

Original Research Article

## A STUDY OF COMPLICATIONS AND ASSOCIATED RISK FACTORS OF DENGUE IN CHILDREN

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### Abstract:

**Background & Method:** The aim of the study is to study the Complications and Associated Risk Factors of Dengue in Children. Dengue sero positive patients are selected and examined clinically for hepatomegaly and jaundice and subjected to complete blood count, liver function tests, ultrasound abdomen, PT, APTT, Widal, HBsAg, HCV and analysed. Bilirubin reacts with sulphanilic acid to produce an azo compound, the colour of which could be measured at 546 nm and this gives an estimate of concentration of bilirubin.

**Result:** In this study, Dengue has affected male and female children almost equally. Thrombocytopenia has occurred in 74% of patients with probable dengue, 98% with warning signs and 100% in severe dengue.

**Conclusion:** In developing country like India, incidence of dengue outbreaks is increasing. Hepatic involvement of varying degrees has been reported. As hepatic dysfunction in dengue is transient and reversible, early identification of the same would help to reduce life threatening complications. Dengue is a self-limiting disease that is caused by viral infection. Dengue must be well treated even if patients are asymptomatic. Complications of Dengue can be manifested in many organs, including neurological, Gastrointestinal, Hematology, Cardiac & Renal systems

**Keywords:** complications, risk factors, dengue & children.

**Study Designed:** Observational Study

### 1. INTRODUCTION

Dengue fever is the most rapidly spreading mosquito-borne viral disease worldwide with an unpredictable clinical course and outcome.[1] If case detection and management is delayed,

the morbidity and mortality from shock and haemorrhage becomes very high.[2] The objective of this study was to determine the risk factors for shock at an early stage of illness in children admitted with dengue fever at a tertiary care hospital.

Dengue is an infectious disease caused by any of the four dengue virus serotypes: DENVs 1–4. It is a mosquito-borne disease and is primarily transmitted to humans by the female *Aedes* mosquito[3]. The disease is mainly concentrated in tropical and subtropical regions, putting nearly a third of the human population, worldwide, at risk of infection

Dengue has become one of the most widespread re-emerging mosquito-borne disease globally. Incidence of dengue has increased 30-fold in last five decades [4]. Currently, dengue is endemic to 128 countries, mostly developing nations, posing a risk to approximately 3.97 billion people annually. A recent dengue distribution model has estimated 390 million dengue infections annually, out of which 96 million cases occurred apparently in India [5]. The Indian subcontinent is the epicentre of dengue with cases being heavily underestimated. Thus, there is an urgent need of improvement in sero surveillance to enable the authorities to prepare adequately for an outbreak.

## **2. MATERIAL & METHOD**

The present study was conducted at Index Medical College Hospital and Research Centre, Indore, M.P. for 06 months. Dengue sero positive patients are selected and examined clinically for hepatomegaly and jaundice and subjected to complete blood count, liver function tests, ultrasound abdomen, PT (Prothrombin time), APTT, Widal, HBsAg (HEPATITIS B ANTIGEN), HCV(HEPATITIS C ANTIGEN) and analysed. Bilirubin reacts with sulphanilic acid to produce an azo compound, the colour of which could be measured at 546nm and this gives an estimate of concentration of bilirubin.

### **COMPLETE BLOOD COUNT:**

CBC was done using automated counter method.

### **LIVER FUNCTION TESTS:**

LFT was done on the day of admission. 3ml venous blood was collected and the following were done

### **TOTAL AND DIRECT BILIRUBIN:**

- Reagents: - Sodium nitrite 10mmol/L
- Sulphanilic acid 23mmol/L
- Sodium acetate 0.9 mol/L
- Sodium benzoate 0.5 mmol/L
- Caffeine 0.25mol/L

### **INCLUSION CRITERIA:**

All serologically proven cases.

**EXCLUSION CRITERIA:**

Associated infections known to cause Hepatic involvement like Malaria, Enteric fever, Hepatitis, Leptospirosis

**3. RESULTS**

**Table No. 01: GENDER DISTRIBUTION OF CASES**

Diagnosis	Gender of the child				Total
	Male		Female		
	N	%	N	%	
PD (Probable dengue)	25	59.52	17	40.48	42
D+WS (Dengue with warning signs)	27	57.45	20	42.55	47
SD (Severe syndrome)	05	45.45	06	54.55	11
Total	57	57.00	43	43.00	100

Dengue affected male and female children almost equally.

