

Variability of Influenza AH1N1 Infections in a Neonatal Unit in Spain

Cristina Calvo^a Ersilia Gonzalez-Carrasco^a Sergio Quevedo^a
Maria Luz García-García^a Alvaro Rando^a Juan Ledesma^b Ana Calderon^b
Francisco Pozo^b Pilar Pérez-Breña^b Inmaculada Casas^b

^aDepartment of Pediatrics, Hospital Severo Ochoa, Leganés, and ^bInfluenza and Respiratory Virus Laboratory, National Center for Microbiology, ISCIII, Madrid, Spain

Established Facts

- Viral respiratory infections in preterm babies admitted to intensive care units can cause respiratory distress with need for mechanical ventilation and death.
- Nosocomial infections with several viruses such as respiratory syncytial virus, coronavirus and human bocavirus have been reported in neonatal units.

Novel Insights

- There are few reports of infections with influenza AH1N1 in the neonatal units and we present three cases of varying severity.
- Neonatologists need to be aware of how influenza respiratory tract infections present in order to treat them and avoid transmission to other vulnerable infants.

Key Words

Influenza AH1N1 • Neonatal intensive care unit • Respiratory distress

Abstract

We describe three positive influenza AH1N1 cases in a neonatal unit during the influenza pandemic in Spain. One term baby presented with an upper respiratory tract infection, another preterm infant with an apnea episode following nosocomial infection, and thirdly, a term infant of a mother with influenza AH1N1 had severe respiratory distress and pneumothoraces needing high-frequency ventilation.

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Introduction

On April 21, 2009, the Center for Diseases Control (CDC) reported the first cases of pandemic influenza AH1N1 virus infection in the United States [1]. Since then reports have been published with data on the evolution of influenza AH1N1 virus infections in children [2] including some deaths [3]. However, there are still only a few clinical papers describing new influenza A infections in children [4–6]. We describe three cases of respiratory infections with influenza AH1N1 of varying degrees of severity in a neonatal unit in Spain. As far as we know our paper reports the first cases of influenza AH1N1 in a neonatal unit.

Background

We have a systematic prospective study in progress to assess the epidemiology of respiratory viral infections in hospitalized children admitted to the Severo Ochoa Hospital (Leganés, Spain). Although neonates are not specifically included in this survey, we are aware of neonatal respiratory infections. Nasopharyngeal aspirate (NPA) specimens were taken from patients when they presented with clinical signs of suspected viral respiratory infections. For virological study, samples were submitted to the Influenza and Respiratory Virus Laboratory (National Center for Microbiology, ISCIII, Madrid, Spain). Specimens in viral transport medium were processed within 24 h of collection. Total nucleic acids from NPA samples were obtained from 200- μ l aliquots using a QIAamp MinElute Virus Spin Kit in a QIAcube automated extractor (Qiagen, Valencia, Calif., USA). The diagnosis of influenza AH1N1 was made with the World Health Organisation-approved Real-Time PCR AH1N1 assay [7]. For the presence of potential sources of co-infection by other respiratory viruses, multiplex reverse transcription (RT)-nested PCR assays (BRQ method [8] and M2 method [9]) were used as previously described.

Case Reports

We here present 3 cases coincident with the peak of the influenza pandemic in Spain (October and early November). However, they were not admitted to the neonatal unit at the same time and their stays did not overlap.

Case 1

A preterm and small-for-date female newborn of a twin pregnancy, at 36 weeks of gestation, with a birth weight of 1,690 g. She did not have respiratory disease during her stay in the neonatal unit. On the 21st day, she suffered an apnea episode which responded to stimulation. Fever was not present but she had rhinorrhea and a NPA specimen was collected for viral analysis. Only influenza AH1N1 RNA was detected. She was discharged from the neonatal unit 2 days later.

Case 2

A full-term female newborn was admitted to the neonatal intensive care unit after birth because of respiratory distress. Her mother had fever and was diagnosed with influenza AH1N1 infection 48 h after the birth. The baby developed progressive respiratory distress with radiological infiltrates and required mechanical ventilation on the first day of life. She suffered bilateral pneumothoraces which needed chest drains and high-frequency oscillatory ventilation. The baby also had hemodynamic shock requiring dopamine and dobutamine and developed transient pulmonary hypertension. Fever was not present but a NPA sample collected on the second day of life detected influenza AH1N1

RNA. The baby was treated with oseltamivir from the first day of life. Blood culture was negative. The baby's respiratory condition showed progressive improvement and she was taken off mechanical ventilation 5 days later and discharged from the neonatal unit on day 18. Subsequently, this patient was admitted in January 2010 with clinical bronchiolitis for 7 days and respiratory syncytial virus A was detected.

Case 3

A full-term 14-day-old male was admitted to the neonatal unit because of weight loss and poor feeding and suspected urinary tract infection. He had no fever but some rhinorrhea was present and antibiotic treatment was started until bacterial infection was excluded with negative blood and urine cultures. A NPA specimen detected influenza AH1N1 and no other respiratory viruses. The patient's general condition showed progressive improvement and he was discharged 5 days later with diagnosis of upper respiratory tract infection.

Discussion

We describe 3 cases of infection with influenza AH1N1 in a neonatal unit setting. By assessing the H275Y mutation of the neuraminidase segment we showed that there was no viral resistance to oseltamivir in these infants. The clinical presentation of our three neonates varied in form and severity.

So far, we have found only one description of infection with influenza AH1N1 in a premature infant. The presenting sign was apnea which required respiratory support by nasal intermittent positive pressure ventilation [10]. This case is similar to our first case. Nosocomial infections have been described in association with several viruses such as respiratory syncytial virus, coronavirus and human bocavirus in neonates [11–13]. We believe that our first case was the result of nosocomial transmission because the baby was hospitalized from birth 21 days before. It is known that influenza viruses can cause mild or asymptomatic respiratory infections [14].

Unfortunately, respiratory samples from parents or other health care workers in the neonatal intensive care unit were not taken, which, if positive, could explain the origin of the infection. Influenza AH1N1 should now be included among the potential pathogens that can cause nosocomial infection in neonatal units. Nosocomial respiratory viral infections in the neonatal unit are of importance and are associated with fatal complications [11–13].

Our second baby at full-term had severe respiratory distress, and her mother was infected with influenza AH1N1. No other viruses or bacteria were isolated. It is likely that this infant acquired the virus from her mother,

either before or during delivery. There are no previous reports of maternal-fetal transmission of the new influenza AH1N1 virus, but this possibility cannot be excluded.

Our first patient had an apnea episode of intermediate severity and recovered well, our second case had severe respiratory distress and was treated with oseltamivir from the first day of life and our third baby had only mild upper respiratory infection and feeding problems. These 3 cases demonstrate the variability of the clinical picture of the new influenza AH1N1 infections in newborns. Generally, neonatal infections have non-specific signs and are difficult to identify. In addition, influenza infections have a spectrum of manifestations ranging from asymptomatic to severe respiratory distress and pneumonia [14].

We want to emphasize that influenza AH1N1 infections can occur in neonatal units and neonatologists must be aware of this in order to detect and treat them and avoid transmission to other vulnerable neonates.

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