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Human parechovirus infections: Types 3 and 4 can cause severe sepsis-like disease

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Background: Human parechoviruses (HPeVs) can cause severe central nervous system (CNS) infections and sepsis-like disease in neonates. Most severe infections, such as encephalitis, lead to hospitalization, intensive care and sometimes even to death. It was recently shown that the majority of encephalitis cases had severe or some long term sequelae at 12 months. The majority of severe infections are caused by HPeV type 3, but in fall 2012 we discovered a small outbreak of HPeV type 4 caused sepsis-like disease.

Methodology: We selected 85 children, aged 0-60 weeks, with symptoms of CNS infection or suspected sepsis in 2011–2012, Helsinki. Children were diagnosed for common CNS infection and sepsis causing bacteria and viruses. HPeV positive samples were subjected to virus isolation and direct typing, by sequencing the viral VP1 genome region. The whole genome of isolated viruses were sequenced and analyzed against other complete HPeV genomes.

Findings: We detected seven HPeV positive children (8%), most were less than 2 months of age (6/7), diagnosed with sepsis-like disease (4/7) and detected in fall (6/7). Five HPeVs were typed, one as HPeV3 and four as HPeV4. We were not able to type two of the viruses due to low amounts of sample. Three HPeV4 viruses were isolated and passaged in colon carcinoma cells (HT-29) and their complete genomes were sequenced. Sequence analyses showed these HPeV4s to be recombinant viruses.

Conclusion: In addition to type 3, HPeV type 4 can cause severe infections in neonates. Clinical diagnostics for this virus is of great importance; it will reduce unnecessary antibiotic use and lead to better care of these children. More studies on genetic and biological features of HPeVs are needed to find which changes in the genome affect virus pathogenesis, such as the effect of the recombination on HPeV4.

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