

Enteric Fever complicated by ARDS - A Case Report

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1. Abstract

Enteric fever(EF) is caused by Salmonella Typhi, Gram negative obligate anaerobe. EF typically presents with fever and gastrointestinal symptoms. Respiratory complications of this disease such as Acute Respiratory Distress Syndrome (ARDS) are seldom reported. Here, we report a case of a 15-year-old female who presented with high grade fever and sudden onset breathlessness for 2 days. On examination, she was hypoxic and had relative bradycardia. A diagnosis of EF complicated by ARDS was made. She was treated with broad spectrum antibiotics and steroids. This case report highlights the respiratory complications of EF and emphasizes the role of steroids in severe pneumonia.

2. Introduction

Salmonella Typhi is a Gram-negative bacillus and an obligate anaerobe that is responsible for causing Enteric Fever. Annually, 11–21 million cases of typhoid fever occur worldwide each year, with predominance in India [1,2]. It is transmitted via contaminated water and food with an incubation period of 7–14 days. Patients may present with fever, gastrointestinal symptoms, and characteristic rose spots along with generalized weakness. Among the reported complications of enteric fever are - intestinal perforation, intestinal hemorrhage, myocarditis and cholecystitis[1]. Few cases have reported respiratory complications of enteric fever including acute respiratory distress syndrome(ARDS) [3-5]. Here we describe a case of a 15-year-old female with recent travel history and sudden onset breathlessness, diagnosed with enteric fever. The objective is to heighten awareness among healthcare professionals regarding respiratory complications of enteric fever.

3. Case Summary

A 15 year old female presented with chief complaints of high grade fever, sudden onset breathlessness, at rest and dry cough since the last 2 days. 10 days prior to this presentation, patient had % high grade fever, associated with chills and rigors, intermittent, with single fever spike per day, without diurnal variation and intermittent afebrile period for 2 days. Fever was relieved upon medication. This was followed by abdominal pain, 3-4 episodes of vomiting per day. Vomitus was non bilious, non bloody. She also had headache, holocranial in nature.

She gave recent travel history to a coastal area. On the 2nd day of travel, she developed high grade fever and dry cough. For this, she was admitted at another hospital. Xray chest at this hospital was suggestive of bilateral consolidation with effusion. Due to worsening hypoxia, she was referred to our hospital.

There was no history of:

- Weight loss
- Diarrhea, jaundice, yellowish discoloration of urine
- Swelling of legs, paroxysmal nocturnal dyspnoea

- Rash, myalgias, sore throat, running nose
- burning during micturition, per vaginal discharge
- joint pains, recurrent oral ulcers, dry mouth, skin tightening, Raynaud's

She is an operated case of hemorrhoidectomy 1.5 years prior to presentation.

She lives in a joint family. They have a pet dog. There is no other significant family history.

She has taken 3 doses of the COVID-19 vaccine. Her last menstrual period is 20/06/24, with regular cycles lasting for 4 days.

On presentation at this hospital, the patient was afebrile, with a pulse rate of 110/min, blood pressure of 120/80mmHg. Her oxygen saturation was 90% on room air. On respiratory examination, air entry was reduced bilaterally and there were crepitations in the left infraclavicular region. There was tenderness in the left hypochondria and lumbar region. There was no pallor, icterus, lymphadenopathy or pedal edema. She was started on non-invasive ventilatory support. Her laboratory investigations were suggestive of normal counts with predominance of neutrophils, hypokalaemia, transaminitis, positive CRP and PCT- highly suggestive of bacterial infection. Ultrasound of the abdomen revealed lymphadenopathy in the right iliac fossa and pericardial region. Chest X ray was suggestive of bilateral pleural effusion and consolidation. Dengue NS1, IgM was negative. Widal was positive with a titre of [O1:120 H 1:140].

Respiratory Biofire was sent which was negative. Urinary Legionella was also negative.

