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Rapid communications

LEGIONNAIRES' DISEASE IN A NEONATAL UNIT OF A PRIVATE HOSPITAL, CYPRUS, DECEMBER 2008: PRELIMINARY OUTBREAK REPORT

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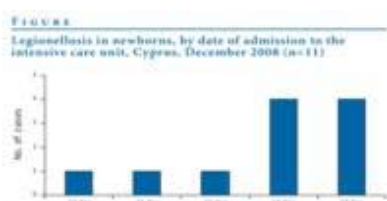
We report an outbreak of Legionnaires' disease in neonates, affecting 11 newborn babies. The case fatality rate is currently 27%. The outbreak has been confirmed by detection of *Legionella pneumophila* antigen in eight of the 11 cases. Tests are in progress to determine the source of infection.

Legionnaires' disease is an established and frequent cause of pneumonia in adults but is thought to be a rare cause in children [1]. It is the acute pneumonic form of disease caused by legionella bacteria, usually *Legionella pneumophila*. About 80-90% of cases are caused by serogroup 1. The incubation period is usually 5-6 days (ranging from 2-10 days). The case fatality ratio has been as high as 39 percent in hospitalised cases, and even higher in immunocompromised persons. Most reported cases in children have involved neonates and children who are immunocompromised [2]. Nosocomial Legionnaires' disease associated with "water birth" (deliveries under water in a pool) has been reported in a few neonates [3].

Outbreak description

A cluster of 11 severely ill newborn babies were admitted to the Intensive Care Unit of the Governmental Hospital Archbishop Makarios III in Nicosia, Cyprus, between 25 and 29 December 2008. All were 7-11 days-old and born in a private hospital in Nicosia between 18 and 22 December 2008. None of the newborns were premature, and all had left the private hospital in a good general condition. They were admitted to the intensive care unit between three and five days after their discharge from the private hospital. The dates of admission of the 11 cases are shown in the Figure.

Figure. Legionellosis in newborns, by date of admission to the intensive care unit, Cyprus, December 2008 (n=11)



Clinical characteristics

The newborns were admitted with the following clinical signs and symptoms: Pyrexia, dyspnoea or tachypnoea and grunting, as well as failure of feeding. Two of them had cyanotic attacks, collapse and shock. Chest X-rays of all babies was positive for pneumonia.

To date, three babies have died (one baby admitted on 25 December died on 31 December, one admitted on 28 December died on 3 January, and one admitted on 28 December died on 7 January). Due to severe pneumonia, one baby is still on a respirator. The general condition of the remaining seven babies has improved, and six of them were discharged from the hospital on 9 January 2009. Immediately upon admission to hospital, all babies were given azithromycin and rifampicin, and the ones in critical condition were additionally given quinolones to cover bacterial infections with sepsis.

Laboratory investigations

Serum samples were tested for antibodies against adenovirus, respiratory syncytial virus, *Mycoplasma pneumoniae* and *L. pneumophila*. Two of the samples were positive for legionella IgM, all other samples were negative.

Urine samples were also tested for detection of *L. pneumophila* antigen. Initially, seven of the samples were positive for *L. pneumophila* serogroup 1 infection. Two negative samples were retested and one of them was then found to be positive, bringing it to a total of eight positive cases.

Bronchoalveolar lavage (BAL) culture was done for three babies who were on respirators. *L. pneumophila* was isolated from all three BAL samples and the serogroup was found to be 2-14.

The first results indicating legionella infection were available on the afternoon of 29 December 2008, and the recommended specific treatment for legionellosis (as described above) was started immediately.

Epidemiological measures

Following detection of the cases, the following measures were taken:

- Epidemiological investigations started immediately after the Unit for Surveillance and Control of Communicable Diseases (Medical and Public Health Services, Ministry of Health) had been informed.
- The admitted newborns were treated in isolation from other newborns also treated in the intensive care unit.
- Disinfection of the newborn unit of the private hospital and of the water supply system was carried out, while the private hospital called experts in the field of water systems legionellosis management and control from the United Kingdom to come to Cyprus for assistance.
- In parallel with the laboratory investigation of the newborns, blood specimens from personnel working in the maternity ward (delivery room, maternity unit and the nursery) were collected and tested for respiratory syncytial virus infection (all were negative).
- Water samples were collected from various points in the private hospital and from the suspected humidifier that had been placed in the newborns' unit on 12 December 2008. Water samples were also taken from the main water supply (municipal) and the distributing system in the hospital. *L. pneumophila* was isolated from the humidifier and from parts of the water distributing system in the hospital.
- Investigation of all the patients who had been admitted to the private hospital since 18 December 2008 was carried out in collaboration with the private hospital to rule out further pneumonia cases. No cases were identified.
- At the same time all paediatricians of babies born in the same hospital during the same period, were contacted, informed about the outbreak and requested to liaise with their patients about the situation.
- The private hospital was advised to implement all appropriate control measures to prevent any further nosocomial infections due to legionella.
- The maternity ward and the nursery were closed on 29 December 2008, immediately after the diagnosis of Legionnaires' disease was laboratory-confirmed.

Conclusion

Legionnaires' disease in neonates is extremely rare. This is the first confirmed outbreak affecting this age group and the

case fatality rate is currently 27%. The investigation is still ongoing and tests are in progress to determine the source of infection.

It is possible that the discrepancy in the serotypes detected in the urine versus the BAL samples was due to cross-reactivity in the antigen test. Until the investigations are complete, however, we cannot exclude the possibility that both serotypes (1 and 2-14) were involved in the outbreak.

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