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Original Research Article

A clinical and biochemical study of dengue fever in Kosi region of Bihar, India

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ABSTRACT

Background: Dengue is a debilitating arthropod-borne viral (arboviral) disease in humans. To improve diagnostics for patients with dengue so that they can receive effective treatments at earliest. In addition, a better understanding of clinical and biochemical study of dengue cases, effective measures can be aimed for the prevention and control of dengue epidemics.
Methods: A retrospective clinical and laboratory study was undertaken among admitted patients in the Department of Physiology at Katihar Medical College and Hospital, Katihar, Kosi region of Bihar, India. Forty-two (42) patients admitted over a period of two years, with laboratory results for NS1 antigen and or /IgM positive, for dengue fever, were taken in the study. Clinical features, haematological and biochemical parameters were noted.
Results: Out of the 42 patients, 38 patients were male (90.4%) and 4 patients were female (9.6%). Pyrexia was the major symptom (100%) followed by splitting headache (90.40%), myalgia (76.19%), conjunctival redness (50.00%), skin rash (42.80%), abdominal pain (30.95%), hepatosplenomegaly (28.57) ascites (26.19%) and retro orbital pain (19.04%). Severe thrombocytopenia (69.51%), leukopenia (20.19%) and elevated serum SGOT and SGPT (88.54%) were observed.
Conclusions: Dengue infection is increasing proportional to increased urbanization and compromised sanitation measures. Fever associated with headache, retro orbital pain, erythematous morbilliform rash, conjunctival redness and itching in palms and soles along with thrombocytopenia, leukopenia, elevated SGPT should prompt a clinician on the possibility of dengue infection.

Keywords: Aedes aegypti, Dengue fever, Diarrhoea, Headache, Nausea

INTRODUCTION

Dengue has become a serious health problem worldwide. Dengue fever is a debilitating arthropod borne viral infection caused by dengue virus.[1-2] Dengue infection is transmitted by female mosquitoes mainly of the species Aedes Aegypti and, to a lesser extent, Aedes Albopictus infected with virus. These mosquitoes will bite in the early morning or evening times but the infection will spread at any time of day. Mosquitoes will take blood from a person who is infected with dengue fever, from 2-10 days after the bite the mosquito will infect with the virus and the virus will spread to all tissues of the mosquito including its salivary glands.[3-5] That virus will not affect mosquito but it will be infected for its life time and transfers the virus to humans. The first ever recorded case of probable dengue fever is mentioned in a Chinese medical encyclopaedia from the Jin Dynasty which mentioned a "water poison" associated with flying objects. The first documented Dengue epidemics befell almost at the same time in Asia, Africa, and North America in the 1780s. The incidence has increased

manifold in India due to unplanned urbanization and migration of population to urban areas. Although initially reported from urban locales, dengue is now being reported from urban and rural backgrounds alike. Symptoms typically start three to fourteen days after contamination. This may include a high fever, headache, nausea, vomiting, muscle and joint pains, and skin rash. The muscle and joint involvement lead to severe pain in the bones, which is why it is called as 'Break bone Fever'. Recovery takes under two to seven days. In some cases, this will lead to life-threatening dengue hemorrhagic fever, resulting in decreasing platelet count and blood plasma spillage, or into dengue shock syndrome where low blood pressure will occur. There are 4 type of viruses that causes dengue are DEN-1, DEN-2, DEN-3 and DEN-4.[6] Infection with one dengue serotype confers lifelong homotypic immunity to the other serotypes, but a person can eventually be infected by all 4 serotypes. A novel vaccine for dengue fever has been endorsed in three countries, yet it is not yet available.[7] This might be finished by disposing of or covering standing water and wearing attire that spreads a great part of the body. Treatment of intense dengue is strong and incorporates giving liquid either by mouth or intravenously for mellow or direct sickness. For more serious cases blood transfusion might be required.[8] Globally, 2.5-3 billion individuals live in approximately 112 countries that experience dengue transmission. Annually, approximately 50-100 million individuals are infected.[9] Initial dengue infection may be asymptomatic (50-90%), may result in a nonspecific febrile illness, or may produce the symptom complex of classic dengue fever (DF).[10] Classic dengue fever is marked by rapid onset of high fever, headache, retro-orbital pain, diffuse body pain (both muscle and bone), weakness, vomiting, sore throat, altered taste sensation and a centrifugal maculopapular rash, among other manifestations. A small percentage of persons who have previously been infected by one dengue serotype develop bleeding and endothelial leak upon infection with another dengue serotype. This syndrome is termed dengue hemorrhagic fever (DHF).

The major population of the Kosi region, namely Katihar, resides in rural areas and increasing reports of Dengue in recent years, is the basis of this study. The exact clinical and laboratory profile is crucial for early diagnosis and management of patients. This study is an attempt to elucidate the clinical and laboratory profile of serologically confirmed cases of dengue fever in Katihar Medical College and Hospital, Katihar, Bihar, India.

METHODS

This retrospective study was carried out in the Department of Physiology, Katihar Medical College and Hospital, Katihar. Prior consent was taken from the ethical committee. All patients with confirmed dengue, who were either hospitalized or managed as outdoor patients with NS1 (non-structural protein) antigen and or IgM dengue antibody positivity was included in this study. The patients with concomitant malaria, typhoid, leptospirosis, etc. were excluded from the study. Detailed history and careful clinical examination was considered for each patient. Laboratory investigations included for this study were hemoglobin, total and differential count, platelet count, hematocrit, liver function tests, blood urea and serum creatinine, chest radiograph and ultrasound scan of abdomen.

