Diagnosing TB-HIV co-infection: a case report in resource-limited setting

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ABSTRACT

**Introduction:** Human immunodeficiency virus (HIV) and tuberculosis (TB) often occur together with each exacerbating the other. In order to eradicate TB, TB/HIV co-infection must be addressed especially in resource-limited setting as this is becoming challenging at such area.

**Case presentation:** This article reports a 22 years old female patient who experienced other respiratory complaints during the past 1 months, including cough with phlegm, especially in the morning, night sweats, along with headache, fatigue, low appetite, oral candidiasis, and unintentional decrease of weight loss for 5 kgs. Her weight was 42 kg, her body height was 160 cm, and his body mass index (BMI) was 16.4 kg/cm2 (malnourished).

The aim of this case report was to give information about TB and their presentation in HIV-infected persons in resource-limited setting.

**CASE REPORT**

A 22 years old female patient came to the emergency department with chief complaint of shortness of breath for one day, accompanied with productive cough and fever. The patient said the fever started approximately one month prior in biphasic manner. The patient also complained of painful swelling in the left area of the neck for one month. The swelling grew bigger and eventually popped out along with pus. The patient noticed another swelling on the right neck for five days. The patient also experienced other respiratory complaints for the past 1 months, including cough with phlegm, especially in the morning, night sweats, along with headache, fatigue, low appetite, oral candidiasis, and unintentional decrease of weight loss for 5 kgs. Her weight was 42 kg, her body height was 160 cm, and his body mass index (BMI) was 16.4 kg/cm2 (malnourished).

Physical examination showed a blood pressure of 110/70 mmHg, heart rate of 80 beats per minute, respiratory rate of 22 times per minute, body temperature of 37.5°C, oxygen saturation level of 98% on oxygen 3 litres per minute with nasal cannula. Oral candidiasis was observed. Chest retraction was seen, along with the swelling around the neck region, extremities were warm in palpation.

There was an enlarged lymph node in the left neck, solitary, 5 x 4 x 3 cm in size, fixed, border not clear. On the right neck, there was another with same characteristic, 2x3x1 cm in size.

During hospitalisation, the patient was significantly. HIV infection increases the progression of TB infection up to 30-fold, ultimately worsens the severity of TB. It is estimated that more than 36 million individuals in the world contracts HIV. An estimated of 10% TB infection is associated with HIV infection. In order to eradicate TB, TB/HIV co-infection must be addressed.

**Keywords:** tuberculosis, HIV infection, TB-HIV co-infection, diagnosis.

Received: 2022-09-27
Accepted: 2022-11-15
Published: 2022-12-30

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease anciently known for infecting not only the lungs but including other extrapulmonary organs. TB is one of the oldest diseases known to affect humans, and is caused by *Mycobacterium tuberculosis* complex. If properly treated, TB is curable in almost all cases, however, if left untreated, the disease may be fatal.

Transmission of the disease happens through airborne spread of droplet produced by patients with infectious pulmonary TB. Although a curing regimen has been established, TB is still considered as one of the most dangerous emerging disease by the World Health Organization (WHO). Human immunodeficiency virus (HIV) and TB often occur together with each exacerbating the other. HIV co-infection may greatly contribute to the global burden of TB. Early diagnosis of tuberculosis related to HIV co-infection, and prompt institution of antitubercular treatment reduces mortality and morbidity significantly. HIV infection increases the progression of TB infection up to 30-fold, ultimately worsens the severity of TB. It is estimated that more than 36 million individuals in the world contracts HIV. An estimated of 10% TB infection is associated with HIV infection. In order to eradicate TB, TB/HIV co-infection must be addressed.

The aim of this case report was to give information about TB and their presentation in HIV-infected persons in resource-limited setting.

