

A case of Concomitant Pulmonary embolism and Pulmonary Tuberculosis in the era of COVID 19, a matter of cautious approach.

Sinda Dakhli¹, Phool Iqbal¹, Muhammad Abubakar¹, Sabeen Zara¹, Muhammad Murtaza¹, Adel Al Bozom¹, and Nedia Neffati¹

¹Hamad Medical Corporation

November 28, 2020

Abstract

Pulmonary Tuberculosis (PTB) and Novel Coronavirus disease 2019 (COVID 19) primarily affect the lungs. Both diseases present with fever, cough, and shortness of breath and possess thrombotic potential as well. Therefore in COVID 19 pandemic, PTB must be taken into consideration for suspected cases in order to avoid fatal consequences.

TITLE:

A case of Concomitant Pulmonary embolism and Pulmonary Tuberculosis in the era of COVID 19, a matter of cautious approach.

Introduction:

Globally, PTB is a significant concern for ill health. According to World Health Organization (WHO), Tuberculosis (TB) remains a major threat to public health, with an estimated 10 million diagnosed cases in 2018 with stable cases in the next recent years and an estimated 1.5 million TB-related deaths in 2018 [1]. PTB is a chronic disease of the lungs that can disseminate in various organs along with rare complications that can be life-threatening, such as pulmonary embolism [2]. The association of pulmonary embolism with Tuberculosis was first reported in an observational study by Morgan in 1950 in which the incidence of PE associated with active TB was 23.4% compared to 23.1% of PE cases in entire series of 634 autopsies [2]. A disease like PTB, which is prevailing for many centuries, can easily be overlooked due to the ongoing COVID 19 pandemic and its apprehension in the community.

Keywords : Pulmonary Tuberculosis, Pulmonary embolism, Thromboembolism, COVID 19, SARS- CoV-2, Anti-coagulation.

Clinical key message:

TB is known to the world for many years. It is associated with various complications and rarely with pulmonary embolism. However, due to its commonalities of presenting features with COVID 19, it can easily be missed and may be life-threatening.

Case presentation:

A 34 years old Mauritanian gentleman with no past medical history presented with a history of fever and productive cough from 2 weeks. Fever was intermittent, a high grade in nature with no diurnal variation. It was associated with productive cough with mild streaks of hemoptysis from one week. There was no history

of night sweats, joint pains, or significant unintentional weight loss. Family history was unremarkable for any disease. There was no drug abuse, recent travel, or sick contact.

On clinical examination, the patient was in mild distress due to cough and high-grade fever of 39.3 C. His blood pressure at presentation was normal; however, he had mild tachypnea from 20-24/min, tachycardia of 102/min with normal oxygen saturation at room air. On auscultation of the chest, there was bronchial breathing in the right lung's middle zone and crackles in the lower zone, respectively. The left side of the lung revealed decreased air entry in the middle zone. The rest of the systemic examination was unremarkable. A Chest XR showed extensive non-homogenous infiltrates in the right lung and left middle zone of the lung, respectively, as shown in the figure: 1. Due to the ongoing COVID 19 pandemic, he was kept under airborne isolation and screened for SARS- CoV-2 virus by real time reverse transcriptase-polymerase chain reaction (rRT-PCR) from the nasopharyngeal sample using gene Xpert technology. It was inconclusive initially. Sepsis workup including blood cultures, urine cultures, respiratory viral panel PCR was negative. There was a clinical suspicion of PTB; therefore, sputum for Acid Fast Bacillus (AFB) PCR, smear, and culture was sent. His sputum for AFB came positive for active PTB. And was immediately started on anti TB medications.

