

Severe apnea in a newborn caused by coronavirus

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Received 20 January 2015; accepted 22 February 2015;
published online 4 March 2015

ABSTRACT

A fifteen-day old boy was admitted to the emergency department due to poor feeding, coughing and wheezing. On examination cyanosis, apnea and bradycardia were observed. Mechanical ventilation was required. Coronavirus was detected by polymerase chain reaction in a nasopharyngeal aspirate. With supportive treatment, he was discharged without any complications. Coronaviruses are one of the causes of severe respiratory tract infections, which may present with apnea in neonates.

Key words: coronavirus, apnea, respiratory tract infection, neonate

Introduction

Respiratory viral infections are among the morbid and potentially mortal respiratory illnesses in childhood. Coronaviruses cause upper respiratory illness and occasionally lower respiratory tract infections in susceptible populations [1]. Premature and mature infants infected with coronaviruses may have symptoms of bradycardia and apnea [2-4]. Also hypoxemia, fever or abdominal distension can be observed in preterm infants [2]. Herein, we present an infant infected by coronavirus that caused severe apnea.

Case Report

A fifteen-day old boy was admitted to emergency department presenting with poor feeding, coughing and wheezing. The birth and perinatal history revealed a single delivery by caesarean section at the gestational age of 37 weeks 6 days from a 31-year-old mother with normal prenatal sonograms and prenatal care, with treatment for 10-days, for a urinary tract infection. At birth, physical examination was unremarkable and he was discharged by the 2nd day of life. The family history was unrevealing. At the admission to emergency department on the 15th day of life, physical examination revealed a pulse of 120 bpm, respiratory rate of 40 breaths/min,

temperature of 36.8° C. Cyanosis and apnea were observed. Rhonchi were heard on auscultation of the lungs.

The laboratory investigation revealed a hemoglobin level of 14.3 g/dL, white blood cell count of $11 \times 10^9/L$ and platelet count of $413 \times 10^9/L$. Serum electrolytes were as follows, Na:138 mEq/L, K:5.57 mEq/L, Cl:105 mEq/L, Ca:9.06 mg/dL, P: 6.63 mg/dL glucose:84 mg/dL. Kidney, liver function tests and urinalysis were normal. Blood C-reactive protein level was 2.16 mg/dL (normal:0-0,8) and serum procalcitonin:2.9 ng/mL (normal:0-0.5). The chest radiography showed hyperinflated lungs without any parenchymal abnormalities. Thus for investigation and treatment, the patient was hospitalized at the neonatal intensive care unit. On follow up, apnea was observed again with accompanying bradycardia. Mechanical ventilation (SIMV) was required. Coronavirus (OC43/ HKU1) was detected by polymerase chain reaction (PCR) in a nasopharyngeal aspirate. Antibiotic treatment was discontinued which had been started on admission to the intensive care unit since the blood and cerebrospinal fluid cultures were sterile on the 10th day of admission. We could not distinguish OC43 or HKU1 by PCR. With symptomatic treatment the patient was discharged without any complications.

Discussion

Acute respiratory tract infections are responsible for considerable morbidity and mortality in humans. A variety of viruses, bacteria and fungi are associated with respiratory tract illness. Viruses are responsible of approximately 80% acute respiratory tract infections [5]. Most of the respiratory viruses belong to the Paramyxoviridae, Orthomyxoviridae, Picornaviridae, Adenoviridae and Coronaviridae families [6]. Coronaviruses cause upper respiratory tract illnesses and occasionally lower tract disease in susceptible populations [1]. In the mid1960s, two human coronaviruses were identified that cause the common cold: human coronaviruses (HCoV)-229E and HCoV-OC43. The recent outbreak of severe acute respiratory syndrome-CoV and subsequent identification of two additional human coronaviruses (HCoV-NL63 and HCoV-HKU1) has drawn attention to this virus family and lastly has added coronavirus responsible for severe acute respiratory syndrome (SARS-CoV) [6-7]. Kuypers et al tested pediatric respiratory specimens using consensus and subtype-specific real-time reverse-transcription polymerase chain reaction (RT-PCR) assays to investigate the role of the human group 1 (229E and NL63) and group 2 (OC43 and HKU1) coronaviruses in childhood respiratory illnesses [1]. Coronaviruses were detected in 66 of 1043 children in the study by Kuypers et al [1]. Of the 66 specimens positive for a coronavirus, 28.8% were group 1

