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Clinical-Hematological Profile of Patient with Dengue Infection in Bihar: A Prospective Study

Pathology

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ABSTRACT

Background: The Dengue is a mosquito borne viral infection and transmitted, primarily by Aedes aegypti and sometimes by Aedes albopictus. Objective: To evaluate hematological changes in patients suffering from acute dengue infection with serological confirmation. Methods: It is a prospective study at tertiary urban hospital. Clinically suspected cases of dengue with serological confirmation during the period from May 2014 to February 2016. Results: Majority of the cases having dengue infection belong to the age group of 1-20 years. Males (61%) were more affected than the females (39%). DF was the most common manifestation (79%), DHF is lesser (17%) and DSS is the least (4%). The thrombocytopenia was seen in 15% of the dengue positive cases. In DSS the hematocrit level lies in the upper limit of normal.

KEYWORDS:

dengue, fever, thrombocytopenia

Introduction

The dengue virus is a arthropod borne virus-Arbovirus, belonging to the Family Flaviviridae and genus Flavivirus[2].It is a mosquito borne viral infection and is transmitted, primarily by Aedes aegypti and sometimes by Aedes albopictus[3]. Dengue is caused by four distinct serotypes of viruses; DEN-1, DEN-2, DEN- 3 and DEN-4.[4] Dengue virus causes a spectrum of illness ranging from in apparent, self-limiting classical dengue fever (DF) to life threatening dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).[4] India is endemic for DF and DHF. All the four serotypes are found in the country. Case fatality rates in endemic countries are 0.22%. Early clinical features of dengue infection are variable among patients, and initial symptoms are often non-specific; therefore, specific laboratory tests are necessary for an accurate diagnosis.[9] According to the US Centers for Disease Control and Prevention (CDC) and the WHO dengue guidelines the clinical features of DF and DHF are sudden onset of fever, severe headache, myalgia and arthralgia, leucopoenia, thrombocytopenia, and hemorrhagic manifestations. It occasionally produces shock and hemorrhage, leading to death. Classic DF symptoms include fever, headache, retro-orbital pain, myalgia and arthralgia nausea, vomiting, and often a rash. Some DF patients develop the more serious form of the disease DHF with symptoms that include a decline in fever and presentation of hemorrhagic manifestations, such as microscopic hematuria, bleeding gums, epistaxis, hematemesis, Melina, and ecchymosis. DHF patients develop thrombocytopenia and hemconcentration; the latter is due to an increase in the concentration of blood cells resulting from the leakage of plasma from the bloodstream. These patients may progress into DSS, which can lead to profound shock and death if not treated.

Literature Survey

The name dengue is derived from the Swahili word 'ki denga pepo' which means 'sudden seizure by the demon'. The term 'break bone fever' was coined following the Philadelphia epidemic in 1780[1]. The earliest description of dengue fever was made in the same year by Benjamin Rush[2]. The other names for dengue fever are dandy fever, denga, dunga fever and coup-d-barre.[11] The ability of the mosquito Aedes aegypti to transmit the disease was demonstrated in the year 1903[2]. The viral etiology was demonstrated in the year 1906[2]. Sabin in 1944 established the existence of the dengue viral serotypes. Dengue serotype 1 was isolated from Hawaii in 1944, serotype 2 from New Guinea in 1944 and serotype 3 and 4 from Philippines in 1956.India comes under category A of the classification meant for SEAR. Here DHF is an emerging disease, cyclical epidemics are frequent and multiple virus serotypes exist. Aedes aegypti is the primary vector.[5] All the four serotype presently exist in the country.5 Dengue virus infection may be asymptomatic or may cause undifferentiated febrile illness (viral syndrome), dengue fever (DF), or dengue hemorrhagic fever (DHF) including dengue shock syndrome (DSS) [73]

WHO classification and grading of the severity of dengue infection [73]

Dengue fever

Probable diagnosis

Acute febrile illness with two or more of the following;
headache, retro-orbital pain, myalgia, arthralgia / bone pain, rash, hemorrhagic manifestations, leucopenia (WBC 5000 cells / mm3), thrombocytopenia (Platelet count < 150,000 cells / mm3),rising hematocrit (5-10%);

and at least one of following:

- supportive serology on single serum sample ; title 12080 with haemagglutinaiton inhibition tests, comparable lgG titre with enzyme-linked immunosorbent assay, or testing positive in lgM antibody test, and
- occurrence at the same location and time as confirmed cause of dengue fever.
- Confirmed diagnosisProbable case with at least one of the following:
- isolated of dengue virus form serum, CSF or autopsy samples.
- four fold or greater increase in serum lgG (by haemagglutination inhibition test) or increase in IgM antibody specific to dengue virus.
- detection of dengue virus or antigen in tissue, serum or cerebrospinal fluid by immunohistochemistry,

immunofluorescence or enzyme-linked immunosorbent assay.

Problem Definition

Early clinical features of dengue infection are variable among patients, and initial symptoms are often non-specific; therefore, specific laboratory tests are necessary for an accurate diagnosis.[9]The diagnosis of dengue is typically made clinically, on the basis of reported symptoms and physical examination; this applies especially in endemic areas. However, early disease can be difficult to differentiate from other viral infections.

