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A STUDY OF CLINICAL AND BIOCHEMICAL PROFILE OF DENGUE FEVER PATIENTS IN A TERTIARY CARE CENTRE K.R HOSPITAL MYSURU

General Medicine

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ABSTRACT

Dengue, one of the most rapidly spreading mosquito-borne viral diseases in the world, is an acute infection caused by an arbovirus in the Flavivirus genus, and the mosquito Aedes aegypti is the vector. The incidence of dengue has grown dramatically around the world in recent decades. The actual numbers of dengue cases are under-reported since many cases are misdiagnosed as other febrile illnesses. Objective: Objectives of this study was to study the clinical and biochemical profile of Dengue fever patients along with comparison of clinical and biochemical profile in Dengue fever and Severe Dengue (Dengue hemorrhagic fever and Dengue shock syndrome)Materials and Methods: This was a cross sectional study, data was collected with the help of patients visiting the OPD/Patients admitted in department of general medicine also by going through the medical records of the patients who were admitted in the hospital with dengue fever. The data was analyzed by SPSS software version 20 and chi square test was applied for qualitative variables. Results: 100 Dengue fever cases were included in the study, among 100 cases 52 cases were males and 48 were females. Dengue cases in the study were 80 and Severe Dengue cases were 20. Fever was the main complaint (91%), body ache (86%), headache (70%), rash (59%), nausea/vomiting (51%), retro orbital pain (35%), abdominal pain (22%), bleeding manifestations (15%).Among these groups fever (100%), body ache (100%), headache (85%)and bleeding manifestations (75%) was predominant in severe dengue. Icterus was seen in (5%) pedal edema (13%)ascites (11%), pleural effusion (10%), in which the majority of this population belonged to severe dengue group. Mean Pulse rate(PR) in dengue was 74±12.4 bpm & severe dengue was 63±16.2 bpm, mean systolic BP was 111±6.5(mmhg) in dengue and 95±17 (mmhg) in severe dengue. The hematological parameters included hematocrit, total cell count and platelets. There was a decrease in the mean total cell count i.e. leucopenia in dengue patients and severe dengue patients but severity of leucopenia was more in severe dengue patients. There was a significant thrombocytopenia was there in both group but more severity was observed in the severe dengue group. Also hematocrit was higher in both groups but hematocrit in severe dengue group was more compared to dengue group. The biochemical parameters included liver function tests and renal function tests. The mean values of total bilirubin, SGPT and SGOT also showed gross impairment mainly in severe dengue group. Hypoalbuminemia was one of the key feature of severe dengue group. The mean values of urea and creatinine showed no significant rise in both groups but hypokalemia was found in both groups but more in severe dengue group. Conclusion: Dengue, one of the most rapidly spreading mosquito-borne viral diseases in the world, in which hepatic involvement is common along with thrombocytopenia leucopenia and hemoconcentration with increasing severity. Hepatic involvement was mainly dengue hepatitis and hypoalbuminemia, but there is no long lasting hepatic impairment seen. Hepatic involvement along with thrombocytopenia can be a prognostic marker in dengue fever and should alert the treating doctor.

KEYWORDS

Dengue; severe dengue; hepatitis; serositis

INTRODUCTION

Dengue fever is the most common Arbovirus infection in the world[1]. Aedes mosquitoes transmit the virus and are common in tropical and subtropical parts of the world. The incidence of dengue has increased dramatically over the past few decades, and the infection is now endemic in some parts of the world. Dengue fever affects more than 2.5 billion people in the Tropics and Subtropics, each year an estimated 390 million cases were reported in roughly 125 countries[1,2].

The clinical symptoms vary from asymptomatic to severe dengue fever, which leads to high morbidity and mortality. Although most DENV infections are asymptomatic or cause only mild systemic illness, small percentage of patients may develop serious complications. Severe complications such as dengue shock syndrome (DSS) and dengue hemorrhagic fever (DHF) occur relatively late in the course of the disease, giving a chance to pick up patients with high likelihood of progression to these complications.

