Latent tuberculosis-induced hydrops fetalis with congenital tuberculosis

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Summary

A 37-year-old primiparity woman in her 26th week of gestation was transferred to the obstetrical unit of a tertiary-care center for the evaluation of hydrops fetalis. Ultrasonographic findings were normal except for fetal ascites and pleural effusion. In spite of fetal treatment of ascites and pleural effusion, the patient underwent an emergency cesarean section in her 29th week of gestation, due to non-reassuring fetal heart rate. The infant died on day 18 and was diagnosed with congenital tuberculosis (TB). The mother had no symptoms related to lung or extra-pulmonary organ invasion caused by TB. The mother was diagnosed with latent TB during postpartum period. As a result of this case, the authors recommend that physicians suspect latent TB as one of the causes of non-immune hydrops fetalis (NIHF) and include maternal infection of TB in the evaluation of NIHF, particularly in countries with a high prevalence of TB.

Key words: Latent tuberculosis; Hydrops fetalis; Tuberculosis.

Introduction

“Hydrops fetalis,” the systemic edema of fetuses, is characterized by excessive fetal fluid accumulation in at least two serous cavities (the abdomen, pleura, or pericardium) or in body tissue (subcutaneous edema) [1]. Hydrops is traditionally classified as either immune hydrops fetalis (IHF) or non-immune hydrops fetalis (NIHF). NIHF has various causes, including cardiovascular, hematologic, chromosomal, syndromic, lymphatic dysplasia, inborn errors of metabolism, and infections.

Infection with Mycobacterium tuberculosis during either intrauterine life or before complete labor is termed congenital tuberculosis (TB), which has a mortality rate of approximately 50%. However, pregnant women with pulmonary TB who have been treated appropriately did not show increased rates of maternal or neonatal complications. So far, there have been no reports of TB directly affecting the fetus. In active TB, a causal relationship with the fetus is established, and because the mother has symptoms, treatment can prevent complications in the fetus. Latent TB is a situation in which the mother is not treated, because she has no symptoms, which may be more dangerous. In this report, the authors present a latent TB-induced hydrops fetalis case, a rare comorbidity.

Case Report

A 37-year-old woman in her 26th week of pregnancy was transferred for evaluation of hydrops fetalis. She had no specific past medical history and no specific symptoms. Her chest X-ray was normal, she did not show any pulmonary or extra-pulmonary symptoms, and she had received her Bacillus Calmette-Guérin (BCG) vaccine at the age of 13. Fetal ascites (1.7 cm) and pleural effusion (1.3 cm) were noted by ultrasound (Figure 1). Amniotic fluid index was 17 cm, and the fetus showed active movement. Doppler study on umbilical artery and middle cerebral artery (MCA) results were non-specific. There was neither fetal pericardial effusion nor any structural abnormality. Maternal serology was negative for Toxoplasma gondii, herpes simplex virus, rubella, cytomegalovirus, parvovirus B19, syphilis, and HIV.

Amniocentesis, fetal thoracentesis and abdominal paracentesis were performed, and a fetal thoraco-amniotic shunt was placed. There was no abnormality found in the fluid analysis study. Microbiological study results did not show any significant finding.

As the pregnancy progressed, the amniotic-fluid index increased to 24 cm at 28 weeks. After a few days, fetal monitoring with a non-stress test showed recurrent variable deceleration with minimal variability at 28 weeks. Therefore, the baby was delivered by emergency cesarean section.

The chest X-ray of the neonate showed pleural effusion in both lungs. Blood and urine cultures were negative. Serology was negative for T. gondii, herpes simplex virus, rubella, cytomegalovirus, parvovirus, and HIV. Pleural fluid was extracted from the post-delivery neonate, and the AFB culture of the pleural fluid showed Mycobacterium tuberculosis (MTB) on day 10, but the neonate was died on day 11.

After the neonate died, the mother was treated for MTB. Chest X-rays did not show any significant finding. Blood culture and sputum culture were negative. Interferon gamma release assay (IGRA) test was positive. The mother was diagnosed with latent TB.

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Discussion

TB is a serious epidemic in Korea and is still at the top of among the OECD countries, although the prevalence has decreased. For latent TB infection, in which the body test is normal and there is no evidence of disease, the tuberculin test and chest X-ray tests are defined as having normal or cured evidence (e.g., calcification of lung or pulmonary lymph nodes) [2].

Latent TB is in a balance between the human immune system and TB bacteria. If this balance is broken, the number of TB bacteria increases, which increases the chances of developing active TB. One-third of the world’s population has been infected with latent TB (LTLI). According to World Health Organization (WHO) [3], Korea has 33 percent of the cases in which the average is similar to the global average, is suspected to be infected [2, 4]. In the current national TB management guidelines, two families under six years of age and HIV infected with TB are described as adaptation for diagnosis and treatment of latent tuberculosis [2].

*Mycobacterium tuberculosis* droplet inhalation generally causes TB [5]. The transmission pathway of tubercle bacilli from the mother to the fetus is via inhalation of amniotic fluid during labor or hematogenous spread through the placenta via mechanisms that have not yet been clearly elucidated [6, 7]. When the mother has TB, the risk of neonatal morbidity and mortality, such as acute fetal distress, prematurity, small-for-gestation age, low birth weight, and perinatal death, is increased [8]. However, because symptoms of congenital TB are similar to those of other neonatal or congenital infections, it is very difficult to diagnose congenital TB of newborns, especially when there is no history of maternal TB [7]. Furthermore, diagnosis of TB in pregnant women is difficult, because the symptoms are similar to physiological symptoms of pregnancy. In addition, TB is usually not considered as a cause of NIHF.

The relationship between TB and hydrops fetalis cannot yet be accurately identified, because it has not been well studied. In this case, the authors report a case of hydrops fetalis resulting from tubercle bacillus culture in the neonate’s pleural fluid, which was finally proven to be vertical transmission.

Given this case, there is the need to consider congenital TB as a cause of NIHF, in endemic area [7]. The present authors recommend that physicians suspect latent tuberculosis as one potential cause of NIHF and include a TB examination, such as interferon-gamma release assay in a pregnant woman, in a work-up protocol of NIHF, particularly in countries with a high incidence of TB. In the same context, the WHO has recommended additional prenatal tests in order to prevent potential mycobacterium TB transmission with active TB to newborn [7].

This case describes the effects of latent TB of mother on the fetus, which resulted in neonatal sepsis and death, due to late diagnosis. Latent TB compared to active pulmonary TB may be more dangerous, because there is no chance for treatment.

Low body mass index is known as a risk factor for TB. Excessive weight loss for the body shape control of young women in recent years could increase the likelihood of TB. [10] Therefore, more studies are needed to investigate the risk of congenital infection during pregnancy, in women with latent TB.

Conclusion

The present case demonstrated neonatal death due to fetal hydrops and sepsis, caused by congenital TB from the vertical transmission of maternal latent TB. Early detection and appropriate treatment of maternal TB might improve fetal prognosis. In the evaluation for cause of NIHF, a protocol of screening TB in asymptomatic women, should be discussed, especially in high-risk countries.
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