

Case Report

Ulutas Med J 2015;1(3):86-89

DOI: 10.5455/umj.20150827014908

ISSN: 2149-0430 eISSN: 2149-388X

UMJ
ULUTAS
MEDICAL
JOURNALS



Ileal Perforation Caused by Typhoid Fever

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Background: Typhoid fever is a systemic infectious disease specific to human beings which is caused by a gram-negative bacillus, *Salmonella typhi*. Its incidence demonstrates significant variations in different regions of the world. It is commonly seen in children of the school age. In developing countries, it is most widely seen, and makes serious complication as intestinal perforation (IP). IP is generally seen within the third week of the disease. In children, it can onset with necrotic ileal Peyer's patches which progress to diffuse peritonitis, unless getting treated with appropriate medical therapy, in cases of delayed diagnosis. In these conditions, it requires surgical treatment. Despite novel antibiotics, and improvements in surgical techniques, the mortality rate still ranged between 9 and 22 percent.

Conclusion: The case report aims to distract attention to importance of appropriate, and timely surgical intervention in a 15-year-old boy who presented with terminal ileum perforation developed secondary to inappropriately treated typhoid fever.

Keywords: Fournier's gangrene, coronary artery bypass, extracorporeal circulation, therapy

Introduction

Typhoid fever is a systemic disease with fatal complications caused by a gram-negative bacillus (*Salmonella enterica* serotype *typhi*) (1). Its microbial agent can be rarely *Salmonella paratyphi*. The only, and the real reservoir of *S typhi* in nature is human being, and it is transmitted through fecal-oral route. Its incidence demonstrates significant variations in different regions of the world (2). It has been reported that in Turkey, approximately 10.000 patients were admitted to the hospital because of typhoid fever every year. It is widespread in school-age children between 5, and 15 years of age. However it can be also seen in small children. During the first week of the disease, increasing fever with shivering is followed

by skin rashes, abdominal pain, and lassitude because of bacterial dissemination into reticuloendothelial system. IP which is one of the serious complications has an incidence ranging between 0.8 and 18 percent (3).

In endemic regions, it is seen within the third week of the disease in the presence of diffuse intestinal inflammation. In this condition longitudinal ulcers which onset with necrosis of the ileal Peyer's patches are localized within 45 cm proximal to the ileocecal valve on the antimesenteric side. IP causes peritonitis, and frequently it manifests itself with abdominal rigidity, and tenderness detected on abdominal examination. It can become apparent in children whose diagnosis was delayed and/or did not receive proper medical treatment.

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Received: July 20, 2015; Accepted: August 27, 2015
Published: September 25, 2015

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They require surgical treatment. In this paper, appropriate, and timely surgical intervention, better postoperative care, and successful treatment of a child with IP caused by typhoid fever were presented.

Case Presentation

A 15-year-old boy was admitted to our hospital with complaints of abdominal pain, and bilious vomiting lasting for 2 days. Antibiotherapy was initiated with ampicillin (50 mg/kg/d) nearly two weeks previously in another center because of his febrile state, but he discontinued this antibiotherapy on the third day of his treatment. His history could not reveal any sign and symptom suggestive of typhoid fever apart from high fever.



Figure-1: Plain abdominal X-ray: free air under the right half of the diaphragm.

On his physical examination, abdominal distension, abdominal tenderness on palpation, and absence of bowel sounds on auscultation were detected. Rectum was empty as felt with digital rectal palpation. Plain abdominal X-ray images obtained in standing position revealed the presence of free air under the right half of the diaphragm (*Figure-1*). Hematologic, and biochemical test results were as follows: hemoglobin, 11.3 g/dl (14-18), WBC, 15000/cm³ (4-10), CRP 9.9 (0-0.5), AST 54

IU/L (1-40), and Na 132 mEq/L (135-145). Hepatitis B, Hepatitis C, and HIV tests were unremarkable.

