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Case Report

# Risks Associated with Pulmonary Tuberculosis and Pregnancy in a Primary Health Care in Hidalgo, Mexico, 2025. A Case Report

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## Abstract

Pulmonary tuberculosis (TB) during pregnancy poses a considerable risk of morbidity for both the pregnant woman and the product of conception if not diagnosed and treated promptly. The coexistence of TB and pregnancy increases the risk of miscarriage, low birth weight, preterm birth, preeclampsia, and perinatal mortality. Active pulmonary TB during pregnancy is associated with greater clinical severity and worse obstetric outcomes. Likewise, women who develop TB during gestation are at higher risk of more severe forms of the disease and a higher frequency of multiorgan involvement. Early detection and timely treatment provide these patients with a better perinatal prognosis; therefore, screening for TB is recommended in pregnant women from high-burden settings. We present the clinical case of a young patient diagnosed with TB who became pregnant three months into anti-tuberculosis treatment, presenting two serious obstetric complications that resulted in perinatal loss. The mother showed favorable clinical progress until discharge from the Health Unit. It is concluded that women of reproductive age affected by TB should also receive comprehensive gynecological-obstetric care so that pregnancies are not overlooked, thereby reducing complications in the mother-child dyad while ensuring the success of anti-tuberculosis treatment.

***Keywords:*** *Pulmonary Tuberculosis; Pregnancy; Primary Health Care*

## Introduction

Significant differences between men and women in immune responses to pathogens and autoantigens are well recognized [1]. Pregnancy adds to this difference by placing women in a temporary state of immunosuppression [2], further increasing their susceptibility to infectious processes. For instance, women are more likely to develop active tuberculosis (TB) within the first 90 days of pregnancy than at any other time in their lives [3]. Pregnancy may be associated with an increased risk of developing TB in women infected with *Mycobacterium tuberculosis* (*Mtb*) [4].

Active pulmonary TB during pregnancy is associated with a profile of greater clinical severity and worse obstetric outcomes; likewise, women who develop TB during gestation present more severe forms of the disease, a higher frequency of multiorgan involvement, and a higher percentage of positive bacterial isolates [5]. It also poses a considerable risk of morbidity for both the pregnant woman and the fetus if not diagnosed and treated in a timely manner [6]. Nguyen HT., *et al*. [7] recommend that programs integrated into maternal care can contribute to the timely detection of TB and pregnancy. In a study by Van Schalkwyk., *et al*. [8] analyzing pregnant women with TB, it was found that 50% experienced serious adverse events, reinforcing the need for timely detection.

Several authors [9,10] have documented that the coexistence of TB and pregnancy increases the risk of miscarriage, low birth weight, preeclampsia, and perinatal mortality. Preeclampsia and eclampsia are mediated by phosphocholinylated neurokinin B (NKB) of placental origin. This peptide induces arterial hypertension, redistribution of blood flow, and suppresses the Th1 and Th17 immune responses essential for *Mtb* control, creating a vicious cycle of placental inflammation, endothelial dysfunction, and ischemia [11]. Loto OM [9] and Meehan SA [10] describe the pathophysiology at the placental level, where structural alterations cause placental insufficiency and angiogenesis disturbances. This damage promotes the hypersecretion of neurokinins and alters the transplacental transfer of anti-mycobacterial IgG antibodies, depriving the fetus of this key immunoprotection; therefore, early detection and timely anti-tuberculosis treatment are a priority.

Furthermore, a study [12] showed a two-fold increase in preterm births and six times more perinatal deaths among pregnant women who delay the initiation of anti-tuberculosis treatment or discontinue it, noting that TB is one of the main causes of non-obstetric maternal death, accounting for up to 15% of cases. An additional health concern is the increased susceptibility to *Mtb* infection in the offspring of mothers treated with antibiotics during pregnancy, since the composition of the microbiota colonizing the newborn's gut is determined by the mother [13]. Consequently, changes in the maternal microbiota during pregnancy affect the microbiota of neonates and render them more susceptible to TB infection compared to children of mothers not exposed to antibiotics [14].

Detection and management constitute a crucial step toward TB eradication [14]. The prevalence of TB infection (TBI, formerly termed latent TB) during pregnancy ranges from 34% to 57% in high-burden regions and from 11% to 15% in low-burden regions [3,4], so early diagnosis and treatment of active disease can reduce maternal and neonatal morbidity and mortality. To this end, rapid molecular tests with drug susceptibility testing significantly shorten the diagnostic process for active TB [14].