and 71.2 % were group 2 subtypes. Lower respiratory tract disease was noted in 34% of coronavirus-positive children; 4 children (7%) required intensive care unit support. Mechanical ventilation was required for 2 children, consisting of Aicardi syndrome with recurrent seizures in 1 child and congenital cardiac disease and trisomy 21 in the other [1]. HCoV-associated hospitalizations for the acute respiratory infections detected highest rates especially in children < 6 months of age in the study by Talbot et al [8]. Similar results were detected in the study of Prill et al with 113 hospitalized children, positive for HCoV [7]. Immunological immaturity or the lack of maternal antibodies in the younger children may be among the reasons [8]. Our patient was a newborn and did not have a chronic illness accordingly.

Group 2 HCoV (OC43 and HKU1) was detected in this case but we could not distinguish OC43 or HKU1 by PCR. This is the main limitation of our report, but in general we know that the main symptoms of premature and term infants infected with coronaviruses are bradycardia and apnea, Also death might be seen in infants especially preterms [2-3-9].

In conclusion, coronaviruses are among the potential causes of respiratory tract infections in neonates presenting with apnea. As there are few studies concerning coronavirus infections in neonates, more data is required in order to understand the pathogenicity and course of this infection among newborns.

REFERENCES

- [1] **Kuypers J, Martin ET, Heugel J, Wright N, Morrow R, Englund JA.** Clinical disease in children associated with newly described coronavirus subtypes. *Pediatrics* 2007; 119: e70-76.
- [2] **Sizun J, Soupre D, Legrand MC, Giroux JD, Rubio S, Cauvin JM, et al.** Neonatal nosocomial respiratory infection with coronavirus: a prospective study in a neonatal intensive care unit. *Acta Paediatr* 1995; 84: 617-620.
- [3] **Sizun J, Soupre D, Legrand MC, Giroux JD, Rubio S, Chastel C, et al.** [Pathogen role of coronavirus in pediatric intensive care: retrospective analysis of 19 positive samples with indirect immunofluorescence]. *Arch Pediatr* 1994; 1: 477-480.
- [4] **Sizun J, Soupre D, Giroux JD, Alix D, De P, Legrand MC, et al.** Nasal colonization with coronavirus and apnea of the premature newborn. *Acta Paediatr* 1993; 82: 238.
- [5] **Jevsnik M, Ursic T, Zigon N, Lusa L, Krivec U, Petrovec M.** Coronavirus infections in hospitalized pediatric patients with acute respiratory tract disease. *BMC Infect Dis* 2012; 12: 365.
- [6] **Pyrc K, Berkhout B, van der Hoek L.** Identification of new human coronaviruses. *Expert Rev Anti Infect Ther* 2007; 5: 245-253.
- [7] **Prill MM, Iwane MK, Edwards KM, Williams JV, Weinberg GA, Staat MA, et al.** Human coronavirus in young children hospitalized for acute respiratory illness and asymptomatic controls. *Pediatr Infect Dis J* 2012; 31: 235-240.
- [8] **Talbot HK, Crowe JE, Jr., Edwards KM, Griffin MR, Zhu Y, Weinberg GA, et al.** Coronavirus infection and hospitalizations for acute respiratory illness in young children. *J Med Virol* 2009; 81: 853-856.
- [9] **Gagneur A, Vallet S, Talbot PJ, Legrand-Quillien MC, Picard B, Payan C, et al.** Outbreaks of human coronavirus in a pediatric and neonatal intensive care unit. *Eur J Pediatr* 2008; 167: 1427-1434.

