

## Case Report



## A Case Report of Disseminated Tuberculosis with Multiple Diagnosis in an Adolescent

**Gayathri Kothawar<sup>1\*</sup>, Lavanya Neerudi<sup>1</sup>, Ramya Balaprabha<sup>2</sup>**

1. Pharm D 6<sup>th</sup> Year, Department of Pharm D, CMR College of Pharmacy, Kandlakoya, Hyderabad, India.
2. Assistant Professor, Department of Pharm D, CMR College of Pharmacy, Kandlakoya, Hyderabad, India.

\*Corresponding author's E-mail: [kothawargayathri@gmail.com](mailto:kothawargayathri@gmail.com)

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### ABSTRACT

There are generally 4 different types of tuberculosis which include Pulmonary Tuberculosis, Avian Tuberculosis, Bovine Tuberculosis, and Miliary Tuberculosis. Among these, the severe and rare kind of tuberculosis is Miliary Tuberculosis which is also called Disseminated Tuberculosis which invades the bloodstream and spreads to all the body organs. This type of TB is most commonly seen in immunocompromised patients such as those with HIV infection, smokers, chronic alcoholics, and patients with other comorbidities. The lungs are the primary organs affected by tuberculosis, the infection can spread to other organs via the lymphatic system, a process known as lymphohematogenous dissemination. Lung, liver, spleen, bone marrow, kidney, adrenals, eyes, and thyroid are among these organs. Cough, shortness of breath, fever, abdomen pain, joint problems, pallor, and weight loss are all common symptoms. Complete blood count, chest X-ray, CT scan, Tuberculin skin test (PPD test), Thoracentesis, sputum examinations and cultures, Interferon Gamma Release Assays (IGRAs), Mycobacterial culture, and Polymerase chain reaction are some of the diagnostic procedures available (PCR). Polyserositis is sometimes linked to tuberculosis, a condition in which the pleura, pericardium, and peritoneum are inflamed, resulting in a severe effusion. Symptoms are comparable to those of tuberculosis (TB). Because it's linked to autoimmune illness, malignancies, and sepsis, diagnosing it might be difficult.

**Keywords:** Miliary Tuberculosis, Disseminated tuberculosis, immunocompromised, comorbidities, polyserositis.

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### INTRODUCTION

Disseminated tuberculosis is one of the rare types of Mycobacterium infection also called Miliary TB whose mortality rate was found to be approximately 15-20% in children and 25-30% in adults.<sup>1</sup> Lungs are the primary organs that get affected in TB but this infection can also spread to the other organs through a lymph system called the lymphohematogenous spread.<sup>2</sup> These organs include the lung, liver, spleen, bone marrow, kidney, adrenals, eyes, and thyroid.<sup>3</sup> Incidence of dTB was found to be high in immunocompromised patients such as HIV-infected patients (causes rapid fatality), chronic smokers, alcoholics, and people with comorbidities. Although these factors are not seen in adolescents, studies show that children in their puberty are at high risk of developing dTB due to compromised immunity and due to the changes in the hormones which provides a suitable environment for rapid colonization and widespread of mycobacterium.<sup>1,4</sup>

The risk of being affected is high when surrounded by people affected with TB, an unhygienic and crowded

environment, poor nutrition, or malnutrition. Common symptoms include cough, Shortness of breath, fever, abdominal pain, joint pains, pallor, and weight loss. Diagnostic tests include Complete blood picture, Chest X-Ray, CT scan, Tuberculin skin test (PPD test), Thoracentesis, sputum examinations, and cultures, Interferon Gamma Release Assay (IGRAs), Mycobacterial culture, Polymerase chain reaction (PCR)<sup>5,6</sup>

Polyserositis is sometimes associated with TB, a condition where there will be inflammation of different serous membranes like pleura, pericardium, and peritoneum with serious effusion. Associated symptoms are similar to TB. Diagnosis is generally tough as it is associated with several other conditions such as autoimmune disease, tumours, and sepsis.<sup>7,8</sup>

This is the rare case of Disseminated tuberculosis in a 14-year-old girl, initially diagnosed with polyserositis and finally concluded to be Disseminated Tuberculosis. This case report highlights the difficulty of diagnosing the disease in adolescent who is not associated or exposed to any risk factors, also had no traveling history and exposure to diseased people. Delayed hospitalization, resulted in the spread of the disease to the liver and spleen already.

### CASE REPORT

A 14-year-old female patient was admitted to the AMC ward with a fever (relieved on taking medication), cough with sputum, shortness of breath, and loss of appetite for 20days with no comorbidities.



**History of past illness:** Her history of past illness revealed that she was suffering from fever, cough with sputum, shortness of breath for 20 days which got relieved on taking OTC medications. Had an episode of jaundice at 3 years of age.

