Control of Dengue/Dengue Haemorrhagic Fever in China

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Abstract

Dengue fever, one of the notifiable infectious diseases under the administration of the Law of the People’s Republic of China on the Prevention and Control of Infectious Diseases, has been a priority health problem in China, especially in its southern provinces which are considered to be tropical or subtropical areas. The dengue fever occurrence epidemic in China has lasted almost 20 years, the outbreaks occurring mainly in two or three provinces, i.e. Guangdong, Hainan and Guangxi Zhuang Autonomous Region, and some infection being found in Yunnan province. The main vectors were different in different provinces. In recent years, however, the dengue morbidity has greatly decreased, and no case has been reported to the Ministry of Health since 1996.

Introduction

Since 1940s, there had been no recorded case of dengue fever until the year 1978(1) when a few cases of dengue fever were reported. But since late 1970s and early 1980s, the epidemics of dengue fever drew the attention of the Government at different levels. The DF prevalence had lasted for nearly 20 years; however, for several years now, no DF case has been detected in China. Because of climatic and environmental factors, the occurrence of DF in China had been limited to two or three provinces, i.e. Guangdong, and Hainan provinces and the Guangxi Zhuang Autonomous Region. In addition, among the south-western provinces such as Yunnan, there had been antibody positive, even though no apparent cases were reported.

Historical background

Dengue fever in China started with the importation of two cases between 1949 and 1976 which could not be confirmed by isolation and serological methods, but only clinically. During 1978-1982 and 1985-1986, there were some epidemics and outbreaks in Guangdong province, (at that time, Hainan was a part of Guangdong province). The sequence of events is as follows:

1978: 22122 cases, with 14 deaths, were reported from seven counties/cities. The first case occurred in May, with
symptoms of fever, headache and muscle ache. The virus was type DEN-4, the morbidity was 39.56/100000, fatality 6, and mortality 0.03/100000.

1979: The cases had greatly decreased, all the cases were restricted to Guangdong province and occurred in the second half of the year. Six hundred-and-sixty-seven cases, including 635 from Hainan, were reported without any death, the morbidity rate being 1.17/100000.

1980: The total number of cases was 452,675, with 71 deaths. This included 437,468 cases from Hainan with 64 deaths; the percentage of cases and deaths from Hainan was 96.66 and 90.14% respectively. The morbidity was 8006.14/100000, fatality 0.1%, and the virus was DEN-3.

1981: 29,543 cases, 2 deaths, morbidity 33.51/100000, fatality 0.1; the virus: DEN-3.

1982: Only 19 cases, no death; all cases were from Hainan, Guangdong province. The virus was DEN-3.


1985: 16,385 cases, 28 deaths, Den-2. Occurred from July to December. Morbidity 25.85/100000, fatality 1.70.

1986: 118,881 cases, 296 deaths. Morbidity 190.12/100000, fatality 2.5; Virus: DEN-2. The morbidity was higher than in 1985, the second highest after that of 1980; however, the fatality was the highest (2.5), which was more than 10 times that in 1980.

1987: 32,830 cases, 79 deaths, morbidity 51.73/100000, fatality 2.4. Virus: DEN-2 (Fig.1).

In 1990, Hainan became a province carved out of Guangdong province. The data was collected and analysed separately.

Figure 1. DF/DHF in People's Republic of China 1979-1987
for 1990-1996, when 7922 cases and three deaths were reported from Guangdong. The average morbidity was 1.67/100000. (Fig.2).

The distribution of cases and types of viruses for the years 1990-1996 are given in Table 1.

The occurrence of the cases was concentrated during the period in August-October, the morbidity percentage being 94.05.

The data of 1995 showed that the cases were mostly typical of DF. There were 12 haemorrhagic cases among 758 cases (1.58%).

