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Study on Clinical Spectrum, Laboratory Profile and Outcome of Dengue Fever in Adults

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Abstract

Background: Dengue infection is a major health burden, which can result in mild self-limited febrile illness to highly fatal haemorrhagic disease. Infection is caused by Dengue virus, which is transmitted by the Aedes aegypti mosquito. Objective: The aim of the study was to see the clinical spectrum, laboratory profile and outcome of dengue fever in adult. Methods: This prospective observational study was carried out on 75 patients in the department of medicine of Bangabandhu Sheikh Mujib Medical University, Dhaka from 11/07/2019 to 20/10/2019. All patients above 18 years with confirmed dengue, who were either hospitalized or managed as outdoor patients with NS1 (non-structural protein) antigen and/ or IgM dengue antibody positive were included in the study. The patients with concomitant malaria, typhoid and leptospirosis were excluded from the study. Detailed history and careful clinical examination were performed on each patient. Results: In this study, all patients (100%) had fever. Among them, 70 (93.3%) was suffering from headache, 66 (88.0%) myalgia, 32 (42.7%) abdominal pain, 30 (40.0%) conjuctival suffusion, 29 (38.7%) nausea/vomiting, 27 (36.0%) skin rashes, 14 (18.7%) pleural effusion, 13 (17.3%) ascites, 13 (17.3%) retro-orbital pain, 11 (14.7%) itching, 8 (10.7%) hepatomegaly, 7 (9.3%) splenomegaly. Death occurred in 3 (4.0%) patients. Rate of cure was 58 (77.3%) and ICU admission was required in 14 (18.7%), they were ultimately cured. Conclusion: Fever associated with headache and myalgia were the most common symptoms. Other common clinical features were abdominal pain, conjunctival suffusion, nausea/vomiting, skin rashes and pleural effusion. Regarding laboratory finding, platelet count has little role in management of dengue patients.

Key words: Dengue Fever, Laboratory Profile.

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Introduction

Dengue infection is a major health burden, which can result in mild self-limited febrile illness to highly fatal haemorrhagic disease.1 The causative organism is Dengue virus, which is transmitted by the Aedes aegypti mosquito. After 5–8 days following the mosquito bite, the disease begins with fever, severe headache, and any of the following: retro-orbital pain with or without photophobia; backache, myalgia and arthralgia. Dengue can cause multiorgan dysfunction such as myocarditis, encephalitis, renal failure, and most importantly hepatitis.2,3 The incidence of dengue has grown dramatically around the world in recent decades. The exact clinical and laboratory profile is crucial for diagnosis as well as successful management of the patients.4 Dengue fever (DF) is an acute febrile illness caused by dengue viruses (DEN-1 to 4) belonging to the family Flaviviridae. An estimated 50 million dengue infections occur annually, and approximately 2.5 billion people live in dengue endemic countries.5 Infectious virus and the virus-encoded NS1 are present in blood during the acute phase, and high level early viraemia and NS1 antigenemia have been associated with more severe clinical presentations.6 Dengue has become endemic in parts of the world due to rapid urbanization, with increased population density and abundance of vector breeding sites.7 Clinical manifestations of DF are varied and can mislead the physician with the other common infections that are prevalent in the community, such as malaria, typhoid, leptospirosis, scrub typhus, community acquired pneumonia and enteroviral gastroenteritis. Patients with dengue fever may not have specific localizing symptoms at the time of presentation.8 It is important to diagnose the aetiological agent in acute pyrexia quickly to prevent complications like shock and bleeding in dengue fever and avoid unnecessary use of antibacterial agents. The aim of this study is to know about clinical spectrum, laboratory profile and outcome of dengue fever. As there is still lack of sufficient clinical studies in this subcontinent about dengue fever, more specific studies are needed for the betterment of public health.

Materials and methods

This prospective observational study was carried out in Department of Medicine of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka City 11/07/2019 to 20/10/2019. All patients above 18 years with confirmed dengue, who were either hospitalized or managed as outdoor patients with NS1 (non-structural protein) antigen and/ or IgM dengue antibody positivity were included in the study. The patients with concomitant malaria, typhoid, leptospirosis which was confirmed by blood test were excluded from the study. Detailed history and careful clinical examination were performed on each patient. Laboratory investigations done were haemoglobin, total and differential leukocyte counts, platelet count, haematocrit, liver function tests, blood urea and serum creatinine, chest radiograph and ultrasound scan of abdomen. Blood counts were monitored periodically as and when required till resolution. Other differential diagnoses were excluded by appropriate tests. The study was approved by ethical review committee of BSMMU and informed consent was obtained from each patient. The main objective of this study was to know about different clinical spectrum, laboratory profile and the outcome of dengue fever in adults.

