



Clinical Spectrum and Factors Predicting Complications in Patients of Dengue Fever Attending Tertiary Care Hospital – A Prospective Study

Suresh Jana

Assistant Professor, Department of General Medicine, Prathima Institute of Medical Sciences, Naganoor, Karimnagar, Telangana, India

Abstract

Background: Dengue is a rapidly spreading mosquito-borne viral disease and is emerging as a leading infectious disease in urban and periurban regions. The spectrum of manifestations in Dengue varies widely from being asymptomatic to a complicated infection presenting with shock and hemorrhage. Our study enables us to correlate the spectrum of manifestations, severity, lab investigations, and radiological means to determine the predictors of complications in Dengue Fever. **Methods:** The study group included n=107 patients of Prathima Institute of Medical Sciences, Karimnagar. The subjects were enrolled after taking consent for the study. Patients with a history of fever and tested positive by Lab Tests. (Dengue – NS1Ag, IgM, and IgG antibodies). Patients of minimum age 18 Yrs or more. **Results:** Most common symptom was fever seen in all cases. Petechiae was seen in 11.2% of the study population. Pleural effusion was seen in 8 and ascites in 9 patients. 82.2% of patients had thrombocytopenia, seen in 82.2% of the study population. Mean platelet count was 78,336 cells/mm³. 34.5% of patients had leucopenia. 32.7% patients had PCV > 45%. A four-fold rise in SGOT values and a 2-fold rise in SGPT values were seen in comparison with the normal population. **Conclusion:** Development of complications in dengue is commonly at the end of a febrile phase. The determining factors in patients with dengue fever are the development of plasma leakage. The onset of complications and duration of recovery is determined by the signs and extent of plasma leakage development of ascites and pleural effusion.

Keywords: Dengue Fever, Clinical Spectrum, Complications, Dengue Virus

Address for correspondence: Dr. Suresh Jana, H. No. 3-1-342, Ambedkar Road, Old Employment office, Karimnagar 505001. Email: drsuresh2k2@gmail.com Mobile: 7799270000

Date of Acceptance: 23/12/2020

Introduction

Dengue is a rapidly spreading mosquito-borne viral disease and is emerging as a leading infectious disease in urban and peri-urban regions accounting for 50 million infections annually.^[1, 2] 2005 World Health Assembly resolution quantifies Dengue as a disease that may constitute a public emergency of international concern.^[3] It has been responsible for many outbreaks of epidemics globally including India.^[1] Dengue was initially confirmed to the east coast of India and has caused epidemics, sometimes along with the

Chikungunya virus, as in 1963 when extensive outbreaks affected Calcutta and Madras. Subsequently, it has spread westwards and in the 1990s Surat and Delhi had major epidemics with deaths due to DHF and DSS. All four types of dengue viruses are present in this country. Occasionally, more than one type of virus has been isolated from the same patient.^[4] In India, the risk of dengue has shown an increase in recent years due to rapid urbanization, lifestyle changes, and deficient water management including improper water storage practices in urban, peri-urban, and rural areas, leading to the proliferation of mosquito breeding sites. The

disease has a seasonal pattern the cases peak after the monsoon, and it is not uniformly distributed throughout the year. However, in the southern states and Gujarat, the transmission is perennial. [5] During 2017, about 188401 cases were reported with 325 deaths. Till September 2018, 40868 cases were reported with 83 deaths among which the highest number of cases were reported from Maharashtra followed by Odisha, Kerala. [6] In Telangana, 5369 cases were reported in 2017, and 2372 were reported till September 2018. [6] The spectrum of manifestations in Dengue varies widely from being asymptomatic to a complicated infection presenting with shock and hemorrhage. [5] There have been many studies that have been conducted globally and over India which have focused on predicting the number of cases associated with the outbreak. [3] Warning signs include persistent vomiting, abdominal pain, lethargy or restlessness, oliguria, refusal of oral intake, and postural hypotension. [5] Our study enables us to correlate the spectrum of manifestations, severity, lab investigations, and radiological means to determine the predictors of complications in Dengue fever.

