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Liver Abscess as a Rare Complication of Typhoid Fever in a Young Adult: A Case Report

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Abstract:
Typhoid fever, caused by Salmonella typhi, remains a significant endemic infection in developing countries. While its gastrointestinal and systemic symptoms are well known, liver abscess as a complication is exceedingly rare. This case report highlights the clinical significance of recognizing atypical presentations, particularly in resource-limited settings with common delayed diagnosis. The condition arises from hematogenous spread of Salmonella typhi in delayed or untreated cases, leading to localized hepatic infection and abscess formation. This descriptive case report documents this rare complication. A 19-year-old male presented with persistent high-grade fever, malaise, headache, and right upper quadrant abdominal pain, plus a history of hematochezia. Examination revealed fever, anemic conjunctivae, and hepatomegaly. Labs showed leukocytosis with neutrophilia, microcytic anemia, elevated liver enzymes, and positive fecal occult blood. The TUBEX TF test was reactive for IgM against Salmonella typhi. Abdominal ultrasonography and contrast-enhanced CT confirmed a solitary liver abscess. Initial ceftriaxone monotherapy yielded limited response; significant improvement followed added intravenous metronidazole. A 19-year-old male presented with persistent high-grade fever, malaise, headache, and right upper quadrant abdominal pain, plus a history of hematochezia. Examination revealed fever, anemic conjunctivae, and hepatomegaly. Labs showed leukocytosis with neutrophilia, microcytic anemia, elevated liver enzymes, and positive fecal occult blood. The TUBEX TF test was reactive for IgM against Salmonella typhi. Abdominal ultrasonography and contrast-enhanced CT confirmed a solitary liver abscess. Initial ceftriaxone monotherapy yielded limited response; significant improvement followed added intravenous metronidazole.

Keywords: *Liver abscess; Typhoid fever; Salmonella typhi; Complication; Antibiotic*

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INTRODUCTION

Typhoid fever is an acute systemic infection caused by *Salmonella enterica* serotype Typhi (*S. Typhi*) that is common in developing countries and associated with low socioeconomic levels and poor sanitary conditions (Crump, 2019; Khanam et al., 2022; Kungu et al., 2025; Oyedeji-Amusa et al., 2024). Humans, as the only natural reservoirs, can be asymptomatic carriers. Transmission usually occurs through the fecal–oral route by ingestion of contaminated food or water. In endemic areas, most cases occur in children and adolescents aged 3 to 19 years.

Common clinical features of typhoid fever are high-grade fever, coated tongue, anorexia, vomiting, hepatomegaly, diarrhea, abdominal pain, pallor, splenomegaly, constipation, headache, and jaundice (Afsar et al., 2025; CDC, 2019; Levani & Prastya, 2020; Munggaran et al., 2019). While its gastrointestinal and systemic symptoms are well known, liver abscess formation as a complication is exceedingly rare. Recent epidemiological studies have reported that hepatic complications occur in less than 1% of typhoid fever cases, with liver abscess being among the rarest manifestations. The condition arises when *Salmonella Typhi* spreads hematogenously, particularly in delayed or untreated cases, leading to localized hepatic

infection and abscess formation (Buzilă et al., 2025; Imara, 2020; Jahan et al., 2022; Mina et al., 2024).

The pathophysiological mechanisms underlying liver abscess formation in typhoid fever remain incompletely understood (Makthala et al., 2025; Pavlek et al., 2022; Putri & Dewi, 2023). Current literature suggests that bacteremic dissemination during the acute phase of infection allows *Salmonella* organisms to seed hepatic tissue, where local factors such as compromised immune response or pre-existing hepatobiliary abnormalities may facilitate abscess development. Additionally, delayed antibiotic treatment has been identified as a significant risk factor for suppurative complications. Due to its rarity, liver abscess as a complication of typhoid fever poses challenges in both diagnosis and treatment. This case report adds to the limited body of literature on this unusual complication and emphasizes the importance of maintaining clinical suspicion in patients with prolonged or atypical presentations of typhoid fever. Here, we present a case report of liver abscess in a 19-year-old male with a delayed case of typhoid fever.

Case Illustrations

A 19-year-old male was admitted to the hospital with chief complaint of high-grade fever since about nine days prior to the examination. The complaint was accompanied by malaise, headache, and right upper quadrant abdominal pain. About a month before the admission, he also had a history of hematochezia.

At presentation, his body temperature was 38.2°C, blood pressure was 110/80 mmHg, pulse rate was 78 beats/min, respiratory rate was 19 times/min, and peripheral oxygen saturation was 98% on room air. Physical examination showed anemic conjunctiva, upper abdomen tenderness, and hepatomegaly.

The laboratory findings showed leukocytosis (20.34 x 109/L) with neutrophilia (NE# 15.16 x 103/µL), hypochromic-microcytic moderate anemia (HGB 8.40 g/L; MCV 73.10 fL; MCH 25.10 pg), elevated liver enzymes (ALT 75.00 U/L; AST 68.00 U/L), and positive result of fecal occult blood test (FOBT). TUBEX TF test showed reactive IgM against Salmonella typhi (Score 6).