Results

Out of 75 dengue patients, Majority

21(28.0%) patients belonged to age 31-40 years. The mean age was 47.8±15.5 years (Table 01). Male was 46 (61.3%) and female was 29 (38.7%). Male: female ratio was 1.6:1 (Figure 01). All patients (100%) had fever, 70 (93.3%) headache, 66 (88.0%) myalgia, 32 (42.7%) abdominal pain, 30 (40.0%) conjunctival suffusion, 29 (38.7%) nausea/vomiting, 27 (36.0%) skin rashes, 14 (18.7%) pleural effusion, 13 (17.3%) ascites, 13 (17.3%) retro-orbital pain, 11 (14.7%) itching, 8 (10.7%) hepatomegaly, 7 (9.3%) splenomegaly (Table 02). Mean haemoglobin was 12.6±2.8 gm/dl, mean total count of WBC was 4991±1688/cmm, leucopoenia 47 (62.7%), mean platelet count 115,725±63,453/cmm, thrombocytopenia 68 (90.7%), mean PCV 39.7±8.3, haematocrit change >20% was in 17 (22.7%), mean urea 41.65±20.12 mg/dl, mean creatinine 1.13±0.51 mg/dl, mean bilirubin 0.95±0.54 mg/dl, mean AST 149.62±131.81 IU/ml, mean ALT 128.41±109.35 IU/ml, mean ALP 145.37±97.55 IU/ml, mean total protein 7.25±0.82 mg/dl and mean albumin was 7.25±0.82 gm/dl (Table 03). Death occurred in 3 (4.0%); rate of cure was 58 (77.3%) and ICU admission was required in 14 (18.7%) (Figure 02). Data analysis was done by using SPSS version 22.

Table 01: Distribution of the study patients by age (n=75)

Age group (years)	Frequency	Percentage
≤30	9	12.0
31-40	21	28.0
41-50	18	24.0
51-60	16	21.3
>60	11	14.7
Mean±SD	47.8±15.5	

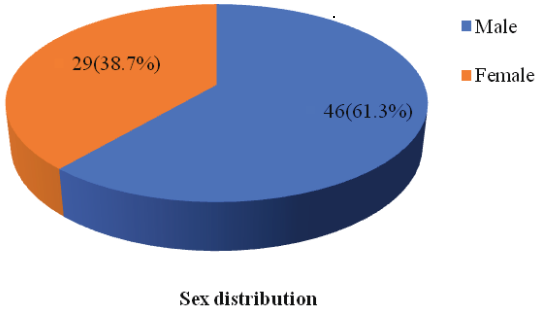

Figure 01: Pie chart showing sex distribution of the study patients (n=75)

Table 02: Distribution of the frequency of different symptoms in patients with dengue fever (n=75)

Clinical features	Frequency	Percentage
Fever	75	100
Headache	70	93.3
Myalgia	66	88.0
Abdominal pain	32	42.7
Conjunctival suffusion	30	40.0
Nausea/vomiting	29	38.7
Skin rashes	27	36.0
Pleural effusion	14	18.7
Retro-orbital pain	13	17.3
Ascites	13	17.3
Itching	11	14.7
Hepatomegaly	8	10.7
Splenomegaly	7	9.3
Bradycardia	5	6.7
Breathlessness	4	5.3
Diarrhoea	3	4.0
Bleeding	2	2.7

Table 03: Distribution of the study patients by laboratory parameters (n=75)

Laboratory parameters	mean±SD, (%)
Hemoglobin (gm/dl)	12.6±2.8
Total count (/cmm)	4991±1688
Leucopenia	47 (62.7%)
Platelet count (/cmm)	115,725±63,453
Thrombocytopenia	68 (90.7%)
PCV	39.7±8.3
Hematocrit change >20%	17(22.7%)
Urea (mg/dl)	41.65±20.12
Creatinine (mg/dl)	1.13±0.51
Bilirubin (mg/dl)	0.95±0.54
AST (IU/ml)	149.62±131.81
ALT (IU/ml)	128.41±109.35
ALP(IU/ml)	145.37±97.55
Total Protein (gm/dl)	7.25±0.82
Albumin(gm/dl)	7.25±0.82

