

# Abdominal Complications of Typhoid Fever

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## Abstract

The natural history of typhoid fever poses both a diagnostic and a therapeutic challenge. Awareness of the clinical features of the primary presentation and of the complications are pivotal to early diagnosis. Typically, aggressive supportive care is all that is needed. However abdominal complications do occur and proper surgical care is required to lower morbidity and mortality.

**Keywords:** Typhoid fever; Abdominal complications; Treatment

## Introduction

Typhoid fever is one of the most common enteric infections in the developing world. The infection starts with a febrile episode and if untreated eventually involves almost every system of the body with abdominal complications developing first. The initial treatment is predominantly medical and supportive in nature. A majority of the abdominal complications are surgical and early consultation with a surgeon should be considered. A high index of suspicion is essential. Therefore the attending clinician needs to be aware of the entire spectrum of clinical manifestations in order to avoid delay in diagnosis of complications. The paper discusses the clinical features, surgical complications and their management.

## Clinical Evaluation

Typhoid fever is caused by *Salmonella Typhi* which is a gram negative non spore forming facultative anaerobic bacillus. The infective dose is usually  $10^3$  to  $10^6$  colony forming units. The mode of transmission is fecal - oral. The clinician needs to be aware of certain predisposing factors which render the patient more at risk for infection. Decreased stomach acidity by virtue of; young age (<1 year), antacid ingestion or achlorhydria especially associated with *H. pylori* infection is a major risk factor. A disruption in intestinal integrity either due to alteration of the intestinal flora usually caused by antibiotics or due to prior gastrointestinal surgery is also a risk factor. A detailed history is vital to diagnosing typhoid fever, instead of other common diseases such as malaria. Inadequacy of treatment can lead to the disease progression eventually manifesting with life threatening surgical complications that will require surgery. Abdominal complications are the most common. As these complications simulate many other abdominal conditions, a good history can alone differentiate the aetiology as typhoid fever and not something else. Fever is present in more than 75% cases followed by abdominal pain in 30–45% of cases. The incubation period varies from 3–21 days depending on the immunological status of the patients. Additional symptoms include headache, chills, cough, severe sweating, myalgia, malaise and diarrhoea. Physical examination reveals coated tongue, hepatosplenomegaly, a rash seen on the chest and abdomen described as rose spots, abdominal tenderness especially supra-umbilical.

Abdominal complications aren't the only issue with typhoid. 2–40% of patients may even exhibit neurologic manifestations such as meningitis, Guillain Barre syndrome, neuritis and various neuropsychiatric syndromes such as muttering delirium or coma vigil accompanied with the picking of the bed clothes [1,2].

Awareness of these clinical features can significantly help the

attending clinician to arrive at a definitive diagnosis for the etiology of the fever as well as the abdominal complications.

## Abdominal Complications

### Small intestine

The organisms have a predilection for sites rich in cells belonging to the reticuloendothelial system [3]. This is typically seen in the Peyer's patches of the small intestine. There is significant hyperplasia followed by ulceration and necrosis of the Peyer's patches. This leads to significant bleeding eventually terminating into a perforation. This complication usually takes place in the third or fourth week of the disease. Since the terminal ileum is abound with Peyer's patches, multiple perforations in the ileum are common leading to high morbidity and a high mortality [4,5].

Patients invariably give a history of melena preceding the onset of abdominal pain. Abdominal signs are usually present eventually leading to board like rigidity of the abdomen. Due to severe peritonitis, the patient has a drastic fall in the urine output eventually passing into a state of septic shock. The time at which the condition is diagnosed and the rapidity with which surgical intervention is offered determine the outcome in such patients [5,6].

Rigorous and aggressive resuscitation is essential to ensure improvement in the urine output. Nasogastric aspiration and supportive intra venous fluids are usually accompaniments of the initial resuscitation. An abdominal x-ray in majority of times may be inconclusive. An ultrasound of the abdomen may reveal free fluid in the peritoneal cavity. A decision to perform exploratory laparotomy needs to be made as soon as the patient regains hemodynamic stability with good urine output [6].

The choice of surgical repair to be performed at laparotomy is the biggest dilemma to the surgeon [7]. An overall appraisal of the patient needs to be considered before taking a decision. For an isolated perforation, simple suturing may suffice. But if the size of

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Received January 22, 2015; Accepted April 14, 2015; Published April 19, 2015

Citation: Vagholkar K, Mirani J, Jain U, Iyengar M, Chavan RK .Abdominal Complications of Typhoid Fever. Journal of Surgery [Jurnalul de chirurgie] 2015; 11(1): 359-361 DOI:10.7438/1584-9341-11-2-1

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the perforation is big, surrounding bowel edematous and the volume of peritoneal contamination significant then the chances of leakage of the sutured perforation are very high [4,6,7]. Leakage of the sutured perforation is associated with extremely high mortality. Therefore, in such a situation it would be a safe practice to exteriorize the ileum proximal to the sutured perforation [8]. This will significantly help in achieving control over the septic process especially in moribund patients.