There are four distinct, but closely related, serotypes of the virus that cause dengue (DEN 1-4). Recovery from infection by one provides lifelong immunity against that particular serotype. However, cross-immunity to the other serotypes after recovery is only partial and temporary. Secondary infection, in the form of two sequential infections by different serotypes is also an epidemiological risk factor for severe disease[2] This study was aimed at assessing the clinical and biochemical profile of Dengue fever.

MATERIALS AND METHODS

This was a hospital based cross sectional study for a period of 2 months from July 2022 to September 2022.this study conducted using clinical and biochemical parameters of the Patients visiting the OPD/Patients admitted in department of general medicine also by going through the medical records of the patients who were admitted in the hospital with dengue fever.

Inclusion Criteria:

All serologically positive Dengue cases, either Dengue NS1 antigen positive or IgM antibody positive cases.

Exclusion Criteria:

Patients with:

1) All Dengue fever positive patients with previously diagnosed chronic liver disease are excluded from the study.
2) All Dengue fever patients with previously diagnosed Hepatitis A, Hepatitis B,Hepatitis C and other hepatotropic virus infection are excluded from the study.
3) All patients with previously diagnosed nephrotic syndrome and protein losing enteropathy are excluded from the study

Ethical approval

Ethical approval was obtained from Mysore medical college and research institute Ethics Committee and the ethical protocols of the declaration of Helsinki (1967) including the ethical principles of informed consent, voluntary participation and withdrawal, privacy and confidentiality, were followed.

Sample size calculated using the formula $n = 4pq/d^2$ with 95% confidence interval and 5% level of significance of (Standard Deviation) =35.95 and absolute allowable error of 7%. The sample size is 100.

Data analysis and statistics

Data obtained from the study has been entered in excel sheets and analyzed using SPSS(Statistical package for social sciences) software

version 20. and has been presented as descriptive statistics in the form of frequency, tables, figures and graphs.

- Descriptive statistics of the explanatory and outcome variables were calculated by mean, Standard deviation for quantitative variables, frequency and proportions for qualitative variables.

Inferential statistics like-
1) Chi-square test was applied for qualitative variables.
2) Independent sample t test will be applied to compare the quantitative variables between the groups. The level of significance is set at 5%. A 'p' value of <0.05 is considered statistically significant.

RESULTS

100 Dengue fever cases were included in the study, among 100 cases 52 cases were males and 48 were females. According to the WHO guidelines number of 'Dengue cases' in the study were 80 and 'Severe Dengue' cases were 20.

A) Clinical Features And Vitals At The Time Of Admission

Fever was the main complaint (91%), body ache (86%), headache (70%), rash (59%), nausea/vomiting (51%), retro orbital pain (35%), abdominal pain (22%), bleeding manifestations (15%).Among these groups fever (100%), body ache (100%), headache (85%)and bleeding manifestations (75%) was predominant in severe dengue. Icterus was seen in (5%) pedal edema (13%)ascites (11%), pleural effusion (10%), in which the majority of this population belonged to severe dengue group. Mean Pulse rate(PR) in dengue was 74±12.4bpm and severe dengue 63±16.23 bpm, mean systolic BP was 111±6.5 mmhg in dengue and 95±17mmhg in severe dengue.

A) Hematological And Biochemical Parameters

The hematological parameters included hematocrit, total cell count and platelets. There was a decrease in the mean total cell count i.e. leucopenia in dengue patients and severe dengue patients but severity of leucopenia was more in severe dengue patients. There was a significant thrombocytopenia was there in both group but more severity was observed in the severe dengue group. Also hematocrit was higher in both groups but hematocrit in severe dengue group was more compared to dengue group.

The biochemical parameters included liver function tests and renal function tests. The mean values of total bilirubin, SGPT and SGOT also showed gross impairment mainly in severe dengue group. Hypoalbuminemia was one of the key feature of severe dengue group. The mean values of urea and creatinine showed no significant rise in both groups but hypokalemia was found in both groups but more in severe dengue group.

