

CASE REPORT

Scrub typhus in pregnancy presenting with permanent hearing loss: A case report

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Abstract

As clinicians, we need to be vigilant about these rare and atypical presentations given the endemic nature of scrub typhus in southern belt of the country. Timely diagnosis and appropriate treatment is the key aspect to prevent further complications.

KEY WORDS

hearing loss, pregnancy, scrub typhus

1 | INTRODUCTION

Scrub typhus can present with audiological symptoms. A pregnant mother presented with fever, pneumonia, delirium, and hearing loss. Investigation showed positive serology for scrub typhus. Clinicians must be aware of audiological presentations in scrub typhus. Possibly, permanent hearing loss resulted from synergistic effect of pregnancy-induced changes.

Scrub typhus is a mite borne infectious disease caused by *Orientia tsutsugamushi*. The vector and reservoir for this disease are the larval trombiculid mites also known as chiggers. The southern belt of Bhutan is seasonally endemic to scrub typhus with highest occurrence in farmers.¹

The clinical manifestations of this nonspecific febrile illness are intense headache and myalgia. Some patients develop generalized lymphadenopathy, macular or maculopapular nonpruritic rashes, and an eschar. Rare and atypical presentations such as acute reversible auditory symptoms like sensorineural hearing loss, tinnitus, and otalgia have been reported.^{2,3} Possible mechanism for such presentations is immune-mediated vasculitis leading to cochlear neuroinflammation resulting from exaggerated Th1 cellular immune response.^{3,4} The severity of infection can vary from mild

symptoms to severe multiorgan failure. Mortality rates were higher in those developing pneumonia, delirium, myocarditis, and elderly population.^{5,6}

The clinical diagnosis accuracy remains nonspecific due to largely overlapping symptoms seen in other tropical infections like dengue, malaria, and leptospirosis. Most patients develop thrombocytopenia, elevated hepatic enzymes, and deranged renal functions. Leukopenia or leukocytosis may develop but most patients present normal total leucocyte count.⁷

Since the audiological symptoms related to scrub typhus discussed in the literature were transient or reversible, we hereby present this case with permanent hearing loss in a pregnant woman following scrub typhus infection.

2 | CASE PRESENTATION

A previously healthy 39-year-old G6P5 farmer at 34 weeks gestation was referred from Punakha District Hospital with 5 days history of fever, headache, generalized bodyache, shortness of breath, and cough. There were no audiological, gastrointestinal, or urinary symptoms. On admission to the maternity ward, she was ill-looking but conscious with

tachypnea, high-grade fever, and pallor. There was no cervical lymphadenopathy, icterus, body rashes, eschar, or ear infection. Her respiratory rate was 26–30/min, pulse rate of 120 beats per minute, and blood pressure of 110/70 mm Hg. Cardiac auscultation revealed ejection systolic murmur at left lower sternal edge, which was probably due to hyperdynamic circulation in anemia. There was coarse crepitation noted in bilateral lung fields. Abdominal examination revealed no hepatosplenomegaly. Cardiotocograph was reassuring.

Presumptive diagnosis of community-acquired pneumonia was made and empirical treatment started with intravenous ceftriaxone and oral erythromycin. Antenatal corticosteroid was administered as per the hospital protocol. One unit of packed red cell was transfused.

Laboratory investigation reports showed moderate anemia (Hb 7.9 gm%), raised C-reactive protein (19.9 mg/L), and mild transaminitis. Renal function was normal. Sputum culture showed *Klebsiella pneumoniae*, which was sensitive to Ciprofloxacin and resistant to Ceftriaxone. Blood and urine culture were sterile. Dengue serology and malaria parasite smear were negative. Chest X-ray (Figure 1) showed features suggestive of pneumonia. Echocardiogram was done to rule out cardiac causes of febrile illness, and the findings were normal.

There was no clinical improvement after 72 h of antibiotic therapy. Intravenous ciprofloxacin was administered based on sputum culture and antibiotic sensitivity test for 3 days. Her respiratory symptoms improved but still remained febrile. She complained of bilateral hearing loss after 3–4 days of admission and appeared delirious on examination. She did not complain of tinnitus or otalgia. Urgent MRI brain showed no significant abnormalities although minor details could not be reported due to frequent motion by the agitated patient.

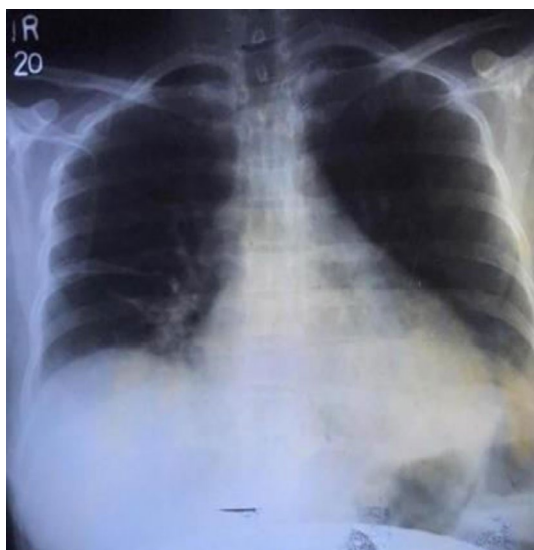


FIGURE 1 CXR posteroanterior view showing segmental consolidation of right lower zone

