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Clinical Profile and Outcome of Dengue Fever from a Tertiary Care Centre at Aurangabad Maharashtra India: An Observational Study

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Abstract :
Introduction: *India is among the countries reporting regular outbreaks of Dengue infections. The clinical & epidemiological profile of Dengue infection changes from time to time. Present study describes clinical & laboratory manifestations of dengue cases from a tertiary care centre.* ***Methods:*** *It is a descriptive observational study. Study duration was two years from Sep 2011 to Aug 2013. All the dengue patients admitted during this period were included and classified as per new WHO-2009 classification into: Dengue Fever without warning signs (DFWOWS), Dengue Fever with warning signs (DFWWS) and Severe Dengue (SD). The clinical & laboratory parameters were studied and described.* ***Results****: From the total of 150 cases, 128 cases (85.33%) were DFWWS, 15 cases (10%) were SD and 7cases (4.67%) were DFWOWS. The commonest age group affected (34 %) was between 11- 15 years. The male: female ratio of cases was 1.73:1. Clinical manifestations were fever (100%), rash (85.33%), arthralgia & myalgia (65.33%), vomiting (64.67%), pain in abdomen (54%), retro orbital pain (43.33%) & convulsions (6.67%). On examination 52% cases had hepatomegaly, 46.67% cases had hemorrhagic manifestations and Tourniquet test was positive in 34.67% of cases. In our study, 54.67% of total cases were positive for NS1 antigen, 28.67% cases were IgM positive and 16.66% cases were positive for both. Maximum number of patients had platelet counts between 40,000 to 1,00,000 (56%). Commonest complication was Encephalitis followed by ARDS. During study period, there was a single death and it was due to ARDS.*

Keywords: *Dengue fever, NS1 antigen, platelet count, severe dengue.*

I. Introduction

The dengue infection has caused epidemics in India which are cyclical and are becoming more frequent. Also the dengue infection is undergoing geographical expansion into rural areas. [1] Severe and fatal forms of the infection i.e. Dengue Haemorrhagic Fever, Dengue Shock Syndrome have been reported in the country from time to time in areas of Delhi, Chennai & Kolkata. [2–5] Mostly, the identification of the dengue infection is based on its characteristic clinical features but dengue cases may present with varied manifestations. [6]

Study published by Doke et al [7] has mentioned that epidemiology and clinical presentation of dengue infection differs significantly across geographical areas in India and there is a need to systematically collect data from various regions and study the nature and course of dengue infections. The present study was done with the objective of studying and describing the clinical profile and outcome of dengue fever from a tertiary care centre at Aurangabad district in Marathwada region of Maharashtra in India.

II. Material And Methods

This descriptive observational study was carried out in the department of Paediatrics; MGM Medical College & Hospital, a tertiary care referral hospital in Aurangabad district of Maharashtra state in India. Study duration was from September 2011 to August 2013.
Study protocol was approved by the ethical committee of the institute.

Children admitted at the hospital paediatric ward in the age group of 0-17 years presenting with febrile illness of 2 to 7 days along with any two of clinical features of dengue like illness i.e. nausea and/or vomiting, rash, myalgia and/or arthralgia, tourniquet test positive, leucopenia were investigated as per hospital protocol. Detailed history and physical examination was done. Blood samples were sent for Complete Blood Count,

NS1Ag and IgM antibody testing. Children positive for NS1 Ag or IgM alone or both NS1Ag and IgM antibodies were included in the study and followed up for clinical profile and outcome. Patients identified to have co-infection with malarial fever or enteric fever; patients negative for both NS1 Ag & IgM and the patients who were discharged against medical advice were excluded from the study.

Informed consent was obtained from each participant's legal guardian. These patients were classified into dengue fever without warning signs (DFWOWS), dengue fever with warning signs (DFWWS) and severe dengue (SD) as per WHO 2009 criteria. [8]

The cases were defined as:

2.1. Dengue fever without warning signs: Live in/travel to dengue endemic area presenting with Fever and 2 of the following criteria: i) Nausea, vomiting, ii) Rash, iii) Aches and pain, iv) Tourniquet test positive, v) Leucopenia, vi) Laboratory confirmed dengue.

