MEDICAL SCIENCE

Inferior vena thrombosis: A complication of MDR tuberculosis

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ABSTRACT

In developing nations, tuberculosis (TB) continues to be a serious health issue, with India bearing the majority of the burden. It comes in a wide variety of presentations and complications. Its propensity for thrombogenesis is a worrying consequence that significantly increases morbidity. Numerous mechanisms of tuberculosis can cause a hypercoagulable condition and thromboembolic consequences. We report a case of a 37-year-old male who had inferior vena cava thrombosis with multidrug-resistant pulmonary tuberculosis (MDR-TB). It was discovered that early diagnosis, anti-TB medication start-up and suitable anticoagulant therapy could save lives. The use of an IVC filter as a treatment in this instance reduced the disease's total morbidity and mortality. The co-treatment with the longer oral bedaquiline containing MDR regimen and anticoagulant therapy is being followed closely in this case and will be a useful tool in the future for further management of such patients.

Keywords: Inferior Vena Cava Thrombosis, Tuberculosis, Multi-drug Resistant Tuberculosis, MDR-TB

1. INTRODUCTION

Tuberculosis (TB) remains a significant health challenge in developing nations, with a range of clinical manifestations and consequences that can vary depending on the geographical location. As with other infectious diseases, TB can result in thrombosis via various mechanisms, including damage to endothelium, venous compression, local invasion or the development of a transient hypercoagulable state. Recent research has found that 1.5 to 3.4 percent of tuberculosis patients experience vascular complications linked to Mycobacterium tuberculosis infection (White, 1989).

Given the high incidence of TB in our country, early diagnosis and timely initiation of therapy are of utmost importance for primary care physicians. While deep venous thrombosis is a rare complication, it should be suspected in patients with TB to prevent further complications. Therefore, it is imperative that primary care physicians be aware of the potential link between TB and thrombosis and take prompt action when necessary (Naithani et al., 2007). In this case report, we present a rare instance of inferior

vena cava thrombosis in a middle-aged man as a complication of multidrug-resistant tuberculosis (MDR-TB). This case underscores the importance of early detection and management of thrombotic complications in TB patients, particularly those with drug-resistant forms of the disease.

2. CASE REPORT

A 37-year-old male with no comorbidities presented to the outpatient department with complaints of low-grade intermittent fever with chills and rigor, cough with mucoid expectoration and generalized weakness for about 2 months with loss of appropriately 6-8kg weight in this duration. On examination, it was seen that the patient was poorly built and nourished, afebrile to touch with a pulse of 130 beats/min with a respiratory rate of 22/min, blood pressure of 110/80 mm of Hg and oxygen saturation of 95% at room air. Pallor was present. The upper respiratory tract was normal. A lower respiratory tract examination revealed right-sided decreased breath sound. Chest X-ray P/A view revealed bilateral pulmonary infiltrates with right-sided pleural effusion (Figure 1). Sputum for Zeihl-Neelsen staining was positive for acid-fast bacilli and sputum GeneXpert showed resistance to rifampicin only. He was started on an oral longer bedaquiline-containing regimen according to programmatic management of drug-resistant tuberculosis in India. He was advised to follow up regularly for monitoring of liver functions and ECG.

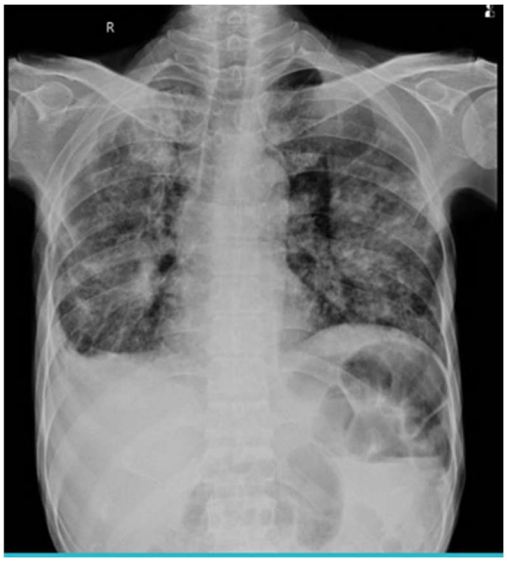

Figure 1 Chest Xray P/A view showing bilateral pulmonary infiltrates with right mild pleural effusion