On abdominal ultrasonography (USG) (Figure 1), a solid heterogenous mass with well-defined lobulated margin was found on the right lobe of the liver, sized ± 7.4 x 4.6 x 8.8 cm. Intra- and peri-lesion vascularization was observed on color doppler ultrasonography (CDUS). Contrast-enhanced CT (**Figure 2** and **Figure 3**) later showed hepatomegaly with a well-defined margin and thick wall cystic lesion on the eighth segment of right liver lobe, confirming a picture of solitary liver abscess. Based on those findings, the patient was diagnosed with suspected liver abscess due to complicated typhoid fever.

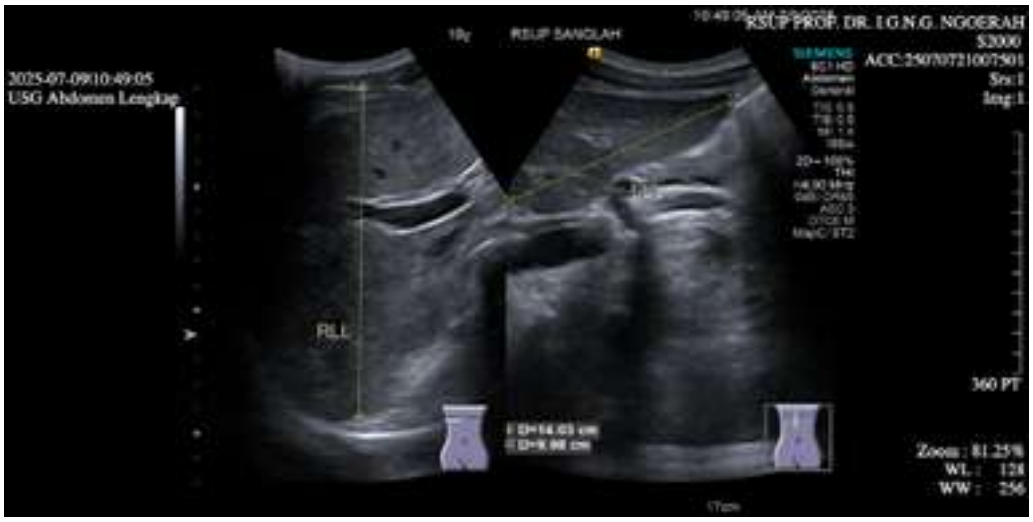

Figure 1: Abdominal USG revealed a mass on the right lobe of the liver

Figure 2: Contrast-enhanced CT revealed hepatomegaly and a cystic lesion on the eighth segment of right liver lobe
(Coronal view)

Figure 3: Contrast-enhanced CT revealed hepatomegaly and a cystic lesion on the eighth segment of right liver lobe
(Axial view)

In the beginning, the patient was initially treated with Ceftriaxone single antibiotic therapy (2 gr/once/day), alongside symptomatic medicines (e.g. Paracetamol, Domperidone), and was planned to get PRC transfusion with HGB target of 10 g/L. On the third day of admission, the patient was still experiencing right upper quadrant abdominal pain, hence the USG was conducted. Soon after knowing the result, the initiation of additional intravenous Metronidazole was started, and the clinical condition then gradually improved. The patient was also suggested to undergo abscess drainage procedure but declined due to personal reasons. The patient then discharged after finishing 14 days of Metronidazole therapy.

METHOD

This study employs a descriptive case report design to document the rare complication of liver abscess in a patient diagnosed with typhoid fever caused by *Salmonella typhi*. The research follows the standard clinical diagnostic and therapeutic procedures in a hospital setting, focusing on a 19-year-old male who presented with symptoms consistent with typhoid fever complicated by a liver abscess.

Sample Selection:

The case study involves a single patient who was admitted to the hospital with a confirmed diagnosis of typhoid fever complicated by a liver abscess. The patient's history, clinical presentation, laboratory findings, imaging results, and treatment outcomes were comprehensively analyzed.

Data Collection:

1. **Clinical History**: A detailed medical history was obtained from the patient regarding the duration of symptoms, past medical conditions, and treatment prior to hospital admission.

2. **Physical Examination**: A thorough physical examination was performed to assess clinical signs such as fever, abdominal pain, hepatomegaly, and conjunctival pallor.
3. **Laboratory Tests**: Blood tests, including leukocyte count, liver enzyme levels (ALT, AST), and fecal occult blood test, were conducted. The *TUBEX TF* test was utilized for *Salmonella typhi* detection.
4. **Imaging**: Abdominal ultrasonography and contrast-enhanced CT were used to confirm the presence and location of the liver abscess.

Data Analysis:

Descriptive analysis of clinical, laboratory, and imaging findings was performed to illustrate the progression of the disease and response to treatment. Comparisons with existing case reports and literature on liver abscess in typhoid fever were made to highlight the rarity and complexity of the condition.

