CASE REPORT

Congenital cytomegalovirus infection and finger anomaly

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SUMMARY

Congenital cytomegalovirus (CMV) infection is the most common cause of intrauterine infection. It affects the central nervous system and causes microcephaly, hydrocephalus, mental retardation, hearing disorder, chorioretinitis and rarely finger anomalies. We present the case of a 4-month-old girl with an agenesis of the middle finger and syndactyly of the fourth and fifth fingers as a result of congenital CMV; this is the first such case in the literature. Here, congenital CMV infection is examined along with finger anomalies.

BACKGROUND

Congenital cytomegalovirus (CMV) infection is seen in approximately 1% of all newborns. From 10% to 15% of congenitally infected newborn cases are symptomatic at birth.¹ Of the symptomatic cases, 90% have various sequelae, from isolated hearing loss to severe mental and/or motor losses. Characteristic symptoms in this regard are intrauterine growth retardation, chorioretinitis, neural hearing loss, prematurity, hepatosplenomegaly, jaundice, microcephaly and intracranial calcification. However, finger anomalies are quite rare in congenital CMV infection.^{2–5} The present study examines a case with agenesis and syndactyly of toes and congenital CMV infection in combination, which is the first such case in the literature.

CASE PRESENTATION

A 4-month-old female patient presented with complaints of vomiting, diarrhoea and body contractions. It was reported that the girl had been vomiting whatever she had eaten 3–4 times per day, and having watery diarrhoea 2–3 times per day since the previous week. Moreover, for the last 3 days, she had experienced a few seconds of contractions in her arms 3–4 times per day. The patient's parents were found to have first-degree consanguinity, and the mother had a caesarean delivery because of face presentation at the expected day. The baby's face was covered with meconium and she had respiratory distress; therefore, she was diagnosed with meconium aspiration syndrome and received inpatient treatment at the neonatal intensive care unit for 2 weeks.

On physical examination, her body weight, height, head circumference, body temperature, pulse, respiratory rate and arterial blood pressure were determined to be 4.7 kg (10–25th centile), 54 cm (3rd centile), 35 cm (<3 centile, 50 centile consistent with the newborn), 36.1°C (axillary), 108/min, 28/min and 100/50 mm Hg, respectively.

Figure 1 Microcephaly, long eyelashes, upturned nose, distinctive ears, retrognathia and short neck observed in the patient.

Symptoms of mild dehydration were observed. The patient had microcephaly, with long eyelashes, an upturned nose, highly arched palate, retrognathia, distinctive ears (to-bottom length 5.2 cm, >+2SD) and a short neck (figure 1). She had medial deviation of the second finger, agenesis of the middle finger and syndactyly of the fourth and fifth fingers

Figure 2 Agenesis of the middle toe, medial deviation of the second toe and syndactyly of the fourth and fifth toes of the right foot (A and B).

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Figure 3 Sleep electroencephalography. Sharp wave activity in the left occipitotemporal (arrow marks).

of the right foot (figure 2). Moreover, she had irregular foot lines. Bilateral chorioretinitis was determined at the ophthalmological examination. The patient had impaired neuromotor development, and had no control of her head and neck and a social smile. She started to recognise her mother for the last 15 days. She was gibbering and attracted by noise.

INVESTIGATIONS

From laboratory examinations, haemoglobin, white cell count and thrombocyte count were determined to be 9.4 g/dL, 17 000/mm³ and 87 000/mm³, respectively; nuclear leukocyte, lymphocyte, monocyte and eosinophil rates were 65%, 30%, 4% and 1% in peripheral blood smear, respectively, and no atypical cell was determined. Erythrocyte sedimentation rate was 5 mm/h, C reactive protein was found to be negative. Analysis of blood biochemistry gave values for glucose, creatine, urea, creatinine, alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, sodium, potassium, phosphorus and calcium of mg/dl, 76 mg/dl, 0.39 mg/dl, 20 U/l, 28 U/l, 39 U/l, 260 U/l, 134 mmol/l, 3.4 mmol/l, 5.7 mg/dl and 9.6 mg/dl, respectively; in blood gas, pH was 7.40, pCO₂ was 27.9 mm Hg and HCO₃ was 23 mmol/L. Full urine examination was normal. No

abnormalities were observed in the stool microscopy. Hepatitis markers are HBsAg (–), anti-HBcIgM (–), anti-HCV (–), anti-HAV IgM (–) and anti-HAV IgG (+). Toxoplasmosis, Epstein-Barr virus, herpes simplex virus types 1 and 2, rubella, parvovirus B19 and HIV serologies were all negative. Serum CMV IgM was positive, IgG was positive and urine CMV DNA PCR was 3303 million copies/mL. The mother's serum CMV IgM was negative, and IgG was positive. Chest radiography of the patient was normal. Foot graphy revealed that the patient had an agenesis of the middle finger and syndactyly of the fourth and fifth fingers (figure 3). Abdominal ultrasonography and echocardiography were normal. Hearing test was normal in both ears. Epileptiform activity was observed in the sleep electroencephalography (figure 4).