**Family history:** Had a family history of cervical cancer (grandmother).

**On Examination:**

On examination she looked pale and found to be febrile and stable, pulse rate was found to be 115bpm, spo2 of 92%, BP of 110/80mmHg.

**Examination of the respiratory system:** Chest examination revealed bilateral air entry positive, decreased BS, IAA with crepts in the lower region, orthopnea positive.

**Laboratory investigation:**

**CBP:**

CBP was done 4 times during the hospital stay which revealed decreased hemoglobin and RBC levels to 7g/dl and 2.92 million/cumm respectively. The patient was on Tablet Iron folic acid initially but fully recovered after 3 pints of blood transfusion on the 7<sup>th</sup> and 12<sup>th</sup> day of hospital stay. Erythrocyte sedimentation rate was found to be 12mm/hour (1<sup>st</sup> hour) and 25mm/hour (2<sup>nd</sup> hour). All other parameters were found to be normal.

**Liver function test and Renal function test:**

Blood urea, and serum creatinine tests were performed 5 times and confirmed to be normal each time, total serum bilirubin was increased to 3.2mgdl on the 10<sup>th</sup> day, and SGOT and SGPT were normal. Electrolytes were found to be normal.

**Anti-smooth muscle antibody (ASMA):**

The level of liver-kidney microsome (LKM) is measured in this test and was determined to be normal at 9.63 IU/L. (Negative < 15 U/L, Positive > 15 U/L)

**Anti-mitochondrial antibody (ELISA):**

Was done on the 9<sup>th</sup> day and levels were found to be normal that is 0.42 (Negative < 0.9 index value, Positive above 1.1 index value)

**Antinuclear antibody test:** Was done on the 6<sup>th</sup> day and the result was negative.

**Ascitic fluid for cytology:** Was done on 9<sup>th</sup>-day cytosmears showed clusters of neutrophils, lymphocytes, eosinophils,

histocytes, and reactive mesothelial cells against a hemorrhage background. No evidence of atypical cells.

**Ascitic fluid-cell count:** Color- pale red, turbid, cells count was 180cells, polymorphs 20%, lymphocytes 80%, mesothelial cells 2-3/hpf, RBC and other cells 10-12/hpf.

**Pleural fluid for cytology:** Done on 3<sup>th</sup> day of admission and showed lymphocytic pleocytosis, total protein in pleura is 2.2 and sugars is 140.

**ADA Levels- Ascitic fluids:** Found to be more than the normal value that is 42 IU/L (0-28 IU/L)

**Ceruloplasmin levels:** were found to be 49.02g/l (20 to 60g/l)

**Mantoux test:** Was done on the 7<sup>th</sup> day of admission and there was no induration found.

**Thoracentesis:** Left-sided thoracentesis was done and 250 ml of straw-colored fluid was aspirated.

**Ascitic fluid culture test:** No bacterial growth was found.

**C- Reactive protein:** Initially on the day was found to be high 29.4

**Ultrasound of abdomen:** Was done on 5<sup>th</sup> day of admission which revealed mild hepatomegaly with coarse echotexture, mild splenomegaly, mild ascites, and pleural effusion,

**X-Ray:** X ray shows cardiomegaly with bilateral mild pleural effusion.



Figure 1: X-ray

**Table 1: Treatments**

S.No	Diagnosis	Duration	Treatment
1.	Pleural effusion, Type 1 respiratory failure on oxygen, anemia	Day 1 to Day 4	1. Inj. Monocef 1g IV BD. 2. Inj. pan 40mg IV OD 3. T. IFA OD 4. T. Paracetamol 500mg OD
2.	Pleural effusion, polyserositis? pulmonary tuberculosis, anemia, ascites	Day4 to Day6	1. Inj. Monocef 1g IV BD 2. Inj pan 40mg IV OD 3. T. IFA OD 4. T. Paracetamol 500mg OD
3.	Pleural effusion, polyserositis, pulmonary tuberculosis, anemia, ascites	Day7 to Day9	1. Inj. piptaz 2.25g IV TID 2. Inj. Pantoprazole 40mg IV OD 3. T. IFA OD 4. T. PCM 500mg TID 5. Inj. optineuron 1amp in 100ml NS OD
4.	Pyrexia of unknown origin, polyserositis, chronic liver disease with portal hypertension, pleural effusion with anemia, ascites, Pedal edema. R/O Wilson's disease & abdominal Koch	Day 9 to Day 11	1. Inj. piptaz 2.25g IV TID 2. Inj. Pantoprazole 40mg IV OD 3. T. IFA OD 4. T. PCM 500mg TID 5. Inj. Lasix 40mg IV BD 6. Inj. Human Albumin 20% in 100ml NS IV BD
5.	Pyrexia of unknown origin, polyserositis, chronic liver disease with portal hypertension, pleural effusion with anemia, ascites with abdominal Koch	Day11 to Day14	1. Inj. piptaz 2.25g IV TID 2. Inj. Pantoprazole 40mg IV OD 3. T. IFA OD 4. T. PCM 500mg TID 5. Inj. Lasix 40mg IV BD 6. Inj. Human albumin 20% in 100ml NS IV BD 7. ATT category 2tab/day 8. T. Benadon 40mg OD
6.	Disseminated Tuberculosis? Pyrexia of unknown origin, polyserositis, abdominal Koch with anemia	Day15 to Day18	1. Inj. piptaz 2.25g IV TID 2. Inj. Pantoprazole 40mg IV OD 3. T. IFA OD 4. T. PCM 500mg TID 5. Inj. Lasix 40mg IV BD 6. Inj. Human albumin 20% in 100ml NS IV BD 7. ATT category 2tab/day 8. T. benadon 40mg OD
7.	Disseminated Tuberculosis; Pyrexia of unknown origin, polyserositis with anemia	Day 19 to Day 23	1. Inj. Pantoprazole 40mg IV OD 2. T. benadon 20mg OD 3. T. IFA OD 4. Inj. piptaz 4.5gm IV TID 5. T. wysolone 20mg OD
8.	Disseminated tuberculosis with pleural effusion with anemia recovered	DISCHARGED	1. ATT 3 tab/day 2. T. wysolone 20mg OD 3. T. benadon 40mg OD 4. High protein diet Ensure protein powder

