Case Report

Unraveling the Enigma of Anti-Tubercular Drug-Induced Vitamin B6 Deficiency and its Role in Provoking Convulsive Seizures - A Revelatory Case Report

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ABSTRACT

The 65-year-old female patient with active tuberculosis who was hospitalized to the primary hospital and was on Category 1 Antitubercular Drugs (Cat 1 ATD) is the subject of this case report. The patient had complications, a reduced appetite, had stopped eating, was nauseous, and had vomited. Eight months prior, the patient has prescribed the first-line anti-tubercular medications rifampin, rifabutin, ethambutol, and isoniazid. Three months prior, the patient stopped taking the medicine. Now, as a result of an unfavorable drug reaction to anti-tubercular medications, the patient had acquired acute hepatitis and convulsive seizuresdue to vitamin B6 deficiency.

Key words: Cat 1 ATD, Hepatotoxicity, Convulsion, Tuberculosis, Vitamin deficiency, Drug-drug interaction, Adverse drug reaction.

Mycobacterium tuberculosis, which induces tuberculosis (TB), is a potentially serious infectious bacterial disease that primarily affects the lungs. This illness spreads when a person inhales sputum splashes that enter through the mouth and nose, upper respiratory tract, and bronchi before reaching the lungs' alveoli and potentially attacking internal organs. The bacteria that cause tuberculosis can infect a lot of people without any symptoms. The most typical signs of this are fever, weight loss, night sweats, and coughing that occasionally has a bloody tint [1].As a result, even if effective chemotherapy is available, TB remains a serious health concern in the majority of countries. This is owing to low patient adherence, primary multidrug resistance, and interruptions partly brought on by adverse drug reactions (ADRs). As a result, more resistant strains evolve, necessitating second-line therapy with more expensive medications and significant ADRs.

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ADRs significantly increase patient morbidity and mortality, which drives up healthcare costs and is a major issue for the common people, the pharmaceutical industry, regulatory agencies, and the medical community [2].Depending on the severity of the condition, taking medicine for TB might last between 6 and 9 months. The United States Food and Drug Administration (USFDA) has currently approved 10 medications for the treatment of TB. Isoniazid (INH), Rifampin (RIF), Ethambutol (EMB), and Rifabutin are recognized medications (RB) [3]. WHO estimates that TB affects one-third of the population and dies one in every four adult males. Primary anti-TB medications have the potential to be hepatotoxic. Anti-TB medications INH, RIF, and RB produce hepatotoxicity like 2 transaminases and severe hepatitis failure, which are mentioned in the first line. Depending on the hepatotoxicity diagnosis criteria, the Anti-TB medication can cause hepatotoxicity in 3 to 30% of cases [4]. Seizures at standard doses are incredibly rare to be documented. This case study describes a convulsive seizure that happened after receiving a short-term therapeutic dose of INH.

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CASE REPORT

Despite having a known case of pulmonary tuberculosis and being on Cat 1 ATD, a 65-year-old female patient recently presented with the cause of appetite, decreased food intake, nausea/vomiting, and extreme fatigability. She is a known case of TB from eight months ago in the patient's previous medical history. An old high resolution CT scan thorax showed irregular cavities in the right upper and lower lobes, centrilobular nodules in both lungs collapsing with bronchiectasis in the right middle lobe, and a tiny (R) para tracheal pulmonary Koch's infection found on the chest. The ECG report overloaded the left atrium excessively, and an ultrasound scan reveals a bladder outflow obstruction.

Table 1 - Laboratory Investigation

Name of the test	Day 2	Day 5	Day 10
Serum Bilirubin (0.2-1 mg/dL)	4.6	7.4	2.7
Direct Bilirubin (0-0.2 mg/dL)	3.5	1.9	1.4
Indirect Bilirubin (0.3-1.0 mg/dL)	1.9	3.0	1.4
SR. Total Protein (6-8 g/dL)	5.6	7.2	7.9
Albumin (3.4-5.4 g/dL)	2.9	3.0	3.9
Globulin (2-3.5 g/dL)	3.0	4.0	2.4
S.G.O.T (4-17 IU/L)	671.8	165	19
S.G.P.T (3-5 IU/L)	132.9	50	18
Alkaline Phosphatase (44-147 IU/L)	136.4	104	90

On admission, the patient was started on antibiotics, hepatoprotective medications, laxatives, and a single anti-tubercular drug were used as part of this therapeutic regimen to treat the main symptoms of appetite loss, nausea, and exhaustion. Decreasing the levels of SGOT/AST, SGPT/ALT, direct and indirect bilirubin, and bilirubin. Antibiotics, Anti-tubercular agents, and Hepatoprotective agents for the treatment of severe tuberculosis in the patient and reducing the bilirubin range but the patient developed a disturbance of consciousness and Tonic-clonic convulsions (Figure 1).