One month later, he presented to the outpatient department with complaints of breathlessness and abdominal pain since 10 days and he was admitted in TB ward. On examination, patient was afebrile to touch, pulse-112/minute, respiratory rate- 28/min BP- 90/60 mm of Hg and SpO2 of 84 on room air. He was requiring oxygen support via nasal prongs to maintain SpO2. There was bilateral pitting oedema. Abdomen was distended and generalized tenderness over abdomen. Blood investigations revealed normal WBC (8000 cells/cubic mm) with normocytic normochromic anemia (Hb- 10 gm/dL) with normal platelets (2.5 lakh cells/cubic mm) and Liver and renal functions tests were normal d-Dimer was 1000 ng/ml. He was started on low molecular weight heparin and continued MDR treatment.

HRCT thorax suggestive of miliary tuberculosis with multiple cavitatory lesions in bilateral lung fields. Ultrasonography of abdomen and pelvis was revealed cystic lesion/fluid collection in the epigastric region, thrombosis of inferior vena cava. CECT abdomen showed asymmetrical thickening of the ileocaecal junction and adjacent ileal loop with peritonitis and multiple necrotic lymphadenopathy- tubercular etiology wet type, pseudocyst of pancreas and Thrombosis of inferior vena cava, its tributaries and bilateral iliac veins (Figure 2). The gastroscopy study was normal. Interventional radiology opinion was taken in view of IVC thrombosis and DVT thrombolysis with IVC filter placement was done (Figure 3). 10 days later he was shifted to oral anticoagulants and continued MDR treatment and was discharged. The patient is followed up for anticoagulation therapy to achieve target International normalized ratio (INR) and MDR treatment.

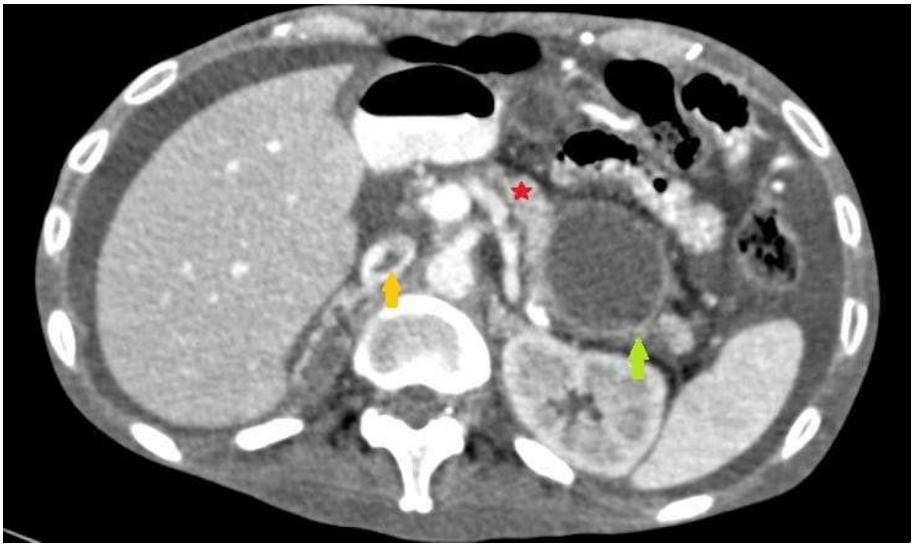

Figure 2 CT axial section showing infrahepatic part of IVC showing hypodense filling defect suggestive of thrombosis (yellow arrow) and thin-walled cyst in tail of pancreas (green arrow)

