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# Prevalence of enterovirus serotypes in children with encephalitis/meningitis in Shanghai, China, 2016~2017

**Jingjing Li**
Children's Hospital of Fudan University, China

**Background:** Eneterovirus (EV) is a major cause of viral encephalitis/meningitis. This study aimed to investigate the prevalence of enterovirus-associated encephalitis/meningitis and the distribution of enterovirus serotypes in children with encephalitis/meningitis in Shanghai during 2016~2017.

**Methods:** We collected cerebrospinal fluid specimens from pediatric patients with encephalitis/meningitis and stool specimens from children with viral encephalitis/meningitis followed with hand-foot-mouth disease (HFMD) during 2016 ~2017. The nested RT-PCR and sequencing were performed to identify the enteroviruses and serotypes.

**Results:** During 2016 ~2017, we obtained 295 non-duplicated cerebrospinal fluid specimens from children with clinically diagnosis viral encephalitis/meningitis, and enterovirus was positive in 163 (55.25%) specimens. Of which, 139 and 156 specimens were taken from inpatients and outpatients, respectively. Enterovirus was positive in 66 (47.48%) and 97 (62.18%) cerebrospinal fluid specimens from inpatients and outpatients, respectively. Among inpatients with viral encephalitis/meningitis, 11 serotypes were identified including Echovirus 30 (E30, 42.42%), Coxsackievirus A6 (CV-A6, 12.12%), CV-A5 (10.61%), E6 (9.09%), E11 (7.58%), CV-A2 (4.55%), E9 (4.55%), CV-B5 (4.55%), CV-A10 (1.52%), CV-B3 (1.52%), E14 (1.52%). Among outpatients with viral encephalitis/meningitis, 13 serotypes were identified, including CV-A6 (31.96%), E30 (23.71%), CV-A10 (14.43%), E6 (7.22%), E9 (5.15%), CV-A2 (4.12%), CV-A9 (4.12%), CV-A5 (3.09%), CV-B5 (2.06%), EV-A71 (2.06%), E14 (1.03%), CV-B4 (1.03%). Of the 5 cases with critically severe encephalitis who all survived, E9, CV-A2 and E6 was identified in 2 cases and 1 case, respectively. Among 163 EV-associated encephalitis/meningitis cases, children aged >4 years old accounted for the most cases with 79.14% (129/163).

Besides, we obtained 61 stool specimens from children with viral encephalitis/meningitis followed with HFMD. And EV was positive in 56 (91.80%) specimens. 11 serotypes were identified including EV-A71 (85.71%), CV-A2 (5.36%), CV-A16 (23.57%), CV-A6 (3.57%), CV-A5 (1.79%). All encephalitis/meningitis followed with HFMD were mild cases. Of which, children aged <4 years old accounted for the most cases with 73.22% (41/56).

**Conclusion:** Multiple enterovirus serotypes co-circulated among children in Shanghai. Non-EV-A71 enteroviruses were responsible for viral encephalitis/meningitis and E30 and CV-A6 were frequent serotype responsible for encephalitis/meningitis. And school children were more susceptible to EV-associated encephalitis/meningitis than preschool child.

**e:** lijing588122@163.com

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