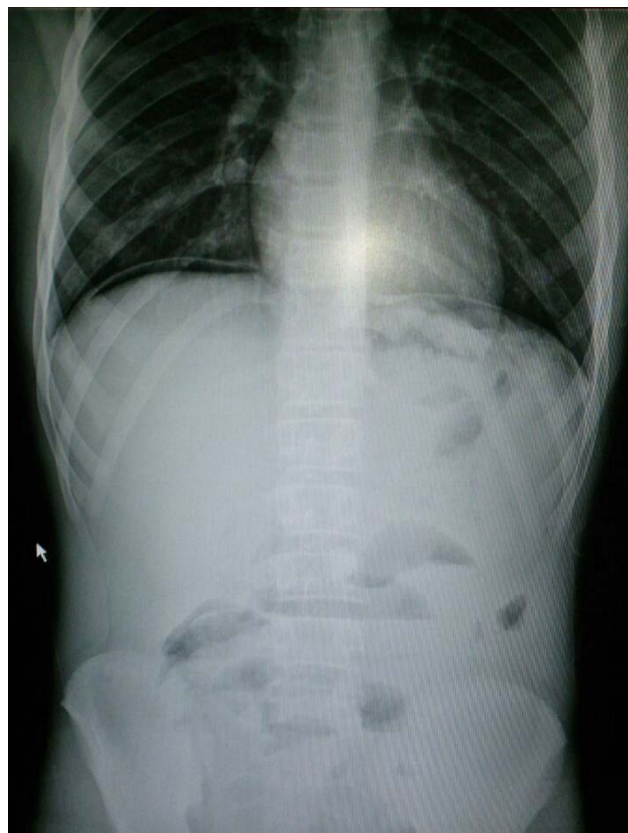


Figure-2: Intestinal perforation: the antimesenteric side nearly 20 cm proximal to the ileocecal valve.

Gruber-Widal agglutination test positivity was detected at >1/160 dilutions. *Salmonella typhi* did not grow on preoperatively prepared blood culture media. Laparotomy performed through midline incision with the indication of IP revealed a perforated area 1 cm in diameter localized on the antimesenteric side nearly 20 cm proximal to the ileocecal valve (*Figure-2*). Besides, patchy areas of fibrosis, and adhesions were observed on the jejunum, and ileum. Peritoneal lavage was performed using isotonic saline.

Edges of the perforated area in the terminal ileum were excised, and primary repair was performed using 3/0 vicryl sutures for double-layer closure of the defect. Then omentum was fixed on this area, and abdominal layers were closed. On postoperative first day, *Salmonella typhi* were grown on stool culture media. Antibiotherapy was initiated with metranidazole, and a third-generation cephalosporin, and the patient was discharged uneventful on the 7. postoperative day. Histopathological evaluation revealed presence of acute, and chronic inflammation on Peyer's patches, elongation, and blunting of cryptas.

Discussion

Typhoid fever still continues to be an important health problem in endemic countries. According to reports released, every year nearly 22 million people are contracting typhoid fever. Its incidence demonstrates significant variations in different regions of the world. Middle, and South America, Eastern European countries, Middle East, and all African countries are endemic regions for typhoid fever. In Turkey, especially Southeastern Anatolia is an endemic region, and nearly 10.000 patients are contracting typhoid fever every year. Besides, the disease can manifest itself as sporadic cases. Human being is the only vector of *Salmonella typhi* in nature. In endemic regions, the disease is mainly transmitted through drinking contaminated water, and fecal-oral route by eating uncooked vegetables, and fruits washed by contaminated water. Though it is generally seen in school-aged children, and young adults, it can be also observed in small children. Our case was a 15-year-old boy who was in the age group in compliance with literature findings.