Material and Methods

The study group was selected from inpatients of Prathima Institute of Medical Sciences, Karimnagar. It was a prospective study done between October 2016 to October 2018. Institutional Ethical committee Permission was obtained for the study. It included n=107 subjects who presented to the Hospital in the above said period. The subjects were enrolled after taking informed consent for the study. The criteria of Inclusion and Exclusion for the study are mentioned below

Inclusion Criteria:

1. Patients with a history of Fever and Tested positive by Lab Tests. (Dengue – NS1Ag, IgM, and IgG antibodies).
2. Patients of minimum age 18 years or more.

Exclusion Criteria

1. Patients with mixed infections – such as those tested positive for malaria, leptospirosis along dengue.

2. Those with bleeding diathesis due to other causes such as DIC, ITP, and Hemophilia were excluded from the study.

Patients admitted to the hospital with complaints of fever and tested positive for Dengue serological Tests – NS1Ag, IgM, and IgG were included in the study after they met the inclusion criteria. Informed Consent was obtained from the patients before their enrolment. A thorough history was taken, and a detailed clinical examination was performed on all the patients. The results of the clinical findings were recorded in a proforma sheet the patients were followed during their hospital stay. Investigations performed on all patients included complete Blood Counts (Hb, PCV, TLC, DLC, PBS), chest X ray, electrocardiogram, ultrasonography (USG), liver Function Tests (LFT), coagulation Profile was done on patients in whom it was considered significant based on the clinical findings. Serial hematological parameters performed during Hospital stay were noted. The results obtained from the study were analyzed according to symptoms, signs, lab investigations (hematological parameters) and any association between the clinical spectrum and laboratory investigations was analyzed. The results obtained were analyzed through statistical analysis and appropriate tests of significance using SPSS Software. Data were entered into Microsoft excel after coding and analyzed using SPSS 11 software. Proportions and Frequencies were computed for qualitative data Correlation was computed for quantitative data. Chi-square was the test of significance for categorical data $p < 0.05$ is considered as statistically significant.

Results

The study was done on n=107 patients who were tested positive for Dengue serological tests. Out of these n=67 were male and n=40 were female patients. In this study, the duration of fever was between 4 – 7 days in 60.8% cases followed by 1 – 3 days in 31.8% cases and > 8 days in 3.7% and > 10 days in 3.7% cases.

Table 1: Age wise Distribution of cases in the study

Age Range (yrs)	Male	Female	Total	Percentage
18 - 30	35	20	55	51.4
31 - 45	23	15	38	35.6
46 - 65	8	5	13	12.1
> 65	1	0	1	0.009
Total	67	40	107	100

Table 2: Symptoms in Study Population

Symptoms	Frequency	Percentage
Headache	50	46.7
Retroorbital pain	5	4.7
Myalgia	78	72.9
Arthralgia	43	40.2
Rash	10	9.3
Hepatomegaly	22	20.6
Conjunctival Suffusion	17	15.8
Pain Abdomen	23	18.6
Vomiting	23	18.6
Convulsion	1	0.9

Table 3: Dengue Serology Reports

Serology	Frequency	Percentage
NS1Ag +ve	30	28.1
IgM +ve	67	62.6
NS1Ag +ve and IgM +ve	3	2.8
IgM +ve and IgG +ve	6	5.6
IgG +ve	1	0.9

The most common positive serology finding was IgM positive in 62.6% cases followed by NS1Ag +ve in 28.1% cases given in table 3. The most common hemorrhagic manifestation was petechiae in 11.2% cases followed by subconjunctival hemorrhage in 5.6% cases, melaena and bleeding PV was seen in 4.7% cases each, bleeding gums, epistaxis, hematuria was seen in 3.7% cases. IV line bleeding in one case. In the study, it was observed that there is no significant association between subconjunctival hemorrhage and Hb%, PCV, and Platelet count i.e., $p > 0.05$ (table 5).