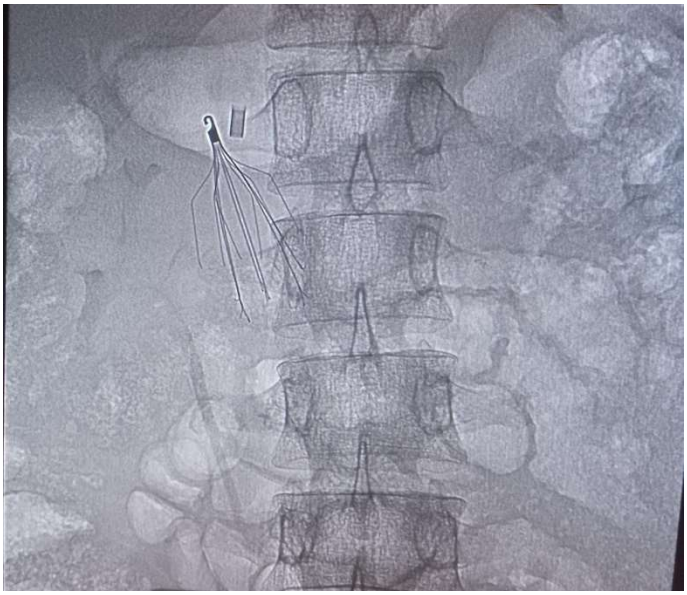

Figure 3 Venography just after IVC filter placement

3. DISCUSSION

The majority of those affected by tuberculosis live in underdeveloped nations, where it is one of the major causes of mortality. An estimated 1.3 million people died as a result of tuberculosis in 2021 and the second leading infectious killer after Covid-19 (World Health Organization, 2021). In the literature, it has been shown that 1.5 to 3.4 percent of tuberculosis patients had vascular problems linked to Mycobacterium tuberculosis infection (White, 1989). Even among patients using ATT, venous thromboembolism, an uncommon TB complication, can develop a few days tuberculosis, with developing nations bearing the greatest burden of the illness. There are many different clinical symptoms of tuberculosis and after diagnosis or toward the end of the disease (Lang et al., 1996). Changes in the vein wall, changes in blood components and a slowing of the flow are frequently linked to the pathogenesis of thrombosis (Naithani et al., 2007).

Due to the hypercoagulable state brought on by tuberculosis, cytokines can be produced and that will activate the vascular intima and create thrombogenic endothelial cells. Additionally, it will promote the liver's production of coagulation proteins (Andus et al., 1991; Mark et al., 2009). Immobility and bed rest raise these risks of hypercoagulability due to the morbidity that the condition causes. Although retroperitoneal adenopathies can produce inferior vena cava thrombosis without any haemostatic abnormalities or thromboembolic consequences, thrombosis in ganglion variants of TB can also be caused by lymph node

compression. Inflammation, haemostatic alterations and hypercoagulability have recently been linked to tuberculosis. Hypercoagulability is brought on by antithrombin 3 deficiencies in TB (Goncalves et al., 2009).

Cytokines will trigger the vascular intima and create thrombogenic endothelial cells because of their pro-inflammatory character. Additionally, they will promote the liver's production of coagulation proteins (Andus et al., 1991; Mark et al., 2009). Immobility and bed rest raise these risks of hypercoagulability due to the morbidity that the condition causes. Although retroperitoneal adenopathies can result in inferior vena cava thrombosis without any haemostatic problems, thrombosis can also be caused by lymph nodes compressing veins in TB ganglionar types (Goncalves et al., 2009).

Numerous studies demonstrate that thrombotic events in patients can develop in a number of places, including the jugular vein, iliac vein, hepatic veins and inferior vena cava. Patients with tuberculosis have retroperitoneal para-aortic lymphadenopathy, which has been documented to occasionally result in mechanical venous blockage in the literature (Gogna et al., 1999; Naithani et al., 2007). When there is an underlying thrombophilic hereditary condition, tubercular lymph nodes can either result in a significant collective matted mass or a modest obstruction that obstructs the IVC. Our case disqualified a predisposed thrombophilic state because protein C and protein S, antithrombin 3 levels and activated partial thromboplastin time were all normal. As a result, large matted tubercular lymph node masses are most likely explanation for our patient's IVC and iliofemoral thrombosis.

