Dengue Fever Outbreak in Lahore

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ABSTRACT

Dengue fever has now affected all the major cities of country. About 41,354 patients underwent antibody screening for dengue fever from Shaukat Khanum Memorial Cancer Hospital, Lahore, during the epidemic period (October 1st 2010 to December 20th 2010). Out of them, 1294 (3.1%) patients were positive for IgM antibodies, and 124 (0.3%) for IgG antibodies. A total of 722 (1.7%) patients were borderline positive for IgM antibodies and 108 (0.26%) were borderline positive for IgG antibodies. Dengue fever has emerged as a global problem over the last 5 years. It has also hit Lahore badly especially after the floods in 2010. High index of suspicion should be there in case of related symptoms.

Key words: Dengue fever.   Outbreak.   Borderline.   Positive cases.   Lahore.

About 50 – 100 million people are infected and half a million lose their lives due to the dengue virus infection worldwide each year. Initially it was thought of being exclusively a tropical disease, but now it has become a global problem and it is now endemic in about 110 countries.[1] It is the most common viral disease transmitted by arthropods and only second in importance to malaria. Chinese medical encyclopedia, Jin Dynasty, revealed first probable record of a case of dengue fever, which it referred to as water poison associated with flying insects. One of the earlier epidemics has been reported in 17th century but the first reasonable and convincing reports of epidemics were given in 1779 and 1780 which affected Asia, North America and Africa. After that, epidemics became infrequent till 1940.[2]

In 1906, it was established that Dengue fever is transmitted by *Aedes* mosquitoes particularly *Aedes aegypti*. Other species like *Aedes albopictus*, *Aedes polynesiensis* and several *Aedes scutellaris* can also transmit the disease. Dengue may also get transmitted by blood products and organ donations. In endemic areas like Singapore, the estimated risk is 1.6 – 6 per 10,000 transfusions.[3] Vertical transmission during pregnancy has also been documented.[4] After the mosquito stings a person, the virus enters the skin and bind to certain cells like keratinocytes and langerhans dendritic cells. They bind with cells through receptors like C type lectin DC design and mannose receptor and get entry into the cells. Dendritic cells then reside in lymph node, meanwhile the virus replicates within the endoplasmic reticulum. The new viruses bud through the surface membrane, where they can enter into other white blood cells like monocytes and macrophages. The initial response of immune system is to produce interferons, which in turn activate adaptive immune system. This leads to generation of antibodies and activation of T-cells which later on target and kill virus infected cells.[5]

Patient usually presents with fever, vomiting and abdominal pain. The earliest laboratory findings are low platelet count and metabolic acidosis. The virus can also be diagnosed by viral isolation by cultures, nuclei acid detection or by IgM and IgG antibody detection.[6]

Dengue fever has now affected all the major cities and towns of country. Initially cases were reported in Lahore and Karachi but now it has affected nearly all major towns and cities of the country. The first case of dengue fever was reported in 1994 in Karachi. After that the disease spread slowly.[7] In 2006, WHO recognized the problem in Pakistan and according to them 4800 cases of Dengue were diagnosed and 50 deaths were reported till 2006. In 2007, first case of dengue fever was reported in Lahore. Since then cases are increasing at a rapid pace. According to official reports, 3305 cases of dengue were diagnosed in Karachi in 2010.[7] After the floods in 2010, there was an outbreak of dengue fever affecting the country during 2010. Unfortunately, there is no effective prevention as there are no specific vaccines available. The major prevention is to keep drainage system effective so that no stagnant pools and ponds stay for long-periods after rain. There is no special management.[8] Two life threatening complications are dengue haemorrhagic fever and dengue shock syndrome. Main reason for haemorrhage is low platelet counts and increased vascular permeability. The later causes plasma leakage and decreased circulating volume. Management is largely supportive with symptomatic treatment, blood transfusions and fluid resuscitation.

Considering the importance of the current situation in Pakistan, we selected all the patients who underwent

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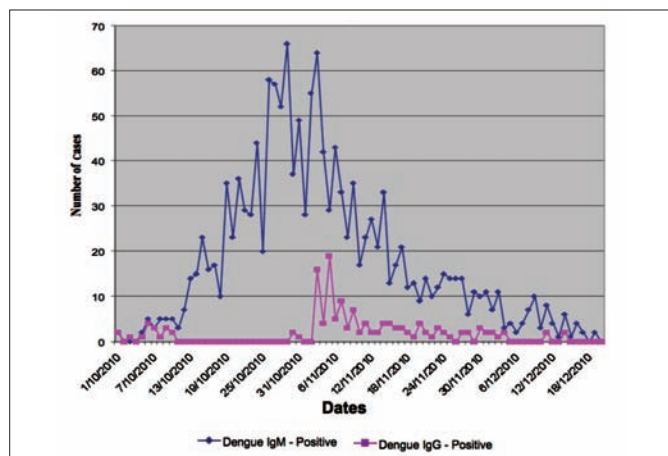
Correspondence: Dr. Usman Hassan, House No. 123, N Block, Model Town, Lahore.
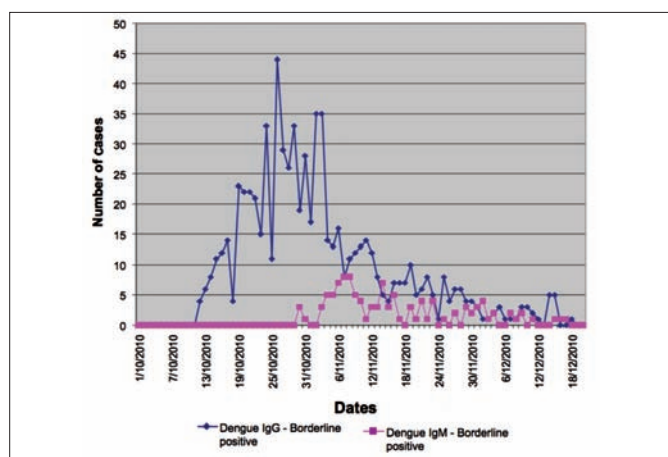*E-mail: usman_hassan256@hotmail.com*