HRCT was suggestive of Mild pleural effusion with underlying basal atelectasis, interstitial fluid tracking and fissural extension noted on both sides. Multiple discrete and confluent nodular infiltrates noted in bilateral lung fields. Dense area of consolidation in basal segments of bilateral lower lobes sparing anterior basal segment of right lower lobe and anteromedial basal segment of left lower lobe.

Sputum, blood, urine and stool cultures were sent. They did not reveal any growth.

In view of clinical history, relative bradycardia and a positive widal titre (repeated twice in 7 days), a final diagnosis of enteric fever complicated by ARDS was made.

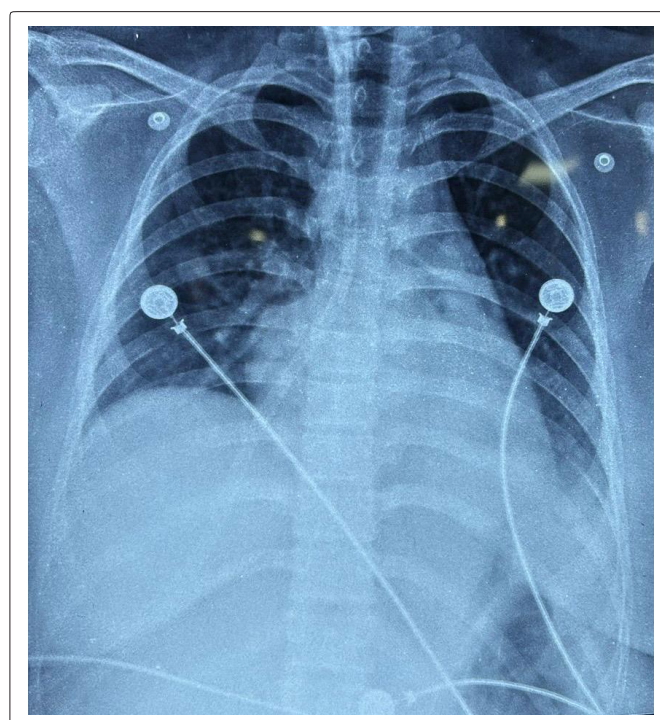
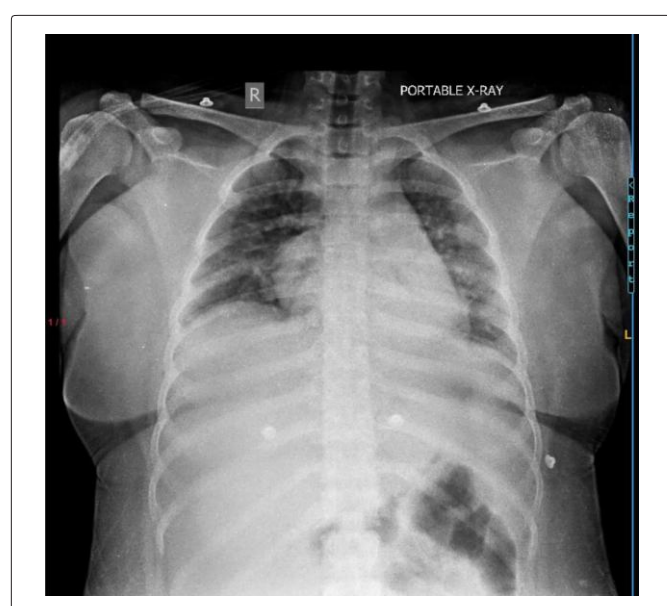
The patient was managed with supportive therapy, broad spectrum antibiotics- meropenem, clindamycin, oseltamivir, bronchodilators and a trial of high dose steroids was given, in view of moderate ARDS. Patient's oxygen requirement gradually went down and her general condition improved. Chest physiotherapy was encouraged. She was discharged at stable vitals.

