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RESEARCH ARTICLE OPEN ACCESS

A Retrospective Study of Clinical and Laboratory Profile of Dengue Fever in Tertiary Care Hospital, Wardha, Maharashtra, India

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Abstract

Dengue disease is caused by dengue virus which is a vector born viral infection. The prevalence of dengue has increased dramatically from past few decades. The clinical symptoms vary from asymptomatic to severe hemorrhagic fever leads to high morbidity and mortality. Method- This retrospective study was carried out during January 2019 to December 2019. The laboratory test was done by using J Mitra & Co on Day 1 of their visit to the hospital which shows NS1, IgM and IgG reactivity towards dengue fever. The clinical profile information data was collected from patient records. Out of 640 samples 62.18% (398) was positive. The percentage of positive males and females were 60.78%, 64.23% respectively. The highest prevalence of dengue infection was observed more in age group between 31-40 years (81.69%) and least prevalence in age group 71-80 years (36.36%). Most of the patients were positive for NS1Ag121 (30.4%) followed by IgM positive 87 (21.9%) & 59 (14.8%) positive for both IgM and NS1 Ag The highest number of infections was seen during October (75.8%) post monsoon season. All patients had a fever, followed by head ache (82%) and body pains (66.4%), 64.84% stayed in the hospital less than 5 days. In tropical and sub-tropical regions dengue is still a leading public health problem especially during rainy and post monsoon seasons. Both NS1 Ag and IgM detection in early acute phase has potential diagnostic value. So, to reduce mortality there need to initiate community-based cohort studies to predict the pace of dengue spread based on clinical presentation and laboratory findings during epidemics in India. Aedesaegypti is a common vector for transmission of DENV, CHIKV and ZIKV, so there is a need to screen for these infections in endemic areas.

Keyword: Dengue, (NS1)Nonstructural Protein I, Immunoglobulin G(IgG), Immunoglobulin M (IgM)

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INTRODUCTION

Dengue feveris an acute arboviral infection cause by a dengue virus,there are four distinct serotypes (DENV1, DENV2, DENV3, and DENV4)of this virus transmitted by Aedesaegypti[1]. The clinical symptoms vary from asymptomatic to severe hemorrhagic fever leads to high morbidity and mortality(20%) if left untreated. The prevalence of dengue has increased dramatically from past few decades and now about half of the population of world areis at risk[2,3,4].Dengue transmission occurs throughout the year in endemic tropical areas; however, in most countries there is a distinct seasonal pattern, with increased transmission usually associated with the monsoon and post monsoon season[5,6]. Lack of specific anti viral drug for the treatment of dengue and had variable clinical presentation which is a very big challenge to the clinicians to prevent the complications and death[7]. So to reduce morbidity and mortality of dengue infection, it is better to understand the clinical profile of disease along with the laboratory parameters of dengue fever. This current retrospective study was carried out to determine, the seasonal distribution, demographic variation with clinical manifestations of all laboratory tested dengue cases.

METHODOLOGY

This retrospective study was carried out during January 2019 to December 2019, in the department of microbiology, at Jawaharlal Nehru Medical College, Wardha, Maharashtra, India. A total of 640 patients with the clinically suspected cases were included in the study. The laboratory test was done by using a rapid solid phase immuno- chromatographic test(J Mitra & Co. Pvt. Ltd.) on Day 1of their visit to the hospital which shows NS1, IgM and IgG reactivity towards dengue fever. The patient clinical profile such as fever, head ache and length of hospital stay were collected from patient records at MRD (Medical Record Department).

RESULT

A total of 640 patient's were included in the study. ,The distributions of patient demographic results were shown in the table: 1, Seropositivity Pattern in dengue fever was shown in the table: 2. Length of hospital stay, Seasonal Variation and

Table 1. Demographic characteristic of Patient (n=640)

Characteristics	Total no of patients	Positive	Percentage
		Gender	
Male	380	231	60.78
Female	260	167	64.23
		Age group in years	
01-10	35	15	42.85
11-20	92	42	45.65
21-30	132	98	74.24
31-40	142	116	81.69
41-50	124	70	56.45
51-60	70	39	55.71
61-70	23	10	43.47
71-80	22	08	36.36
		Geographical distribution	
Urban	415	274	66
Rural	225	124	55.1
Total	640	398	62.2

Table 2. Seropositivity Pattern in dengue fever

Parameters	Number	Percentage
NS1 Ag	59	14.82
IgMAbs	87	21.86
IgGAb	44	11.06
NS1 Ag and IgMAb	121	30.40
NS1 Ag and IgGAb	40	10.05
IgM and IgGAbs	47	11.81
Total	398	100

clinical profile of dengue infections were shown in the tables: 3, 4, &5 respectively. The mean age was 35.03±5.07 years old and Standard deviation σ *is 16.6188.* Mean Length of hospital Stay (Mean±SD) =3.65±1.39, Range:2-7 days

Table 3. Length of hospital stay in In-patients

Length of hospital stay	Study population	%
≤ 5 days	200	83.68
>5 days	39	16.32
Total	239	100

