CASE REPORT / OLGU SUNUMU

DOI: 10.4274/mjima.galenos.2026.261023
Mediterr J Infect Microb Antimicrob 2026;15:261023
Erişim: http://dx.doi.org/10.4274/mjima.galenos.2026.261023

Deep Vein Thrombosis as a Complication of Pulmonary Tuberculosis: Clinical, Diagnostic, and Therapeutic Implications

Pulmoner Tüberkülozun Bir Komplikasyonu Olarak Derin Ven Trombozu: Klinik, Tanısal ve Terapötik Yansımalar

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Abstract

Tuberculosis (TB) is a multisystem infectious disease that can promote a hypercoagulable state through prolonged systemic inflammation or dysfunction of the endothelium and coagulation cascade. This report describes a case of deep vein thrombosis (DVT) involving the entire right iliofemoral venous axis and the infrarenal inferior vena cava, which developed 4 weeks after the initiation of anti-TB therapy in a young woman with pulmonary TB (PTB). The patient had no conventional risk factors for thromboembolism. Given the potential for drug interactions with rifampicin, she was successfully treated with fondaparinux for 10 months, with complete resolution and no complications during the 12-month follow-up. We also present a narrative review of the literature focusing on treatment options and risk factors. Clinicians should maintain a high level of clinical suspicion for DVT in patients with TB throughout the course of treatment.

Keywords: Tuberculosis, deep vein thrombosis, anticoagulant therapy

Öz

Tüberküloz (TB), uzun süreli sistemik enflamatuvar reaksiyon ya da endotel ve koagülasyon kaskadı disfonksiyonu sonucunda hiperkoagülabiliteye yol açabilen, multisistemik bir enfeksiyon hastalığıdır. Bu olgu sunumunun amacı, pulmoner TB tanısı alan genç bir kadında, anti-TB tedavisine başladıktan dört hafta sonra gelişen; sağ iliyak-femoral venöz aksın tamamını ve infrarenal inferior vena kavayı tutan bir derin ven trombozu (DVT) olgusunu sunmaktır. Hastada bilinen herhangi bir tromboembolik risk faktörü bulunmamaktaydı. Rifampisin ile olası ilaç etkileşimleri göz önünde bulundurularak, hasta on ay boyunca fondaparinuks ile başarılı bir şekilde tedavi edilmiş; 12 aylık takip süresince tam iyileşme sağlanmış ve herhangi bir komplikasyon gelişmemiştir. Ayrıca, tedavi seçenekleri ve risk faktörlerine odaklanan bir literatür derlemesine de yer verilmiştir. Klinisyenler, TB hastalarında tedavi süreci boyunca DVT gelişme ihtimalini her zaman akılda tutmalıdır.

Anahtar Kelimeler: Tüberküloz, derin ven trombozu, antikoagülan tedavi

Introduction

Tuberculosis (TB) is a multisystem infectious disease that can promote a hypercoagulable state as a result of prolonged systemic inflammation or endothelial dysfunction and coagulation cascade abnormalities[1-16]. Venous thrombosis and pulmonary thromboembolism can worsen the prognosis and clinical outcomes. The aim of this study was to review the literature on cases of deep vein thrombosis (DVT) in patients with TB, prompted by a recent case of extensive right iliofemoral venous axis in a young woman with pulmonary TB (PTB).

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Received/Geliş Tarihi: 26.06.2026 **Accepted/Kabul Tarihi:** 14.10.2026 **Published/Yayınlanma tarihi:** 24.11.2026

Cite this article as/Atıf: Mastroianni A, Vangeli V, Guadagnino G, Chidichimo L, Berardelli L, Greco S. Deep vein thrombosis as a complication of pulmonary tuberculosis: clinical, diagnostic, and therapeutic implications. Mediterr J Infect Microb Antimicrob. 2026;15:390-394

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Case Report

A 22-year-old woman of Romanian origin who had resided in Italy for 14 years was diagnosed with PTB in July 2023. The patient was immunocompetent and had no comorbidities other than mild iron deficiency anemia. She presented to the emergency department of our hospital with a persistent dry cough, night sweats, and fever lasting more than a month, despite taking various antibiotics at home. She was a non-smoker, was not obese, and had no history of recent surgery, trauma, prolonged immobilization, or previous thromboembolism. She denied using oral contraceptives or other hormonal therapies, and pregnancy was ruled out. Her family history was negative for cardiovascular or thrombotic diseases.

At that time, computed tomography (CT) revealed multiple bilateral centrilobular micronodular parenchymal consolidations, most prominent in the right lung and left lower lobe. Tuberculous cavities and partially obliterated bronchiectatic changes were also observed in the anterior and superior segments of the right upper lobe, the superior lingular segment, and the apical segment of the right lower lobe. The patient had multiple enlarged lymph nodes in the right hilar region and the bilateral upper and lower paratracheal regions. In addition, edematous thickening of the bowel wall was observed in the ascending colon, extending to the colonic flexure, cecum, and terminal ileum, accompanied by mild perivisceral fat stranding, reactive mesenteric lymph nodes, and a small amount of pelvic fluid. These findings strongly suggested severe active TB, with presumed concomitant intestinal involvement, given the subsequent complete resolution of these findings following targeted treatment. Mycobacteriological examination of sputum and bronchoalveolar lavage fluid was positive for acid-fast bacilli, and polymerase chain reaction testing for *Mycobacterium tuberculosis* DNA was positive. Drug susceptibility testing showed that the strain was fully susceptible to rifampicin and isoniazid.

