



A STUDY TO DETERMINE FASTING LIPID PROFILE AS A PREDICTOR OF MORTALITY AND MORBIDITY IN DENGUE INFECTION

General Medicine

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ABSTRACT

BACKGROUND: Dengue fever remains the most rapidly spreading mosquito-borne viral disease worldwide and in recent decades a re-emergence of the virus and its severe forms has been observed. **AIM OF THE STUDY:** To correlate the fasting lipid profile with the Dengue severity and to identify those patients at risk for capillary leakage and coagulopathy. **METHODS:** This is a comparative cross sectional study. All patients with clinical features suggestive of viral infection were subjected to dengue serology testing. Depending on the day of fever patients were subjected to either NS1 Antigen or IgM Antibody titre. For all 132 patients CBC, RFT, LFT, fasting lipid profile, USG Abdomen, Chest X ray, Dengue serology was done. Patients were monitored daily throughout critical and convalescent period for any signs of capillary leakage, bleeding manifestation and shock. **RESULTS:** Out of 132 patients included in the study, 87 were males and 45 were females with most of the patients in age group of 21- 30 years. Out of 62 patients with bleeding manifestations, 60 patients had serum cholesterol <100 and all 62 patients had HDL <50. Out of 92 patients with capillary leakage 85 patients had serum cholesterol <100 and all 92 patients had HDL <50. All 52 patients had both total cholesterol < 100 and HDL <50 either at the time of admission or during febrile period. **CONCLUSION:** Serum fasting lipid profile is useful indicator in predicting bleeding manifestation, capillary leakage and shock in dengue and hence in predicting dengue hemorrhagic fever/dengue shock syndrome, hereby reducing the mortality and morbidity in dengue.

KEYWORDS

INTRODUCTION

Dengue fever remains the most rapidly spreading mosquito-borne viral disease worldwide and in recent decades a re-emergence of the virus and its severe forms has been observed. Over 2.5 billion people live in dengue endemic countries, with approximately 50 million dengue infections diagnosed annually. Of those diagnosed, an estimated 500000 people, the majority being children, develop severe forms of dengue and require hospitalization annually. About 2.5% of those affected do not survive.

There are 4 serotypes of the dengue *Flavivirus* that can present in a wide spectrum of manifestations. Presentations range from self-limited DF (dengue fever), causing arthralgia, myalgia, and headache, to the more severe forms, such as dengue hemorrhagic fever (DHF), presenting with thrombocytopenia, hemorrhagic manifestations and increased vascular permeability, and dengue shock syndrome (DSS), which can be fatal if left untreated.

It has been established that hypolipidemia, occurs in critically ill patients and is an independent predictor of clinical outcomes. Theories postulate that the immunopathogenesis of dengue infections demonstrate the possibility of lipoprotein's ability to modify inflammatory immune function and host immune response during infections.

Research also suggests that during viral infections, lipoproteins bind to viruses and neutralize their negative effects, while certain viruses use LDL receptors for entrance into cells. Similarly, HDL and LDL have been shown to modulate hepatitis C virus infectivity, promoting virus-cell interaction by facilitating virus-cell entry. Research also demonstrated that using markers to indicate thrombocytopenia and hemorrhagic manifestations have been associated with severe forms of dengue. Despite several studies looking at possible biomarkers to indicate severe forms of dengue, there have been few studies that address and elucidate a correlation between dengue fever severity and changes in the lipid profile.

AIMS AND OBJECTIVES

To determine fasting lipid profile as a predictor of mortality and morbidity in dengue infection

- To correlate the Fasting lipid profile with the Dengue severity
- To identify those patients at risk for capillary leakage and coagulopathy.

MATERIALS AND METHODS

Study Design:

Comparative cross sectional study

Study Period:

1 year

Study Population:

All fever patients attending Medical OPD/ admitted as inpatients In medical wards.

Setting :

Department of General medicine, Narayana medical college and hospital, Nellore.

Sample Size :

130 (Sample size is calculated using epi info app. Assuming a prevalence of total cholesterol in Dengue patient as 80%, sample size is calculated as 130 for a CI of 95%)

Inclusion Criteria :

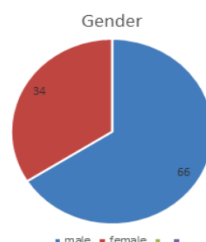
All patients with IGM ELISA Positive and NS1 ANTIGEN Positive are included in the study.