## DISCUSSION

Disseminated tuberculosis is a rare kind of tuberculosis which is most commonly seen in immunocompromised patients such as HIV patients, underdeveloped immune systems, chronic smokers, alcoholics, people with comorbidities and rarely due to hormonal changes in adolescents and it has the high risk of morbidity and mortality especially in children under 15 years of age.<sup>3</sup> This is the rare condition of disseminated tuberculosis in a 14-year-old girl having no comorbidities and no exposure to any risk factors. In disseminated tuberculosis infection generally spread to other organs like the liver spleen, bone marrow, kidneys, eyes, thyroid, and other organs through the lymph.<sup>2,3</sup> The mortality rate in children is 15 to 20% because of late diagnosis. Quick start of treatment is found to improve the mortality.<sup>1</sup> In this case the infection has already spread to the liver and spleen due to the delay of hospitalization, though she was symptomatic for 20 months, which in addition resulted in further delay of diagnosis and worsened the condition.

In this case, the anti-TB medications were started from the 11<sup>th</sup> day of hospitalization due to the difficulty in diagnosis, multiple symptoms, and multiple organ involvement. TB if not diagnosed or identified in the early stages can lead to Disseminated TB and it can be fatal within a year if not treated properly.<sup>9</sup> In this case on the 16<sup>th</sup> day of admission patient suddenly became unconscious with spo2 37% with 12 liters of oxygen, pulse rate 52 per minute feeble, low volume, BP 70/? And with low GCS, immediately Inj. Midazolam 2cc was given through IV and connected to the ventilator. The next day patient became stable and all the vitals were normal. This case reveals the severity of the disease and the need for early and proper diagnosis and treatment.

Tuberculosis generally involves serous membranes likely pleural, pericardial, and peritoneal sacs and results in complex tuberculous polyserositis.<sup>10</sup> The pleural membrane was involved in this patient and was also diagnosed with polyserositis. However, the final diagnosis was disseminated tuberculosis. Thus, TB can involve multiple diagnosis resulting difficulty in the choice of treatment.

General diagnostic tests include Complete blood picture, Chest X-Ray, CT scan, Tuberculin skin test (PPD test), Thoracentesis, sputum examinations, and cultures, Interferon Gamma Release Assay (IGRAs), Mycobacterial culture, Polymerase chain reaction (PCR)<sup>5,6</sup>. Though the PPD test is specific to TB, it sometimes gives false negative and false positive results which is true in this case, the test declared no induration. Thus, there are no gold standard tests to perform and confirm the disease especially if there is delay of hospitalization irrespective of the presence of symptoms. Sputum test can be of good use in this condition but unfortunately due to the lack of equipment the test was not done in this case.

After conducting all the other available tests and final diagnoses Anti-tuberculosis medications were prescribed for 8 months and the patient was discharged with a complete cure of anaemia, anasarca, and other symptoms with a total of 22 days of hospitalization.

## CONCLUSION

Though Disseminated tuberculosis is a rare kind of tuberculosis especially in adolescents, it is a serious and life-threatening condition. Lack of definite and gold standard diagnostic tool and their facilities, common and undifferentiable symptoms, multiple organ involvement, and delayed hospitalization will result in difficulty of diagnosis and even cause fatality. Thus, complete awareness among low-income areas, which proper diagnostic tools and treatment should be provided to prevent the damage.

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