For the treatment of active TB in our setting, the four first-line anti-tuberculosis drugs (Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol) are used, which are considered safe during pregnancy [15]. In a multicenter study [16], the prevalence of total adverse events for these drugs was 25.9%. By drug category, the prevalence of total adverse events was 50% for Ethambutol, it was 32.6%, and 13.7% for Isoniazid. In a retrospective study conducted by Meehan., *et al*. in 2020 [10], involving 248 pregnant women for whom pregnancy outcomes could be documented, one of the factors associated with an adverse pregnancy outcome was an unfavorable result of anti-tuberculosis treatment. In the study by Van Schalkwyk., *et al*. [8] significant fetal exposure to first-line anti-tuberculosis drugs was found, evidencing the risk of fetal exposure to these drugs, which usually do not produce harmful effects on the product [22].

## Objective of the Study

The objective of this report is to analyze and share our experience in the diagnosis and treatment of a patient with active TB and pregnancy, which may be useful in first-level care units, contributing to improving the timeliness and quality of care for this type of patient.

## Clinical Case Presentation

A 22-year-old woman sought medical attention in April 2025, reporting a chronic productive cough of two months' duration, with yellowish-greenish sputum without hemoptysis, weight loss, asthenia, adynamia, and hyporexia. She denied fever, evening sweats, or chills. She had no history of contact with TB-positive patients and reported a history of sporadic acute respiratory conditions. Regarding her obstetric history, she reported one pregnancy, one vaginal delivery, zero cesarean sections, and zero abortions; menarche at 12 years, with

a 28x5-day rhythm, eumenorrheic. She began sexual activity at age 20. Her first pregnancy had adequate prenatal care, no complications, and delivery was attended at the secondary care level without secondary problems.

On physical examination, the patient was in poor general condition, very thin, with pale skin and poor hydration status. Oropharynx showed dry oral mucosa; neck without cervical adenitis. Pulmonary examination revealed fine crackles disseminated in both lung fields, with emphasis on the right upper and middle lobes. Abdomen without apparent abnormalities, peristalsis present. Extremities with osteotendinous reflexes present but diminished.

Somatometry and vital signs: Weight = 37.2 kg; Height = 151 cm; BMI = 16.3; Temperature = 35.4°C; Blood Pressure = 90/60 mmHg; Heart Rate = 101 bpm; Respiratory Rate = 22 breaths/min; $O_2$ Saturation = 95%. Fasting capillary glucose = 97 mg/dL.

A diagnostic protocol for active TB was initiated through microbiological identification by sputum smear microscopy (acid-fast bacilli [AFB]), along with laboratory studies: complete blood count, clinical chemistry, liver function tests, and a chest X-ray.

The laboratory, radiological, and bacteriological results are presented below:

- Complete blood count: Erythrocytes 4.88 x $10^6$/$mm^3$; Hemoglobin 11.60 g/dL; Hematocrit 36.50%; Mean corpuscular volume 74.90 fL; Mean corpuscular hemoglobin 23.90 pg; Mean corpuscular hemoglobin concentration 31.90 g/dL. Leukocytes 6.40 x $10^3$/µL; Total neutrophils 4.10 x $10^3$/$mm^3$; Total lymphocytes 1.60 x $10^3$/µL; Total monocytes 0.70 x $10^3$/µL; Platelets 357 x $10^3$/$mm^3$.
- Blood chemistry: Serum glucose 87 mg/dL; Urea 13.70 mg/dL; Creatinine 0.79 mg/dL; Total cholesterol 116 mg/dL; Uric acid 9.15 mg/dL; Triglycerides 57.3 mg/dL.
- Liver function tests: Total proteins 9.40 g/dL; Albumin 4.00 g/dL; Globulin 6.40 g/dL; Total bilirubin 1.50 mg/dL; Direct bilirubin 0.20 mg/dL; Indirect bilirubin 1.30 mg/dL; Aspartate aminotransferase 15.0 U/L; Alanine aminotransferase 16.0 U/L; Alkaline phosphatase 82 mg/dL; Lactate dehydrogenase 199.0 IU/L.
- Urinalysis: Straw yellow, turbid; Density 1.020; pH 5.0; Nitrites negative; Proteins negative; Glucose negative; Ketones negative; Urobilinogen normal; Bilirubin negative; Blood negative; Leukocytes negative. Sediment: Cells ++; Leukocytes 5-6/field; Erythrocytes 0-1/field; Bacteria +++; Calcium oxalate crystals ++.
- The initial sputum smear microscopy was positive (+++) in all three simples requested. Subsequent follow-up AFB smears were negative.

Based on these results, the intensive phase of anti-tuberculosis treatment was initiated (April 2025) using the Directly Observed Treatment, Short-course (DOTS) strategy recommended by the World Health Organization (WHO), with the following antibiotics: Pyrazinamide 400 mg, Isoniazid 75 mg, Ethambutol 300 mg, Rifampicin 150 mg, administered as three tablets taken daily from Monday to Saturday, with rest on Sunday.

