

Incidences of Typhoid Perforation by Diagnostic Tests

These results were gained from the point of view of diagnostic tests to find out the incidences of typhoid. From Abdominal X-ray, 90%, from ultrasound, 83.4% and from Widal test, 93.3%. The analysis showed that the abdominal X-ray gives better results than ultrasound. (Table 4, Fig 4).

Table 4: Incidences of Typhoid Perforation by Diagnostic Tests

Diagnosis System	Signs	Patients	Percentage (%)
X-ray	Pneumo Peritoneum	27	90 %
Ultrasound	Free Fluid in the Peritoneal Cavity	25	83.4 %
Widal Test	Titer \geq 1:160	28	93.3 %

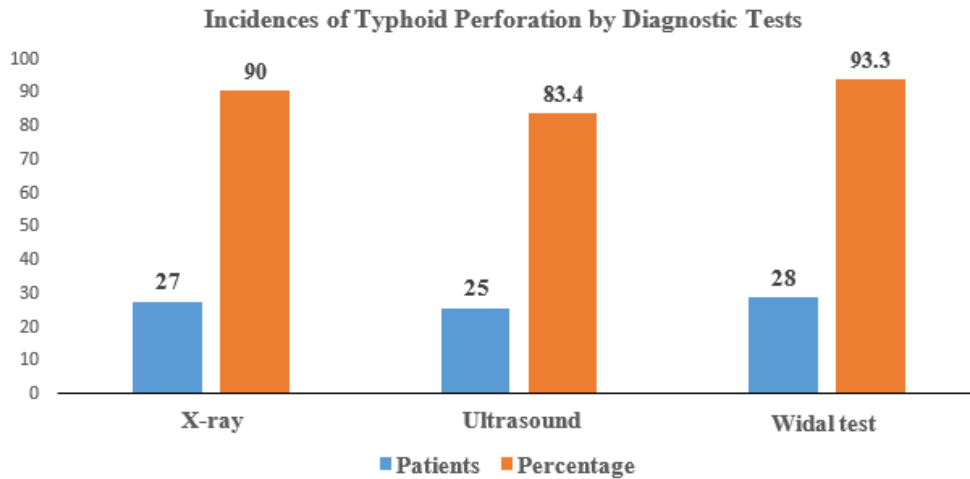


Fig 4. The incidences of intestinal perforation due to typhoid are shown in terms of Diagnostic Tests. The above graph describes the incidences of intestinal perforation due to typhoid, based on tests such as abdominal X-ray, abdominal ultrasound and Widal test. The diagnosis of Peritonitis patient by Widal test the intestinal perforation due to typhoid was confirmed.

Incidences of Typhoid Perforation from a Regional Perspective

Our study showed that (29) 96.6% of cases occurred in the distal ileum, and only one case in 3.4% occurred in the jejunum. To analyze these cases, it can be concluded that the incidences of intestinal perforation due to typhoid are more in the ileum of the small intestine than in other parts (Table 5, Fig. 5).

Table 5: Incidences of Typhoid Perforation by Location

Location	Frequency of Patients	Percentage (%)
Distal Ileum	29	96.6 %
Jejunum	1	3.4 %
Total	30	100 %

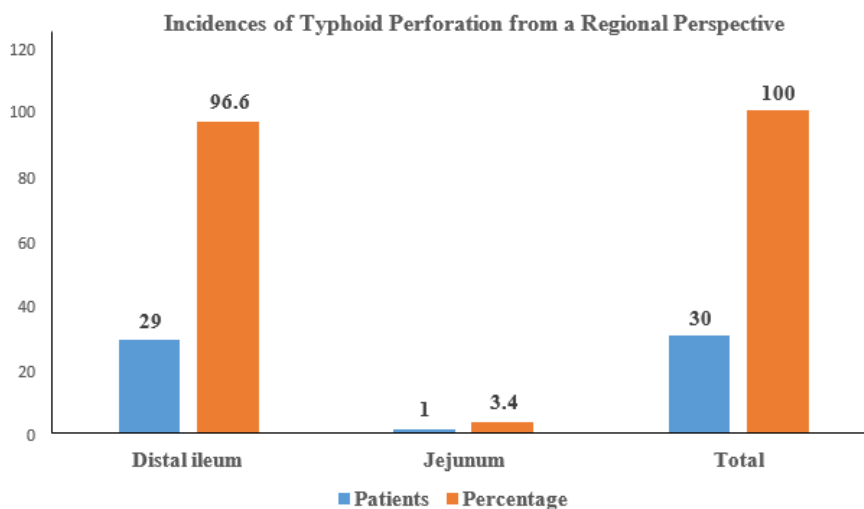


Fig 5. Observing the above figure, it is clear that most of the incidents occurred in the distal part of the ileum, and only one (3.4%) of the incidents occurred in the jejunum.



DISCUSSION

We investigated intestinal perforation due to typhoid in 30 patients in the surgery department of Nangarhar Public Health Central Hospital, where the number of incidences was high in young patients.