2.2. Dengue fever with warning signs: The Warning signs included were: **(**i) Abdominal pain or tenderness. (ii) Persistent vomiting. (iii) Clinical fluid accumulation. (iv) Mucosal bleed. (v) Lethargy. (vi) Restlessness. (vii) Liver enlargement >2cm. (viii) *Laboratory:* Increase in haematocrit concurrent with rapid decrease in platelet count.

2.3. Severe dengue: Criteria for inclusion were: i) Severe plasma leakage leading to: a) Shock. b) Fluid accumulation with respiratory distress. ii) Severe bleeding as evaluated by clinician.

iii) Severe organ involvement: a) Liver: AST or ALT>=1000. b) CNS: Impaired consciousness. c) Heart and other organs.

Laboratory investigations carried out in these patients included haemoglobin, blood counts, haematocrit, and liver function tests. Chest X ray was taken to demonstrate pleural effusion. Ultrasound abdomen was done to identify ascites, polyserositis and gall bladder wall thickening. CSF analysis was done in patients with convulsions, meningeal signs and altered sensorium. Outcome was described in terms of duration of hospital stay, complications noted in dengue cases and number of deaths.

III. Results

In our study, 128 (85.33%) cases were Dengue fever with warning signs, 15 (10%) were Severe dengue and 7 (4.67%) were Dengue fever without warning signs.

In our study there were 95 (63.33%) males and 55 (36.66%) females, with a male to female ratio of 1.73:1 .The commonest age group affected was between 11- 15 years that is in 34 % of the total cases with a mean age group of 9.21±4.78 years. Dengue fever with warning signs was the predominant type in all the age groups. Table-1 and Table-2 describe the details regarding age, sex and type of dengue in the study population. Table-3 shows the urban and rural proportion of cases. There was seasonal variation in dengue cases and as shown in Table-4, maximum number of cases occurred during the months of October to December (59.33%), followed by July to September (30.67%).

Table-5 describes the clinical manifestations in study population. The laboratory findings of Haemoglobin, Haematocrit and platelet count are summarized in Table-6 whereas Table-7 shows the range of platelet count in types of dengue cases as per WHO classification. Elevation of SGOT was higher in severe dengue patients. Rising trend of SGOT values were seen as the severity of the category rises. SGOT levels were more elevated than SGPT in all the groups as seen from Table-8. Table-9 shows the Ultrasound Abdomen findings. The serology reports are summarized in Table-10. Table 11 to 13 indicate the blood transfusion and Paediatric intensive care unit (PICU) requirements, complications of dengue and outcome in the types of Dengue infection.

IV. Tables:

Table-1: Distribution of Patients according to Type of Dengue & Sex

Type Of Dengue	Male		Female		Total	
	Cases	Percentage	Cases	Percentage	Cases	Percentage
Dengue fever without warning signs (DFWOWS)	04	4.21%	03	5.45%	07	04.67%
Dengue fever with warning signs (DFWWS)	84	88.42%	44	80.00%	128	85.33%
Severe dengue (SD)	07	07.37%	08	14.56%	15	10.00%
Total	95	100%	55	100%	150	100%

Table-2: Distribution of Patients according to Age-group

Age Group (yrs)	DFWOWS		DFWWS		SD		Total	
	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage
0-5	01	14.29%	37	28.91%	06	40.00%	44	29.33%
6-10	03	42.86%	31	24.22%	03	20.00%	37	24.67%
11-15	02	28.57%	45	35.17%	04	26.67%	51	34.00%
>15	01	14.29%	15	11.72%	02	13.33%	18	12.00%
Total	07	100%	128	100%	15	100%	150	100%
Mean± SD	**8.86 ± 4.87**		**9.23 ± 4.83**		**8.93 ± 5.94**		**9.21 ± 4.78**	

Table- 3: Geographical Distribution of Patients

Area	DFWOWS		DFWWS		SD		Total	
	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage
Rural	04	57.15%	74	57.81%	13	86.67%	90	60.00%
Urban	03	42.85%	54	42.19%	02	13.33%	60	40.00%
Total	07	100%	128	100%	15	100%	150	100%