His fever started to settle down but the patient had persistent sinus tachycardia and tachypnea. ECG and cardiac markers were normal. An urgent CT pulmonary angiogram (CTPA) was ordered to rule out PE. CTPA revealed lung air space disease with new consolidation areas suggestive of an underlying infective process like pulmonary tuberculosis or COVID 19. An acute filling defect was identified in the left lower lobe anterior and lateral segments of the pulmonary arteries impressive of pulmonary embolism, as shown in the figure: 2. Repeat COVID 19 screening test was negative. Family history did not reveal any thromboembolic disease in the first-degree relative. Thrombophilia workup, including protein C and S, anti-thrombin activity, Factor V Leiden, and prothrombin gene mutations, was unremarkable. Based on clinical presentation and further investigations, he was labeled and treated as a case of active PTB complicated with PE. He was started immediately on therapeutic anticoagulation with low molecular weight heparin (LMWH) as an inpatient and was discharged on Rivaroxaban, a new oral anticoagulant (NOAC), with follow-up of 6 weeks. During the follow-up period, he remained stable.

Discussion:

Tuberculosis is a disease known to the world for ages and primarily affects the respiratory system. It can spread to any organ like the brain, heart, abdomen, bones, etc., leading to grave complications like meningitis, pericarditis, perforation of the intestines, and osteomyelitis, and severe life-threatening sepsis as well [3]. Rarely, it can also complicate to cause PE.

TB has the potential to cause venous thrombois and has been described in a few studies. A retrospective review conducted on 3293 tuberculosis patients showed that 46 had coexisting diagnosed venous thromboembolism (VTE) with a mean age: 53.4 ± 19.6 years [4]. None of the 46 reported cases received thromboprophylaxis before the VTE events as they were fully ambulatory until they developed VTE. In 2019 a retrospective analysis of 7,905 patients diagnosed with Tuberculosis, 0.6% exhibited pulmonary thromboembolism (PTE), deep venous thrombosis (DVT), or both at or after the time of diagnosing TB [5]. Another reported case described an unusual left-arm DVT site in an asymptomatic young PTB patient [6].

Tuberculosis, pulmonary, and extra-pulmonary, has been suggested as an independent risk factor for venous thromboembolism (VTE). An underlying mechanism is yet unclear, but it is described as multifactorial in the literature. All three components of Virchow's triad, i.e., hypercoagulability, venous stasis, and endothelial dysfunction, maybe a possibility to cause VTE in TB [7]. Other factors that also contribute to TB's thrombogenic state include reactive thrombocytosis, anemia, and release of pro-inflammatory cytokines damaging the vascular endothelium during the disease process [7]. Turken et al. described a hypercoagulable state in active TB due to the imbalance between the pro-coagulant and anticoagulant factors such as increased fibrinogen, factor VIII plasminogen activator inhibitor 1 plasma levels, and depressed anti-thrombin III and protein C levels in the first month of treatment [8].

Early initiation of anti TB medications has been described to decrease the hypercoagulable state in TB patients [5]. In terms of treatment, LMWH is safer and requires minimal monitoring [5]. The overall morbidity and mortality are also decreased. Moreover, oral anticoagulation, especially with warfarin, needs carefully monitored because of hepatic enzyme induction by anti-tuberculosis drugs that increase the hepatic clearance of oral anticoagulant, resulting in higher doses of the drug; therefore, NOACs can also be considered [2,5].

Our patient was young, ambulatory, and did not have any risk factors for thromboembolism like decreased mobility, malignancy, immunocompromised state, or hereditary thrombophilia diseases. He was kept on a prophylactic dose to prevent thromboembolism during his hospital stay, and still, he developed pulmonary embolism. Thus, it signifies the risk of developing PE in TB patients.

Conclusion:

Due to the ongoing COVID 19 pandemic, PTB can easily be overlooked and associated VTE or PE can be devastating to one's life. We aim to highlight the association of PTB with PE in the current era of COVID 19 pandemic, which is a fatal condition and needs prompt action. Although, VTE and TB possess a strong association, but TB complicating as PE has been scarcely reported in the literature. Timely diagnosis and management can prevent life threatening complication and death.

Authors details with order of contribution:

Dr. Sinda Dakhliya, MBBS¹

Email: 14006677@rcsi.com

Contribution: Case identification, manuscript writing and literature review

Dr. Phool Iqbal , MBBS¹

Email: dr.phooliqbal89@gmail.com

Contribution: Case identification, Manuscript writing and literature review.