A research based on age was conducted in Tanzania on 104 patients. The results indicated that the incidences of intestinal perforation were higher in young patients than in older patients (Chalya et al., 2012). Another study was conducted on 101 patients in Nigeria, where its result also showed that the incidents were significantly higher in younger patients than in the aged (Ugwu, Yiltok, Kidmas, & Opaluwa, 2005). Likewise, a study conducted on 155 patients in India and its analysis showed more incidences of intestinal perforation due to typhoid in young individuals (Shrivastava, Kumar, Pankaj, Bala, & Sewak, 2014). A study conducted on 65 patients in Ghana indicated that the incidences of intestinal perforation due to typhoid were higher in young people than in older people (Kuubiye, Mogre, Majeed, & Alhassan, 2014). The results of our research are similar to the results of the studies above.

Research conducted on 101 patients regarding the incidences of intestinal perforation due to Typhoid in Nigeria showed that the cases were higher in male patients than females (Ugwu et al., 2005). In addition, a study conducted on 78 patients in India found that the incidences of intestinal perforation due to typhoid were higher in men than in women (Eggleston, Santoshi, & Singh, 1979). The research on 104 patients in Tanzania showed more cases in males than females (Chalya et al., 2012). Research conducted on 65 patients in Ghana found that due to typhoid of the intestines, the incidences of perforation were higher in males than in females (Kuubiye et al., 2014). Furthermore, a study conducted in Nigeria on 43 patients who had perforation due to typhoid, the analysis of the research showed that most cases of the disease were in males compared to females (Na'aya, Eni, & Chama, 2004). The results of these studies showed that the incidences of typhoid were higher in males than in females, so the results of this study are similar to the results of the above studies.

The clinical features of intestinal perforation due to typhoid had 100% fever and abdominal pain, 36.6% abdominal distension, 16.6% vomiting, 13.3% diarrhoea and constipation. A research conducted in Nigeria showed that all the patients had a fever and abdominal pain in the cases of perforation due to typhoid (Ugwu et al., 2005). In a study conducted on 155 patients in India, abdominal pain and fever were present in all patients (Shrivastava et al., 2014).

In this study, a total of 30 patients were observed; 90% were diagnosed by abdominal X-ray and 83.4% by ultrasound, where the best result was provided by abdominal X-ray. A research conducted in Pakistan on 130 patients to diagnose the patients who had intestinal perforation due to typhoid found that, to a great extent, abdominal X-rays and ultrasounds were utilized (Abro, Siddiqui, & Ahmad, 2012; KHAN, 2020). A study was conducted on 155 patients in India, where most of the cases were diagnosed through abdominal X-ray and ultrasound, and for all the patients, Widal tests were positive (Shrivastava et al., 2014). Another study was conducted on 104 patients in Tanzania, of which (74.7%) were confirmed through abdominal X-ray (85.7%) by ultrasound and 94.2% by Widal Test (Chalya et al., 2012). Another study was conducted on 65 patients in Ghana; on the analysis of the result, it was found that the incidences of intestinal perforation due to typhoid were mostly positive in abdominal X-ray, ultrasound and Widal test (Kuubiye et al., 2014). The results of this study are similar to the results of the above-mentioned studies, and the best methods for diagnosis are abdominal X-ray. It is also worth mentioning that the Widal test was positive in all patients.

This study found that the incidences of abdominal perforation were 96.6% in the last part of the ileum and 3.4% in the jejunum part. The research was conducted on 101 patients in Nigeria in terms of location. It was found that most of the cases of perforation due to typhoid occurred in the last part of the small intestine ileum (Ugwu et al., 2005). A study conducted on 104 patients in Tanzania showed that 97.8% of cases occurred in the last part of the ileum (Chalya et al., 2012). The figures obtained from the results of these studies showed that the incidents were more in the last part of the ileum, so the results of our study are similar to the results of the mentioned studies.

CONCLUSION

There was a higher percentage of cases of intestinal perforation due to typhoid in men than women. Based on anatomical location, the incidences were more in the ileum, and according to age, the incidences of intestinal perforation were more in the under-thirty age group. From the clinical point of view, all the patients had a fever, abdominal pain and abdominal distension. However, the best procedure for diagnosis was an abdominal X-ray and to diagnose the factors Widal test was suitable.



SUGGESTIONS

1. All compatriots are kindly suggested to take the patient to the hospital and not take pain relief medicine over the counter if a patient develops a fever followed by abdominal pain.
2. All medical personnel are suggested if a patient has abdominal pain. There are possible signs and symptoms of intestinal perforation due to typhoid. The use of medicine should be avoided. The patient should be referred to the hospital so that the patient is fully diagnosed, and if needed, the patient should be operated on time so that complications are avoided.
3. To diagnose the disease, doctors should not only consider physical checkups, but the patient should undergo radiological, laboratory and ultrasound, which are necessary to approve the ultimate diagnosis.

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