JCRMHS

Journal of Clinical Case Reports, Medical Images and Health Sciences

Volume 14 Issue 5, 2026

Article Information

Received date: 03/11/2026

Published date: 10/11/2026

*Corresponding author

C. Chahboune, Pulmonology Department, 20 August 1953 University Hospital, Casablanca, Morocco

E-mail: chaimaa1chahboune@gmail.com/ chaimaa1chb@gmail.com

Key Words:

Multidrug-Resistant Tuberculosis, Pregnancy, Second-Line Antituberculosis Drugs

Case Report

Multidrug-Resistant Tuberculosis During Pregnancy: Two Case Reports and Review of the Literature

C. Chahboune*, S. Msika, H. Arfaoui, B. El Bied, H. Oulad Bada, H. Bamha, N. Bougteb, H. Jabri, W. El Khattabi, MH. Afif.

Pulmonology Department, 20 August 1953 University Hospital, Casablanca, Morocco

Abstract

Multidrug-resistant tuberculosis (MR-TB) remains a major global public health concern, particularly among women of reproductive age. The management of MR-TB during pregnancy is particularly challenging, owing to the limited clinical experience and evidence regarding the safety and efficienty of second-line antituberculosis drugs in this population. We report two cases of MR-TB occurring during pregnancy. Both patients were closely monitored throughout pregnancy and postpartum, and at three months of follow-up, both mothers and their infants were clinically well, with no significant complications reported. These cases highlight the complexities involved in managing MR-TB during pregnancy and underscore the need for individualized therapeutic strategies and multidisciplinary care.

Introduction

Multidrug-resistant tuberculosis (MR-TB) is defined as Mycobacterium tuberculosis bacteria resistant to at least rifampicin and isoniazid, and remains a major global health concern (1). MR-TB requires a more intensive therapeutic approach than drug-susceptible tuberculosis, generally involving multidrug regimens that include second-line antituberculosis agents. These second-line agents are generally considered to have lower efficacy and a less favorable safety profile, with a higher potential for adverse effects than the first line drugs (2). However, data regarding the safety and tolerability of second-line antituberculosis drugs during pregnancy remain limited. In contrast, untreated tuberculosis during pregnancy has been associated with increased maternal morbidity and mortality (3). Furthermore, the risks of disease progression, adverse pregnancy outcomes, and transmission of infection to the newborn support the initiation of appropriate antitubercular agents during pregnancy when clinically indicated (4). Here we report 2 cases of MR-TB that were treated with second-line drugs during pregnancy.

Case Presentation

Case 1

A 28-year-old woman, at 22 weeks and 4 days of pregnancy, consulted for episodes of loss of consciousness associated with right-sided hemiparesis and aphasia since 2 months. Electroencephalography revealed no significant abnormalities. Brain MRI revealed supratentorial and infratentorial subcortical nodular lesions, with imaging features suggestive of cerebral tuberculomas (Figure 1). Concurrently, she presented progressively worsening dyspnea, fever, night sweats, and a productive cough with green sputum, without hemoptysis. Chest radiography revealed an alveolo-interstitial pattern with cavitary lesions (Figure 2). Chest CT Scan demonstrated alveolo-interstitial opacities associated with mediastinal lymphadenopathy, raising the initial suspicion of tuberculosis.

The GeneXpert MTB/RIF molecular assay of sputum samples detected Mycobacterium tuberculosis at a low bacillary load and identified rifampicin

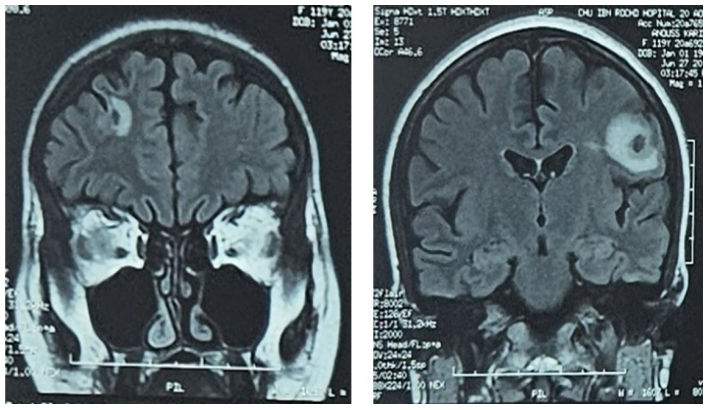


Figure 1: *Brain MRI showing subcortical nodular lesions, whose appearance was suggestive of cerebral tuberculomas.*



Figure 2: *Frontal chest radiograph revealing an alveolar-interstitial pattern with cavitary lesions.*

resistance, and direct sputum smear examinations were negative, whereas sputum culture was positive.