Additionally, and in accordance with national regulations, her seven contacts-including her sexual partner-were studied, all of whom were AFB negative. Her asymptomatic one-year-old daughter was started on chemoprophylaxis with Isoniazid every 24 hours for six months; her first follow-up gastric aspirate AFB smear at two months was negative, as was the one at five months.

Two months into anti-tuberculosis treatment, the patient was asymptomatic, in fair clinical condition, with improved skin coloration, good hydration status, and breath sounds within normal parameters. She had scant weight gain of 200g. Control AFB smear was negative.

On July 3, 2025-two months after starting treatment-she completed the intensive phase and began the maintenance phase according to current regulations: three tablets of Isoniazid and Rifampicin on alternate days (Monday, Wednesday, and Friday). Her weight was 40.700 kg, representing a gain of 3.5 kg. The patient reported secondary amenorrhea of three months' duration. Upon further inquiry during this

consultation, she stated that she had been using a monthly injectable hormonal contraceptive method (Norethisterone 50 mg/Estradiol 5 mg), with the last application in early April 2025, after which she discontinued the method. In the following month, due to suspicion of pregnancy, a blood pregnancy test was performed and resulted positive. In early September 2025, a transvaginal ultrasound revealed a gestational sac of 5.2 weeks, without visualization of the yolk sac or embryo, along with a subchorionic hematoma measuring 10 x 3 mm (Image 1).

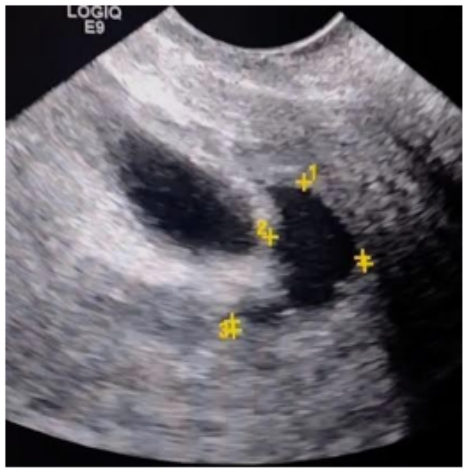


***Image 1:*** *From the USG of the health unit, the subchorionic hematoma can be seen.*

The patient was scheduled for a follow-up ultrasound seven days later, which confirmed the subchorionic hematoma and the absence of embryonic viability, (Image 2) leading to the diagnosis of missed miscarriage. She was referred to the secondary care level for pharmacological management: Legal Interruption of Pregnancy (LIP).

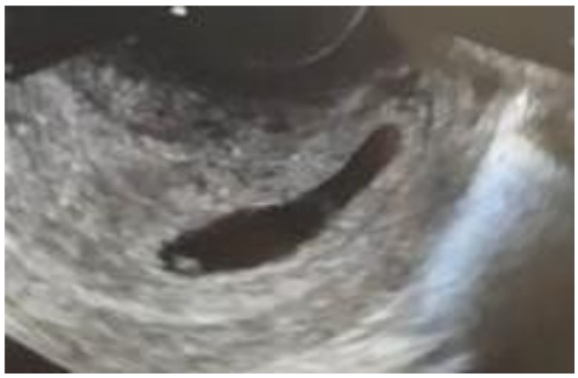

***Image 2:*** *From the USG of the health unit, the lack of fetal viability can be observed is observed (Retained dead egg).*

Prior to referral, follow-up laboratory tests were performed:

- Complete blood count: Erythrocytes 4.46 x $10^6$/$mm^3$; Hemoglobin 12.80 g/dL; Hematocrit 38.10%; Mean corpuscular volume 85.40 fL; Mean corpuscular hemoglobin 28.80 pg; Mean corpuscular hemoglobin concentration 33.70 g/dL. Leukocytes 7.10 x $10^3$/µL; Total neutrophils 4.20 x $10^3$/$mm^3$; Total lymphocytes 2.10 x $10^3$/µL; Total monocytes 0.80 x $10^3$/µL; Platelets 164 x $10^3$/$mm^3$.
- Blood chemistry: Serum glucose 84 mg/dL; Urea 24.27 mg/dL; Creatinine 0.70 mg/dL; Total cholesterol 110 mg/dL; Uric Acid 4.05 mg/dL; Triglycerides 41.3 mg/dL.
- Liver function tests: Total proteins 7.00 g/dL; Albumin 3.00 g/dL; Globulin 4.00 g/dL; A/G ratio 0.8; Total bilirubin 1.93 mg/dL; Direct bilirubin 0.28 mg/dL; Indirect bilirubin 1.65 mg/dL; Aspartate aminotransferase 15.0 U/L; Alanine aminotransferase 13.0 U/L; Alkaline phosphatase 58 mg/dL; Lactate dehydrogenase 199.0 IU/L.
- Urinalysis: Straw yellow, turbid; Density 1.020; pH 5.0; Nitrites negative; Proteins negative; Glucose negative; Ketones negative; Urobilinogen normal; Bilirubin negative; Blood negative; Leukocytes negative. Sediment: Cells ++; Leukocytes 5-6/field; Erythrocytes 0-1/field; Bacteria +++; Calcium oxalate crystals ++.