CASE REPORT

A 22 years old female patient came to the emergency department with chief complaint of shortness of breath for one day, accompanied with productive cough and fever. The patient said the fever started approximately one month prior in biphasic manner. The patient also complained of painful swelling in the left area of the neck for one month. The swelling grew bigger and eventually popped out along with pus. The patient noticed another swelling on the right neck for five days. The patient also experienced other respiratory complaints for the past 1 months, including cough with phlegm, especially in the morning, night sweats, along with headache, fatigue, low appetite, oral candidiasis, and unintentional decrease of weight loss for 5 kgs. Her weight was 42 kg, her body height was 160 cm, and his body mass index (BMI) was 16.4 kg/cm2 (malnourished).

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During hospitalisation, the patient was
planned to undergo several diagnostic test. Chest X-ray X-ray examination showed a miliary tuberculosis (Figure 1). The patient was tested for molecular Rapid Test (GeneXpert) M. tuberculosis (M.Tb) was done and the result was positive. The laboratory examination results were white blood cells 11.61 x 10^9/μL, haemoglobin level 7.8 g/dL; haematocrit 23.5%; platelet count 481 x 10^9/μL; neutrophils to lymphocyte ratio was 18.86; AST 82 U/L; ALT 50 U/L; BUN 29 mg/dL; glucose 141 mg/dL; natrium 123 mmol/L; kalium 3.6 mmol/L; chloride 99 mmol/L. FNAB result for lump on the neck showed a miliary tuberculosis infection along with lymphadenitis. The diagnosis of pulmonary tuberculosis, lymphadenitis tuberculosis, and stage IV HIV infection were made. The patient received treatment of intravenous Cefoperazone 1 gram BID; intravenous Omeprazole 40 mg OID; oral Acetyl cysteine 200 mg TID; oral Paracetamol 500 mg TID; Nystatin drops TID; oral Ondacetrone 4 mg BID; anti- tuberculosis medication category I, 3 tablets 4 FDC; PRC transfusion until Hb > 10 gr/dL.

After two weeks of care, the patient stated that the symptoms of shortness of breath and cough were relieved, no tachypnoea, hypoxaemia, candidiasis, and chest retraction were seen. Patient also no longer feel discomfort from side effects of Anti-tuberculosis medication. Patient was discharged, ARV regiments was given on outpatient department three days later. The regimen given was TLE (Tenofovir, Lamivudin, and Efavirenz) once a day.

After 1 months on ARV, Swelling around the neck area has relieved (Figure 2). Laboratory examination showed HIV viral load was measured 2.81 x 10^5 copies/mL (5.45 log copies/mL), white blood cells 4.23 x 10^9/μL, haemoglobin level 12.1 g/dL; haematocrit 36.5%; platelet count 355 x 10^9/μL; AST 19 U/L; ALT 12 U/L; BUN 22 mg/dL; serum creatinine 0.9 mg/dL.

The patient was allowed to continue under care in outpatient department with TB and ARV regiments.

**DISCUSSION**

In a policy on cooperative TB-HIV efforts, the WHO suggests a mix of strategies to lessen the prevalence of TB among HIV-infected people. Antiretroviral medication, prevention therapy, infection control, and enhanced case discovery are some of these strategies. One potentially relevant finding from a comprehensive analysis is that the prevalence of TB-HIV co-infection was considerably greater with full blood exams and chest X-rays than with other diagnostic techniques. This result may be attributable to the chest X-ray’s increased sensitivity and specificity when compared to sputum culture. From the standpoint of public health, the high incidence of HIV in the general population was linked to the prevalence of TB-HIV co-infection. In this case report, the diagnosis of HIV was suspected because the chest X-ray showed miliary TB infection along with lymphadenitis TB. In addition, this patient was ordered a complete anti-HIV antibody examination to confirm the HIV infection suspicion.