**Table No. 02: COMPARISON BETWEEN GROUPS WITH RESPECT TO PLATELET COUNT**

PLATELET	Diagnosis						Total	P Value
	PD		D+WS		SD			
	N	%	N	%	N	%		
Normal	11	26.2	01	2.1	-	-	12	0.001
Decrease	31	73.8	46	97.9	11	100	88	
Total	42	100	47	100	11	100	100	

Thrombocytopenia occurred in 74% of patients with probable dengue, 98% with warning signs and 100% in severe dengue.

**Table No. 03: COMPARISON OF CHANGES IN LIVER FUUNCTION TESTS AND PLATELET COUNT**

Diagnosis	Normal		Decreased		Increased		Total
	N	%	N	%	N	%	
PLATELET	12	12	88	88	-	-	100
SBR-TOTAL	90	90	-	-	10	10	100
SGOT (Serum glutamate oxalate	26	26	-	-	74	74	100

transaminase)							
SGPT (Serum glutamate pyruvate transaminase)	42	42	-	-	58	58	100
ALP (Alkaline phosphatase)	72	72	-	-	28	28	100
PT (Prothrombin time)	89	89	-	-	11	11	100
APTT (Activated partial thromboplastin time)	89	89	-	-	11	11	100
S.PROTEIN	88	88	12	12	-	-	100
ALBUMIN	97	97	03	03	-	-	100

**Table No. 04: Complications**

<b>Complications</b>	<b>Percentage</b>
Hepatitis	42
Hepatic Failure	39
Severe Shock	21
Myocarditis	19
Cardiomyopathy	12
Pneumonia	28
Pleural Effusion	28
Pulmonary Edema	22
Myelopathy	23
Myositis	06
Encephalitis	04
Brachial Neuritis	04
Seizures	37
Orchitis	06
Oophoritis	07

**Table No. 05: Risk Factors**

<b>Risk Factor</b>	<b>Percentage</b>
Myalgia	37
Headache	43
Retro-orbital pain	33
Palmar erythema	35
Joint pain	20
Hepatomegaly	37
Splenomegaly	16
Right hypochondriac pain	07
Epigastric tenderness	17
Facial flush	22
Pleural effusion	06
Ascites	07
Lymphadenopathy	32
Giddiness	28
Oliguria	22
Persistent vomiting	43
Pain abdomen	23
Bleeding	11

#### **4. DISCUSSION**

This study was an attempt to predict the various risks factors associated with complications. We found that the most commonly affected group were children >6 years of age and were significantly at increased risk to develop shock. As per the 2011 WHO revised guidelines, infants and children are high risk group to develop severe dengue infection in the form of shock and hemorrhage that is contrary to our findings. The probable factors for higher age to be affected were increased exposure to mosquito bites, active viral replication, and secondary infection as was with few previous studies.[6] Bleeding manifestations were significantly associated with shock in our study and were more common in children >6 years of age, similar to the previous studies.[7&8]

Serum SGOT was raised in 74 % of patients with dengue. When compared between the groups, rise in SGOT occurred in 74% of patients with probable dengue, 98% with warning signs and 100% in severe dengue. Study by M Narayanan et al[9], SrivenuItha et al[10] and Brij Mohan et al[8]also observed deranged liver enzyme levels. Souza et al reported elevation of SGOT in 63.4% cases and Kuo et al[7] observed rise in SGOT in 97.9% of cases.

SGPT was raised in 58% of patients with dengue infection. When compared between the groups, rise in SGPT occurred in 42% of patients with probable dengue, 66% with warning signs and 81% in severe dengue. Study by M Narayanan et al[9], SrivenuItha et al[10] and

Brij Mohan et al[8] also observed elevation in SGPT. MMA Faridi et al[11] reported 64.6% rise in ALT levels. Patients with severe dengue had higher level of enzymes. Thrombocytopenia occurred in 74% of patients with probable dengue, 98% with warning signs and 100% in severe dengue.

## 5. CONCLUSION

In developing country like India, incidence of dengue is increasing. Hepatic involvement of varying degrees has been reported. As hepatic dysfunction in dengue is transient and reversible, early identification of the same would help to reduce life threatening complications.

Dengue is a self-limiting disease that is caused by viral infection. Dengue must be well treated even if patients are asymptomatic. Complications of Dengue can be manifested in many organs, including neurological, Gastrointestinal, Haematology, Cardiac & Renal Systems.

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