The patient therefore began anti-TB treatment with rifampicin, isoniazid, pyrazinamide, and ethambutol on July 30, 2023, for 8 weeks. After completing the first 4 consecutive weeks of treatment, her clinical symptoms and microscopic examination findings gradually improved, and sputum samples tested negative for *Mycobacterium tuberculosis*. She was discharged home and continued to receive outpatient follow-up. However, after experiencing persistent hyperpyrexia and abdominal pain at home for approximately 5 days, she was readmitted to the hospital on September 4, 2023.

A chest and abdominal CT scan documented persistent grossly cavitated lesions at the right lung apex, the anterior segment of the right upper lobe, the lingula, and the apicobasal segments of the lower lobes, as well as an inferior pericardial effusion. It also revealed acute thrombosis involving the entire right iliofemoral venous axis, extending into the infrarenal inferior vena cava (IVC) to the saphenofemoral junction (Figure 1). A color Doppler ultrasound study performed on September 5, 2023, confirmed an occlusive right popliteal-femoral-iliac DVT without evidence of floating thrombi.

Laboratory tests showed the following results: prothrombin time, 12.2 seconds; international normalized ratio, 1.12 (normal values [NV], 0.85–1.15); activated partial thromboplastin time, 32 s (NV, 23–38); fibrinogen, 559 mg/dL (NV, 150–450); antithrombin III, 86.8% (80–120); factor V, 147% (70–140); factor VIII, 197.4% (70–150); protein C, 67% (70–140); free protein S, 74%; D-dimer, 4 mg/L; lupus anticoagulant screening



Figure 1. Acute thrombosis involving the entire right iliofemoral venous axis (computed tomography scan). An arrow has been overlaid on the final image to clearly indicate the occluded infrarenal segment of the inferior vena cava.

test (LA1), 45 s; confirmatory test (LA2), 35 s; LA1/LA2 ratio, 1.2 (NV, 1–1.3); C1 inhibitor, 31 mg/dL (NV, 21–39); and C-reactive protein, 77.2 mg/L (NV, 0–5). The elevated fibrinogen and factor VIII levels, combined with the mildly decreased protein C level were interpreted as consequences of the acute-phase inflammatory response rather than congenital thrombophilia.

Advanced interventions, such as systemic thrombolytic therapy or catheter-directed thrombolysis were carefully considered given the extensive proximal involvement. However, they were withheld because of an unfavorable risk–benefit ratio, specifically the high risk of bleeding associated with active cavitary pulmonary lesions and presumed intestinal TB lesions. Treatment with fondaparinux (7.5 mg/0.6 mL) was then initiated, gradually improving the extensive venous thrombosis. An initial venous Doppler ultrasound scan performed on September 19, 2023, revealed that the venous thrombosis persisted without any significant change. The patient completed the four-drug anti-TB therapy on September 30, 2023, and continued dual therapy with rifampicin and isoniazid for 16 consecutive weeks. A new venous Doppler ultrasound scan on October 17, 2023, confirmed right iliofemoral thrombosis but revealed initial recanalization. Fondaparinux was continued because oral anticoagulants (warfarin or direct oral anticoagulants) carry a high risk of treatment failure or toxicity due to rifampicin's potent CYP3A4- and P-glycoprotein-inducing effects. Ten months after starting fondaparinux therapy, a new venous Doppler ultrasound demonstrated complete resolution of the right iliofemoral DVT, from the infrarenal IVC to the saphenofemoral junction. After completing anti-TB therapy, the patient experienced no complications during a 12-month follow-up.

Discussion

To contextualize this case, we conducted a narrative literature review using the PubMed/MEDLINE databases covering publications through June 2026, with the search terms "tuberculosis," "deep vein thrombosis," and "venous thromboembolism." We included peer-reviewed case reports, case series, and retrospective cohort studies reporting individual patient data on DVT associated with active TB. A total of 69 unique cases of DVT in patients with PTB have been individually described in the literature, excluding duplicated registry cohorts (Table 1)[1-11,13-16]. Apart from the reports by White[1] (46 cases), El Fekih et al.[3] (a retrospective study of 14 cases), Ambrosetti et al.[2] (a retrospective study of 5 cases), and Shitrit et al.[4] (a retrospective study of 5 cases), all other reports described single cases or case series involving no more than three patients[5-11,13-16]. Clinical outcomes were favorable with complete recovery in most cases, although five patients died in the series reported by White[1], and one death was reported in another study[6]. A systematic review and meta-analysis by Danwang et al.[12] found that the incidence of DVT among 16,190 patients across nine studies was 1.3%, with a concomitant incidence of pulmonary thromboembolism of 5.8%. Based on our literature search using PubMed/MEDLINE databases, to our knowledge, this is the first case of extensive DVT involving the infrarenal IVC secondary to PTB reported in Italy, highlighting the educational value of managing extensive thrombosis during rifampicin therapy.

