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# Deaths of Children during an Outbreak of Hand, Foot, and Mouth Disease in Sarawak, Malaysia: Clinical and Pathological Characteristics of the Disease FREE

L. G. Chan, Umesh D. Parashar , M. S. Lye, F. G. L. Ong, Sherif R. Zaki, James P. Alexander, K. K. Ho, Linda L. Han, Mark A. Pallansch, Abu Bakar Suleiman, ...  
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M. Jegathesan, Larry J. Anderson, Outbreak Study Group

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## Abstract

From April through June 1997, 29 previously healthy children aged <6 years (median, 1.5 years) in Sarawak, Malaysia, died of rapidly progressive cardiorespiratory failure during an outbreak of hand, foot, and mouth disease caused primarily by enterovirus 71 (EV71). The case children were hospitalized after a short illness (median duration, 2 days) that usually included fever (in 100% of case children), oral ulcers (66%), and extremity rashes (62%). The illness rapidly progressed to include seizures (28%), flaccid limb weakness (17%), or cardiopulmonary symptoms (of 24 children, 17 had chest radiographs showing pulmonary edema, and 24 had echocardiograms showing left ventricular dysfunction), resulting in cardiopulmonary arrest soon after hospitalization (median time, 9 h). Cardiac tissue from 10 patients showed normal myocardium, but central nervous system tissue from 5 patients showed inflammatory changes. Brain-stem specimens from 2 patients were available, and both specimens showed extensive neuronal degeneration, inflammation, and necrosis, suggesting that a central nervous system infection was responsible for the disease, with the cardiopulmonary dysfunction being neurogenic in origin. EV71 and possibly an adenovirus, other enteroviruses, or unknown cofactors are likely responsible for this rapidly fatal disease.

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