If perforations are multiple, then resection of the entire segment is the method of choice. A primary anastomosis with proximal ileostomy is a safe choice as it prevents the chances of anastomotic dehiscence. The proximal ileostomy can be closed 12 weeks later [7,9].

Exteriorization is one of the safest and best options for typhoid enteric perforations. It reduces the chances of leakage thereby leading to re-laparotomy to a bare minimum. Majority of patients presenting with enteric perforation are severely moribund and nutritionally depleted at the time of surgery. Therefore, in a situation where the process of healing cannot be relied upon, exteriorization is the best lifesaving option for the patient.

### Gall bladder

The gall bladder is also affected in typhoid fever developing acalculous cholecystitis [10,11]. Concurrent gall stones may worsen the problems predisposing to perforation of the gall bladder [10]. Various hypotheses have been put forward to explain the pathophysiology of acalculous cholecystitis in typhoid fever [11]. However the exact mechanism still remains uncertain. Endotoxin mediated injury seen in gram negative sepsis is one of the most proposed hypotheses. These mediators lead to biliary stasis which results in increased bile viscosity, sludge formation and mucocele of the gall bladder. This in turn results in functional or secondary mechanical obstruction of the cystic duct due to inflammation. The other hypothesis proposes increased abnormal permeability of the serous membranes along with capillary leakage as a result of direct invasion of the gall bladder wall by typhoid bacilli, thus leading to thickening of gall bladder wall and distension. In a select 10–15% of patients, if the cystic duct obstruction persists, the inflammatory process may progress to gangrene and perforation [10]. The commonest site is the fundus of the gall bladder. The treatment of acalculous cholecystitis is conservative. However, if perforation occurs, cholecystectomy has to be performed. Cases of concomitant ileal and gall bladder perforations have been reported [12]. This significantly adds to the mortality in such patients. These patients require early detection and prompt surgical intervention. Radiological investigations such as ultrasound and computed tomography have low specificity in detecting these complications. Hence, a high index of clinical suspicion can only help in early detection of such complications. The role of laparoscopy in typhoid enteric perforation is extremely limited. Extensive fluid collections, adhesions and distended bowel loops limit significantly the dexterity of laparoscopic instrumentation. Hence, laparoscopy is to be avoided in such situations [6].

### Liver

Typhoid fever commonly results in a significant increase in liver size [13]. Enlargement of the liver leads to dysfunction of the hepatocytes which may be due to hyperplasia and hypertrophy of the reticulo-endothelial cells accompanied by hepatocyte damage induced by anti-pyretic medications [14,15]. The net result is cholestasis. There may be increase in levels of bilirubin, ALT, AST and GGT. PT/PTT may not be seriously altered. Treatment is predominantly supportive with administration of antibiotics such as quinolones which are the drug of choice in such cases [13,15].

### Spleen

The spleen is a very important reticulo-endothelial organ and is typically greatly enlarged in typhoid fever [16]. Massive enlargement

of the spleen causes increased stretching of the splenic capsule predisposing to either spontaneous rupture or increased susceptibility to rupture following minor trauma [17]. Left upper quadrant pain accompanied with severe pallor and shock should raise the suspicion of a ruptured spleen. Treatment is immediate laparotomy with splenectomy [17].

### Pancreas

Pancreas is another organ which is affected in typhoid. Development of pancreatitis pre disposes to pancreatic abscess formation. The root of infection in pancreatic abscess may perhaps be due to infected bile reaching the pancreas by the pancreatic duct, hematogenous or lymphatic spread from the intestinal tract [18]. Treatment is usually conservative with excellent resolution with antibiotics and supportive care [19].

### Conclusion

Typhoid continues to be febrile disease with significant surgical complications.

Awareness of the clinical features of this disease is pivotal in prompt diagnosis of the disease as well as its complications. A high degree of awareness and clinical suspicion is essential for early diagnosis of abdominal complications.

Prompt and aggressive treatment can only reduce the morbidity and mortality to a minimum.

Exteriorization is the best option for bowel perforations in moribund septic patients especially in children.

### Conflict of interest

The authors have no conflict of interest to report.

### Acknowledgements

We would like to thank Mr. Parth K Vagholkar for his help in typesetting the manuscript.

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