Chi square test of independence indicated a significant correlation of the mean values of total count, platelets, hematocrit, total bilirubin, SGOT, SGPT, serum albumin and serum potassium since the p values of the following parameters were <0.05.

During follow up also subjects belonged to severe dengue group took more time for recovery. All clinical and biochemical parameters improved except serum albumin.

Table 1: Hematological And Laboratory Parameters In Dengue And Severe Dengue

PARAMETERS (day 1)	DENGUE CASES		SEVERE DENGUE CASES	
		MEAN		MEAN
TOTAL COUNT (cells/cumm)	Leucopenia=11(13.8%) Leucocytosis=1(1.2%)	6797±2281	Leucopenia=14(70%) Leucocytosis=1(1%)	3635±2160
PLATELET COUNT (cells/cumm)	Thrombocytopenia+ =79(98.8%) Thrombocytopenia-=1(1.2%)	81320±8348	Thrombocytopenia+= 20 (100%) Thrombocytopenia-=0	37000±2438.
HEMATOCRIT (%)	46.4±2.1		49.3±2.6	
TOTAL BILIRUBIN (mg/dl)	0.8 ±.51		4.9±1.5	
SGOT(IU/l)	>40= 18 (10%)	34.7±23.1	>40= 15 (75%)	236.4±162.9
SGPT(IU/l)	>40= 4(5%)	35.5±18.1	>40= 15(75%)	215 ± 134.1
SERUM ALBUMIN (mg/dl)	≤3.5= 5(6.2%) >3.5= 75(93.8%)	3.8± .25	≤3.5= 20(100%) >3.5= 0	2.6 ± .33
SERUM POTTASSIUM (mEq/l)	≤3.5= 1(1.2%) >3.5= 79(98.8%)	4.3±.59	≤3.5= 16(80%) >3.5= 4(20%)	3.0±.39

Table 2: Hematological And Laboratory Parameters In Dengue And Severe Dengue On Follow Up

PARAMETERS	DAY 1	DAY 3	DAY 5	DAY 7
TOTAL COUNT(cells/cumm)				
DENGUE	6797	8424	7845	8397
SEVERE DENGUE	3635	4932	6445	7629
PLATELET COUNT(cells/cumm)				
DENGUE	81320	61995	95114	154375
SEVERE DENGUE	37000	28450	58350	100984
HEMATOCRIT(%)				
DENGUE	46	43	39	40
SEVERE DENGUE	49	46	40	43
TOTAL BILIRUBIN(mg/dl)				
DENGUE	0.8	0.8	0.8	0.8
SEVERE DENGUE	4.9	3.9	1.3	1.2
SGOT(IU/l)				
DENGUE	34	36	36	34
SEVERE DENGUE	236	210	180	94
SGPT(IU/l)				
DENGUE	35	35	35	34
SEVERE DENGUE	219	198	166	83
ALP(IU/l)				
DENGUE	63	65	60	63
SEVERE DENGUE	90	90	90	87
SERUM ALBUMIN(mg/dl)				
DENGUE	3.8			3.8
SEVERE DENGUE	2.6			2.6

DISCUSSION

The purpose of this study was to study about the clinical and biochemical profile of dengue fever patients in K. R hospital, Mysore. 100 Dengue fever cases were included in the study, among 100 cases 52 cases were males and 48 were females with mean age of the population was 38.3years. According to the WHO guidelines number of 'Dengue cases' in the study were 80 and 'Severe Dengue' cases were 20.

In this study fever was the main complaint (91%), body ache (86%), headache (70%), rash (59%), nausea/vomiting (51%), retro orbital pain (35%), abdominal pain (22%), bleeding manifestations (15%).Study conducted by rubar etal also had fever (93.1%), abdominal pain (29.5%), skin rash (25.3%), and diarrhea (19.7%) as the main complaints.