Table 4: Platelet count (Cells/mm³) in study population

Platelet Count	Frequency	Percentage
0-10,000	5	4.7
10,001-50,000	41	38.3
50,001-1,00,000	29	27.1
1,00,000-1,50,000	13	12.1
>1,50,000	19	17.8

In the study, it was observed that there was a significant association between Hb% and platelet count among dengue patients i.e. among 31 patients with Hb% >15, platelet count was <50000 in 61.29%. there is a highly significant positive correlation between Hb and PCV i.e. as Hb increases there is a significant increase in PCV. Similarly, there was a highly significant negative correlation between Hb and Platelet count i.e. as Hb increases there is a decrease in platelet count. There was no significant correlation for other parameters with Hb%.

Table 5: Association between Sub-Conjunctival hemorrhage, Hb%, PCV and Platelet count among dengue patients

		Sub-Conjunctival Hemorrhage			Significance
		Absent	Present	Total	
Hb%	<15	71	5	76	$X^2=0.468$, $df=1$, $p=0.494$
	>15	30	1	31	
PCV	<45	68	4	72	$X^2=0.001$, $df=1$, $p=0.973$
	>45	33	2	35	
Platelet count	<50,000	46	3	49	$X^2=0.045$, $df=1$, $p=0.831$
	>50,000	55	3	58	

Discussion

A feature unique to dengue which differentiates it from other viral illness is its ability to cause plasma leakage. It determines the severity of infection in dengue and its clinical categorization into dengue fever, dengue Haemorrhagic fever, and dengue shock syndrome. Haemoconcentration and thrombocytopenia are the distinctive features of dengue hemorrhagic fever. Plasma leakage complicates the clinical picture in dengue and causes fluid accumulation in body cavities, leading to the development of bilateral pleural effusion (right being the dominant side) and ascites. This in turn reduces the effective circulating volume leading to the development of shock referred to as dengue shock syndrome. In the present study, there were n=67 males and n=40 females constituting 62.6% and 37.4% of the study population respectively. A higher prevalence of dengue infection was noted among males than females which is congruent with other Indian studies. [7] A higher prevalence of dengue infection among males when compared to females is also seen in other studies by Anish L et al; [8] 57 % of male patients were reported with 44 % females. In the study conducted by Deshwal R et al; [9] 72.8% of male patients were reported with 27.1 % female patients. In the study conducted by Karoli R et al; [10] 62.6 % of male patients were reported with 37.4 % females. The predominant age group affected in the study was 18 – 30 years. This correlates with the study done by Anish L et al; [8] where 61.7 % of patients were in between the age group of 18- 30 yrs. Majority of the patients 60.8% in our study presented with complaints of fever of 4-7 days duration 31.8% had a fever of 1-3 days. This correlates with the study done by Deborah HL et al; [11] in which the mean duration of fever in dengue patients was 4 days. In our study majority of patients had a fever of 4-7 days. The commonest hemorrhagic manifestation noted in the study group was petechiae, seen in 11.2%, and the next common being subconjunctival hemorrhage seen in 6 patients (5.6%) of the study group. All the patients in the study group underwent complete blood counts at admission. The mean PCV in the study group is 41.2%. Analysis revealed that 32.71% patients had

haematocrit > 45%, 67.28% patients had haematocrit < 45%.

The mean platelet count in the study population was 78,336 cells / mm³ at the time of admission. N=93 of n=107 patients had platelet count less than 1,50,000 cells/mm³ accounting for 82.2% of the study group. This has a very close resemblance to a study done by Ratageri et al; [12] in which thrombocytopenia was seen in 82% of the study group. Liver function tests were done on n=32 out of n=107 patients. Analysis of it revealed a mean serum bilirubin level of 1.17 mg/dl. Mean SGOT values in the study population were 170 U/L which is about four times the normal value and the mean SGPT values were 93U/L. This has a significant correlation with the study done by Shukla et al; [13] in which higher SGOT levels were found than SGPT levels. In our study, some n=8 patients had pleural effusion accounting for about 7.5% of the study group, predominantly on the right side. This is comparatively less than that observed by Shukla et al; [13] in which 15% had pleural effusion. In our study, there were 8 patients presented with pleural effusion accounting for about 7.5% of the study group, predominantly on the right side. This is comparatively less than that observed by Shukla et al; [13] in which 15% had pleural effusion. From the analysis of the data, it was observed that there was no significant statistical association/correlation with the clinical spectrum and lab investigation. However, there is a very significant positive statistical association between hemoglobin and hematocrit with a 'p' value of <0.01, which means that with an increase in hemoglobin, hematocrit increases, and with the decrease in hemoglobin, hematocrit decreases. Also, there is a significant negative association between hemoglobin and platelets with a 'p' value of <0.05. It means that with an increase in hemoglobin, platelets decrease indicating the development of haemoconcentration, and with a decrease in platelet count, the hemoglobin improves indicating recovery. There is also a significant positive association between total protein and albumin and vice-versa.

