

Title: Three cases of mumps virus and enterovirus co-infection in children with enteroviral meningitis

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Several viruses are responsible for aseptic meningitis; however, in the region of Southwest Iran, the role played by each virus is still not very well known. The aim of this study is to determine the relative frequencies of mumps virus, herpes viruses, and enteroviruses, as well as co-infections among them, in patients with aseptic meningitis. In this cross-sectional study, samples of cerebrospinal fluid (CSF) were collected between December 2012 and December 2013 from patients under 14 years, who were hospitalized in Abuzar Children's Hospital in Ahvaz, Southwest Iran (the only children's hospital in Khuzestan province and Southwest Iran). All 66 CSF samples and corresponding clinical data were collected from patients with aseptic meningitis by specialists, and with the patients' consent. The DNA and RNA were extracted from these samples and subjected to polymerase chain reaction (PCR) as well as reverse transcription polymerase chain reaction (RT-PCR) for detection of mumps virus, herpes viruses, and enteroviruses. Nine of the samples (three mumps-positive and six enterovirus-positive) were sequenced. The mumps virus sequences were investigated for possible mutations in the SH and partial HN regions. 3 Up to 39 patients (59.09%) were found to be positive for enteroviruses, three (4.5%) for mumps virus, and one (1.5%) for herpes viruses (specifically, the varicella-zoster virus). Two patients (3.03%) had a mumps virus and enterovirus co-infection. Among the three detected mumps virus samples, one belonged to genotype B, while the others belonged to genotype N. Six sequenced enteroviruses indicated the highest similarity with Echovirus 30. An amino acid substitution at position 51 (N→T) was detected in the HN region of genotype N mumps virus samples, in comparison to the reference strain.

Conclusion:

This study shows a high incidence (59.09%) of enterovirus infection, especially during spring and fall, among the patients with aseptic meningitis. This indicates that enteroviral meningitis is endemic in our region and necessitates the improvement of sanitation and public hygiene. The results of sequencing revealed that all the sequenced viruses were derived from vaccine strains (L-Zagreb, L3, Hoshino) and Echovirus 30. Mumps virus infection in vaccinated patients shows the importance of mumps vaccine alteration in Iran, because of its low immunization, as compared to other vaccine strains.