The clinical examination found an acute hypoxemic respiratory distress, her peripheral oxygen saturation was 85% on room air, her heart rate was 100 beats per minute, and her respiratory rate was 24 breaths per minute and her body weight was 60 kg. Chest examination revealed faint crackles, while the remainder of the physical examination was unremarkable. Supplemental oxygen therapy was initiated.

Initial laboratory investigations revealed an anemia with an hemoglobin level of 10.3 g/dL, an erythrocyte sedimentation rate (ESR) of 72 mm/h at the first hour. Initial liver function tests (ASAT, ALAT, ALP, GGT) were within normal limits. Serological tests for hepatitis B and C, HIV, TPHA and VDRL were negative. Abdominal ultrasonography was unremarkable and confirmed an ongoing pregnancy at approximately 24 weeks of amenorrhea. Baseline audiometry was normal.

Hain Genotype line probe assay testing revealed gyrA mutations (mutations 3C and 3D), consistent with fluoroquinolone resistance. Susceptibility to kanamycin and other aminoglycosides was reported.

Taken together, these findings supported a diagnosis of rifampicin and fluoroquinolone-resistant pulmonary tuberculosis, associated with cerebral lesions radiologically suggestive of tuberculomas.

Given the severity of the patient's clinical condition, the case was discussed at a specialized multidisciplinary meeting. The consensus recommendation was to promptly initiate an appropriate antituberculosis treatment regimen.

Initial treatment with RHZE, combined with vitamin B6, associated with a six-week course of oral corticosteroids was initiated. Regarding the neurological manifestations, specialist consultation favored a diagnosis of cerebral tuberculomas and recommended treatment with levetiracetam for three months, followed by reassessment.

After one month of treatment, given the lack of clinical improvement, the case was discussed in a multidisciplinary team meeting, and the decision was made to initiate a treatment regimen comprising kanamycin, linezolid, clofazimine, isoniazid, cycloserine, ethambutol, ethionamide, and vitamin B6.

However, follow-up liver function tests revealed significant hepatocellular injury, with ASAT levels of 349 IU/L, ALAT levels of 457 IU/L, and GGT levels of 253 IU/L. Antituberculosis treatment was discontinued 1 month after. Following discussion at a pharmacovigilance meeting, the liver injury was considered likely to be drug-induced, with isoniazid and/or pyrazinamide suspected as potential causative agents. Isoniazid was considered the more likely culprit based on the temporal relationship and the doses administered.

Following treatment discontinuation, transaminase levels progressively returned to normal in 15 days, and the case was re-discussed at a multidisciplinary team meeting, the decision was made to resume treatment while excluding isoniazid and pyrazinamide. Treatment was therefore reintroduced after 1 week, with a regimen comprising kanamycin, linezolid, clofazimine, cycloserine, ethambutol, ethionamide, and vitamin B6. Follow-up liver function tests after treatment reintroduction remained satisfactory.

From an obstetric perspective, a gynecological consultation recommended considering delivery at 34 weeks of gestation, depending on maternal and fetal outcomes. Ultimately, the pregnancy was continued under multidisciplinary monitoring. The patient delivered at term a live-born male infant weighing 1700 g, with Apgar scores

of 8 and 9 at 1 and 5 minutes, respectively. The tuberculin skin test (Mantoux test) and gastric aspirate examination performed in the newborn were negative for acid-fast bacilli. Histopathological examination of the placenta was unremarkable, with no evidence of tuberculous involvement. No obvious congenital malformations were observed. During the postpartum period, the patient was in good general condition, with a body weight of 64 kg. Liver function tests were within normal limits and 2 direct sputum smear examinations were negative.