On examination, her blood pressure was 180/92 mmHg, her temperature was 36.3ºC, her heart rate was 107 beats/min, her respiratory rate was 26 breaths/min, and her oxygen saturation was 97% on room air. The findings of the systemic examination was normal. No abnormal findings were detected on head CT scans. The user laboratory finding for causes of convulsion was absent, except for the important finding of the patient's serum, vitamin B6 level was low (Table 1). This leads us to diagnose the patient with convulsive seizure due to vitamin B6 deficiency is associated with isoniazid which is involved in the Cat 1 ATD. The justification for thera-pystops Cat 1 ATD, causing hepatotoxicity and convulsive seizure to the patient. During follow-up, no medication interactions are discovered after rational drug administration.

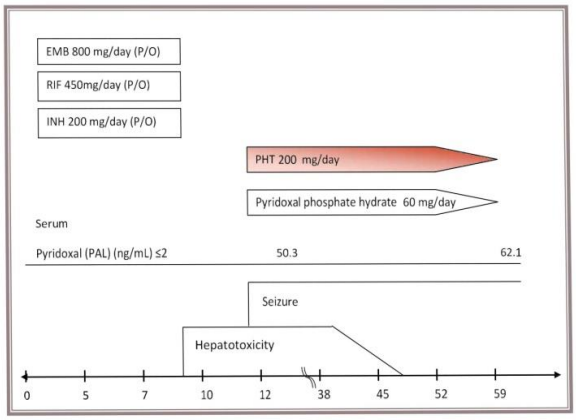

Figure 1: Clinical course of the patient. Convulsive seizure occurred eleven days after the administration of antitubercular drugs. Seizure refractory to standard anticonvulsant therapy were controlled with the administration of pyridoxal phosphate hydrate (vitamin B-6). EMB: Ethambutol, RIF: Rifampin, INH: Isoniazid, PHT: Phenytoin.

DISCUSSION

In India, 8-36% of cases of drug-induced hepatotoxicity occur. Asian nations have a greater rate of drug-induced hepatotoxicity (DIH), which may be attributed to racial vulnerability, the peculiarities of drug metabolism, and the existence of numerous known risk factors such HIV infections, nutritional deficiencies, and alcoholism [5]. The causes of hepatotoxicity in patients range between 1 and 10% across different nations, depending on elements like social and economic situations as well as geographic location. India (8–10%) has the highest rate of drug-induced hepatotoxicity, which may be related to genetics, chronic viral hepatitis, malnutrition, and drunkenness [6]. In the intrinsic phase of treatment, which is determined by the etiology of the second-line injectable agent, the WHO has recommended at least five medications [7].

It is classified as a conditional recommendation with extremely low assurance in the estimate of the effect that

the recent WHO moves to prescribe at least 4 effective medications at the beginning of treatment is effective. Note that the 2019 WHO guidelines and our guideline committee both promote the use of newer, more effective oral medicines with better repurposing and downplay the use of injectable treatments [8].

The new WHO recommendation for the previous approach is multidrug-resistant TB (MDR-TB) and are rifampin resistance TB (RR-TB) in several regards; levofloxacin or moxifloxacin may be used. For fluoroquinolone, levofloxacin is advised because to its safety profile and lower risk of medication interactions [9]. Isoniazid can cause various adverse events. Central nervous system (CNS) effects, such as headache seizure, dysphoria, and irritability, have been reported. CNS effects occur due to vitamin B-6 deficiency; in the patient's case, a deficiency of vitamin B-6 of regarded to be a cause of patient convulsions and seizures because the serum vitamin B-6 level was administration was low [10].

CONCLUSION

The case is unique because the patient developed hepatotoxicity and convulsion seizures due to an adverse drug reaction of Cat 1 ATD. The supplementation of vitamin B-6 is recommended in patients with other conditions indicative of subclinical vitamin B-6 deficiency to prevent the central nervous system effect. The patient was diagnosed with Pulmonary Koch's Infection, where standard treatments are provided to a patient to reduce the level of ALT/AST. Clinical advancements and positive patient outcomes are future goals that we can accomplish.

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