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Disseminated Hematogenous Tuberculosis after Spontaneous Abortion

Sarah Cheyney, Rena Ow, Crystal Verdick, Mary Reischmann, and Stephen Carlan

ABSTRACT

Disseminated tuberculosis is a mycobacterial infection that either involves the blood, bone marrow, liver or two or more noncontiguous sites. While tuberculosis is not uncommon in pregnancy, active, disseminated tuberculosis is exceedingly rare and is associated with poor maternal and fetal outcomes including a ninefold increase in miscarriage. Symptoms of both disseminated tuberculosis in pregnancy can be vague and nonspecific making it difficult to diagnosis. A 20-year-old, immune competent female presented with worsening dyspnea over two months and cavitary lesions on chest imaging. She had been treated with oral antibiotics two months prior and was noted to have an early intrauterine pregnancy at the time. She subsequently miscarried spontaneously. PCR (polymerase chain reaction) testing from brochoalveolar lavage isolated Mycobacterium Tuberculosis. A liquid biopsy (Karius) was positive for Cytomegalovirus, Herpes Simplex Virus 1, and Candida Albicans. The patient had a prolonged and complicated treatment course and ultimately was discharged to inpatient rehabilitation. Disseminated tuberculosis is associated with significant mortality and morbidity warranting prompt treatment with clinical suspicion. Treatment should start when active TB is diagnosed in pregnancy regardless of the trimester. The prenatal care giver is in a unique position to screen and support women who otherwise may not interact with a structured healthcare system.

Keywords: Disseminated tuberculosis, Mycobacterium tuberculosis, spontaneous abortion.

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I. Introduction

Disseminated tuberculosis (TB) is a life-threatening mycobacterial infection that either involves the blood, bone marrow, liver, or two or more noncontiguous sites [1]. The diagnosis can be difficult to make as symptoms can vary significantly and often mimic other pathologies [2], [3]. Disseminated tuberculosis is associated with significant mortality and morbidity for both mother and fetus including a ninefold increase in miscarriage, and a six fold increase in perinatal death [4], [5]. The normal physiological immune suppression in pregnancy can potentially increase a patient's susceptibility of infection, reactivation and spread of tuberculosis primarily in the postpartum period [2]. Despite being rarely seen in pregnant or postpartum females, the mortality and morbidity of disseminated tuberculosis warrant prompt evaluation and treatment with high clinical suspicion [1]. We present a woman with a recent first trimester spontaneous abortion who was seen with no recorded risk factors other than dyspnea two months prior. She did not receive a diagnostic workup for TB until she developed progressive disease and symptoms including cough.

II. Case Report

This is a 20-year-old G2P0020 female with a past medical history of a recent spontaneous abortion who presented with progressive dyspnea. She previously presented 1.5 months prior at 4 weeks and 6 days of gestation by early ultrasound with pelvic pain and vaginal bleeding in the setting of cough, diarrhea, and fever. She had decreasing beta-human chorionic gonadotropin (b-hCG) quantitative levels 2102 mIU/mL to 1982 mIU/mL. On early pelvic ultrasound, the gestational sac was noted without a yolk sac or an embryonic pole and

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gradually appeared to migrate from the lower uterine segment towards the internal cervical os. The patient was then diagnosed with an inevitable abortion. On chest X-ray, the patient had patchy left upper lobe opacities indicative of an infectious process. She was diagnosed with pneumonia and treated with outpatient azithromycin and noted improvement in symptoms.

At the time of her diagnosis of pneumonia, screening for TB had not been performed. She subsequently had a complete spontaneous abortion and then presented with the progressive dyspnea. She denied hemoptysis, weight loss, night sweats, and chest pain. Upon presentation, the patient was hemodynamically stable with a Glascow Coma Score of 14. Within 6 hours of presentation, she decompensated requiring intubation and vasopressors for cardiorespiratory failure.

A complete blood count was significant for white blood cell count of 13.3 x 10^3/ul [normal range of 4.4-10.5 x 10^3/ul] and hemoglobin of 6.2 g/dL [normal range of 11.9-15.1 g/dL]. Human chorionic gonadotropin and blood cultures were negative.

Chest X-ray (Fig. 1) was suspicious for a cavitary lesion. CT chest (Fig. 2A, 2B, and 2C) was performed and revealed several bilateral cavitary lesions, the largest in the left upper lobe measuring 4.6 x 5.9 cm.