Since the disease demonstrates multisystemic involvement, it has a large spectrum of clinical signs, and symptoms. However its most widespread symptoms include bilious vomiting, abdominal pain, and distension. Our case was admitted to the hospital with this clinical manifestations. Its prevalently encountered surgical complications include IP, bleeding, cholecystitis, osteomyelitis, and abscess. More rarely it can cause pancreatitis, hepatic, and splenic abscesses, pleural effusion, and orchitis. Among them IP is the most widespread, and serious surgical complication typhoid fever in developing countries. Sometimes it might be the first manifestation of typhoid fever. In our case any clinical symptom suggestive of typhoid fever was not detected apart from high fever. In the whole world, incidence of peritoneal perforation ranges between 0.6, and 4.9 percent. While in the endemic regions, its incidence varies between 4.5, and 75 percent (4). In 89.67 % of the cases only one perforation has been reported. In cases with perforations larger than 2 cm in diameter, higher rates of peritoneal leakage was found. All over the gastrointestinal system-from stomach down to rectum- may be involved. Most frequently ileum is affected (98.6 %) followed by jejunum (1.29 %), and colon (0.64 %). Also in our case, ileal perforation was detected. Peyer's patches are most frequently found in ileum which explains highest incidence of ileal perforations.

Diagnostic criteria used for the detection of IP which develops secondary to typhoid fever include specific clinical symptoms, detection of free air under diaphragm on plain abdominal X-ray obtained in a standing position, Widal-Gruber agglutination test positivity at $\geq 1:600$ dilution, and intraoperative findings (result of the histopathological evaluation of the perforated bowel segment). (2). In more than 70 % of the cases cited in the literature, presence of free air under diaphragm as detected on plain abdominal radiograms obtained in a standing position has been reported. (5). Some authors reported higher incidence rates up to 91.7 percent. In compliance with the literature, image of free air under the left side of the diaphragm was observed in our case.

In patients whose resuscitation process is prolonged because of delayed hospital admissions after development of peritonitis, electrolyte imbalance, inadequate perioperative hydration, increase in the number of perforations, gradual spread of peritonitis, hypovolemia, and septic shock effect its prognosis adversely (6). Ileal perforation caused by typhoid fever should be surgically treated. Surgical methods used include primary repair, primary repair with omental patch (3), resection, and anastomosis, ileostomy, and ileotransverse colostomy (7). Among them the most frequently preferred method is primary repair. In cases with one perforation, primary repair is preferred, while in cases with multiple perforation ileostomy or resection plus anastomosis may be preferred. As a simple, rapid, and cost-effective method primary repair is still used most prevalently. Omentum is a highly vascularized organ and contains angiogenic factors which induce development of blood vessels. Indeed, relatively improved outcomes have been reported in patients who had undergone primary repair with omental patch when compared with patients treated with only primary repair (8). We also applied primary repair with omental patch in our patient with only one perforation. On histopathological evaluation we detected evidence of acute, and chronic inflammation on Peyer's patches and cryptal alterations. These findings were consistent with IP associated with typhoid fever. Despite scientific developments, IP secondary to typhoid fever is a major health problem especially in developing countries.

Hospital admission time, number, and location of perforation(s), its intraabdominal spread, and surgical method performed determine mortality, and morbidity. (4,9). Timely, and effective surgical intervention, proper postoperative care, and use of effective antibiotherapy

improve prognosis of patients (10,11). In children as antibiotherapy prevalently TMP-SMX, third generation cephalosporins, and ampicillin have been used. In our case thanks to surgical intervention together with effective antibiotherapy applied at an early stage, any postoperative complication was not experienced.

Conclusion

In a child who is suffering from typhoid fever, high fever may be the first clinical symptom. In Southeastern Anatolia where typhoid fever is an endemic infection, one can still encounter IP which is the most serious, and most prevalently seen complication of typhoid fever. Establishment of early diagnosis, application of an appropriate surgical intervention, and improved postoperative care are extremely effective in the prevention of mortality, and morbidity.

Conflict of Interest

The authors declare that no conflict of interest exists in publishing this article.

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DOI: [dx.doi.org/10.5455/umj.20150827014908](https://doi.org/10.5455/umj.20150827014908)

Cite article as: Sarsu SB, Karapur A. Ileal Perforation Caused by Typhoid Fever. *Ulutas Med J*. 2015;1(3):86-89

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