Clinico-Haematological Study of Dengue Cases

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Abstract

Objectives: To study and establish clinical and haematological correlation in cases of dengue viral infection. **Methodology:** A total 169 serum samples were received from L.G. Hospital for the detection of Dengue IgM during the period of October 2013 to January 2014. They were tested for the same with ELISA method. The clinical -haematological case study was done and the data was analyzed retrospectively. **Results:** Total 169 serum samples were tested, out of which 44(26.03%) were positive for Dengue IgM antibodies. Out of the total serum samples, Male: Female ratio and Urban: Rural ratio was 1.6:1 and 2.8:1 respectively. Peak incidence of the disease is seen in October. Clinically fever was the commonest presentation in 39(88.6%) patients followed by headache and muscle pain i.e., 33(75%) and 16(36.3%) respectively; the least common was epistaxis in 4 (9.04%) patients. Retrobulbar pain was in 3(6.8%) rash was in 6 (13.6%) and hemorrhagic manifestations in 12 (27.2%) patients. Amongst total WBC count, the proportion of Lymphocyte was above 70% in 3(6.8%) cases, between 50-70% in 17(38.6%) cases, and between 35-49% in 16(36.3%) cases and below 35% was in 8(18.18%) cases. The platelet count less than 50,000 was observed in16(36.3%) cases, 50,000 to 1, 00000 in 15(34.09%) cases and greater than 1,00,000 was in 13(29.5%) cases.19(43.1%) patients had erythrocyte sedimentation rate less than 7mm/hr, While 15(34.09%) patients had8-20mm/hrand 10(22.7%) had more than 20 mm/hr.

Key Words : Dengue, IgM antibodies

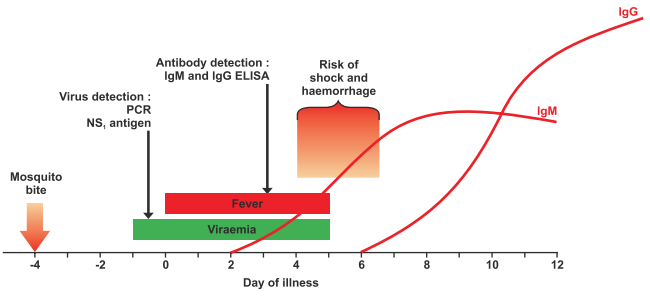
Introduction :

Dengue fever is a febrile illness caused by an RNA flavivirus. It is transmitted by the female Aedes egypti mosquito that primarily lives in the tropical and subtropical regions of the world. The virus is found within the salivary glands of the female mosquito and can be passed from adult to egg, which allows it to survive from season to season. [1]

There are 4 serotypes namely, DENV-1, DENV-2, DENV-3 and DENV-4. Each serotype provides specific lifetime immunity by homotypicneutralising antibody and short-term cross immunity by heterotypic non neutralising antibody. All serotypes can cause severe and fatal disease.

The Symptoms of dengue viral infection are headache, fever, exhaustion, severe joint and muscle pain, swollen glands (lymphadenopathy), and rash. The presence of fever, rash, and headache is particularly characteristic of dengue fever (the "dengue triad"). [2] Dengue hemorrhagic fever is a more severe form of the viral illness; itssymptoms are headache, fever, rash, and evidence of hemorrhage in the body. Petechiae (small red or purple splotches or blisters under the skin), bleeding in the noseor gums, black stools, or easy bruising are all possible signs of hemorrhage. This form of dengue fever can be life-threatening and can progress to the most severe form of the illness, dengue shock syndrome. [3]

The acquired immune response to dengue infection consists of the production of antibodies that are primarily directed against the virus envelope proteins. The response varies depending on whether it is a primary or secondary infection. [4] [5] A primary antibody response is seen in individuals who are not immune to dengue and a secondary immune response is observed in patients who have had a previous dengue infection. A primary infection is characterized by a slow and low-titer antibody response. Immunoglobulin M(IgM) antibodies are the first isotype to appear, by day 3 5 of illness in 50% of hospitalized patients and by day 6 10 of illness in 93 99% of cases. The IgM levels peak ~2 weeks after the onset of fever and then generally decline to undetectable levels over the next 2 3 month. [6-8]



