International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 16; Issue: 11; November 2026
Website: www.ijhsr.org
Case Report *ISSN: 2249-9571*

Typhoid Fever Beyond the Gut: A Postmortem Diagnosis of Fatal Myocarditis and Acute Respiratory Distress Syndrome: A Case Report

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DOI: https://doi.org/10.52403/ijhsr.20261113

Received: 02/07/2026; Revised: 18/09/2026; Accepted: 03/11/2026

ABSTRACT

Typhoid fever, caused by *Salmonella enterica* serovar Typhi, is a systemic infection that predominantly affects the gastrointestinal tract but may rarely involve other organ systems. Cardiopulmonary complications such as myocarditis and acute respiratory distress syndrome (ARDS) are uncommon and often underrecognized. We report a fatal case of enteric fever complicated by myocarditis and ARDS, diagnosed on postmortem examination.

A 28-year-old female presented with fever, chills, rigours, and vomiting for five days. Laboratory investigations revealed severe thrombocytopenia, and serology was positive for typhoid fever. Despite empirical antimicrobial therapy, the patient deteriorated rapidly, developed acute respiratory distress, and succumbed four days after admission. Autopsy findings were grossly unremarkable. Histopathological examination revealed lymphocytic myocarditis and diffuse alveolar damage with hyaline membrane formation consistent with ARDS. Other organs showed no significant pathology.

This case underscores the importance of recognising rare but fatal cardiopulmonary complications of typhoid fever and maintaining a high index of clinical suspicion in severe cases.

KEYWORDS: typhoid, myocarditis, acute respiratory distress syndrome

INTRODUCTION

Typhoid fever, also known as enteric fever, is a systemic infectious disease caused by *Salmonella enterica* serovar Typhi (*S. Typhi*) and, less commonly, by *Salmonella enterica* serovar Paratyphi A. It remains a major public health challenge in developing and underdeveloped countries because of inadequate sanitation, unsafe drinking water, and limited access to healthcare. [1] Despite appropriate antimicrobial therapy, enteric fever remains associated with significant morbidity and mortality, particularly when complicated by multiorgan involvement.

The clinical manifestations of enteric fever vary and range from nonspecific symptoms such as low-grade fever, headache, fatigue, malaise, anorexia, cough, constipation, and rose spots to severe systemic disease. In

complicated cases, potentially fatal outcomes may result from encephalitis, cranial neuritis, intestinal haemorrhage or perforation, and, infrequently, cardiopulmonary complications such as pneumonitis and myocarditis. [2] Pulmonary involvement in typhoid fever is rare but may present as interstitial pneumonitis or progress to acute respiratory distress syndrome (ARDS), particularly in the setting of severe sepsis. [3]

Myocarditis refers to inflammation and injury of the cardiac muscle and can be fatal. Viral infections are the most common cause, with an epidemiological shift from Coxsackie B virus and adenovirus in earlier decades to parvovirus B19 as the most frequently identified pathogen in recent studies. [4] Bacterial myocarditis is uncommon, with a reported prevalence ranging from 0.2% to 1.5%, but should be considered in patients presenting with sepsis and unexplained ventricular dysfunction. [3] Owing to its nonspecific clinical features, myocarditis is frequently overlooked unless a high index of clinical suspicion is maintained. [5]

We report a rare and fatal case of enteric fever complicated by myocarditis and ARDS, diagnosed on postmortem histopathological examination, highlighting the importance of recognizing atypical and life-threatening manifestations of typhoid fever.

CASE REPORT

A 28-year-old female presented to the emergency department with a history of fever associated with chills and rigors, along with vomiting, for five days. Initial laboratory investigations revealed severe thrombocytopenia, and serological testing was positive for typhoid fever. The patient was started on empirical antibiotic therapy and supportive management.

Despite treatment, the patient failed to show clinical improvement, and her condition progressively deteriorated. She subsequently developed an acute onset of shortness of breath and respiratory distress. Over the next four days following admission, she worsened rapidly and eventually succumbed to the illness.

A complete medicolegal autopsy was performed, and viscera were submitted for histopathological examination. The specimens received included the heart, both lungs, liver, spleen, and both kidneys. No gastrointestinal organs were available for examination.

On gross examination, all organs appeared unremarkable. Microscopic examination of multiple sections from different regions of the heart revealed (Figure 1) mild to moderate inflammatory infiltrates between cardiac muscle fibres and adjacent fibro-adipose tissue involving the apex, right ventricular wall, and left ventricular wall. The infiltrate was predominantly lymphocytic, consistent with features of acute myocarditis.

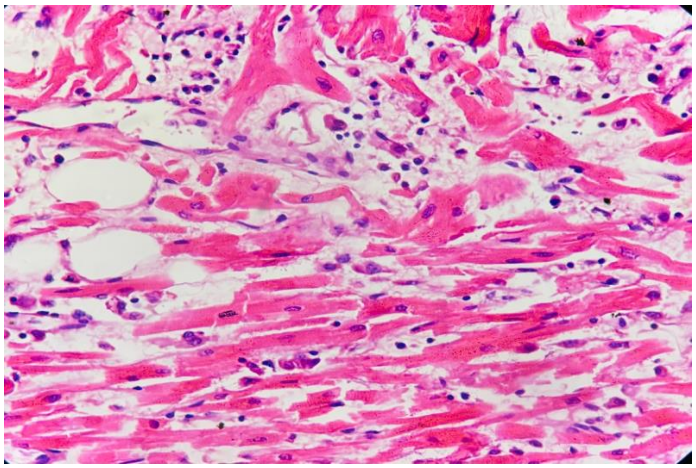


Figure 1- Acute myocarditis-Inflammatory infiltrate with fragmented cardiac myocytes (H&E 400x)

Histopathological examination of lung sections showed (Figure 2) diffuse acute inflammatory infiltrates within the alveolar spaces, fragmented alveolar septae, and eosinophilic hyaline membrane–like formations, findings consistent with acute respiratory distress syndrome. Liver, spleen, and kidney sections were unremarkable with congested blood vessels.