It is advised that all patients with active TB have an HIV test. Even in industrialized nations, this guideline is not being followed to a high degree. Due to the frequently negative sputum examination, abnormal radiographic features, and similarity to other opportunistic illnesses, TB diagnosis in HIV-infected patients is challenging. The degree of immunosuppression brought on by HIV infection affects how clinically TB manifests in people who are HIV-infected. Most patients with pulmonary TB have immune systems that are quite intact (CD4+ > 200/mm3). In contrast, extrapulmonary TB is linked to people with a weakened immune system (CD4+ 200/mm3). Extrapulmonary TB is the most frequent cause of pyrexia of unclear etiology in HIV-infected individuals in poor nations. The most prevalent types of extrapulmonary involvement are meningitis, pleural effusion, extra thoracic lymph node TB, and abdominal TB. Poor granuloma development and neutrophil-rich lymph node involvement are characteristics of advanced HIV infection. One intriguing suggestion made by the WHO is that while screening for TB, questions should be asked regarding a variety of symptoms rather than just a chronic cough. These symptoms include fever, night sweats, weight loss, and diarrhoea, which need to be explored further more to exclude any other infections. In this case report, fever of unknown origin was observed. Beside the pulmonary findings, an

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**Figure 1.** Chest X-ray of the patient showing miliary TB.

**Figure 2.** Progression of the neck swelling at and after admission.
extrapulmonary sign of lymphadenopathy and abscess were seen on the neck area, in addition of the oral candidiasis. This may indicate a deteriorated immune system of the patient. 

The degree of HIV-related immunosuppression affects the range of pulmonary TB radiographic symptoms. The radiographic picture is comparable to that of non-HIV infected people in the early stages of HIV infection when the person is not immunosuppressed and has more typical lesions of upper lobe infiltrates with or without accompanied by cavities. Rising immunosuppression, extra lung involvement, swollen mediastinal or intrathoracic lymph nodes, invasion of the lower lobes, and miliary tuberculosis signs are becoming increasingly prevalent.\(^{16-18}\) In this case report, the chest X-ray of the patient showed miliary tuberculosis, in accordance with the symptoms, leading to an immunocompromised suspicion of the patient.

Additional diagnostic tools such as GeneXpert-Rif is endorsed by the WHO for rapid diagnosis of TB. GeneXpert is an automated TB cartridge-based DNA amplification assay, with integrated and automated sample preparation, amplification and detection using real-time PCR, providing results within 100 minutes. Nucleic acid amplification assay (NAAT) provides a reliable method to improve the specificity of diagnosis, but has a variation in sensitivity. Commercial kits have the advantage of being well standardised and reproducible, but there are concerns about their accuracy, reliability, high cost, and requirement for proper laboratory infrastructure. These limitations restrict their application in resource-limited settings. The culture of M. tuberculosis is the most sensitive way to diagnose TB in HIV-infected individuals.\(^{18-21}\)

WHO recommends ARV to be initiated among all adults with HIV regardless of the clinical stage and at any CD4 count. However, ART should be initiated with the priority of adults with severe or advanced HIV clinical disease (WHO clinical stage 3 and above) and adults with CD4 count ≤350 cells/µL. Several studies have shown the benefits of initiating CD4 counts ≤350 cells/µL significantly reduces mortality, disease progression, and the incidence of opportunistic diseases, especially TB and non-AIDS-defining conditions.\(^{22}\) In this case we found that the CD4+ count of the patient was 46 cells/µL which made the patient eligible for the ART initiation. In addition, HIV viral load of the patient measured at 2.81 x 10^5 copies/mL is projected to be suppressed after ART initiation.

**CONCLUSION**

TB and HIV co-infection represents a novel pathogenic scenario at the global level. It constitutes a serious diagnostic and therapeutic challenge. In particular, this phenomenon weighs heavily on countries with strained health care budgets. Hence, it is important to suspect HIV in TB-infected patients, vice versa. In resource-limited settings, screening modalities focus more on clinical assessment rather than supporting diagnostics.

**AUTHORS’ CONTRIBUTION**

Both authors have contributed equally to the writing of this manuscript.

**FUNDING**

No funding sources.

**CONFLICT OF INTEREST**

None declared.

**ETHICAL APPROVAL**

Informed consent from the patient has been attained for the writing of this manuscript.

**REFERENCES**