Ethical Considerations

Informed consent was obtained from the patient for publication of the case details. The confidentiality of patient information was maintained in compliance with medical ethics guidelines.

RESULTS AND DISCUSSION

Clinical, laboratory, and imaging findings in this case demonstrated classical features of pyogenic liver abscess superimposed on typhoid fever. The patient's leukocytosis with neutrophilia, elevated liver enzymes, and positive TUBEX TF test confirmed both the infectious etiology and the hepatic complication. Imaging studies revealed a solitary abscess in the right hepatic lobe, consistent with the typical location described in previous reports of Salmonella-associated liver abscesses.

Liver abscess is a rare complication of typhoid fever. There are several possibilities for its pathogenesis, one is the migration of S. typhi to the liver in an asymptomatic carrier, and the other is hematogenous migration from the focus during the intestinal phase of typhoid state—as the primary pathophysiological mechanism involved in typhoidal Salmonella infection is invasion of distal ileum mucosa followed by bacteremia and seeding in different organs.

In the present case, several patient-specific risk factors may have contributed to the development of liver abscess. First, the nine-day duration of fever prior to hospital admission suggests delayed healthcare-seeking behavior, allowing prolonged bacteremia and subsequent hepatic seeding. Second, the patient's history of hematochezia one month prior to admission raises the possibility of pre-existing gastrointestinal pathology that may have facilitated more invasive infection. Third, the presence of moderate anemia (HGB 8.40 g/L) at presentation suggests chronic blood loss or hemolysis, which could have compromised host immune response. These factors collectively created a favorable environment for the progression from uncomplicated typhoid fever to suppurative hepatic complication.

Additional predisposing factors for Salmonella liver abscess documented in the literature include intravenous drug use, spread of a contiguous infectious process, hemoglobinopathies,

pre-existing hepato-biliary diseases, malignant tumors, and immunosuppressed condition. While these classical risk factors were not identified in our patient, the combination of delayed presentation and possible underlying gastrointestinal pathology appears to have been sufficient to allow abscess formation.

Patients with Salmonella liver abscess have clinical and laboratory findings similar to those observed in patients with other bacterial hepatic abscesses. Recent advances in diagnostic imaging have significantly improved the detection and characterization of hepatic abscesses. Ultrasonography and CT are highly sensitive to the diagnosis of liver abscesses. Pyogenic abscesses can be single or multiple, and Salmonella abscesses, like amebic abscesses, are predominantly solitary and located in the right lobe. This anatomical predilection is attributed to the preferential blood flow to the right hepatic lobe via the portal vein, facilitating bacterial seeding in this region. Both ultrasound and CT scan can be used to guide needle aspiration for etiological diagnostic and therapeutic purposes. All pyogenic abscesses should be aspirated to guide antibiotic therapy, which should be started as soon as the diagnosis is suspected, and should be directed at anaerobes and Enterobacteriaceae.

The management approach in this case reflects current evidence-based guidelines for pyogenic liver abscess secondary to enteric fever. Pyogenic Liver Abscess (PLA) caused by S. typhi requires drainage by open or percutaneous methods, in addition to prolonged courses of antibiotics. Current international guidelines recommend intravenous Ceftriaxone or Fluoroquinolones for 14-21 days. Alternate therapy for susceptible strains is Cotrimoxazole, Ampicillin, or Chloramphenicol for 14-21 days. In this case, the initial monotherapy with Ceftriaxone proved insufficient, necessitating the addition of Metronidazole to provide adequate anaerobic coverage. This therapeutic modification resulted in marked clinical improvement, underscoring the importance of broad-spectrum antibiotic coverage in hepatic abscess management. The patient's refusal of percutaneous drainage, while suboptimal, did not preclude successful treatment, though it may have prolonged the recovery period and increased the risk of complications. Combined surgical and clinical treatment of a Salmonella intraabdominal abscess showed to have good prognosis in adults.

This case contributes to the growing body of evidence regarding atypical presentations of typhoid fever in endemic regions. The combination of delayed presentation, pre-existing gastrointestinal symptoms, and anemia created a clinical scenario conducive to suppurative complications. Future research should focus on identifying predictive markers for hepatic complications in typhoid fever patients, which could facilitate earlier intervention and improved outcomes.

CONCLUSION

Liver abscess represents a rare yet serious complication of typhoid fever, demanding early recognition and aggressive management with prolonged intravenous antibiotics and often percutaneous drainage, unlike uncomplicated cases that respond to short-course oral therapy. This case underscores delayed presentation, pre-existing gastrointestinal pathology, and anemia as potential risk factors for suppurative hepatic complications, urging clinicians—especially in resource-limited settings—to maintain high suspicion for atypical presentations involving prolonged fever, right upper quadrant pain, and elevated liver enzymes to prevent

diagnostic delays and morbidity. For future research, prospective cohort studies in endemic regions could investigate the incidence, risk factors, and optimal antimicrobial regimens for typhoid-related liver abscesses, potentially incorporating advanced imaging and molecular diagnostics to improve outcomes.

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