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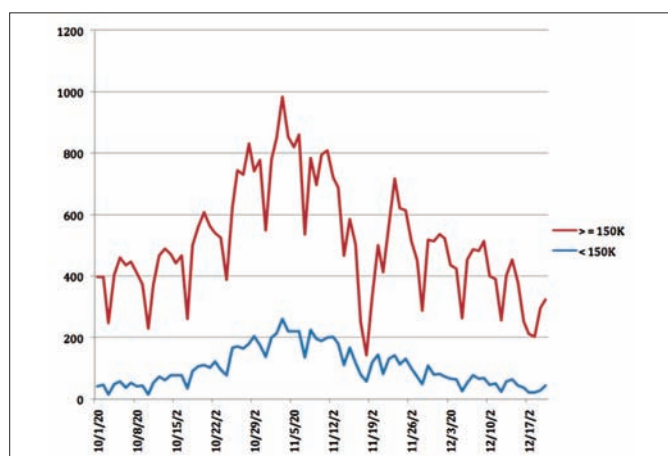**Table I:** IgM and IgG positive and borderline positive cases.

Dengue IgM positive cases	1294 (57.5%)
Dengue IgG positive cases	124 (5.5%)
Dengue IgG borderline positive cases	722 (32.1%)
Dengue IgM borderline positive cases	108 (4.9%)
Total number of positive cases	2248

Figure 1: Dengue IgM and IgG positive cases.

Figure 2: Dengue IgM and IgG borderline positive cases.

Figure 3: Platelet count pattern in patients getting screened for dengue antibodies.

test for dengue fever antibodies during an epidemic period (October 2010 to December 2010) at Shaukat Khanum Memorial Cancer Hospital (SKMCH), Lahore. All the patients were referred based on the clinical suspicion of dengue fever. Antibody screening was done by kit named International Immunodiagnostic Dengue IgM EIA and IgG EIA. About 41,354 patients underwent antibody screening. Out of these, 1294 (3.1%) patients were positive for IgM antibodies, and 124 (0.3%) for IgG antibodies. A total of 722 (1.7%) patients were borderline positive for IgM antibodies and 108 (0.26%) were borderline positive for IgG antibodies.

A total of 2248 patients turned out to be positive for either IgM or IgG anti-dengue antibodies. This included both positive and borderline positive cases. About 57.5% of the cases were positive for IgM antibodies and 5.5% for IgG antibodies, whereas, about 32.1% of the cases were borderline IgG positive and 4.9% borderline IgM positive (Table I).

Figure 1 shows the stepwise increase in the number of cases with IgM positive antibodies. The numbers reached the peak near the end of October and start of November, followed by fall in number of positive cases till end of December. For IgG positive cases, there was a smaller peak seen near the start of November. Same was the result for borderline positive cases. The number of IgM borderline positive cases revealed stepwise increase reaching its peak at the end of December and start of November. IgG borderline positive cases showed a smaller peak near the start of November (Figure 2). Complete blood picture was done in all cases. Out of all cases, 33093 cases had platelet count above 150,000/mm^3 and 8261 cases had platelet count below 150,000/mm^3. The number of patients in both groups revealed stepwise increase in numbers with peak reaching in early November followed by a stepwise decrease over next one and a half month (Figure 3).

In one local study done on 341 acute cases, 48.7% were confirmed by IgM dengue specific kit, 7.9% in gray zone and 43.4% were negative. A total of 200 suspected re-infected patients were tested for IgG. About 39.5% were positive, 1.5% in gray zone and 59% were negative.[9] Results were comparable to this study regarding IgM positive cases and IgM borderline positive cases. After onset of symptoms, IgM levels generally rise quickly and peak by two weeks. Levels then fall to become undetectable over 2 – 3 months. Similarly, IgG antibodies rise quickly and peak at about two weeks after infection and then fade gradually over 3 – 6 months. In another local retrospective cross-sectional study done during 2003-2007, only 26.3% of the cases were IgM positive.[10]

In a study done by Yew *et al.* in Singapore in 2004, 59% of the cases were positive for IgG indicating past infection.[11] The present study found low percentages for IgG positive cases but high percentages of IgG

borderline positive cases. In borderline positive cases, in this study, number of IgG borderline cases had a greater peak than number of borderline IgM positive cases. This may indicate subclinical infections prevailing in the community.

Another peculiar finding in this study was that among 8261 patients with low platelet counts (< 150,000/mm^3) and only 2248 cases were positive for IgM and IgG antibodies. This included both the positive and borderline positive cases. The reason for rest of the patients being negative may be that most of the patients came for antibody screening very early i.e., within the first two weeks, which is the time when antibodies are not detectable.

Dengue fever has emerged as a global problem over the last 5 years. It has also hit Lahore badly especially after floods. High index of suspicion should be raised in case of related symptoms. As there is no cure, prevention is very much important.

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