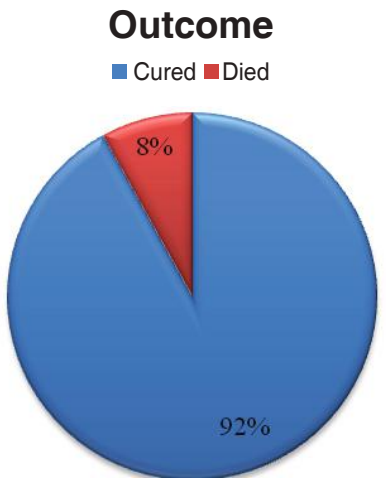

Figure 02: Pie chart showing the outcome of the study patients

Discussion

In this study, we observed that majority 21 (28.0%) patients belonged to age 31-40 years. The mean age was found 47.8±15.5 years. Gupta et al.4 reported that maximum number of patients belonged to the age group 18-40 years, 22 (48.9%) followed by 41-60 years, 17 (37.8%). The majority of the patients in the present study were young individuals. Jain et al.9 from Greater Noida, Patil et al.10 from Maharashtra and Chaturvedi et al.11 also reported a high incidence in young population. Deshwal et al.12 reported maximum patients were in 21-40 age group (62.91%).

Current study showed male was 46 (61.3%) and female was 29 (38.7%). Male: female ratio was 1.6:1. Vanamali et al.13 showed that male was 116 (61.05%) and female was 74(38.95%). Gupta et al.4 also reported 28 (62.2%) were male and 17 (37.8%) were female. In their study, male to female ratio was 1.49:1. Deshwal et al.12 reported majority of the patients were males (72.81%). Females formed 27.18% of the cohort. Male to female ratio in their study was 2.67:1.

In this study, we observed all patients (100%) had fever. Among them 70 (93.3%) patients were suffering from headache, 66 (88.0%) myalgia, 32 (42.7%) abdominal pain, 30 (40.0%) conjuctival suffusion, 29 (38.7%) nausea/vomiting, 27 (36.0%) skin rashes, 14 (18.7%) pleural effusion, 13 (17.3%) ascites, 13 (17.3%) retro-orbital pain, 11 (14.7%) itching, 8 (10.7%) hepatomegaly, 7 (9.3%) splenomegaly. Deshwal et al.12 Fever was universal followed by headache (94.75%), myalgia (90.67%), conjunctival injection (39.41%), morbilliform skin rash (37.86%), abdominal pain (24.46%), retro-orbital pain (18.25%), itching predominantly localized to palmar and

plantar aspects of hands and feet (13.39%). Positive tourniquet test was found in 16.50% of patients, while bleeding in form of petechiae, ecchymosis and epistaxis was documented in 5.43% of cases. Pleural and ascitic fluid exudation were documented in 20% and 16.31% of cases, respectively. Hepatomegaly was noted in 14.75% and splenomegaly in 13.20% of all cases.

Mandal et al.14 in a similar study have documented headache in 62.16% and rash in 37.84% of cases. Thrombocytopenia may not be the sole causative factor for development of these rashes as they developed in patients with platelet counts above 50,000/cumm. 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.15 Munde et al.16 in their series of patients had 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 our study patients.17 Itching was noticed in 13.39% of their cases, this finding has not been noticed by most other studies except a few, Rachel et.18 al from their study in Kollam, Kerala have documented pruritis in 10.4% of their patients. Vanamali et al.13 reported apart from fever, headache (85%) was the most frequent symptom at admission followed by myalgia (65%). Abdominal pain was noted in 45% patients; vomiting and dizziness were also common but found in less than 50% of the patients. Hepatomegaly was seen in 26 patients (14%). 18 patients were found to have bleeding manifestations. Gupta et al.4 fever was documented in all 45 (100%) patients, the most common symptom followed by reduced appetite 41 (91.1%), myalgia 39 (86.7%), headache 36 (80%), abdominal pain 29 (64.4%), nausea/ vomiting 18 (40%), diarrhea 17 (37.8%) and pruritus 17 (37.8%). Bleeding manifestations occurred in 21 (46.7%) patients, of whom petechiae 17 (37.8%) was the most frequent followed by gum bleeding 5 (11.1%). Ecchymosis 3 (6.7%), malena3 (6.7%) and haematuria 2 (4.4%) were less common. Bleeding manifestations were more likely with lower platelet counts, and 06 patients had more than one bleeding manifestations. Isolated hepatomegaly and splenomegaly found in 5 (11.1%) and 9 (20%) respectively while hepatosplenomegaly was found in 4 (8.8%). Ascites and plural effusion were found in 2 (4.4%) and 3 (6.7%) patients respectively.

