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Cytomegalovirus Enteritis in a Premature Infant

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Background/Purpose: Up to 2.5% of newborn infants are cytomegalovirus (CMV) positive at birth. Five percent will be symptomatic at birth, including cytomegalic inclusion disease. Symptoms such as hearing loss and mental retardation will ultimately develop in 15%.

Methods: The authors describe a case of CMV enteritis in a 2.2-kg newborn that presented as necrotizing enterocolitis (NEC) and subsequently developed a colonic stricture.

Results: There are four reports of neonatal CMV enteritis in the nonEnglish-language literature. Cytomegalovirus enteri-

tis has become prevalent among the immunosuppressed pediatric and adult patient population.

Conclusions: We propose the addition of CMV to the list of pathogens responsible for NEC. A review of neonatal CMV infection is provided.

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INDEX WORDS: Cytomegalovirus, enteritis, necrotizing enteritis, colonic stricture.

CONGENITAL CYTOMEGALOVIRUS (CMV) infection is responsible for significant morbidity and mortality in the newborn. Up to 2.5% of infants are CMV positive at birth. Ninety five percent of seropositive newborns are initially asymptomatic. The symptomatic infants may develop encephalitis, hearing loss, hepatitis or pneumonia. We present a case of CMV enteritis in a premature infant presenting as necrotizing enterocolitis (NEC). A review of CMV infection of the newborn is also provided.

CASE REPORT

A 2,200-g boy was born at 33 weeks' gestation to a gravida, 1, para, 1 17-year-old woman at a referral hospital. Prenatal care was not obtained. Emesis, abdominal distension, and mild respiratory distress developed in the infant. An abdominal x-ray showed an ileus pattern, no pneumatosis or free air. Seven days of ampicillin and gentamicin was administered for presumed necrotizing enterocolitis. Blood culture findings were negative. He received phototherapy for hyperbilirubinemia caused by ABO incompatibility. He was discharged from the referral hospital at 18 days of age tolerating oral feeds.

The infant was returned to the referral hospital at 5 weeks of age with irritability, emesis, and abdominal distention. He passed a stool once daily. There was no weight gain since the prior hospitalization. The abdomen was soft but distended. Findings of a rectal examination showed an anal fissure and hemoccult-positive stool. Laboratory data results were white blood cell count of $16 \times 10^9/L$, hemoglobin level of 7.7 g/dL, hematocrit level of 22%, platelet count of $314 \times 10^9/L$, and bandemia value of 27%. Urine analysis and urine antigen screen results for streptococcus were negative. Blood culture findings were negative. Abdominal radiographs demonstrated multiple distended bowel loops, air fluid levels, and no free air. He passed several large bowel movements after receiving a rectal suppository the following morning. Feedings were then tolerated. The abdominal distension resolved promptly. He was discharged after 2 days of receiving ampicillin and gentamicin.

The patient was readmitted at 7 weeks of age with bilious emesis and abdominal distension. X-rays showed diffuse intestinal distension, air

fluid levels, and no air in the colon. A sepsis workup was performed and antibiotics were given. A barium enema showed a tight stricture involving the descending colon.

The infant was transferred to our institution where a left hemicolectomy with a primary anastomosis was performed to excise a 5-cm stricture in the mid descending colon. Surgical pathology findings showed an ischemic colonic stricture that contained cytomegalic intranuclear inclusion bodies (Fig 1). Urine was positive for CMV. An ocular examination excluded CMV retinitis. Results of a head CAT scan were normal. Hearing was slightly impaired. The mother was positive for CMV. He was discharged 12 days after surgery thriving on oral feeds. The infant was doing well at 9 months of age.

DISCUSSION

Transmission of CMV occurs in 40% to 50% of infants subjected to primary CMV infection during pregnancy. Modes of transmission include transplacental spread and contact with cervical secretions during delivery. Ten to fifteen percent of these infants will be symptomatic.¹ Twenty to forty percent of seropositive women shed CMV into their breast milk. Asymptomatic CMV infection will develop in 60% of these infants. The premature infant with prolonged hospitalization and blood transfusion has a 15% acquisition rate of CMV infection.³

Ninety five percent of congenitally seropositive infants are asymptomatic, but in 10% to 15% abnormalities such