Exclusion Criteria

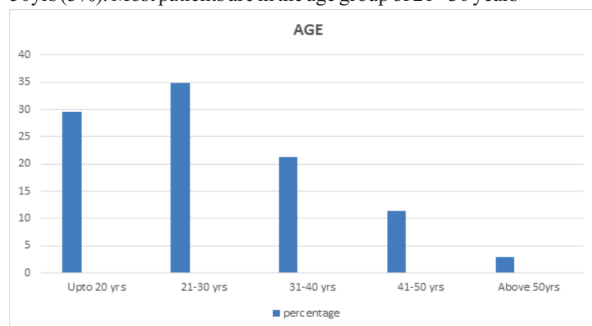
- Patients with a history of dyslipidemia
- Patient who is a known case of CAD/CVA
- Patient with the family history of hyperlipidemia
- Patient who is on lipid lowering drugs.

RESULTS

Among 132 patients, 87 (65.9%) were Males and 45 (34.1%) were females



A total of 132 patients with Dengue positivity were enrolled in the study. Among the patients with Dengue, percentage wise distribution of patients less than 20yrs (29.5%), between 21-30yrs (34.8%), between 31-40yrs(21.2%), between 41-50yrs (11.4%) and above 50yrs (3%). Most patients are in the age group of 21 – 30 years

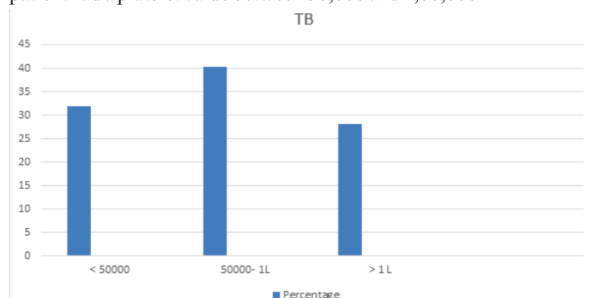


Among 132 patients, 93 (70.5) patients were IgM positive and 39 (29.5) patients were NSI Antigen positive

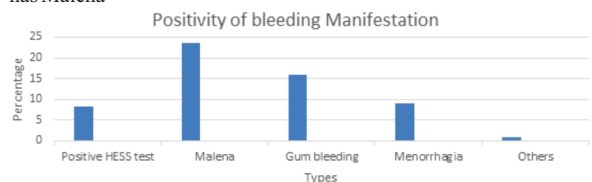
	Frequency	Percent
IGM	93	70.5
NSI	39	29.5
Total	132	100



Among 132 patients all patients had thrombocytopenia. For analysis purpose patient were split into three categories according to thrombocytopenia as <50,000; 50,000 to 1Lakh and >1 Lakh. Out of these 42 (31.8%) patients had platelet value of less than 50,000, 53 (40.2%) patients had platelet value between 50,000 and 1,00,000 and 37 patients had a platelet value of more than 1,00,000. Most of the patient had a platelet value between 50,000 and 1,00,000

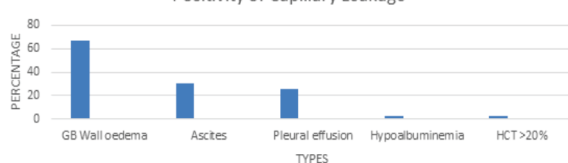


Among 132 patients, 62(47%) patients had bleeding manifestations. Out of which 31 (23.5%) patients had Malena, 21 (15.9%) patients had Gum bleeding, 12 (9.1%) patients had Menorrhagia, 11 (8.3%) patients had positive Hess test and 1 (0.8%) had other manifestations like hemetamesis, haeomptysis, etc. Most of the patients in our study has Malena



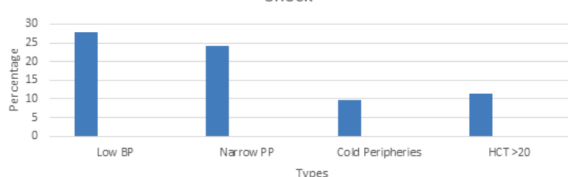
Among 132 patients, 92 (69.1%) patients had Capillary leakage as shown in table and figure 7. Out of these 88 (66.7%) patients had Gall bladder wall oedema, 40 (30.3%) patients had Ascites, 34 (25.8%) patients had pleural effusion, 4 (3.0%) patient had hypoalbuminemia and 3 (2.3%) patients had hematocrit > 20%

Positivity of Capillary Leakage

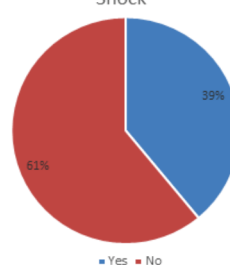


Among 132 patients, 52 (39.4%) had developed shock. Out of which 37 (28%) patients had low Blood pressure, 32 (24.2%) had narrow pulse pressure, 13 (9.8%) patients had cold peripheries and 15 (11.4%) had hematocrit of <20%. Most of the patient had low blood pressure in our study.