Methodology

It is a prospective study at tertiary urban hospital. Clinically suspected cases of dengue with serological confirmation of either dengue specific NS1 antigen assay and/or IgM and/or IgG antibodies detection are selected. Evaluation of hematological parameters are carried out

Results & Discussion

Majority of the cases having dengue infection belong to the age group of 1-20 years, wherein 61% belong to 1-10 years group and 24% belong to 11-20 years group. Dengue fever is seen most commonly in 1-20 years group. DHF and DSS are seen most commonly in the 1-10 years group. Among infants disease is seen only in 6.4% of the cases. Males (61%) were more affected than the females (39%). DF cases were more among males (61%) than to females (39%). DHF cases were more in makes (63%) than in females (37). DSS cases were seen equally among males and females. The incidence of dengue illness among males was 95% and among females were 69% and the relation between than was not significant ($p > 0.05$). DF was the most common manifestation (79%), DHF is lesser (17%) and DSS is the least (4%).All the cases had fever (100%). Other common symptoms included headache (70%), joint pain (66%), retro-orbital pain (46%), myalgia (37%), backache (25%), rash (21%), hemorrhage (15%), splenomegaly (8%), hepatomegaly (6%) and CNS symptoms (1%). The patients with DF, hepatomegaly was seen in 6.5% and splenomegaly in 9% in patients with DHF, hepatomegaly was seen in 7% and splenomegaly in 7%. The patients with DSS were neither associated with hepatomegaly nor splenomegaly. The thrombocytopenia was seen in 15% of the dengue positive cases, rest of the 75% had normal platelet count. Thrombocytopenia was seen in the dengue positive patients (15%). Thrombocytopenia was not seen in any DF cases, but was seen in 67% of DHF cases and 83% of DSS cases. Thrombocytopenia was more associated with DSS than with DHF and this has been proved to be significant. ($P<0.001$). The incidence of bleeding in patients with thrombocytopenia was 48% as compared to the incidence in normal platelet count patients (9%). This difference was found to be significant ($p<0.001$). The range and mean values of hematocrit in DF, DHF, DSS, falls within the normal range of hematocrit (35-50%). In DSS the hematocrit level lies in the upper limit of normal range.

The most common age group of infection in the present study was 1-20 years (which includes children and young adults). This was comparable to other studies of Gore MM[58], Baruah [66], and Dash PK et al [4]. The high number of cases in the pediatric and young adult age group implies that the disease is endemic in these regions. In these areas, adults manifest with disease less, as they become immune to the virus. However, in the study conducted by Neerja M et al3, high number of cases were seen in the adult age group. This indicates that the virus had been introduced to a non exposed population and disease was not endemic. In our study the disease was more seen in case of males (61.2%) than to the females (38.7%).The reason for this may be due to more exposure of the males to the bite of vector Aedes aegypti, due to their clothing habits or outdoor activities. In a study conducted by Kamal S et a[l8] females were more commonly affected. In our study DF and DHF were also more commonly seen in males than females; however DSS were seen equally among them.The disease shows seasonal distribution. We observed that disease was more seen during the months of August, September, October, and November, which corresponded to the monsoon and post -monsoon season. All the earlier studies have corresponded to our study. Most of the cases have occurred from the months of May to November, which corresponds to the monsoon or post-monsoon season. This can be attributed to the presence of an environment favorable for the breeding of the vector Aedes aegypti. In our study dengue illness manifested as DF (79%), DHF (17%) and DSS(4%). This corresponds to a study by Neerja M et al [3].Other studies by Pancharoen et al[67] and Setty BR [68] show more number of DHF and DSS patients and less of DF patients. The various clinical features in our study included fever (100%), headache (70%), joint pain (66%), retro-orbital pain (46%), myalgia (37%), backache (25%), rash (21%), haemorrhage (15%), CNS symptoms (1%), hepatomegaly (6.4%) and splenomegaly (8.3%) is comparable with Aggarwal et al[29],Dash PK et al4,Neerja M et al [3],Khan E et al [18],Saha et al [70]. In our study 23/155 (15%) had thrombocytopenia rest of the cases 132/155 (75%) had normal platelet count. None of the DF patients had thrombocytopenia (0/122). all the patients having DF had normal platelet count (100%). 67% (18/27) of DHF patient had thrombocytopenia, rest of them 33% (9/27) had normal platelet count. 83% (5/6) of DSS patients had thrombocytopenia, rest of them 17% (1/6) had normal platelet count. The association of thrombocytopenia with DHF and DSS has been proved to be significant ($p < 0.001$), Studies by other authors Cherian T et al [26],Singh NP [34],Khan E et al [18],Banerjee et al [71]show high association between dengue illness and thrombocytopenia, in our study only 15% of dengue positive patients had thrombocytopenia.

Conclusion

Most common age group affected was 1-20 years. DF was most commonly seen in age group of 1-20 years, DHF and DSS was seen in age group of 1-10 years. Disease was more common in males than females. Disease was more common in the months of August-November, i.e., monsoon and post monsoon season. DF was seen in 79% of cases, DHF was seen in 17% of cases and DSS was seen in 4% of cases. The various symptoms associated were fever (100%), headache (70%) joint pain (66%), retro-orbital pain (46%), myalgia (37%), backache (25%), rash (21%), hemorrhage (15%), CNS symptoms (1%), hepatomegaly (6%) and splenomegaly (8%).Thrombocytopenia was seen in 15% of the cases. Thrombocytopenia was associated with DHF (67%) and DSS (83%). No cases of DF had thrombocytopenia. There was an association between thrombocytopenia and bleeding.

Future Scope

The mild form of dengue infection or dengue fever can be simple acute febrile illness, the patient might not visit a physician, and this can frequently result in underdiagnosis of cases. who present with fever and leukopenia should be tested for dengue, even in the absence of other symptoms[72]

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