The 2003 SARS Outbreaks in Taiwan

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Introduction

Severe acute respiratory syndrome (SARS) is caused by SARS-associated coronaviruses (SARS-CoVs) (Drosten et al., 2003; Fouchier et al., 2003; Peiris et al., 2003b; Ksiazek et al., 2003). The first known outbreak of SARS occurred in China’s Guangdong province in November, 2002 (Chinese SARS Molecular Epidemiology Consortium, 2004). By August 7 of the following year, SARS had spread to more than 30 countries, affecting 8,096 people and resulting in 774 deaths worldwide (World Health Organization, 2004). In 2003, Taiwan experienced a series of SARS outbreaks and the Municipal Hoping Hospital (referred to hereafter as HP) in Taipei City suffered the first and the most serious outbreak of SARS-CoV nosocomial infections: 137 probable cases and 26 deaths (Division of Surveillance and Investigation, Center for Disease Control, Taiwan, 2003; Lan et al., 2005b). According to the Center for Disease Control (CDC) in Taiwan, 364 of the 664 probable Taiwanese SARS cases reported to the World Health Organization were confirmed by reverse transcriptase-polymerase chain reaction (RT-PCR) and/or neutralizing antibody tests (Center for Disease Control, 2003a). In this chapter, we will discuss the molecular and clinical epidemiology of SARS infection in Taiwan during 2003.

The First and Second Waves of SARS Infections

In Taiwan, the first SARS case was diagnosed on 14 March 2003 (Center for Disease Control and Prevention, 2003b). This index case involved a Taiwanese businessman who had visited Guangdong province from February 5–21. After he came back to Taiwan, he transmitted the disease to his wife, his son (SARS-CoV-TW1), and the doctor who treated his son (SARS-CoV-TW3). On 15 March 2003, seven employees from a Taiwanese construction company flew from Hong Kong to Beijing. Four of them developed SARS symptoms on March 26, several days after returning to Taiwan (Olsen et al., 2003).
The Third Wave of SARS Infection: A Series of Nosocomial Infections

On 26 March 2003, a male resident of the Amoy Gardens housing complex in Hong Kong flew to Taiwan; he stayed overnight in a small hotel in Taipei and took a train from Taipei to Taichung City to visit his younger brother the following day. The visitor returned to his Hong Kong home on March 28 after experiencing fever the preceding evening. His younger brother, who developed symptoms on March 31, became Taiwan’s first SARS-related fatality (TC1).

On April 6, a 47-year-old Taiwanese female (TW-HP1) suffering from fever and coughing for several days visited the emergency room at the municipal Hoping hospital. On April 9, this patient was transferred to another private hospital where she was diagnosed to have SARS. Although patient TW-HP1 stayed only in the emergency room of Hoping hospital for 3 days, seven employees including a laundry worker (the index case) developed SARS after she left. In all, 137 probable SARS cases and 26 mortalities resulted from this nosocomial infection.

On April 24, for the reason of quarantine, the Taipei City government shut down Hoping hospital without warning. All the employees of the hospital were asked to return to the hospital and stay with the patients and their visitors during the quarantine. On April 28, the Taiwan government imposed mandatory quarantines on all air travelers from China, Hong Kong, Singapore, Macau, and Toronto, but nosocomial SARS infections continued to be reported in many hospitals island-wide. More than ten hospitals experienced outbreaks of nosocomial SARS-CoV infec-

Fig. 1  Epidemiological curves of probable (gray color) and confirmed (darker color) SARS cases in Taiwan. Confirmed cases were validated by the Taiwan’s Center for Disease Control using RT-PCR and serological tests. Arrows mark dates of outbreaks of nosocomial infections in HP, JC, NYU, KC, PH, GD, and YM hospitals and of diagnoses of SARS in several key patients.