Table 4. Seasonal Variation of dengue Infections

Months	Total number of patients		Number of positive patients	percentage
Wards	OPD	IPD		
January	07	-	01	14.28
February	18	-	-	0
March	11	-	-	0
April	08	-	-	0
May	01	-	-	0
June	01	-	-	0
July	05	-	-	0
August	16	06	03	13.63
September	45	36	53	65.43
October	95	62	119	75.79
November	96	75	121	70.76
December	98	60	101	63.92
Total	401	239	398	62.18
	640			

DISCUSSION

According to WHO, in last 5 decades dengue infections has shot up 30 fold, because of its complex patho-physiological, ecological as well as economical problems[8]. In current study majority of patients were males (380 males out of 640 patients)than females, this may due to males are more exposed to mosquitoes in outdoor activity similar findings were reported in Gupta et al. and Dar es Salaam 2014 outbreak[9,10].

In the current study large number i.e. 81.69% of dengue cases are from age group between 31 to 40 years which is similar to the study MM Kauser et al.[11]. Kaushik M. et al.[4]Dhruba et al.[1] , Ghouth et al.[12] and PadhiS et al.[13] reported that most common affected age group was 11-20 years, the difference may be the study population and sample size. In the present study positive rate was high in urban population compared to the rural population. Urbanization tends to increase the number of habitats suitable for Aedesaegypti. The Aedesaegypti mosquito population was highest in slum houses, shop houses and multistoreyed flats. In the current study highest number of dengue cases were reported in the post-monsoon period similar results were found in study done by Lata R. patel et al.[14] During monsoon period heavy rains leads to stagnation of large amount of water. These are the favourite breeding places for vector

Table 5. Symptoms distribution in dengue patients

Symptoms	No. of cases (n=640)	%
Fever	640	100
Headache	525	82
Body ache	425	66.4
Retro orbital pain	240	37.5
Abdominal pain	180	28.1
Nausea/ vomiting	121	18.9
Conjunctival congestion	100	15.6
Generalised weakness	95	14.8
Joint pain	65	10.2
Anorexia	41	6.4
Diarrhea	41	6.4
Dry cough	32	5
Skin Rash	24	3.8
Bleeding	20	3.1
Bradycardia	16	2.5

mosquito. This may be the cause for more number of cases in post-monsoon season.

Single stranded RNA virus belonging to genus flavivirus, is responsible for acute illness in dengue. 4 to 10 days was the incubation period for dengue fever. Febrile phase, critical phase and recovery phase are these conditions seen in dengue infection[9 &10]. Overall sero-positivity rate was 62.2% (398/640). In the current study over all NS1 detection was 220 (49.7%) patients were positive, Results were correlating with other study by Anitha Chakravarti 35(39.7%). In dengue infection the role of NS1 Ag for early detection is currently being assess by many investigators, without the requirement of paired sera (Two serum samples taken from a patient usually at 1 week apart)and it circulates uniformly in all serotypes of dengue and there is no cross reaction of dengue NS1 antigen with other flaviviruses [13-15]. The NS1 is produced in high concentration in the serum during acute phase (0-6 days) of infection. The sensitivity varies between 85.5 and 95.9% and specificity between 95.0 and 100% using the viral isolation as a reference test[16,17].

Dengue IgM can be detected within 3-5 days in 50% people after onset of symptoms, and 80% after day 5 and to 99% on day 10they and not detected after 2–3 months. IgM is not specific, they can cross-reaction with other flaviviruses and also with rheumatoid factor[17]. So if the patient sample is reactive for NS1 Ag and IgM antibodies instead of IgM only, that is more specific. At end of the first week of onset symptoms, IgG antibodies will detect and remain life-long in some patients. Detection of NS1 and IgG, IgM and IgG detection indicates the seroconverstion stage of infection. If only IgG Abs detection in serum, it indicates past infection, secondary infection or cross-reaction with other flaviviruses antigen[17]. In the current study fever was present in all the patients (100%), followed by headache and body pains which is similar to the other studies[18-20]. Only 16.32% were stayed in the hospital more than 5 days which is similar to the other study carried out by Solanke SN et al. at Jalna[20]. In the current study no mortality was found.

CONCLUSION

In tropical and sub-tropical regions, dengue is still a leading public health problem especially during rainy and post monsoon seasons. An increased urbanization and behavior change in vector is also one cause for increase in dengue cases. Males were most commonly affected. BothNS1 Ag and IgM detection in early acute phase has potential diagnostic value. So, to reduce mortality there need to initiate community-based cohort studies to predict the pace of dengue spread based on clinical presentation and laboratory findings during epidemics in India. Aedesaegyptiis a common vector for transmission of DENV, CHIKV and ZIKV, so there is a need to screen for these infections in endemic areas.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORS' CONTRIBUTION

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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ETHICS STATEMENT

Not applicable.

DATA AVAILABILITY

All datasets generated or analyzed during this study are included in the manuscript.

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