Shock



Shock



In addition to routine investigations from all 132 patients blood samples were withdrawn to look for serum total cholesterol, HDL and triglycerides

All patient are followed for any bleeding manifestation till discharge. It was found that 60 out of 93 patients who had bleeding manifestation had serum total cholesterol less than 100. Only 2 patients with bleeding manifestations had serum total cholesterol more than 100

It has also shown a significant p value of <0.01

	TOTAL BM		TOTAL
	YES	NO	
CHOLESTEROL <= 100	60	33	93
>100	2	37	39
TOTAL	62	70	132

All patient are followed for any capillary leakage till discharge. It was found that 85 out of 93 patients who had capillary leakage had serum total cholesterol less than 100. Only 7 patients with capillary leakage had serum total cholesterol more than 100

It has also shown a significant p value of <0.01.

	TOTAL CL		TOTAL
	YES	NO	
CHOLESTEROL <= 100	85	8	93
>100	7	32	39
TOTAL	92	40	132

All 132 patient are followed for any shock till discharge. It was found that 52 out of 93 patients who had shock had serum total cholesterol less than 100. No patients with shock had serum total cholesterol more than 100

It has also shown a significant p value of <0.01

	TOTAL S		TOTAL
	YES	NO	
CHOLESTEROL <= 100	52	41	93
>100	0	39	39
TOTAL	52	80	132

On measuring HDL, it was found that 62 out of 100 patients who had bleeding manifestation had HDL less than 50. No patients with bleeding manifestations had HDL more than 50. It has also shown a significant p value of <0.01

	TOTAL BM		TOTAL
	YES	NO	
HDL $\leq$ 50	62	38	100
> 50	0	32	32
TOTAL	62	70	132

On measuring HDL, it was found that 92 out of 100 patients who had capillary leakage had HDL less than 50. No patients with capillary leakage had HDL more than 50.

It has also shown a significant p value of <0.01.

	TOTAL CL		TOTAL
	YES	NO	
HDL $\leq$ 50	92	8	100
>50	0	32	32
TOTAL	92	40	132

On measuring HDL, it was found that 52 out of 100 patients who had capillary leakage had HDL less than 50. No patients with capillary leakage had HDL more than 50.

It has also shown a significant p value of <0.01.

	TOTAL S		TOTAL
	YES	NO	
HDL $\leq$ 50	52	48	100
>50	0	32	32
TOTAL	52	80	132

DISCUSSION

Dengue is the most rapidly spreading mosquito borne disease in the world. Dengue is one disease entity with different clinical presentations and often with unpredictable clinical evolution and outcome.

Morbidity and Mortality in dengue virus infection is significantly increasing due to dengue hemorrhagic fever and dengue shock syndrome. So early identification of DHF/DSS is necessary.

In this study we propose that HYPOCHOLESTEROLEMIA is a useful early predictor of DHF/DSS and hence it will significantly reduce morbidity and mortality through early identification.

Rising of hematocrit and decreasing platelets are often used clinically to determine which patient has dengue hemorrhagic fever, but these findings are generally not seen until defervescence.

Hence hypocholesterolemia could be used in predicting dengue hemorrhagic fever/ dengue shock syndrome in early stage before rising of hematocrit and decreasing platelets, thereby preventing mortality and morbidity in dengue fever.

In dengue, there are altered cytokine levels and increased oxidative stress. These factors lead to a lowered serum total cholesterol level which is increasingly being utilized as a predictor of clinical deterioration and poor prognosis.

In our study we have taken 132 patients who were Dengue positive either by IgM or by NS1 antigen. Blood samples were collected from all patients to measure serum fasting lipid profile in addition to routine investigation.

Patient were followed during critical period for bleeding manifestation, Capillary leakage and Shock i.e. Dengue hemorrhagic fever and Dengue shock syndrome. It was found that many patients who had serum cholesterol less than 100 and HDL less than 50 were ended up having dengue shock syndrome and Dengue hemorrhagic fever.

It is concluded from our study that serum fasting lipid profile can be used as a tool in predicting dengue hemorrhagic fever / dengue shock syndrome in dengue patients. It is a relatively easy, simple, accessible and cost effective method which can be used in predicting severe dengue during admission / febrile period. Patients having hypocholesterolemia should be given at most care in preventing severe dengue.

We suggest in utilizing serum fasting lipid profile in all dengue patients for predicting severe dengue early and managing appropriately hence reducing the mortality and morbidity in dengue.

CONCLUSIONS

Serum fasting lipid profile is useful indicator in predicting bleeding manifestation, capillary leakage and shock in dengue.

Hence Serum fasting lipid profile is useful in predicting dengue hemorrhagic fever/dengue shock syndrome, hereby reducing the mortality and morbidity in dengue.

As it is cost effective, easy accessible, widely available tool we suggest to use Serum fasting lipid profile for predicting dengue hemorrhagic fever/dengue shock syndrome for all patients at an early stage.

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