Given the drug-resistance profile and the need to optimize the treatment regimen in the postpartum period, bedaquiline was initiated. From a respiratory standpoint, the patient reported clinical improvement. Regarding the neurological manifestations, follow-up brain MRI revealed persistent lesions. Neurological consultation recommended continuation of the ongoing treatment regimen. Evaluation of the infant at 3 months of age revealed no clinical evidence of tuberculosis.

This case highlights the therapeutic challenges of fluoroquinolone-resistant tuberculosis during pregnancy, particularly in the presence of neurological involvement and drug-induced hepatotoxicity, and underscores the importance of individualized, multidisciplinary management.

Case 2

A 24-year-old woman with a six-year smoking history. She was being followed for bacteriologically confirmed pulmonary tuberculosis since 4 months. Her clinical course during initial antituberculosis treatment was characterized by a negative bacteriological results at the second month followed by a positive result at the fourth month. Xpert MTB/RIF testing detected Mycobacterium tuberculosis and rifampicin resistance. Molecular drug susceptibility testing using the Hain assay revealed fluoroquinolone resistance associated with a gyrA gene mutation (mutation 3c), while susceptibility to kanamycin was retained.

On admission, the patient presents a performance status score of 0. She was afebrile, with a body temperature of 37°C, and an oxygen saturation of 96% on room air. Her blood pressure was 90/50 mmHg, heart rate was 78 beats/min, respiratory rate was 20 breaths/min, and body weight was 59 kg. Chest examination revealed mild wheezing, with no other significant clinical abnormalities.

Chest radiography revealed diffuse, ill-defined bilateral reticulomicronodular opacities, predominantly involving the middle lung zones (Figure 3). Initial laboratory investigations showed an hemoglobin level of 11.1 g/dl, and an erythrocyte sedimentation rate of 24 mm/h at the first hour. Renal and hepatic function were preserved. Serological tests for HIV, hepatitis B, hepatitis C, and syphilis (TPHA-VDRL) were negative. Abdominal ultrasonography, ophthalmological examination, and audiometry normal findings.

Following multidisciplinary discussion, an extended antituberculosis regimen tailored to the drug-resistance profile was selected. The regimen included kanamycin, ethionamide, cycloserine, ethambutol, pyrazinamide, linezolid, para-aminosalicylic acid (PAS), and isoniazid, together with vitamin B6 supplementation.

Follow-up chest radiography, after 2 months, showed initial radiological improvement, whereas bacteriological monitoring yielded discordant results: smear microscopy was

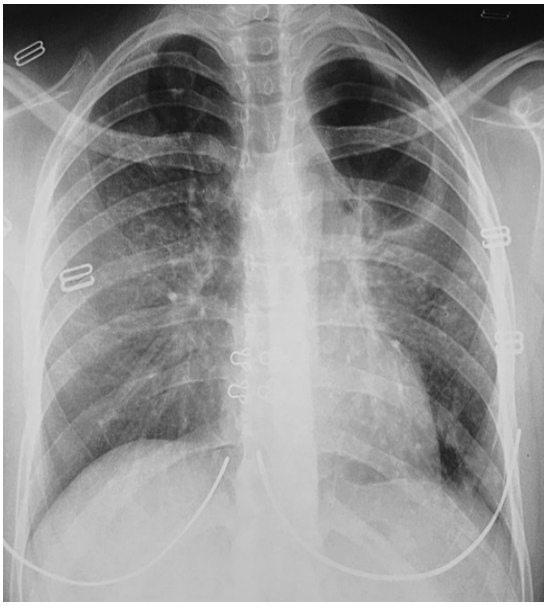


Figure 3: *Frontal chest radiograph showing diffuse, bilateral, ill-defined reticulomicronodular opacities, predominantly involving the mid-lung fields.*



Figure 4: *Frontal chest radiograph performing at the end of treatment demonstrating radiological improvement.*

negative in one specimen but remained positive (1+) in other specimen. During follow-up, the patient developed knee arthralgia, prompting an adjustment of the pyrazinamide dosage, as well as amenorrhea. The serum β-human chorionic gonadotropin (β-hCG) testing was positive, with a level of 50,107 mIU/mL. Pelvic ultrasonography confirmed an ongoing pregnancy estimated at 15 weeks of gestation despite contraceptives measures.

