Legionella pneumophila Pneumonia in a Newborn after Water Birth: A New Mode of Transmission

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We report a case of Legionella pneumophila pneumonia in a 7-day old neonate. Because the hospital water, and particularly the pool water for water birthing, was contaminated by L. pneumophila serogroup 1, the newborn was infected following prolonged delivery in contaminated water, perhaps by aspiration. This is the first case of nosocomial Legionella pneumonia in neonate after water birth.

Legionella infection is usually acquired by inhalation of contaminated aerosols and, sometimes, by aspiration of contaminated water in association to nasogastric tube use [1]. Nosocomial infections have been described in adults but rarely in neonates [2]. In the present study, we describe a case of nosocomial Legionella pneumonia in a 7-day old neonate.

In December 1999, an infant was born after a full-term, uneventful pregnancy, following a prolonged vaginal delivery in a hospital birthing pool. No incubator was used, and the infant was discharged 4 days after birth in good general condition. Three days later, he was readmitted to the same hospital after the appearance of fever and dyspnea. Respiratory distress increased in the following days, and a chest radiograph revealed diffuse bilateral alveolar-interstitial infiltrates. Ampicillin-sulbactam (150 mg/kg q.d. iv) and clarithromycin (8 mg/kg q.d. iv) were administered for 10 days. Despite progressive clinical improvement, the radiologic picture remained unchanged, and for this reason he was transferred to the pediatric department at the age of 1 month. Investigations ruled out an immunodeficiency. The results of laboratory tests (serological testing, antigen detection, and PCR) were negative for the usual respiratory pathogens, such as Chlamydia trachomatis and Chlamydia pneumoniae, respiratory syncytial virus, cytomegalovirus, Epstein-Barr virus, Herpes simplex virus type 1, mycobacteria and Pneumocystis carinii.

Antibody titers against Legionella pneumophila serogroup 1 were positive on samples collected 26 and 33 days after the onset of symptoms (indirect immunofluorescence assay, 1/256; microagglutination, 1/4096) [3, 4]. A decrease of antibody titers was observed 51 days after the onset of symptoms (indirect immunofluorescence assay, 1/32; microagglutination, 1/512). Samples for culture were not available. The results of Legionella urinary antigen (EIA Biotest) were positive on 7 repeated unconcentrated and concentrated [5] urine samples, which were collected from the first to fourth month; they became negative at the next control from the sixth month. Anti-Legionella antibodies were negative in the mother, who was always healthy.

After a positive diagnosis of Legionella infection (at 26 days after the onset of symptoms), clarithromycin (15 mg/kg b.i.d.) was administered to the child for 3 weeks. The findings of a chest x-ray progressively improved and normalized at 3 months of age. No clinical symptoms was observed at the latest visit, which was nine months after birth.

Environmental investigations were performed on the water supply of the hospital were the child was born. L. pneumophila serogroup 1 was isolated by culture from central hot water tanks and from hot water outlets (tap and shower head of delivery room’s pool, and sink tap in the delivery room and the patient’s room) at 300 to 2000 cfu/L, using methods described elsewhere [6]. L. pneumophila was not isolated from the patient’s home.

The incidence of Legionella infection among neonates is unknown. The number of cases is presumably underestimated, most likely because Legionella species are not considered as a causative agent of neonatal pneumonia. Nine sporadic cases of neonatal Legionella infection have been described, 6 of which had a fatal outcome [2]. All cases were nosocomial, and in 5 of these cases, Legionella species were documented in the hospital environment. For 1 case, molecular methods confirmed the identity of the clinical isolate and the strains isolated from hot water supply, which suggests that the neonate was presumably infected by means of aerosol released from the humidifier within the incubator [7].

Contaminated whirlpool baths have been reported to be a source of legionellosis in adults [8]. Recently, a birthing pool was associated with a case of L. pneumophila pneumonia that occurred in a newborn after water birth in a home bathtub [9].

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a neonate after water birth. The fact that the hospital water, and particularly the pool water for water birthing, were contaminated by the same *L. pneumophila* serogroup 1 that was responsible for the child’s infection strongly suggests that he was infected after prolonged delivery in contaminated water, perhaps by means of aspiration. Because neonatal legionellosis, if unrecognized, may have a high fatality rate, pediatricians should be aware of this possible transmission route. Water birth is increasingly being offered as an option. When water birth is practiced, infection control policies (pool maintenance and de-contamination for *Legionella* species) are highly recommended to prevent *Legionella* transmission [10].

**References**