Dengue-specific IgG is detectable at low titre at the end of the first week of illness and then slowly increases. By contrast, during a secondary infection, high levels of IgG antibodies that cross-react with many flaviviruses are detectable even in the acute phase and rise dramatically over the following 2 weeks. [8] The kinetics of the IgM response are more variable; as IgM levels are significantly lower in secondary dengue infections, false-negative test results for dengue-specific IgM have been reported during secondary infections. [7, 9, 10]Following a dengue infection, IgG can remain for lifelong, which complicates the serodiagnosis of past, recent and current infections. [8] [10] IgA and IgE responses have also been documented but the utility of detecting these immunoglobulins as markers for dengue serodiagnosis requires further study. [11]

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Material and Methods

Total 169 human blood samples of all age group & gender from clinically suspected cases of Dengue fever attending OPDs& IPDs from October 2013 to January 2014 in L.G. Hospital, Ahmedabad were collected with standard laboratory precautions.Two blood samples were obtained from each patient, one in tube with K2EDTA and other inplain test tube and stored at 2- 8 c until used. A structured format containing information of the patient and family members, clinical features, details of treatment and recurrence was used for data collection.Each sample was confirmed for its sufficient quantity & quality. Serum was separated by centrifugation. All the samples were tested within three days of collection by Qualitative Capture ELISA IgM antibodies detection against Dengue virus in V.S.Hospital, Ahmedabad.K2EDTA sample was used for doing complete hemogram.

Result & Discussion

Total serum samples tested were 169 out of which, 44(26.03%) were positive for IgM antibodies. Out of the total serum samples, Male: Female ratio and Urban: Rural ratio was 1.6:1 and 2.8:1 respectively. Peak incidence of the disease was seen in October.Clinically fever was the commonest presentation in 39(88.6%) followed by headache and muscle pain i.e. 33(75%) and 16(36.3%) respectively, least common presentations were epistaxis in 4 (9.04%) patients, retrobulbar pain was in 3(6.8%)& rash was in 6 (13.6%). The hemorrhagic manifestations were observed in 12 (27.2%) cases. Patients with platelet count less than 50,000 in 16(36.3%), 50,000 to 1 in 15(34.09%) and greater than 1,00,000 in 13(29.5%).The complete hemogram revealed the proportion of lymphocyte above 70% in 3 (6.8%) cases, between 50-70% in 17 (38.6%) cases, and between 35-49% in 16 (36.3%) cases and below 35% in 8 (18.18%) cases. Patients with erythrocyte sedimentation rate less than 7mm/hrwere 19(43.1%), 8-20mm/hrwere 15(34.09%)and more than 20 mm/hrwere 10(22.7%). The clinical and haematological parameters of present study match with the study conducted at tertiary care hospital, Pune. Clinically, fever is the most common presenting symptom i.e.88.6%, followed by headache i.e. 75%.

Leukopenia and thrombocytopenia are common findings in dengue fever and are believed to be caused by direct destructive actions of the virus on bone marrow precursor cells. The resulting active viral replication and cellular destruction in the bone marrow are believed to cause the bone pain. Bleeding is caused by capillary fragility and thrombocytopenia and may manifest in various forms, ranging from petechial skin haemorrhages to life-threatening gastrointestinal bleeding.

Table: 1 Comparison of study at tertiary care hospital Pune [12] and present study

Variable	Present study	Study at tertiary care hospital, Pune
Study duration	Oct 2013-Jan 2014	Nov 2012-April2013
No. of samples tested/positive samples	169/44 (26.03%)	452/98(21.6%)
Most common clinical symptom (Fever)	88.6%	95%
Platelet count <50,000	36.3%	57%
1lakh-50,000	34.09%	23.1%
>1lakh	29.5%	19.9%
ESR>20 mm/hr	22.7%	33.4%

Conclusion

High grade fever with leukopenia and thrombocytopenia are common findings in dengue infection. Urban males are affected more due to several factors like, changing lifestyle, traditional water storage practices; water receptacles. Laboratory plays an important role in detection of IgM antibody in primary infection. In secondary infections, the virus may be complexed with antibody, making it undetectable by most current laboratory diagnostic techniques.

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