After thorough discussion with the patient and counseling regarding the potential risks and expected benefits, she repeatedly expressed her wish to continue the pregnancy to term. Accordingly, joint follow-up by the pulmonology and obstetrics and gynecology teams was recommended, including regular fetal morphological ultrasonographic examinations.

At the 5 months of pregnancy, regarding microbiological findings, sputum smear microscopy remained positive (1+), but became negative on the six month, suggesting a favorable bacteriological response to treatment. From a respiratory standpoint, the patient reported clinical improvement, with a reduction of productive cough, resolution of fever and night sweats, she experienced a 6 kg weight gain during treatment. Gynecological follow-up was also scheduled.

The patient spontaneously went into labor at 37 weeks of amenorrhea and delivered a live male infant weighing 1.5 kg, with Apgar scores of 8 and 9 at 1 and 5 minutes, respectively. The tuberculin skin test (Mantoux test) and gastric aspirate examination performed in the newborn were negative for acid-fast bacilli. Placental histopathological examination was unremarkable, with no evidence of tuberculous involvement. No obvious congenital malformations were observed.

Evaluation of the infant at 3 months of age revealed no clinical evidence of tuberculosis infection. During the postpartum period, the mother continued her second-line antituberculosis treatment, including injectable kanamycin.

After 18 months of second-line antituberculosis treatment, the patient's clinical and laboratory outcomes were favorable. Chest radiography demonstrated radiological improvement at the end of treatment (Figure 4).

Discussion

Multidrug-resistant TB (MR-TB) is described as Mycobacterium tuberculosis bacteria resistant to rifampicin and isoniazid with or without resistance to other drugs. This form of tuberculosis is prevalent in nearly all countries (1). In Morocco, approximately 261 cases of drug-resistant tuberculosis were notified in 2024, of 0.71 % among newly diagnosed cases and 7.6 % among previously treated patients (5). Gestational MR-TB remains uncommon, with fewer than 100 reported cases to date, although its incidence may increase with the resurgence of tuberculosis during pregnancy (6). Physiological and immunological changes associated with pregnancy may facilitate the progression of latent tuberculosis infection to active disease (7,8). Thus, multidrug-resistant tuberculosis (MR-TB) occurring during pregnancy should be considered within the same therapeutic framework as that currently applied to the use of first-line antituberculosis drugs during pregnancy. The scarcity of available evidence and the lack of consensus regarding the management of MR-TB during pregnancy make this a challenging and controversial clinical situation. The limited evidence available to guide the management of MR-TB during pregnancy is based primarily on clinical observations and case reports (7,9,10,11).

Most clinicians have advised women against becoming pregnant or continuing an ongoing pregnancy (12). In many cases, these patients receive suboptimal treatment from healthcare professionals due to the inherent challenges associated with their management, including insufficient data on the safety profiles of medications, restrictions on the use of rifampicin and isoniazid, uncertainty regarding the optimal timing for treatment initiation, limited data on treatment-related toxicity, and concerns about post-treatment complications (6).

The management of MR-TB during pregnancy represents a major therapeutic dilemma. On the one hand, the second-line antituberculosis drugs used to treat MR-TB are potentially teratogenic, less effective, and more toxic; on the other hand, suboptimal management of these patients may have serious consequences. Therefore, the management of pregnant patients with MR-TB requires a multidisciplinary approach involving obstetricians, neonatologists, pulmonologists, and public health specialists. Treatment regimens and duration should be individualized according to the drug-susceptibility profile of the strain responsible for the infection. Treatment is generally deferred until the second trimester to minimize the risk of drug-related teratogenic effects, except in patients with HIV infection or those presenting with critical clinical conditions (7).

Several case series and reports have been published on this topic; some reported no perinatal adverse effects, whereas others described cases of growth restriction and congenital malformations (9,10,11,13). In a retrospective study of 38 Peruvian pregnant women treated for multidrug-resistant tuberculosis, 61% were successfully treated, 13% died, and 5% experienced treatment failure. Eight patients (21%) developed pregnancy-related complications, including spontaneous abortions and vaginal bleeding. None of the newborns exhibited teratogenic effects (9). Among five South African pregnant women with multidrug-resistant tuberculosis, three were HIV-infected, and two experienced

treatment-related adverse events, namely hearing loss and drug-induced hepatitis. No evidence of teratogenicity was observed in the newborns (13).