Table 1. DF Prevalence in Guangdong 1990-1996

<table>
<thead>
<tr>
<th>Type of virus</th>
<th>Cases</th>
<th>Deaths</th>
<th>Morbidity*</th>
<th>Motality</th>
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<tbody>
<tr>
<td>1990</td>
<td>D4</td>
<td>374</td>
<td>0</td>
<td>0.60</td>
</tr>
<tr>
<td>1991</td>
<td>D4/D1</td>
<td>371</td>
<td>3</td>
<td>0.57</td>
</tr>
<tr>
<td>1992</td>
<td>–</td>
<td>2</td>
<td>0</td>
<td>0.003</td>
</tr>
<tr>
<td>1993</td>
<td>D2</td>
<td>359</td>
<td>0</td>
<td>0.53</td>
</tr>
<tr>
<td>1994</td>
<td>–</td>
<td>4</td>
<td>0</td>
<td>0.006</td>
</tr>
<tr>
<td>1995</td>
<td>D1</td>
<td>6812</td>
<td>0</td>
<td>9.75</td>
</tr>
<tr>
<td>1996</td>
<td>–</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>7922</td>
<td>3</td>
<td>1.67</td>
<td></td>
</tr>
</tbody>
</table>

* per 100,000

Before 1990, Hainan had witnessed five epidemics/outbreaks 1917. The data showed that the DEN-3 virus was responsible for these epidemics, but during 1985-1988 and in 1991 DEN-2 was also

Figure 2. DF/DHF in People’s Republic of China 1990-1996
associated\(^2\). The cases were a mix of DF and DHF. *Aedes aegypti* mosquito has been the major vector in the epidemics of DF in Hainan. The geographical and seasonal data show the characteristics were in line when control measures were taken. With a decrease in the density of the *Ae. aegypti* mosquito, the cases of DF/DHF also declined. As described above, the people in Hainan are also sensitive to the dengue viruses, and the prevalence depends on the degree of exposure to the vector.

**Vector surveillance**

The vectors of DF/DHF are *Aedes albopictus* and *Aedes aegypti* mosquitoes. *Aedes albopictus* mosquito is prevalent throughout Guangdong province. *Ae. aegypti* and *Ae. albopictus* mosquitoes together were found in two districts of the province (Zhanjiang and Maoming). The climate of Hainan province, which is an island, is subtropical, and the rainy season lasts several months. The main vector of DF/DHF is *Aedes aegypti* mosquito, which is found mainly in seaside areas.

**Laboratory support**

The laboratory facilities are available in the Institute of Virology, Chinese Academy of Preventive Medicine, and the Beijing Institute of Tropical Medicine. All the activities are administered and supported by the Department of Diseases Control, Ministry of Health.

**Risk factors**

Guangdong and Hainan provinces are subtropical areas. Considering the climate and the environment, *Aedes* mosquitoes breed abundantly in living dwellings in these areas. There is no effective control against these vectors.

During recent years, many areas have come under construction. During this activity, many people are employed temporarily, and the health and hygiene conditions are not ideal. The DF cases mostly occur among this group of people. At the same time, with economic development, tourism is catching up. Some cases were detected among emigrants who had visited other regions in the country or had gone abroad.

Although dengue is listed in the Law of the People’s Republic of China on the Prevention and Control of Infectious Diseases as a notifiable infectious disease, the prevalence had been restricted to one or two provinces, and there had been no reporting of its incidence due to lack of knowledge on the part of local health workers. Some cases were misdiagnosed as that of typhoid or influenza. Surveillance network is also not very strong.

**Future strategy**

Surveillance network needs to be strengthened while training activities should be encouraged and supported. Technical teamwork is significant in China.

There is a need to develop some kind of a joint project in several provinces with international collaboration. It can prove to be
a practical way for the control of DF, as happened in 1991 when a research project on the control of dengue fever at community and environmental level was finalized between the Hainan Anti-Epidemic Station and the Research Center of Social Development of Canada. The outcome of the research was promoted in the areas of health education, intervention, etc.

Coordination among the relevant agencies should be continued as control of DF should not be the responsibility of the health department alone. Other agencies, especially those responsible for construction activities, vector control as well as medicine and biomedical production should be actively involved in the programme.

References


<table>
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<tr>
<th>Cases</th>
<th>Years</th>
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<th>Cases</th>
<th>Years</th>
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- [Cases]
- [Deaths]