In this study, we observed that mean haemoglobin was found 12.6±2.8 gm/dl, mean total count was 4991±1688/cmm, leucopenia was 47 (62.7%), mean platelet count 115,725±63,453/cmm, thrombocytopenia was 68(90.7%), mean PCV 3939.7±8.3, hemotocrit change >20% was 17 (22.7%), mean urea was 41.65±20.12 mg/dl, mean creatinine 1.13±0.51 mg/dl, mean bilirubin was 0.95±0.54 mg/dl, mean AST was 149.62±131.81 IU/ml, mean ALT was 128.41±109.35 IU/ml, mean ALP was 145.37±97.55 IU/ml, mean total protein was 7.25±0.82 mg/dl and mean albumin was 7.25±0.82 gm/dl. Vanamali et al.13 showed thrombocytopenia was seen in 75% of the patients, 30% of patients had a platelet count below 40000/cmm, while 9% patients were found to have less than 20000/cmm. The lowest platelet count and highest hematocrit were seen on fifth day of illness. Bleeding manifestations were seen in 18 (32%) patients of 56 patients with platelet counts less than 40000/cmm and 55% of the patients platelet counts below 20000/cmm had

bleeding manifestations. Bleeding manifestations were more likely with lower platelet counts. Among the 10 patients who died, seven had thrombocytopenia with platelets <40000/cmm while six patients were noted to have DIC with platelet >40 000/cmm. Headache is one of the most common symptoms next to fever which is similar to that reported by Itoda et al.19 which was present in 90% cases. On the other hand, a North Indian study by Seema et al.20 reported headache in only 9% of cases. Deshwal et al.12 platelet count at presentation was less than 50,000/cmm in around 69.51% of cases, though it kept on falling further during hospitalization / observation. Minimum platelet count noted was 8,000/cmm. Leucopenia was noticed in around 20.19% of cases. Raised liver serum transaminases were noted in 88.54% of patients. Raised hematocrit (>45%) was noted in 20.77% of patients at presentation. In a study by Kularatne et al.21 88% patients showed elevated ALT and AST, with 122 of them having a two–fold increase. Mandal et al.14 documented elevated transaminases in 83.78% of cases.10 Gupta et al. Among haematological parameters, raised haematocrit (>45%) was found in 35 (23.33%) and leukopenia (<4000/cmm) was found in 58 (38.66%) patients. Thrombocytopenia was observed in all the patients with varying severity, severe (<20000/ cmm) was observed in 23 (15.33%) patients while moderate (20000- 50000/ cmm) in 62 (41.33) patients. Platelet count at presentation was <50000/cmm in about 56.66% of the patients though it kept falling further during hospitalisation. Minimum platelet count noted was 9000/cmm.

This study showed that death occurred 3(4.0%); rate of cure was 58 (77.3%) and ICU admission was required in 14 (18.7%), they were ultimately cured. Deshwal et al.12 reported total mortality was 0.77% (04/515). Gupta et al.4 total of the 45 patients with DF, 6 (13.3%) required the ICU treatment, of the ICU admitted patients.

Conclusion

Fever associated with headache and myalgia were the most common symptoms. Other common clinical features were abdominal pain, conjunctival suffusion, nausea/vomiting, skin rashes and pleural effusion. Most of the patients' complication developed after decreasing platelet level. Early diagnosis, careful monitoring and proper fluid management are absolutely necessary in reducing the mortality due to dengue haemorrhagic fever and dengue shock syndrome.

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