

Abstract

Shigellosis is common in the mountainous townships in eastern and central Taiwan. There were 25 to 108 cases annually identified in 1996 to 2000 in the eastern area. However, shigellosis has become epidemic in the eastern area after a large outbreak occurred in a high school in Hwalien City in October 2000. In 2001, outbreaks caused by *Shigella sonnei* were dramatically increased in eastern Taiwan as well as in central Taiwan. To investigate the relationship of cases identified in the two areas, we analyzed 377 shigella isolates recovered from 1996 to 2001 in eastern and central Taiwan by pulsed-field gel electrophoresis (PFGE). The results of PFGE genotyping and epidemiological data of the cases were used to discuss the dynamic change of shigella strains appeared in the period of the six years, the relationship among the outbreaks and the increase of cases in 2001.

The 377 isolates were grouped into 15 PFGE pulsotypes of which D1 (285 isolates), D3 (51), and D10 (20) were the major types. D1, D3, and D10 were further divided into 37, 10, and 2 subtypes, respectively. The distribution of pulsotypes (strains) in the two areas was changing by time. D10 strain was detected in eastern Taiwan in 1996 and 1997 and in central Taiwan in 1997 and 1998. D3 strain was detected only in central Taiwan in 2001, whereas D1 strain first appeared in 2000 and became prevalent in 2001 in both areas. D1 strain was very likely imported from southern Asia. It was first isolated from a traveler in March 2000 and caused a large outbreak in a high school of Hwalien City in October. Following the outbreak, infection by D1 strain dramatically increased in Hwalien County and central Taiwan, including Ren-ai and Puli Townships of Nantao County and some coastal townships of Taichung County and Miaoli County. D3 strain was first detected in Sinyi, Nantao County. The source of D3 in Sinyi could be derived from Alishan Township since an outbreak caused by the same strain occurred earlier in the township.

The PFGE analysis indicated that D1 strain was the major causal agent responsible for the abrupt increase of shigella infections in eastern and central Taiwan in 2001 and causing the most of the outbreaks during the year. Since PFGE is a very powerful molecular typing method for most bacteria and fast protocols have been developed, PFGE can be used as a routine method for subtyping clinical bacterial pathogens for monitoring emerging outbreak. The Centers for Disease Control and Prevention of the United States has been setup a PFGE subtyping network, called PulseNet, for monitoring foodborne diseases. Many countries, such as Canada, some European countries, and Japan, have been in the PulseNet network. We should setup a PulseNet-Taiwan network to PFGE bacterial isolates of important infectious diseases and to participate in the PulseNet-World network, to facilitate the international monitoring and control of

emerging bacterial diseases.

Key Word : shigellosis 、 pulsed-field gel electrophoresis 、 molecular epidemiology