Conclusion

Development of complications in dengue is commonly at the end of the febrile phase. The determining factors in patients with dengue fever are the development of plasma leakage. The onset of complications and duration of recovery is determined by the signs and extent of plasma leakage development of ascites and pleural effusion. A patient with dengue should

be clinically monitored based on the extent of hydration, general wellbeing, and by daily regular monitoring of blood counts. It is of utmost importance to assess the development of hemorrhagic manifestations daily. Adequate hydration should be the cornerstone in the management of dengue and hematocrit should be used as a tool in assessing the extent of plasma leakage and management.

Conflict of Interest: None declared

Source of Support: Nil

Ethical Permission: Obtained

References

1. Goel A, Patel ND, Lakhani KK, Agarwal SB, Agarwal A, Singla S et al. Dengue Fever – A Dangerous foe. Indian academy of clinical medicine. 2004; 5(3): 247-58.
2. Cook GC, Zumla AI. Dengue and Dengue Haemorrhagic Fever. In: Manson's Tropical Disease. 22nd Edn. London, UK. Elsevier Limited 2009;753-61.
3. World Health Organization. Dengue guidelines for diagnosis, treatment, prevention and control: New edition. World Health Organization. 2009; <https://apps.who.int/iris/handle/10665/44188> [Accessed on 25th Oct 2019]
4. Ananthanarayan R, Panicker CKJ. Arboviruses. In: Panicker CKJ, Ed. Ananthanarayan & Panicker's Textbook of Microbiology, 8thEdn. University press India Pvt Ltd, 2009; 519.
5. Yeolekar M E. Dengue. In: API Textbook of Medicine. 8th edition. Mumbai, India: The Association of Physicians of India 2009;113-16.
6. Dengue Epidemiological report of NVBDCP. Available from <https://nvbdcp.gov.in/index4.php?lang=1&level=0&linkid=431&lid=3715> [Accessed on 20th Nov 2019]
7. Garg A, Garg J, Rao YK, Upadhyay GC, Sakhuja S. Prevalence of dengue among clinically suspected febrile episodes at a teaching hospital in North India. J. Infect. Dis. Immun. 2011;3:85-89.
8. Anish L, Poonam L. Clinical profiles of dengue infection during an outbreak in Northern India. J Trop Med, 2016;5917934:1-7.
9. Deshwal R, Qureshi MI, Singh R. Clinical and laboratory profile of Dengue fever. J Assoc Physicians India. 2015;63(12):30-32.
10. Karoli R, Fatima J. Clinical profile of dengue infection at a teaching hospital in North India. J Infect Dev Ctries. 2012 Jul 23;6 (7):551-54.
11. Deborah HL Ng, Joshua GX Wong, Tun-Linn Thein, Yee-Sin Leo, David C. Lye. The Significance of Prolonged and Saddleback Fever in Hospitalised Adult Dengue. PLoS ONE 11(12): e0167025.
12. Ratageri VH, Spheur TA, Wari PK, Chavan SC, Mujahid IB, Yergolkar PN. Clinical profile and outcome of dengue fever cases. Indian J Pediatr. 2005;7:705-706.
13. Shukla V, Chandra A. A. Study of hepatic dysfunction in dengue. JAPI. 2013;61-460-461.
14. Ejaz K, Khursheed M. Pleural effusion in Dengue. Karachi perspective. Saudi Med J. 2011; 32(1):46-49.