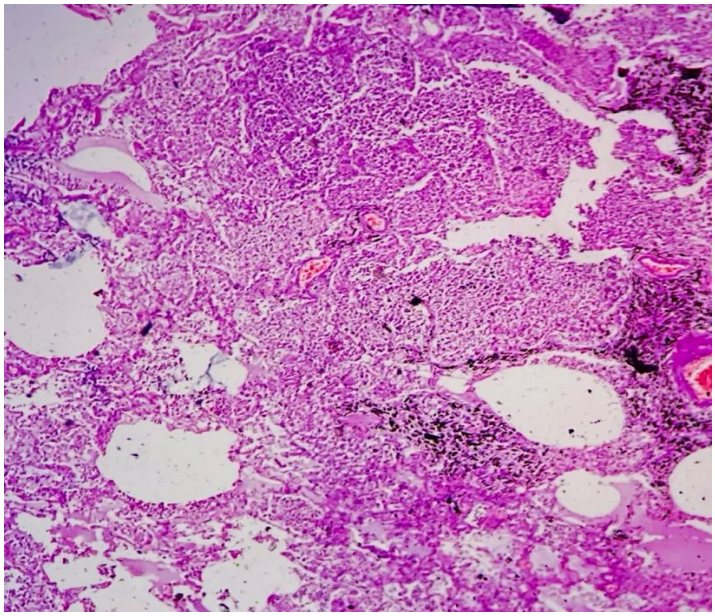


Figure 2- Pneumonitis- Acute inflammatory infiltrate within the alveoli with destruction of the alveolar septa. (H&E 100x)

DISCUSSION

Enteric fever is a systemic illness with protean manifestations, often involving multiple organ systems, which may pose significant diagnostic challenges. Cardiovascular complications have been reported in approximately 1%–5% of patients with typhoid fever and include myocarditis and endocarditis as the most common entities, while pericarditis and arteritis are less frequently encountered. [5] Myocarditis remains an unusual but serious complication, with the first reported case dating back to 1884.

Clinically, myocarditis may be asymptomatic or present with a wide spectrum of manifestations, ranging from mild inflammation to fulminant congestive heart failure. Patients may develop atypical chest pain, dizziness, syncope, palpitations, or life-threatening atrial and ventricular arrhythmias. Due to the nonspecific nature of these symptoms, myocardial involvement may be easily overlooked in the absence of a high degree of clinical suspicion. [2] Cardiovascular insufficiency resulting from typhoid myocarditis has been identified as a leading cause of mortality during the second week of illness, often in association with septicemia. [5]

Pulmonary complications in typhoid fever are uncommon and include bronchitis, interstitial pneumonitis, pleural effusion, and rarely ARDS. The pathogenesis of ARDS in enteric fever is thought to be multifactorial, involving hematogenous dissemination of *Salmonella*, endotoxin-mediated cytokine release, and immune-mediated alveolar-capillary damage. Progression to ARDS significantly increases mortality, particularly in patients with delayed diagnosis or inadequate treatment. [3]

The diagnosis of myocarditis relies on a combination of clinical, laboratory, and imaging findings. Echocardiography and electrocardiography serve as useful adjuncts but often yield nonspecific results. Cardiac magnetic resonance imaging (CMR) has emerged as a valuable noninvasive

diagnostic modality. Endomyocardial biopsy may be considered in selected cases with life-threatening arrhythmias or refractory heart failure. [2] However, in fatal cases, histopathological examination at autopsy remains the gold standard for diagnosis.

The characteristic pathological features of typhoid myocarditis include inflammation of intramural vessels, microcirculatory disturbances, stromal oedema, lymphocytic and macrophage infiltration, occasional granuloma formation, and dystrophic or necrotic changes in cardiomyocytes. [6] The present case demonstrated classic histomorphological features of acute myocarditis along with pulmonary findings consistent with ARDS, establishing the cause of death.

CONCLUSION

Enteric fever is associated with a wide spectrum of clinical manifestations, ranging from asymptomatic infection to fatal multiorgan involvement. Myocarditis and ARDS are rare but life-threatening complications that may occur even in immunocompetent individuals. Due to their nonspecific presentation, these complications are at risk of being overlooked, underscoring the need for a high index of clinical suspicion. [2] Routine cardiovascular evaluation, including electrocardiography and serial noninvasive imaging, should be considered in patients with severe enteric fever. Early recognition and timely intervention may significantly reduce morbidity and mortality. [4]

Declaration

Ethical Approval: Approved
Acknowledgement: None
Source of Funding: None
Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Rani U, Jindal M, Verma R, Kataria SP, Singh S. Typhoid fever beyond the gut: a postmortem diagnosis of fatal myocarditis and acute respiratory distress syndrome: a case report. *Int J Health Sci Res.* 2026; 16(11):111-114.
DOI: *https://doi.org/10.52403/ijhsr.20261113*

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