In our literature review, oral anticoagulants were used as medical treatment in most cases. Physicians should remain alert to the possibility of DVT in patients with TB, as TB should be considered a risk factor for DVT, particularly in malnourished, elderly, or seriously ill patients who may have poorer outcomes, a higher incidence of DVT, and impaired immune and coagulation functions. This association may be explained by inflammation-induced hypercoagulability, which leads to the release of cytokines (interleukin [IL]-1, IL-6, and tumor necrosis factor-alpha), and other factors that can promote endothelial damage, increase fibrinogen levels, disrupt fibrinolysis, and reduce antithrombin III levels. In some cases, enlarged lymph nodes associated with TB may form nodal masses that compress blood vessels, promote blood stasis, and thereby increase the risk of DVT. Importantly, our patient developed DVT one month after initiating anti-TB therapy. This timing raises the possibility that the early phase of treatment may coincide with a prothrombotic state, potentially due to transient coagulation imbalances or endothelial changes during the initial bacterial-killing phase. The therapeutic management highlights an important clinical consideration: rifampicin is a potent inducer of hepatic drug-metabolizing enzymes and transporters, including CYP3A4 and P-glycoprotein. Choosing fondaparinux over oral anticoagulants avoided potentially significant drug–drug interactions and provided stable anticoagulation for this extensive proximal thrombosis. Thrombolysis, although potentially effective for extensive proximal thrombosis, must be carefully weighed against the bleeding risks associated with cavitary PTB and mucosal TB lesions.

Study Limitations

As a narrative review and single case report, this work cannot establish a definitive epidemiological or causal association. Thrombophilia testing was performed during the acute phase, which may have affected baseline protein activity levels. Therefore, clinicians should maintain a high level of clinical suspicion for the possible association between DVT and TB, both during the initial stages of the disease and throughout

Table 1. Summary of primary case reports and case series of deep vein thrombosis associated with tuberculosis (1889–2025).

References, year	Cases	DVT site	PE	Concomitant risk factors	Anticoagulant treatment	Thrombolysis used?	Duration	Outcome
White[1], 1989	46	N.M.	N.M.	Malnutrition during the winter season	Heparin/oral Anticoagulants	No	N.M.	41 cured, 5 died
Ambrosetti et al.[2], 2006	5	N.M.	2	Active inflammation	N.M.	No	N.M.	Cured
El Fekih et al.[3], 2009	14	Lower limbs	2	Bed rest, inflammation	Oral anticoagulants	No	3–6 months	Cured
Goncalves et al.[5], 2009	2	Lower limbs	1	None	Oral anticoagulants	No	N.M.	Cured
Shitrit et al.[4], 2012	5	N.M.	1	Advanced age	Oral anticoagulants	No	Long-term	Cured
Kumarihamy et al.[6], 2015	1	Lower limb	Yes	Severe infection	Oral anticoagulants	No	N.M.	Died
Sangani et al.[7], 2015	1	Left femoral and IVC	No	Pediatric patient	Oral anticoagulants	No	6 months	Cured
Gupta et al.[8], 2017	3	Lower limbs	No	None	Oral anticoagulants/ LMWH	No	3 m/3 weeks	Cured
Azdaki et al.[10], 2018	1	Left popliteal to iliac	No	Hemoptysis	Oral anticoagulants	Yes (systemic)	N.M.	Cured
Mehra et al.[11], 2020	1	Left femoral	No	Celiac disease and disseminated TB	LMWH	No	N.M.	Cured
Subahi al.[13], 2021	1	Lower limb	Yes	Saddle PE	Oral anticoagulants	Yes (systemic)	N.M.	Cured
Shriwastav et al.[15], 2023	1	Left jugular and axillary	Yes	Upper extremity presentation	Oral anticoagulants	No	N.M.	Cured
Ahmad et al.[9], 2023	1	Bilateral lower limbs	No	Congenital protein S deficiency	Oral anticoagulants	No	N.M.	Cured
Anweri et al.[16], 2023	1	Left renal, IVC, and legs	No	Acute kidney injury	Oral anticoagulants	No	N.M.	Cured
Present case, 2026	1	Right iliofemoral and IVC	No	None (exclusion of conventional risks)	Fondaparinux (parenteral)	No bleeding risk	10 months	Cured

IVC, inferior vena cava; PE, pulmonary embolism; LMWH, low-molecular-weight heparin; N.M., not mentioned; DVT, deep vein thrombosis; TB, tuberculosis; m, months.

maintenance therapy.

Ethics

Informed Consent: The written informed consent for publication was obtained from the patient.

Footnotes

Authorship Contributions

Surgical and Medical Practices: S.G., Concept: V.V., Design: G.G., Data Collection or Processing: L.C., Literature Search: L.B., Writing: A.M.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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