Outside pregnancy, the preferred treatment regimens for MR-TB combine ethionamide, pyrazinamide, kanamycin, levofloxacin, ethambutol, and cycloserine during an intensive phase lasting 6 to 9 months, followed by a continuation phase of 18 to 24 months consisting of four drugs: levofloxacin, ethionamide, ethambutol, and cycloserine (14). However, certain precautions and modifications are required when these drugs are used during pregnancy. Aminoglycosides are avoided in treatment regimens administered to pregnant women because of the risk of ototoxicity to the developing foetus. Although capreomycin is also associated with a potential risk of ototoxicity, it is the drug of choice when injectable therapy is unavoidable. To minimize fetal exposure, capreomycin may be administered three times weekly from the initiation of treatment (6).

The use of prothionamide and ethionamide during pregnancy remains controversial, as animal studies have reported cases of growth restriction, abortions, congenital malformations, and central nervous system abnormalities. Therefore, these drugs are generally replaced by para-aminosalicylic acid (PAS). The safety of PAS use was questioned in the past; however, the available data have failed to confirm these concerns. It is currently considered one of the safest second-line drugs (6).

Furthermore the use of fluoroquinolones during pregnancy does not appear to increase the risk of congenital malformations, as concluded by the meta-analysis by Bar-Oz et al. (15). Thus, despite limited data on the safety and prolonged use of fluoroquinolones, cycloserine, para-aminosalicylic acid (PAS), and amoxicillin/clavulanic acid during pregnancy, these drugs are considered preferred therapeutic options for the treatment of multidrug-resistant or extensively drug-resistant tuberculosis (MR/UR-TB) in pregnant women (6).

In the two clinical cases reported in our study, ethionamide was administered throughout pregnancy, with no congenital malformations observed in the newborns. This finding is consistent with the data reported by Schardein in several clinical reports (7). Nevertheless, many authors remain opposed to its use during pregnancy.

Given the limited data available regarding the safety of delamanid and bedaquiline during pregnancy for the treatment of MR/UR-TB, these drugs should be avoided (6).

Thus, given that the teratogenic potential of second-line antituberculosis drugs remains poorly established, effective contraception is strongly recommended for all non-pregnant women receiving antituberculosis treatment for drug-resistant tuberculosis. Nevertheless, when undiagnosed or untreated during pregnancy, MR-TB is associated with increased maternal morbidity and mortality, as well as a higher risk of vertical transmission. It is also associated with an increased risk of obstetric complications, including spontaneous abortion, fetal growth restriction, oligohydramnios, preterm delivery, and increased neonatal mortality (8–16).

True congenital tuberculosis is extremely rare, and the risk of transmission is particularly high during the early neonatal period. The newborn should receive the Bacille Calmette–Guérin (BCG) vaccine at birth, in accordance with the recommendations of the World Health Organization (WHO). However, the role of isoniazid (INH) prophylaxis in neonates born to mothers with MR-TB remains uncertain (6).

Conclusion

Based on the available evidence in the literature, we conclude that, although pregnancy complicates the management of MR-TB, the established and potential benefits of continuing treatment appear to outweigh the theoretical risks to both the mother and the foetus. A thorough assessment of pregnant patients, taking into account gestational age and disease severity, is warranted before treatment initiation, with the primary objective of achieving sputum culture conversion before delivery.

Conflict of Interest: The authors declare no conflict of interest.