Dr. Muhammad Abubakar, MBBS¹

Email: Mabubakar@hamad.qa

Contribution: Manuscript writing

Dr. Sabeen Zara , MBBS¹

Email: SZara1@hamad.qa

Contribution: Manuscript writing

Dr. Muhammad Murtaza, MBBS¹

Email: MMurtaza1@hamad.qa

Contribution: Literature review

Dr. Adel Al Bozom, MBBS¹

Email: adel.bozom@hotmail.com

Contribution: Literature review

Dr. Nedia Neffati, MD¹.

Email: NNEFFATI@hamad.qa

Contribution: Manuscript review, literature review, supervision

Affiliation: Hamad Medical Corporation, Doha, Qatar¹

Department: Internal Medicine Department.

Acknowledgements:

I would like to thank Dr. Abdel-Naser Elzouki, senior consultant of Internal Medicine at Hamad Medical Corporation for always supporting young researchers at our institute. I would like to thank the patient for giving us the consent and following as well for this manuscript. Open Access funding provided by the Qatar National Library.

Conflict of interest:

All authors of this manuscript have no conflict of interest to declare.

References:

1. Ding C, Wang S, Shangguan Y, Feng X, Guo W, Shi P, et al. Epidemic Trends of Tuberculosis in China from 1990 to 2017: Evidence from the Global Burden of Disease Study. *Infection and drug resistance*. 2020;13:1663-72.
2. Ekukwe NC, Bain LE, Jingi AM, Sylvia K, Mintom P, Menanga A. Bilateral pulmonary embolism in a patient with pulmonary tuberculosis: a rare association in Yaounde, Cameroon. *The Pan African medical journal*. 2014;17:262.
3. Adigun R, Singh R. Tuberculosis. *StatPearls*. Treasure Island (FL)2020.
4. Sharif-Kashani B BB, Moradi A, Tabarsi P, Chitsaz E, Shemirani S, Esmaili-Khansari M, Masjedi MR. Coexisting venous thromboembolism in patients with tuberculosis. *Thromb Res* 2010 May;125(5):478-80 doi: 101016/j.thromres201001014 Epub 2010 Feb 4 PMID: 20137804.
5. Ha H KK, Park JH, Lee JK, Heo EY, Kim JS, Kim DK, Choi IS, Chung HS, Lim HJ. Thromboembolism in Mycobacterium tuberculosis Infection: Analysis and Literature Review. *Infect Chemother* 2019 Jun;51(2):142-149 doi: 103947/ic2019512142. 2019.
6. Hariz A. GM, Hamdi M.S., Boukhris I. Deep vein thrombosis of the left arm revealing an asymptomatic pulmonary tuberculosis. *BMJ Case Rep* 2019;12:e229484 doi:101136/bcr-2019-229484. 2019.
7. Amitesh Gupta PM, Abhishek Faye, Debducta Bandyopadhyay, and Rupak Singla. Pulmonary tuberculosis - An emerging risk factor for venous thromboembolism: A case series and review of literature. *Lung India* 2017 Jan-Feb; 34(1): 65–69. 2017.
8. Bansal S UK, Joshi JM. . Systemic thrombosis due to pulmonary tuberculosis. *Natl Med J India* 2017;30:201-2. 2017(Available from: <http://www.nmji.in/text.asp?2017/30/4/201/218672>).

Figure captions/Legends:

Figure 1: Chest XR: extensive non-homogenous infiltrates in the right lung and left middle zone marked with black arrows.

Figure 2: CT pulmonary angiogram (CTPA) remarkable for consolidation marked with a white arrow on the right side and area of filling defect in the left pulmonary artery marked with red arrow.

Hosted file

PE and TB figures'.pdf available at <https://authorea.com/users/379564/articles/495758-a-case-of-concomitant-pulmonary-embolism-and-pulmonary-tuberculosis-in-the-era-of-covid-19-a-matter-of-cautious-approach>