On September 10, the patient was referred to a second-level medical unit for pharmacological LIP with Misoprostol tablets, achieving expulsion of the embryo. Five days later, bleeding was minimal and without apparent complications.

Regarding her microbiological follow-up for TB, six monthly control AFB smears were performed, all of which were negative, demonstrating adequate microbiological control and a good response to anti-tuberculosis treatment. She continued treatment until its completion on October 13, 2025, with negative control AFB smears, as well as negative cultures by the Petroff method and subsequent negative PCR controls.

## Discussion

Tuberculosis (TB) during pregnancy poses a considerable risk of morbidity for both the pregnant woman and the fetus if not diagnosed and treated promptly [2].

In this regard, pregnancy represents an opportunity for TB detection and management, and constitutes an essential step toward its eradication. Early diagnosis and treatment of active disease can reduce maternal and neonatal morbidity and mortality [14].

Likewise, the need for integrated surveillance systems that identify cases of reproductive-age women with TB as early as possible is underscored, so that potential pregnancies can be detected and followed in a more comprehensive manner, encompassing both TB management and the monitoring of the pregnancy and fetal development [17].

Pregnant women with TB have high maternal mortality (OR = 2.8) and an increased risk of complications such as preterm birth (OR = 1.7), spontaneous abortion (OR = 9.0), perinatal neonatal death (OR = 4.2), intrauterine growth restriction, low birth weight, and stillbirth [18].

However, a meta-analysis reports that the overall prevalence of congenital anomalies associated with the use of anti-TB drugs during pregnancy is 1.9% [18]. Furthermore, maternal infection increases the risk of congenital TB, a rare but serious condition with high mortality, which can occur through transplacental transmission, aspiration of infected amniotic fluid, or inoculation during delivery. Therefore, the need for routine screening and comprehensive family planning for patients with TB is emphasized, including counseling on risks and safe contraception [18].

The work also highlights that diagnostic delay is associated with greater clinical severity at the time of detection, which may translate into worse maternal outcomes and an increased risk of neonatal transmission. Consequently, maintaining active clinical surveillance

both during gestation and postpartum is recommended, especially in women with epidemiological risk factors such as recent migration, immunosuppression, or a history of TB contact [19].

TB during pregnancy constitutes a substantial disease burden worldwide that has been historically underestimated. Sugarman., *et al*. (2014) [20] estimated that in 2011 there were approximately 216,500 pregnant women with active tuberculosis globally, including 4,400 in the Region of the Americas, where at that time a notification rate of 11 new positive cases per 100,000 women aged 15 - 44 years and a TB prevalence of 34 per 100,000 in the same denominator were calculated [20].

That study indicates that a considerable proportion of these cases is not diagnosed during pregnancy, which is associated with a significant increase in maternal and perinatal mortality [20]. In conclusion, this work positions TB in pregnancy as a relevant global public health problem, with a quantifiable burden and serious consequences for both mother and newborn [20].

The authors emphasize the need to integrate TB screening and management within maternal health services, especially in high-burden countries, as a key strategy to reduce maternal-fetal morbidity and mortality [20].

Crocker-Buque (2025) [21] recently emphasized the urgency of generating more scientific evidence so that this vulnerable group no longer depends on recommendations based on animal studies or limited observational data, underscoring that TB during pregnancy is not merely a common infectious disease, but a critical factor that increases maternal mortality between 6% and 15% globally [21]. The research highlights that women with active TB face an alarming clinical landscape, hence an urgent call to integrate family planning services and routine TB screening into prenatal care, especially in high-burden regions, to save the lives of both mothers and children [21].

## Conclusion

It is widely documented that TB increases the risk of obstetric complications. In the case presented, regrettably, aspects related to the possibility of the woman becoming pregnant were overlooked at the initiation of her TB diagnosis and follow-up, an issue identified five weeks into her gestation. The product of the pregnancy was not viable, and the woman underwent an abortion. In areas with high TB prevalence, it is imperative that women of reproductive age receive more comprehensive care and follow-up, paying special attention not only to TB but also to gynecological-obstetric care, so that pregnancies do not go unnoticed and complications in the mother-child dyad can be reduced, while ensuring the success of anti-tuberculosis treatment.

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