Repeat serological investigation showed positive IgM for scrub typhus. Other hematological investigations including complete blood count, liver functions, and renal functions did not show significant changes compared with previous results. She responded to oral azithromycin 1 g daily for 03 days. Induction of labor was done in view of fetal jeopardy and delivered a male baby weighing 2100 g with Apgar score of 9 and 10 at 1 and 5 min, respectively. There were no intra-partum and immediate postpartum complications. Audiology examination done postpartum 3rd day showed profound sensorineural bilateral hearing loss (Figure 2A). Audiology re-assessment was done at 6 and 12 weeks postpartum.

Clinically, there was no improvement in her hearing and repeat pure tone audiometry (PTA) at 12 weeks (Figure 2B) still showed profound bilateral sensorineural hearing loss similar to the initial assessment. A retrospective diagnosis of permanent sensorineural hearing loss following scrub typhus in pregnancy was made. Auditory brainstem response (ABR) was not performed as MRI brain performed earlier did not identify any retrocochlear lesions and PTA findings were sufficient to assess the hearing threshold. She was advised to adopt total communication as an alternative.

3 | DISCUSSION

This is a case of scrub typhus in pregnancy presenting with respiratory symptoms. The diagnosis of scrub typhus in our case was delayed due to predominant respiratory symptoms, absence of eschar, and the initial false-negative serology result with SD Bioline Tsutsugamushi RDT (Standard Diagnostics Inc).⁸ The appearance of audiological symptoms such as hearing loss in acute undifferentiated febrile illness should raise suspicion for scrub typhus infection.² Audiological symptoms were present in almost 30% of the cases.⁹ A hospital-based review of records of 33 pregnant women with scrub typhus infection reported 4.5% incidence although none of the cases reported hearing loss.¹⁰ Similar to nonpregnant patients, the severity of disease is associated with delayed diagnosis and treatment leading to multiorgan failure. It is associated with poor obstetric outcome such as maternal admission to intensive care unit, miscarriage, fetal demise, and preterm birth especially in 3rd trimester in at least 50% of the cases.^{10,11} Consistent with other studies, maternal, fetal, and neonatal outcomes were favorable in our case as there was no multi-organ dysfunction. There are also few case reports on vertical transmission.¹² However, the baby's serology in our case came negative for scrub typhus infection. Case series reported by Premaratna et al.² have shown objective improvement in hearing loss in those who recovered without any complications. All cases except one responded to course of tetracycline/chloramphenicol. One patient died due to myocarditis and meningoencephalitis due to delayed diagnosis. One hypothetical

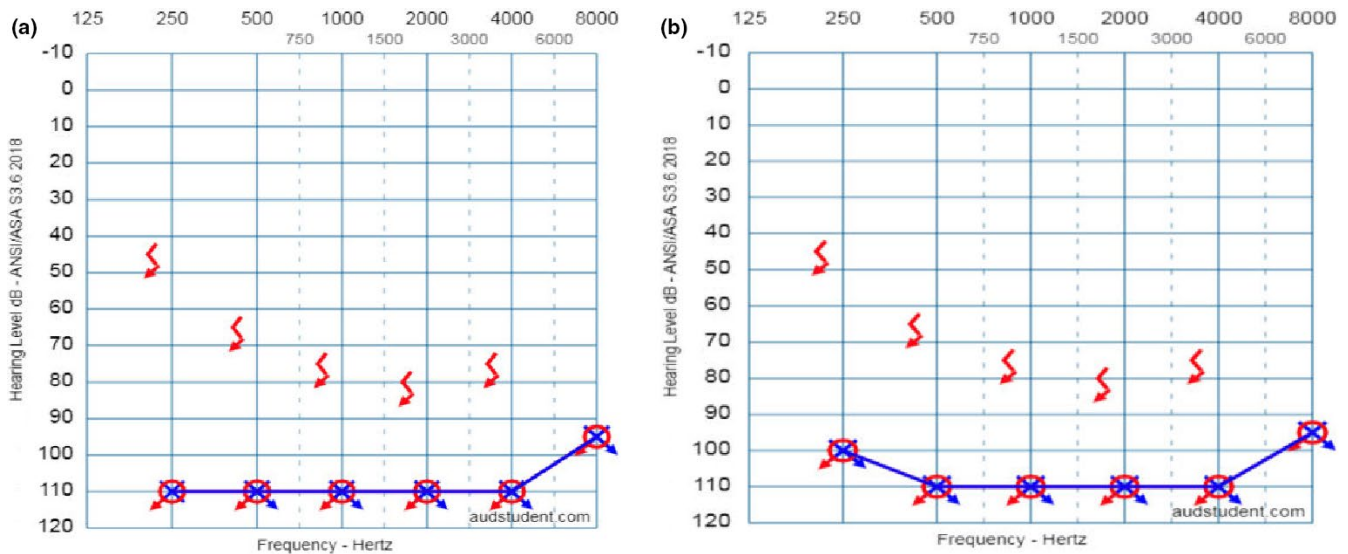
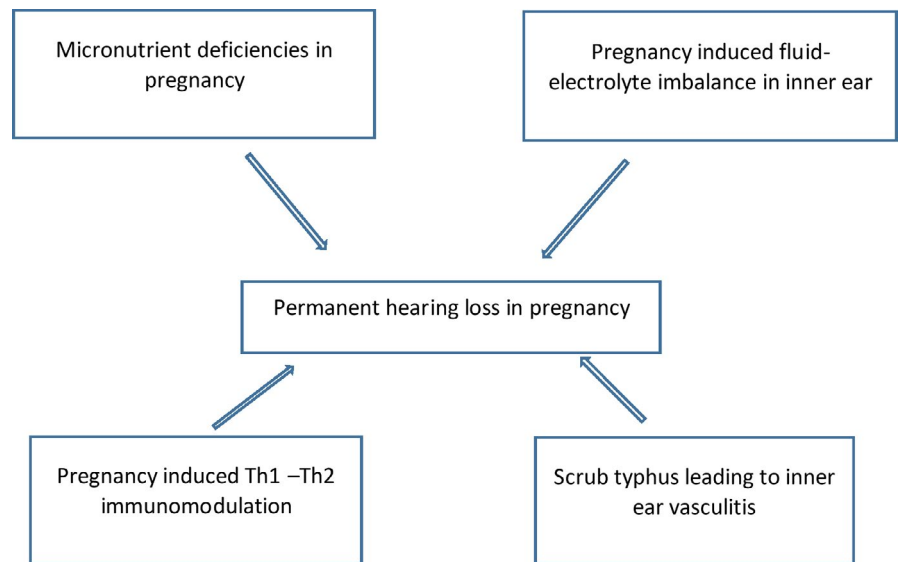