RESULTS

A total of 42 patients with confirmed dengue virus infection were analyzed. Majority of these cases reported to hospital during the rainy season, showing the breeding of mosquitoes during this period. Out of 42 patients, 32 patients were males (90.4%) and 4 patients were female (9.6%).

Table 1: Clinical features observed in total number of patients with percentage.

Clinical features	Number of patients (n=42)	Percentage (%)
Pyrexia	42	100
Splitting headache	38	90.40
Myalgia	32	76.19
Retroorbital pain	08	19.04
Abdominal pain	13	30.95
Nausea	04	09.52
Diarrhoea	03	07.14
Conjunctival redness	21	50.00
Skin rash	18	42.80
Itching	07	16.66
Bradycardia	06	14.28
Bleeding	05	11.90
Positive tourniquet test	08	19.04
Pleural effusion	06	14.28
Breathlessness	04	09.52
Ascites	11	26.19
Hepatomegaly	12	28.57
Splenomegaly	12	28.57

The age group of the patients was between 18 to 50 years, mostly rural field workers. Pyrexia was the major symptom (100%) followed by splitting headache (90.40%), myalgia (76.19%), conjunctival redness (50.00%), morbilliform skin rash (42.80%), abdominal pain (30.95%), hepatosplenomegaly (28.57) ascites (26.19%) and retro orbital pain (19.04%). Severe thrombocytopenia (69.51%), leucopenia (20.19%) and elevated serum SGOT and SGPT (88.54%) were observed. Fever was universal followed by headache, myalgia, conjunctival injection, skin rash, abdominal pain and itching predominantly localized to palmar and plantar aspect of hand and feet (16.66%). Positive tourniquet test was found in 19.04% of patients, while bleeding in form of petechiae, ecchymosis and epistaxis was documented in 11.90% of cases. Pleural effusion and ascitic fluid

exudation was documented in 14.28% and 26.19% of cases, respectively. Hepatomegaly and splenomegaly was observed in 14 cases i.e. 28.57% of all cases (Table 1).

Table 2: Laboratory parameters.

Parameters	No. of patients	Percentage
Platelet count	28	66.66
TLC <4000/ cmm	16	38.09
SGOT/SGPT >40iu/l	10	23.80
Haematocrit >45%	14	33.33

DISCUSSION

Increase in the number of dengue cases over the past few years has been attributed to rapid unplanned urbanization with unchecked construction activities and poor sanitation facilities contributing fertile breeding areas for mosquitoes, it is also seen that increase in alertness among medical personnel following the epidemics and availability of diagnostic tools in the hospitals have contributed to the increased detection of cases.[11] The higher number of males is primarily because of the rural construction, small factory and field workers and migratory workers who leave their home for the job purpose. Fever was the most common presentation (100%), which is in unison with other similar studies from India and South-East Asia.[12] Headache and myalgia were seen in majority of cases. Retro-orbital pain was noticed in only in 19.04% of cases. Conjunctival redness was observed in 50% of all cases and morbilliform skin rash was observed in 42.8% of all cases. Mandal et al in similar study have documented headache in 62.16% and rash in 37.84% of cases.[13] Thrombocytopenia may not be the sole causative factor for development of these rashes as they developed in patients with platelet counts above 50,000/cubic mm. Dengue virus interacts with host cells, causing release of cytokines and stimulation of immunologic mechanism causing vascular endothelial changes, infiltration of mononuclear cells and perivascular edema.[14] Munde et al in their series of patients have shown myalgia in 50% and headache in 25% of all patients. Muniraja et al documented conjunctival congestion in 2.6 to 7.3% of cases which is much less than present study patients.[15] Itching was noticed in 16.66% cases in study, which has not been observed by most other studies except a few. Rachel et al from the study in Kollam, Kerala have documented pruritus in 10.4% of their patients. Positive tourniquet test was seen in 19.04% and bleeding in form of petechiae in around 11.90% of patients which was less than some other similar studies and in line with Shabid et.al from Karachi.[16] Bleeding diathesis is a known feature of dengue fever because of low platelet count and leakage from blood vessels. Bone marrow suppression, Immune-mediated clearance and spontaneous aggregation of platelets to virus infected endothelium may be responsible for such thrombocytopenia. Raised liver enzymes were documented in 23.8% of cases which is on a lower side. In study by Kularatne et al, 88% patients showed elevated SGOT and SGPT, with 122 of them having a two-fold increase.[17] Mandal et al documented elevated transaminases in 83.78% of cases. Study from Brazil by Silva et al has found an interacting partner between NS1 protein and liver proteins in the causation of hepatic dysfunction in dengue fever.[18] Pleural effusion documented in 14.28% on chest radiography and ascites seen in 26.19% of patients of ultrasound scan of abdomen was marginally higher from other similar studies.[19]

CONCLUSION

Dengue infection is increasing proportional to increased urbanization and compromised sanitation measures. Fever associated with headache, retro orbital pain, erythematous morbilliform rash, conjunctival redness and itching in palms and soles along with thrombocytopenia, leucopenia, elevated SGPT should prompt a clinician on the possibility of dengue infection. Early diagnosis, careful monitoring and proper fluid management goes a long way in reducing the mortality due to dengue hemorrhagic fever and shock syndrome. Further studies are required for a better understanding of dengue for the purpose of early diagnosis and treatment, to prevent morbidity and mortality and for the prevention of an impending dengue outbreak.

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