Brain tomography revealed calcification areas in the periventricular subependymal regions, and lateral ventricles were wide (figure 5). In brain magnetic resonance monitoring, gyruses were pachygyric, lateral ventricles were wider than normal, corpus callosum was thin and there were periventricular subependymal hyperintense areas (figure 6).

DIFFERENTIAL DIAGNOSIS

Other viral infections such as TORCH should be considered in differential diagnosis.

TREATMENT

The patient was diagnosed with acute gastroenteritis and was given a fluid treatment. Myoclonic seizures were controlled via clonazepam, vigabatrin and valproic acid treatments.

OUTCOME AND FOLLOW-UP

The patient was diagnosed with congenital CMV infection as a result of the clinical and laboratory examinations, and then given ganciclovir 10 mg/kg/day for 6 weeks. During the follow-up period, the clinical and laboratory findings of the patient were observed to recover via the ganciclovir treatment. The patient's seizures are now under control and she remains an outpatient at the clinic.

Figure 4 Foot graphy revealing the agenesis of the middle finger and syndactyly of the fourth and fifth fingers.

Figure 5 Brain tomography revealing hyperdense areas in the periventricular subependymal regions and dilatation in lateral ventricles (A and B).

Figure 6 Pachygyria in the frontal gyruses, dilatation in the lateral ventricles, periventricular hyperintense areas and hypoplastic corpus callosum in the T1-weighted images showing axial (A) and sagittal (B) sections on the brain magnetic resonance.

DISCUSSION

Congenital CMV infection is the most common cause of intra-uterine infection in developed countries.¹ The most common clinical symptoms are jaundice, hepatosplenomegaly, splenomegaly and petechia. These symptoms are seen in approximately two-thirds of the affected children. They cause severe neurological sequelae in affected cases. Neurological symptoms are microcephaly, hydrocephalus, mental retardation, cerebral palsy, movement disorders, unilateral or bilateral hearing disorder, chorioretinitis and convulsion.^{1 2}

There are three cases of congenital CMV infection with finger anomalies reported in the literature (Table 1). Cinbis *et al*³ reported a case with brachydactyly, and Fraser *et al*⁴ reported a case having congenital hydrocephalus with big toes and flexion deformities of the thumbs. Moreover, Caksen *et al*⁵ determined nail rudiments in the right hand and short second, third, fourth and fifth phalanges of a case with psychomotor

retardation and convulsions. The case presented here had an agenesis and syndactyly of the toes as a result of congenital CMV infection, and is the first such case in the literature. Neuroradiological anomalies are determined in two-thirds of CMV cases. They can cause pain in the brain, pachygyria, polymicrogyria, lissencephaly, schizencephaly, heterotopia and cortical dysplasia such as hippocampal dysplasia and migration anomalies. Cerebral calcifications (especially periventricular) may cause periventricular cysts, ventriculomegaly, corpus callosum agenesis/hypogenesis, cortical atrophy, retardation of myelination in white matter and cerebellar hypoplasia.^{6–8} In the present case, brain tomography revealed periventricular calcification, and brain MRG revealed dilatation, pachygyria and corpus callosum hypoplasia in the lateral ventricles.

In summary, the present case suggests that congenital CMV infection should always be considered in infants with finger anomalies.

Table 1 Congenital cytomegalovirus cases with extremity anomalies

Article	Year	Extremity anomaly	Additional clinical finding
1 Cinbis <i>et al</i> ³	1993	Brachydactyly	—
2 Fraser <i>et al</i> ⁴	1994	Big toes, flexion deformity of thumbs	Congenital hydrocephalus
3 Çaksen <i>et al</i> ⁵	2001	Nail rudiments in the right hand and short second, third, fourth and fifth phalanges (brachydactyly)	Psychomotor retardation, microcephaly, periventricular calcification, hydrocephalus, convulsion
4 Presented case	2013	The agenesis of the middle toe and syndactyly of the fourth and fifth toes	Psychomotor retardation, microcephaly, periventricular calcification, pachygyria, chorioretinitis

Learning points

- ▶ Intrauterine infection due to cytomegalovirus is the most common of the intrauterine viral infections that affects the central nervous system.
- ▶ Neurological symptoms are microcephaly, hydrocephalus, mental retardation, cerebral palsy, movement disorders, unilateral or bilateral hearing disorder, chorioretinitis and convulsion.
- ▶ Congenital CMV infection should be considered in infants with finger anomalies.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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