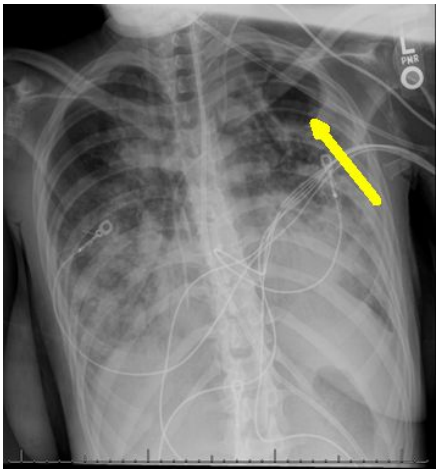

Fig. 1. Chest x-ray depicted the left upper lobe cavity (yellow arrow).

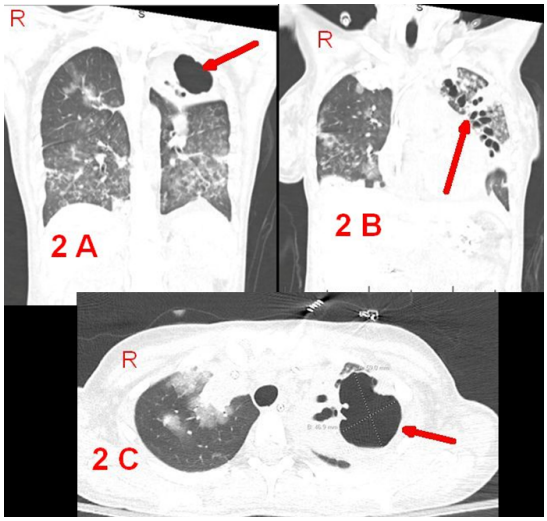

Fig. 2. A) CT scan of chest. Red arrow at cavitary lesion in left upper lobe. B) Multiple cavitary lesions (red arrow) on the left. CT scan of chest. C) Cross section of chest with large cavity at red arrow in left upper lobe.

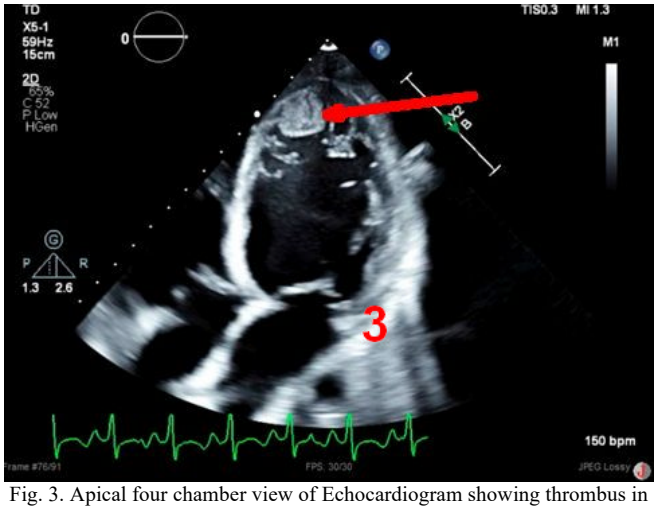

Fig. 3. Apical four chamber view of Echocardiogram showing thrombus in the left ventricle measures 2.1cm x 1.7cm (red arrow).

Transthoracic echocardiogram (Fig. 3) revealed an ejection fraction of 15-19% and left ventricular thrombosis. Bronchoscopy was preformed due to CT chest findings. Bronchoalveolar lavage was positive for AFB and isolated Mycobacterium tuberculosis (MTB).

The patient was screened for any risk factors for tuberculosis including incarceration, travel, and recent contact with infected persons, but no risk factors were identified. Treatment was initiated with rifabutin, levofloxacin, pyrazinamide, ursodiol due to transaminitis. Solumedrol was later added due to concern for drug fever and immune reconstitution inflammatory syndrome. HIV and ANA were negative. Due to recurrent fevers despite treatment, a Karius test was performed and was positive for Cytomegalovirus, Herpes Simplex Virus 1, MTB, and Candida Albicans. Micafungin and valganciclovir were added to the treatment regimen.

Unfortunately, the patient's course was prolonged and complicated, requiring tracheostomy due to multiple failed extubations and bilateral below-the-knee amputations due to sepsis and prolonged hypotension. Remarkably, the patient's condition stabilized, and she was discharged to an inpatient rehabilitation center.