4. Discussion

Enteric fever(EF) is common among developing countries. Annually, 11–21 million cases of typhoid fever occur worldwide

Laboratory investigations

DATE	27/06	30/6	1/7	2/7	3/7	4/7
HB	9.7	10.3	10.0		10.2	10.1
WBC	5840	6.41	8.89		10.43	11.54
PLT	216	152	155		322	447
N/L/E	83/12/1	75/15/1	75/20/1		77/17/1	76/16/1
HCT	26.9	32.3	30.5		31.9	31.2
MCV / RBC	92/2.92	100.4/3.22	100.8/3.03		103.9/3.07	104/3
UREA		22.3				
CREAT		0.58			0.51	
NA ⁺		139				
K ⁺		3.31		3.38	3.67	4.11
ALT/AST	34.5	66/109			39/32	
ALP		211			124	
TB/DB		1.06/0.65			0.64/0.31	
TP/ALB		6.35/3.22			6.21/3.27	
CRP	248.7	212.5			24.3	15.56
PCT			0.53			



each year, with predominance in India. A large scale study conducted in an Urban slum setting in India concluded the incidence to be 2/1000 population/year under five years of age and 5.1/1000 populations/year under 10 years of age[1,2] S.typhi is transmitted via contaminated food and water,with vehicles being flies,urine and stool. The microorganism enters the bloodstream via small intestine resulting in primary bacteremia and in the blood, it is rapidly phagocytosed by macrophages and the reticuloendothelial system(RES). Viable bacteria multiply within the RES and enters the blood stream again after few days or weeks giving rise to secondary bacteremia. This results in localised infection of other organs and subsequently causes complications. The incubation period may last 3 days to 3 weeks. The most common symptoms reported are fever and diarrhoea,with a majority of patients following a benign course. It can also manifest like an influenza illness, abdominal discomfort, constipation,weakness and dizziness.The complication rate depends on the ingested involucum dose, host's immunity, previous exposure and virulence of the strain[6]. The reported complications mainly consists of intestinal perforation, intestinal hemorrhage, myocarditis and cholecystitis. Our patient presented with high grade fever, shortness of breath and gastrointestinal symptoms. In a case report similar to ours by Das et al, an adult in India presented with Arthritis

as a complication of EF and ARDS 5 days after initiation of antibiotic therapy[5]. Another case highlights a teenager diagnosed with EF complicated by Shock and subsequently ARDS [4]. In our patient, A RT-PCR biofire test was carried out which came back negative for H. Influenzae, Mycoplasma, SARS-Cov-2 and H1N1. There were no typical symptoms of Tuberculosis and no such risk factors were present, making mycobacterium tuberculosis an unlikely pathology. Urinary antigen test for Legionella also came back negative. There was no autoimmune history. SLE was ruled out by negative ANA titres by Immunofluorescence. S. Lipase levels came back normal, hence ruling out acute pancreatitis. The presentation being acute and at a young age made malignancy to be unlikely in this patient. Out of all the tests mentioned above, a positive widal test in addition to gastrointestinal symptoms supported our diagnosis. A chest X-ray and HRCT thorax showing bilateral infiltrates and consolidation, not fully explained by cardiac failure or fluid overload, along with hypoxemia met the criteria to conclude our diagnosis of ARDS. Few cases have been described with patients developing respiratory complications due to enteric fever[7]. In our case also, a steroid trial was given in view of worsening hypoxia. There have been trials that prove role of steroids in severe pneumonia[8]. Dexamethasone was found to have a role in hypoxic patients with severe COVID 19 during the pandemic[9]. Our patient also improved with steroids. In a teenage patient developing ARDS and septic shock secondary to enteric fever, steroid trial improved the clinical course[4]. Our case report has several limitations. Although Widal titres were positive for this patient, we could not confirm Salmonella Typhi on microbiological cultures. Widal is not gold standard for diagnosis of enteric fever. Widal may be false positive in several conditions [10]. Our patient was not responding to empirical therapy and hence higher antibiotics were administered in view of worsening condition of the patient. Our patient had already been partially treated at another hospital and this could have altered the clinical course of her illness and had a bearing on her investigations.

5. Conclusion

we would like to emphasize that ARDS may present as a rare complication of enteric fever. And there is a role of steroids in severe pneumonia causing ARDS.

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