Due to the possibility of serious repercussions, early identification of IVC thrombosis is essential. Comparatively, lower extremity deep venous thrombosis is associated with a 33% greater risk of pulmonary embolism. Additionally, there is a chance that clots will spread, including to the hepatic and renal veins. Another possible outcome from phlegmasia cerulean dolens is critical limb ischemia. Symptoms and physical exam findings differ depending on the type and location of occlusion. IVC thrombosis is diagnosed by imaging once it has been suspected. It has been established that magnetic resonance imaging (MRI) and computed tomography with contrast are similarly sensitive for diagnosis (Kaufman et al., 2005). Venography is the gold standard imaging modality. Venography is time-consuming and invasive but is the recommended approach if surgical intervention is intended (Andus et al., 1991; Kaufman et al., 2005). In present case CT found that there was caval thrombosis.

A higher dose of acenocoumarol is frequently required to attain therapeutic INR values because of rifampicin's effects on cytochrome P450. Additionally, by reducing the formation anticoagulant and also increasing the clearance of anticoagulant hepatic proteins, this medication may lead to hypercoagulability (Kaufman et al., 2005; Turken et al., 2002). Awareness of DVT as a complication of severe pulmonary tuberculosis or MDR-TB is important to primary care practitioners as TB is common infection encountered by them in their daily practice.

4. CONCLUSION

Given the potential for the development of inferior vena cava thrombosis, particularly in cases of widespread and severe forms of tuberculosis (TB), it is essential to proactively screen for thromboembolic disease at all TB diagnostic evaluations. Failure to do so could result in missed diagnoses and consequent adverse outcomes. It is crucial to recognize that retroperitoneal tubercular lymphadenitis is a potential cause of unexplained thrombosis and clinicians should be mindful of this possibility when evaluating patients. This is especially relevant given that inferior vena cava thrombosis can be one of the atypical presentations of tuberculosis. Failing to investigate this possibility could lead to missed opportunities for timely and effective treatment, as well as exacerbate the risk of further complications.

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Author Contribution

All authors equally contributed in this case report.

Informed Consent

The patient was asked if the data concerning the case can be used for publication and they consented.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

REFERENCES AND NOTES

1. Andus T, Bauer J, Gerok W. Effects of cytokines on the liver. Hepatology 1991; 13:364–375.
2. Gogna A, Pradhan GR, Sinha RS, Gupta B. Tuberculosis presenting as deep vein thrombosis. Postgrad Med J 1999; 75:104–105. doi: 10.1136/pgmj.75.880.104
3. Goncalves IM, Alves DC, Carvalho A, Brito MDC, Calvario F, Duarte R. Tuberculosis and Venous Thromboembolism: A case series. Cases J 2009; 2:9333. doi: 10.1186/1757-1626-2-9333
4. Kaufman LB, Yeh BM, Breiman RS, Joe BN, Qayyum A, Coakley FV. Inferior vena cava filling defects on CT and MRI. Am J Roentgenol 2005; 185:717–726. doi: 10.2214/ajr.185.3.01850717
5. Lang IM, Mackman N, Kriett JM, Moser KM, Schleef RR. Prothrombotic activation of pulmonary arterial endothelial cells in a patient with tuberculosis. Hum Pathol 1996; 27:423–427. doi: 10.1016/s0046-8177(96)90118-5
6. Mark PL, Ashok PP, Deshpande RB, Mahashur AA. A patient with hypercoagulable state due to tuberculosis. Indian J Chest Dis Allied Sci 2009; 51:49–51.
7. Naithani R, Agrawal N, Choudhary VP. Deep venous thrombosis associated with tuberculosis. Blood Coagul Fibrinolysis 2007; 18:377–380. doi: 10.1097/MBC.0b013e3280d942b4
8. Turken O, Kunter E, Sezer M, Solmazgul E, Cerrahoglu K, Bozkanat E, Ozturk A, Ilvan A. Hemostatic changes in active pulmonary tuberculosis. Int J Tuberc Lung Dis 2002; 6:927–932.
9. White NW. Venous thrombosis and rifampicin. Lancet 1989; 2:434–435. doi: 10.1016/s0140-6736(89)90603-x
10. World Health Organization. Global Tuberculosis Report 2021. https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2021 (accessed 4.5.23)