III. Discussion

In 2011, there were estimated to be more than 200,000 cases of active TB in pregnant females across the globe [2]. Tuberculosis is a common cause of both maternal and fetal morbidity with the majority of cases being pulmonary tuberculosis. In HIV positive patients, the presentation of tuberculosis is more likely to be extrapulmonary; however, an extrapulmonary presentation of tuberculosis is rarely seen in patients with intact immune systems [2].

While tuberculosis can be prevalent in pregnancy, the progressive disseminated hematogenous form is rare [2]. The risk of obstetric morbidity is increased by four times in patients with tuberculosis and congenital tuberculosis has a mortality of 50% even with treatment [3]. Disseminated tuberculosis also carries significant morbidity as it can also be associated with infertility [3]. A case report published in 2021 displayed obstructed Fallopian tubes in a patient with disseminated tuberculosis [3].

Disseminated tuberculosis is a mycobacterial infection that either involves the blood, bone marrow, or liver; or involves two or more noncontiguous sites [1]. Symptoms and duration of symptoms of disseminated tuberculosis can vary significantly and can resemble a variety of other pathologies [3], [6]. Typical symptoms are vague and include fever, fatigue, headache, and weight loss. Less often, patients can present with acute respiratory failure, cholangitis, and hypotension [2].

The body's defense against tuberculosis is a cellular immune response [1]. A physiological change in pregnancy results in the suppression of the T-helper 1 cells [1], [2]. Pregnancy induces this immunosuppressive state to allow for fetal development without maternal rejection. This suppression has been thought to increase the susceptibility of pregnant females to infection, reactivation, and spread of tuberculosis [1], [2]. After delivery, the suppression of the T-helper 1 cells is alleviated, and symptoms of tuberculosis can be exacerbated [2]. As such, peripartum women have an increased risk for disseminated tuberculosis. Compared to nonpregnant women, postpartum women are twice as likely to have a reactivation of latent tuberculosis [3]. It is our hypothesis that the suppression of her cellular immune response in pregnancy resulted in the disseminated spread of tuberculosis. After the spontaneous abortion, the cellular immune response was reactivated and resulted in a pro-inflammatory response [2]. This response is similar to Immune Reconstitution Inflammatory Syndrome seen in patients with AIDs after starting antiviral therapy [2]. This reactivation of her immune system is believed to have contributed to her significant morbidity.

IV. Conclusion

Disseminated tuberculosis is a rare presentation of tuberculosis in both patients with intact immune systems and in pregnant patients. Symptoms can be vague and nonspecific thus making it difficult to diagnose. Immune suppression in pregnancy allows the bacterium to spread with minimal to no symptoms. After delivery or if the pregnancy is terminated early as with our patient, the immune system is reactivated and results in a pro-inflammatory state. Due to its significant mortality and morbidity, disseminated tuberculosis should be considered as a differential in a postpartum patients presenting with respiratory symptoms and cavitary lesions.

Acknowledgment

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Conflict of Interest

Authors declare that they do not have any conflict of interest.

References

[1] Wang JY, Hsueh PR, Wang SK, Jan IS, Lee LN, Liaw YS, et al. Disseminated tuberculosis: a 10-year experience in a medical center. *Medicine (Baltimore).* 2007; 86(1): 39-46. Barbosa OA, Teles FM, Maia ACC, Pessoa GMF, de Alencar IM, de Sousa ET, et al. Disseminated hematogenous tuberculosis in puerperium-case report. *Oxf Med Case Reports.* 2019; 2019(11): 479-481.

[2] Eshiwe C, Shahi F, Gordon N, Lillie P. Rare and unusual case of hepatic and disseminated tuberculosis in an immunocompetent patient. *BMJ Case Rep.* 2019; 12(6): e229384.

[3] Hoyos-Orrego Á, Trujillo-Honeysberg M, Diazgranados-Cuenca L. Congenital tuberculosis as a result of disseminated maternal disease: case report. *Tuberc Respir Dis (Seoul).* 2015; 78(4): 450-4.

[4] Sobhy S, Babiker Z, Zamora J, Khan KS, Kunst H. Maternal and perinatal mortality and morbidity associated with tuberculosis during pregnancy and the postpartum period: a systematic review and meta-analysis. *BJOG.* 2017; 124(5): 727-733.

[5] Chua A, Nichols J, Li JC, Flynn CE, Facciolo K. Disseminated Tuberculosis Involving Lung, Peritoneum, and Endometrium in an Immunocompetent 17-Year-Old Patient. *Cureus*. 2020; 12(7): e9081.