Study conducted by Yang J et al [3] had had fever (94.9%) as the main complaint, muscle pain (63.4%), vomiting (76.8%), headache (82.7%), abdominal pain (57.9%), back pain (59.7%), and decreased appetite (79. 7%) and study of Kuo HJ et al[4] showed fever (92.8%) as the main complaint, myalgia(57.9%), headache(39.4%), bone pain(33.8%) and abdominal pain(19.6%),

In this study mean total cell count was 6797±2281 & 3635±2160 (cells/cumm) in dengue patients and severe dengue patients respectively. There was a significant thrombocytopenia was there in both group 81320±8348 & 37000±2438(cells/cumm) in dengue patients and severe dengue patients, more severity was observed in the latter. Also hematocrit was higher in both groups but hematocrit in severe dengue group was more compared to dengue group.

Study conducted by Hegazi MA et al[5] showed a mean total count of 3.14 ± 1.01 & 3.43 ± 1.11(x 10^3/mm^3) in dengue patients and severe

dengue patients .Both groups had thrombocytopenia with mean value of 133.10 ± 42.68 & 79.56 ± 25.13 (x 10^3/mm^3) in dengue patients and severe dengue patients.

In this study the mean values of total bilirubin, SGPT and SGOT also showed gross impairment mainly in severe dengue group. Total bilirubin was0.8 ±.51 and 4.9±1.5 mg/dl in dengue and severe dengue group respectively. SGOT was raised in 10 % and 75% of the population in dengue and severe dengue with a mean of 34.7±23.1 and 236.4±162.9 IU/L in the respective groups. SGPT was raised in 5% and 75% with a mean of 35.5±18.1 and 215 ± 134.1 IU/L in dengue and severe dengue group respectively. Hypoalbuminemia (100%) with mean value of 3.0±.39 was one of the key feature of severe dengue group.

Study conducted by Hegazi MA[5] etal showed a total bilirubin 0.83 ± 0.18 and 2.29 ± 0.59 mg/dl in dengue patients and severe dengue patients . also high levels of SGOT/SGPT in severe dengue group a mean value of SGOT 63.35 ± 15.16 and 133.32 ± 31.39 IU/L in dengue and severe dengue group. SGPT of 96.15 ± 31.87 & 244.25 ± 66.64 IU/L in dengue and severe dengue group respectively. Hypoalbuminemia with mean value of 3.16 ± 1.09 mg/dl was present in severe dengue group.

Study conducted by Srisuphanunt M[6] et al also showed high levels of SGOT/SGPT in severe dengue group a mean value of SGOT 136.48 ± 139.57 and 405.57 ± 1456 IU/L in dengue and severe dengue group. SGPT of 93.7 ± 86.84 & 222.07 ± 384.68 IU/L in dengue and severe dengue group respectively. Hypoalbuminemia with mean value of 3.14 ± 0.51 mg/dl was present in severe dengue group.

Study conducted by Swamy AM[7] et al showed SGOT Levels was elevated in 66.7%, 78.6% and 91.7% patients of dengue without warning signs, warning signs and severe dengue respectively. SGPT was elevated in 42.4%, 52.4% and 91.7% patients of dengue without warning signs, warning signs and severe dengue respectively. Hypoalbuminemia (50.8%) was present, was significantly more in severe dengue.

CONCLUSION

Dengue, one of the most rapidly spreading mosquito-borne viral diseases in the world, in which hepatic involvement is common along with thrombocytopenia leucopenia and hemoconcentration with increasing severity. Hepatic involvement was mainly dengue hepatitis and hypoalbuminemia, but there is no long lasting hepatic impairment seen. Serositis occurs in many cases of Dengue, more in severe dengue and can present with pleural effusion, ascites and significant gall bladder wall edema. Bleeding manifestations were due to the low platelet count in almost all cases and coagulopathy was not observed in the cases. Also hypokalemia was observed in severe dengue cases. Hepatic involvement along with thrombocytopenia can be a prognostic marker in dengue fever and should alert the treating doctor!

Limitations:

Our study comprised a relatively small sample size, could have been done with more samples.

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