Correspondence

An outbreak of dengue fever in Tirupur, Coimbatore district, Tamil Nadu

Sir,

Dengue is considered as a serious public health problem with about 2.5 billion people are at risk globally of which a few may progress to dengue haemorrhagic fever (DHF) / dengue shock syndrome (DSS), the major cause of mortality mainly among infants. In India, DF and DHF had been documented in different parts of the country including southern India (Tamil Nadu). A sudden increase of fever cases with haemorrhagic manifestations has been reported in Tirupur Municipality in Coimbatore district, Tamil Nadu during July 2005. We present here the aetiology of the outbreak and the results of serological, entomological and virological studies carried out in the DF affected areas.

Tirupur town, (Latitude: 11°.05’ N, Longitude: 77°.20’ E), reported an outbreak of fever cases during the second week of July 2005. People from different parts of the country visit and stay in this textile town for hosiery trade for long periods. Due to the non-availability of natural source of water there is acute scarcity in this area and storage of potable water has become a regular practice of the local residents. Two urban areas viz., Rayapuram and Samundipuram and a rural area (Bharathinagar) with reports of deaths due to dengue were selected. Suspected dengue cases admitted (including DHF) to the Government hospital and private nursing homes in Tirupur were included in the study according to the case definition of WHO.

A total of 77 plasma samples (0.5 ml) were collected by finger prick method and transported to the laboratory in wet ice. Relevant histories of the cases were collected after obtaining consents of the patients/patient’s parents/guardians. Dengue virus specific IgM and IgG antibodies were screened using Pan Bio ELISA Kit (Brisbane, Australia) as per the manufacture’s instruction. To rule out the possible cross-reactions, samples were also screened against the closely related flaviviruses [Japanese encephalitis virus (JE) and West Nile virus (WN)] infections by haemagglutination inhibition (HI) test using dengue virus (DENV), JEV and WNV antigens. Dengue monotypic positive samples were further titrated in HI test. Acute plasma samples were also inoculated in Toxorhynchites splendens larvae and the presence of virus was xenodiagnosed using immunoflourescent antibody test. As per the data received from local health authorities, three deaths were also reported among children.

Entomological survey was carried out in the three selected localities, where death due to dengue had occurred. Adult mosquitoes collected in landing and resting collections were identified and segregated in to separate pools and were transported to the laboratory at Centre for Research in Medical Entomology, Madurai in liquid nitrogen. Immature mosquitoes were surveyed following Single Larva Technique (SLT) and the collected larvae and pupae were transported to the laboratory and reared up to adult stage to identify up to species level.

Though the silent circulation of DENV in nearby districts of Coimbatore, Erode and Vellore were reported, the occurrence of DHF has been noticed for the first time in Tirupur town. Dengue considered as an urban disease and recently DHF cases were reported among paediatrics population in Chennai city, southern India, now it has been noticed in the rural areas. However, in Tirupur, dengue has been noticed both in rural (Bharathinagar) and in urban areas (Rayapuram and Samundipuram) simultaneously. A total of 77 samples (45 male and 32 female) were screened for DENV specific IgM antibodies. Of these,
Table. Results of IgM, IgG and HI tests demonstrating dengue virus infection in Tirupur

<table>
<thead>
<tr>
<th>Sample no.</th>
<th>Age (yr)</th>
<th>Sex</th>
<th>IgM</th>
<th>IgG</th>
<th>ELISA test</th>
<th>HI test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JEV</td>
<td>WNV</td>
</tr>
<tr>
<td>T1</td>
<td>14</td>
<td>M</td>
<td>+</td>
<td>+</td>
<td>1:320</td>
<td>1:320</td>
</tr>
<tr>
<td>T11</td>
<td>12</td>
<td>M</td>
<td>+</td>
<td>+</td>
<td>1:160</td>
<td>1:40</td>
</tr>
<tr>
<td>T12</td>
<td>10</td>
<td>M</td>
<td>+</td>
<td>+</td>
<td>1:640</td>
<td>1:640</td>
</tr>
<tr>
<td>T17</td>
<td>11</td>
<td>F</td>
<td>+</td>
<td>+</td>
<td>1:160</td>
<td>1:160</td>
</tr>
<tr>
<td>T20</td>
<td>7</td>
<td>F</td>
<td>+</td>
<td>+</td>
<td>1:2560</td>
<td>1:1280</td>
</tr>
<tr>
<td>T25</td>
<td>7</td>
<td>M</td>
<td>+</td>
<td>+</td>
<td>1:160</td>
<td>1:160</td>
</tr>
<tr>
<td>T36</td>
<td>7</td>
<td>F</td>
<td>+</td>
<td>+</td>
<td>1:640</td>
<td>1:640</td>
</tr>
<tr>
<td>T37</td>
<td>4</td>
<td>M</td>
<td>+</td>
<td>+</td>
<td>1:2560</td>
<td>1:2560</td>
</tr>
</tbody>
</table>

JEV, Japanese encephalitis virus; WNV, west nile virus; DENV, dengue virus

39 per cent (30 samples) were positive. There was no significant difference in positivity rate of both sexes as proportion of male and female was 40 and 37.5 per cent respectively. As DHF manifestations were noticed among the paediatric populations, the plasma samples were also tested for DENV IgG antibodies. Of the 30 IgM positive samples, eight (27%) were positive for DENV specific IgG antibodies. Sample numbers T1, T12, T20 and T37 clearly showed the rise in the HI antibody titre of 1:2560 (within the age group between 4 & 14 yr) indicating the secondary dengue infection (Table). This also suggests the circulation of multiple serotype of DENV in this area, which may lead to the development of DHF in future. The circulation of multiple serotypes of DENV in Tamil Nadu has been documented earlier implicating the phenomenon of vertical transmission which ideally plays a role in maintenance of DENV in nature. Similar observations were noticed in other areas of Tamil Nadu. One pool of female mosquitoes emerged from immatures was found positive for DENV antigen which was further processed and DENV-2 and DENV-3 viruses were isolated. These findings indicate the circulation of multiple serotypes in the area and the possible threat of DHF outbreak.

In conclusion, circulation of multiple serotypes in Tirupur might enhance the probability of development of life threatening DHF in this area. Our findings also provided evidence for the circulation of more than one serotype of DENV in rural and urban areas of southern India and stress the need for implementation of appropriate control strategies.

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References