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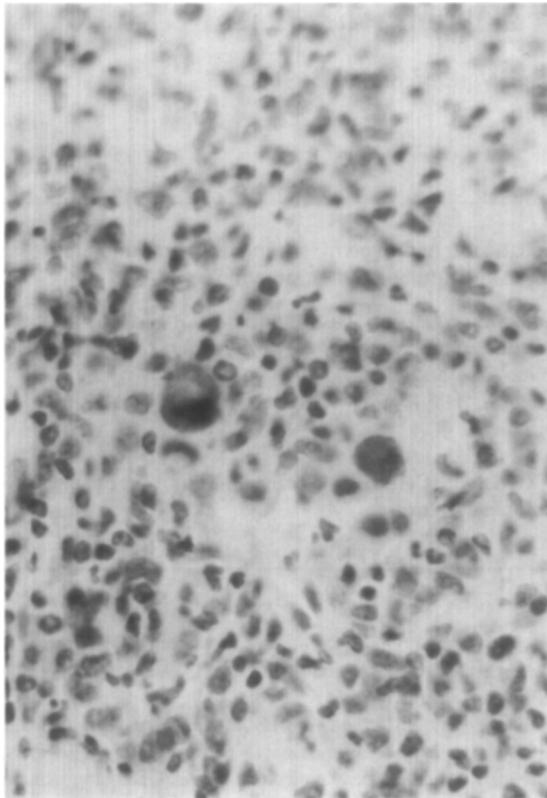


Fig 1. Cytomegalic intranuclear inclusion bodies in resected colon.

as hearing loss (10%), psychomotor retardation or neuromuscular disorder (2-7%), learning disability (4%), dental defect (3%), and chorioretinitis (1%) will eventually develop. Of the affected infants, the most severe but least common presentation is cytomegalic inclusion disease (CID). CID carries a 20% mortality rate. The clinical findings include jaundice, hepatitis, hepatosplenomegaly, thrombocytopenia, purpuric rash, microcephaly, meningioencephalitis, chorioretinitis, cerebral calcifications, and hearing loss.⁴ Congenital anomalies associated with CID include clubfoot, inguinal hernia, strabismus, high-arched palate, and defective tooth enamel.⁵

Detection of CMV in the urine or saliva in the first 2 weeks of life is best for diagnosis of congenital CMV because postnatally acquired CMV infection can cause confusion. Other methods of diagnosis include biopsy,

histology, immunohistology, serologic assays, CMV DNA by polymerase chain reaction, and CMV antigenemia.^{5,6}

Intrauterine CMV infection has presented as fetal meconium peritonitis. This infant was exposed to CMV during the late first trimester. A prenatal ultrasound scan performed at 22 weeks' gestation showed irregular echogenic intraabdominal mass with calcified and echolucent areas consistent with intrauterine bowel perforation. This infant was born with mild respiratory distress, hepatosplenomegaly, and thrombocytopenia. CMV study results were positive. He did not have a bowel obstruction after birth.⁶

There are a few reports of NEC associated with CMV in the French and Italian literature. Gretillat et al⁷ reported CMV inclusion bodies in the intestine of an infant who had NEC. Sann et al⁸ described 11 cases of necrotizing enterocolitis during an 18-month period. CMV was present in six of these patients. NEC accounted for 22% of symptoms associated with CMV. They concluded that CMV may act as an aggravating factor of NEC.⁸ Colonic stricture after NEC was found to be associated with CMV in reports by D'Agostino et al⁹ and Fournier et al.¹⁰ Each investigator suggested CMV as the primary pathogen or suprainfection in the evolution of NEC in these two patients.

Cytomegalovirus enteritis in the immunocompromised pediatric and adult patient has been well documented.^{11,13} These patients suffer from intestinal ulceration, perforation, hemorrhagic proctocolitis, pseudomembrane formation, and toxic megacolon. The virulent clinical course usually mandates early diagnosis and treatment for survival. Treatment modalities include reduction of immunosuppression, gancyclovir, foscarnet, and surgery. CMV enteritis in these newborns did not appear to carry the same virulence experienced by the immunocompromised host. All the infected newborn infants presented survived without treatment targeted at CMV.

The list for pathogens responsible for NEC has included *Escherichia coli*, *Klebsiella pneumonia*, *Clostridia* species, coagulase-negative *staphylococci*, *Enterococcus*, *Candida*, *Coxsackie B2* and *Coronavirus*.¹⁴ Cytomegalovirus should be added to this list.

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