References

1. M.A. Espinal, A. Laszlo, L. Simonsenetal.,"Global trends in resistance to antituberculosis drugs," The New England Journal of Medicine, vol.344, no.17, pp.1294-1303,2001.
2. Sonya Shin et al. Treatment of Multidrug-Resistant Tuberculosis during Pregnancy: A Report of 7 Cases. Clinical Infectious Diseases 2003:36 (15 April), Major Article.
3. Kefyalew Addis Alene et al. Treatment Outcomes Among Pregnant Patients With Multidrug-Resistant Tuberculosis : A Systematic Review and Meta-analysis. JAMA Network Open/ Infectious Diseases. 2022 ;5(6):e 2216527.
4. Marian Loveday et al. Pregnant Women With Multidrug-Resistant/ Rifampicin- Resistant Tuberculosis and the All-Oral 6-Month Regimen: Experiences From a Patient Series in South Africa. Clinical Infectious Diseases, 2026:82 (15 May), Major Article.
5. Le Guide national de la Lutte Antituberculeuse au Maroc (2025). https://fr.scribd.com/document/939446213/Guide-du-PNLAT-2025-251008-095850.
6. Minakshi Rohilla, Bharti Joshi, Vanita Jain, Jasvinder Kalra, and G. R. V. Prasad. Multidrug-Resistant Tuberculosis during Pregnancy: Two Case Reports and Review of the Literature. Hindawi Publishing Corporation Case Reports in Obstetrics and Gynecology Volume 2016, Article ID 1536281, 4 pages.
7. S. Shin, D. Guerra, M. Rich et al., "Treatment of multidrug resistant tuberculosis during pregnancy: a report of 7 cases," Clinical Infectious Diseases volume 36, no.8, pp : 996-1003, 2003.
8. P. Zvandasara, J. W. Hargrove, R. Ntozini et al., "Mortality and morbidity among postpartum HIV-positive and HIV negative women in Zimbabwe: risk factors, causes, and impact of single-dose postpartum vitamin A supplementation," Journal of Acquired Immune Deficiency Syndromes, vol.43, no.1, pp :107-116, 2006.
9. E. Palacios, R. Dallman, M. Munoz et al.,"Drug-resistant tuberculosis and pregnancy: treatment outcomes of 38 cases in Lima, Peru," Clinical Infectious Diseases, vol.48, no.10, pp.1413-1419, 2009.
10. P. Tabarsi, P. Baghaei, M. Mirsaeidi et al., "Multidrug resistant tuberculosis in pregnancy: need for more intensive treatment," Infection, vol.35, no.6, pp.477–478, 2007.
11. P. C. Drobac, H. del Castillo, A. Sweetland et al., "Treatment of multidrug-resistant tuberculosis during pregnancy: long-term follow-up of 6 children with intrauterine exposure to second line agents," Clinical Infectious Diseases, vol.40, no.11, pp.1689 1692, 2005.
12. Ismat lotia farrukh et al. Pregnancy and Birth Outcomes in Patients With Multidrug-Resistant Tuberculosis Treated With Regimens That Include New and Repurposed Drugs. Clinical Infectious Disease, 2024 :78 (15 January), Brief Report.
13. M. Khan, T. Pillay, J. Moodley, A. Ramjee, and N. Padayatchi, "Pregnancies complicated by multidrug-resistant tuberculosis and HIV co-infection in Durban, South Africa," International Journal of Tuberculosis and Lung Disease, vol.11, no.6, pp.706-708, 2007.
14. Guidelines on Programmatic Management of Drug Resistant TB (PMDT) in India, Central TB Division, Directorate General of Health Services, Ministry of Health, May 2012..
15. B. Bar-Oz, M. E.Moretti, R. Boskovic, L.O'Brien, and G. Koren, "The safety of quinolones- a meta-analysis of pregnancy outcomes," European Journal of Obstetrics Gynecology and Reproductive Biology,vol.143, no.2, pp.75-78, 2009.
16. S. Kishan and S. Kaur, "Tuberculosis and pregnancy," in Proceedings of the National Conference on Pulmonary Diseases (NAPCON'01), Mumbai, India, November 2001.

Citation: C. Chahboune , Multidrug-Resistant Tuberculosis During Pregnancy: Two Case Reports and Review of the Literature. Jour of Clin Cas Rep, Med Imag and Heal Sci 14 (5)-2026.

Copyright © All rights are reserved by **C. Chahboune**

Your next submission with Journal of Clinical Case Reports Medical Images and Health Sciences will reach you the below assets

- Quality Editorial service
- Peer Review
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats

(**Pdf, E-pub, Full Text, Audio**)

- Instant DOI Activation

Track the below URL for one-step submission

https://jmedcasereportsimages.org/submit-manuscript/