Risk Factors for Severe Adenovirus Infection in Children during an Outbreak in Singapore

Veena Rajkumar, 1,2 MBBS, DCH, FRCPCH (UK), Cheryl SM Chiang, 1 MBBS, MRCPCH, MMed, Jia Meng Low, 3 Dip in Paed and Neonatal Nursing, Lin Cui, 4 PhD, Raymond TP Lin, 4,5 FRCPCH, MBBS, Nancy WS Tee, 5,6 MBBS, FRCPCH, Matthias Maiwald, 2,5,6 MD, FRCP, D(ABMM), Chia Yin Chong, 1,6,7 MRCP, MMed, Koh Cheng Thoon, 1,6,7 MBBS, MRCPCH (UK), MMed (Paeds) (Singapore), Natalie WH Tan, 1,6,7 MBBS, MRCPCH

Abstract

Background: Human adenoviruses (HAdVs) can cause a variety of human illnesses, with associated temporal and geographic changes in disease incidence. We report the emergence of an outbreak of HAdV infections in Singapore, presumably caused by a change of the predominating type to HAdV-7. We examined the clinical features of children admitted with HAdV infection to 1 institution and the risk factors for severe infection. Materials and Methods: This is a retrospective case-control study of all HAdV-infected children admitted during weeks 1 to 19 in 2013, as identified from laboratory records. A descriptive retrospective analysis of epidemiology, clinical data and the outcome of these children was also performed. Patients with severe infections were defined as cases, those with non-severe infections as controls, and the 2 groups were compared to find possible independent risk factors. Results: Eighty-five patients with HAdV infection were studied, including 11 (12.9%) cases and 74 (87.1%) controls. Binary logistic regression showed that cases were more likely to be <2 years old (adjusted OR 10.6, 95% CI, 1.8 to 63.2) and to have significant comorbidities (adjusted OR 19.9, 95% CI, 3.4 to 116.1) compared to controls. The predominant type in 2013 was HAdV-7, which differed from 2011 and 2012, when HAdV-3 was more common. There was a trend towards pneumonia being more common in patients infected with HAdV-7 than in patients infected with other types, although this did not reach statistical significance (OR 2.8, 95% CI, 0.9 to 8.7). Conclusion: The emergence of HAdV-7 in a population where other HAdV types had circulated previously may have caused the outbreak in Singapore, and this was associated with more serious infections in children. Young age (<2 years) and significant comorbidities were associated with more severe HAdV infection.

Keywords: Comorbidity, Complications, Epidemiology, Immunocompromised, Paediatric