Human parechovirus-3 infection mimicking Hirschsprung-associated enterocolitis

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Abstract

Human parechovirus-3 (HPeV-3) infection is being increasingly identified as an important pathogen leading to neonatal sepsis-like illness. In this case report, we present a pre-term infant with striking abdominal distention whose signs and symptoms were quite similar to those of Hirschsprung-associated enterocolitis but the patient suffered from the gastrointestinal phenotype of HPeV-3 infection.

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Human parechovirus (HPeV)-3 is a newly recognized pathogen causing severe infections including sepsis-like illness, meningitis, encephalitis, and a hepatitis-coagulopathy syndrome especially in neonates and young infants [1,2]. Abdominal distention can be very prominent in some cases and the signs seen in those cases could be confused with acute surgical abdomen [3]. We herein report an infant with HPeV-3 infection whose signs and symptoms were difficult to differentiate from those of Hirschsprung-associated enterocolitis (HAEC).

1. Case report

A 33-day-old pre-term (36 weeks of gestation) male infant was transferred to our institute with a 12 h history of fever, lethargy, and abdominal distention. He was admitted to the intensive care unit due to bradycardia and apnea, which suggested septic shock. At birth, meconium was passed normally without delay, and breastfeeding was started as usual. He had no history of constipation, vomiting, diarrhea, congestion, rhinorrhea, or rash.

On admission to the intensive care unit, he had a temperature of 37.6 °C rectally, pulse of 210 beats per minute, and blood pressure of 78/48 mm Hg. He required ventilator and circulatory support. Abdominal distention was prominent. Laboratory evaluation revealed a total white blood cell (WBC) count of 1810 cells/mm³ and a differential count of 70% neutrophils and 13% lymphocytes. The C-reactive protein (CRP) concentration was below 0.2 mg/dl.

Plain roentgenogram showed marked distention of the intestine with absence of gas in the pelvic cavity (Figs. 1A and 2A). An emergent CT scan revealed that colon was significantly dilated, and intestinal volvulus or internal hernia which would cause closed loop obstruction were ruled out. A contrast enema study demonstrated significant dilatation of the distal colon with a transitional zone at the rectum, but narrow segment in the distal rectum was not evident, which did not support a diagnosis as Hirschsprung disease (Fig. 2B). Thereafter, rectal mucosal biopsy was performed but the specimens showed ganglion cells in the submucosal plexus with the absence of acetylcholinesterase-positive fibers, indicating that the patient did not have Hirschsprung disease. On hospital day 2, HPeV was detected from the serum, by means of real-time PCR [4]. Further analysis

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revealed this virus to be HPeV-3. On hospital day 3, an erythematous rash was noted on his chest, abdomen, and upper and lower extremities. From these clinical symptoms and laboratory data, we concluded that the patient suffered from HPeV-3 infection. He was free from cardiovascular support on day 7, and weaned from ventilator support on day 8. He was discharged on hospital day 15.

2. Discussion

HPeV is classified into the Picornaviridae family [5] and infection of this virus presents a wide spectrum of disease presentation. Many HPeV subtypes have been revealed, i.e., subtypes 1–16, in recent years [6]. HPeV-1 and 3 are the major genera, the former mainly causing mild respiratory or gastrointestinal symptoms, whereas HPeV-3 is associated with severe neonatal disease [1,2].

Only recently a real-time PCR method to detect HPeV-3 has been developed and it made accurate diagnosis of infection of this organism possible [7]. The virus was isolated from stool specimens at a rate of 88%, nasal discharge at 82%, pharynx at 31%, urine at 0%, and spinal fluid at 71% in infected patients [5]. The treatment of neonatal parechovirus infection is primarily supportive therapies. Pleconaril is the most advanced antiviral treatment option for enteroviruses, although only limited data on its efficacy for neonatal enterovirus disease have been presented [8].

The clinical manifestations of HPeV-3 infection in infants vary, and include gastroenteritis, respiratory diseases, aseptic meningitis, encephalomyelitis, lymphadenopathy, myocarditis, hemolytic uremic syndrome, neonatal sepsis-like syndrome, hemophagocytic lymphohistiocytosis, and sudden infant death syndrome [1,2,5,7,9]. Recently, a distinctive erythematous rash presenting mainly on the soles and palms was reported to be a valuable clue for diagnosing HPeV-3 infection [9,10].

The clinical picture of HPeV-3 infection sometimes resembles HAEC as presented here. Prominent abdominal distension has been described as a dominant feature of HPeV-3 infection accompanied by a striking erythematous rash [3,9,11]. Indeed, the symptoms of diarrhea, abdominal distention, and fever in infants with HPeV-3 infection are almost the same as those of HAEC [12]. The signs of acute abdomen were sometimes severe enough to warrant an exploratory laparotomy in children with HPeV-3 infection [3]. To date, two patients with HPeV-3 infection requiring surgery were reported. One neonate received unnecessary laparotomy [3], and the other 7-week-old infant had signs that were consistent with...
necrotizing enterocolitis (NEC), presenting a significantly thickened and hyperemic transverse colon [13].

In summary, we present an infant with HPeV-3 infection whose clinical symptoms and roentgenologic features were very similar to those of HAEC. HPeV-3 is a newly identified virus that can cause severe abdominal distention in neonates and young infants. Thus, surgeons should be aware of the gastrointestinal phenotype of HPeV-3 infection when ruling out HAEC in severely ill young infants with abdominal distention.

Conflict of interest statement
All authors have no conflict of interest.

References