FIGURE 2 Pure tone audiometry (A) Initial (B) 12 weeks postpartum

FIGURE 3 Mechanism of permanent hearing loss in pregnancy and scrub typhus infection



explanation on rarity of literature on permanent hearing loss due to scrub typhus in pregnancy may be due to a shift in Th1 to Th2 immune modulation.¹³ A balanced Th1/Th2 immune response has been noted in animal studies with milder form of scrub typhus infection.⁴ On the contrary, an exaggerated Th1 and suppressed Th2 response has been noted in severe infection. Possibly, neuroinflammation may be more pronounced due to the Th1 to Th2 shift in early stage of infection followed by overwhelming infection at later stage. A reasonable postpartum time period of 3 months was allowed to recover from pregnancy-associated hearing loss as seen in some healthy women.¹⁴ Telephonic follow-up with spouse at 6 months revealed no subjective improvement in hearing as hearing recovery took up to 6 months in the case series by Premaratna et al.²

Xu et al.¹⁵ reported about 40% of the women in second half of pregnancy experienced profound sensorineural

hearing loss when followed up at 6 months postpartum. They cited hormone-induced fluid and electrolyte imbalance in the inner ear as the only etiology. However, the hearing loss was unilateral and associated with tinnitus in majority of the cases. Farming occupation is the most important risk factor for scrub typhus infection in our country.¹ Pregnancy per se is not a risk factor for scrub typhus infection but a risk factor for hearing loss.¹⁵ Association between macro and micronutrient deficiencies and hearing loss is well documented, and this effect certainly would be more profound in nutrient-deficient state like pregnancy in developing countries.^{16,17} Pregnancy-induced physiological changes in immunomodulation, nutritional deficiencies, and fluid-electrolyte changes would have played synergistic role in permanent nature of hearing loss in scrub typhus infection (Figure 3). Our case report is limited by the lack of laboratory investigations to confirm the nutritional status of the mother.

4 | CONCLUSION

As clinicians, we need to be vigilant about these rare and atypical presentations given the endemic nature of scrub typhus in southern belt of the country. Timely diagnosis and appropriate treatment is the key aspect to prevent further complications.

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CONFLICT OF INTEREST

None declared.

AUTHORS CONTRIBUTION

ST was involved in conception and design, acquisition of data, analysis and interpretation of data, revising it critically for important intellectual content, final approval of the version to be published, and agreed to be accountable for all aspects of the work. ND was involved in conception and design, acquisition of data, revising it critically for important intellectual content, final approval of the version to be published, and agreed to be accountable for all aspects of the work. DD was involved in conception and design, acquisition of data, interpretation of data, revising it critically for important intellectual content, final approval of the version to be published, and agreed to be accountable for all aspects of the work. TO was involved in conception and design, acquisition of data, interpretation of data, revising it critically for important intellectual content, final approval of the version to be published, and agreed to be accountable for all aspects of the work.

ETHICAL APPROVAL

Ethical approval is not needed for case report in de-identified patients.

DATA AVAILABILITY STATEMENT

Data sharing not applicable as this article did not generate or analyzed dataset.

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