Table-4: Distribution of Patients according to Month of Admission

Month of Admission	DFWOWS		DFWWS		SD		Total	
	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage
January – March	00	00%	03	02.34%	00	00%	03	02.00%
April – June	00	00%	10	07.81%	02	13.33%	12	08.00%
July-- September	02	28.57%	41	32.03%	03	20.00%	46	30.67%
October— December	05	71.43%	74	57.81%	10	66.67%	89	59.33%
Total	07	100%	128	100%	15	100%	150	100%

Table-5: Clinical features of Study Population

Symptoms	DFWOWS		DFWWS		SD		Total	
	Cases	%	Cases	%	Cases	%	Cases	%
Fever	07	100%	128	100%	15	100%	150	100%
Arthralgia &/or Myalgia	05	71.43%	86	67.19%	07	46.67%	98	65.33%
Headache	02	28.57%	53	41.40%	03	20%	58	38.67%
Rash	06	85.71%	109	85.17%	13	86.67%	128	85.33%
Hemorrhagic Manifestations	05	71.43%	57	44.53%	08	53.33%	70	46.67%
Vomiting	05	71.43%	80	62.5%	12	80%	97	64.67%
Retro orbital pain	03	42.86%	57	44.53%	05	33.33%	65	43.33%
Pain in Abdomen	03	42.86%	70	54.69%	08	53.33%	81	54%
Convulsions	01	14.86%	01	0.78%	08	53.33%	10	6.67%
Tourniquet test	02	28.57%	44	34.37%	06	40%	52	34.67%
Hepatomegaly	04	57.14%	61	47.66%	13	86.67%	78	52%

Table-6: Mean Hemoglobin, Haematocrit & Platelet Count

Parameter	**DFWOWS (Mean ± SD)**	**DFWWS (Mean ± SD)**	**SD (Mean ± SD)**	**Total (Mean ± SD)**
Hemoglobin (grams %)	12.03 ± 1.95	12.40 ± 2.05	11.93 ± 1.79	12.12 ± 1.93
Haematocrit (%)	40.41 ± 6.17	39.39 ± 5.96	37.83 ± 6.16	39.29 ± 6.09
Platelet Count (per ml)	41535 ± 15889	53992 ± 27873	37873 ± 23513	44467 ± 22425

Table-7: Distribution of Platelet count according to type of dengue

Platelet Count (per ml)	**DFWOWS**		**DFWWS**		**SD**		**Total**	
	Cases	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**
>1,00,000	00	00%	07	4.67%	00	00%	07	4.67%
40,000 to 1,00,000	04	57.14%	73	61.72%	07	66.67%	84	56%
20,000 – 39,999	03	42.86%	42	28%	05	33.33%	50	33.33%
< 20,000	00	00%	06	4.69%	03	20%	09	6.67%
Total	07	100%	128	100%	15	100%	150	100%

Table-8: Mean SGOT & SGPT in DFWOWS, DFWWS & SD

	DFWOWS (Mean ± SD)	**DFWWS (Mean ± SD)**	**SD (Mean ± SD)**	**Total (Mean ± SD)**
SGOT	221.71±94.09	267.94±167.72	418.67±360.83	302.77±207.55
SGPT	100.42±36.50	135.63±102.72	148.67±118.16	128.24±85.79

Table-9: Distribution of USG abdomen findings in DFWOWS, DFWWS & SD

Ultrasound Abdomen Finding	DFWOWS		DFWWS		SD		Total	
	Cases	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**
Hepatomegaly	02	28.57%	74	49.33%	11	73.33%	87	58%
Gall Bladder wall edema	02	28.57%	38	29.69%	10	66.67%	50	33.33%
Ascites	00	00%	22	17.19%	04	26.67%	26	17.33%

Table-10: Distribution of Dengue serology in DFWOWS, DFWWS & SD

Dengue serology	DFWOWS		DFWWS		SD		Total	
	Cases	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**
NS1 only	05	71.53%	73	57.03%	04	33.33%	82	54.67%
IgM only	02	28.57%	34	26.56%	07	53.33%	43	28.67%
Both	00	0%	20	15.62%	05	20%	25	16.66%

Table- 11: Blood Transfusion & Pediatric Intensive Care Unit (PICU) requirement in DFWOWS, DFWWS & SD

	DFWOWS		DFWWS		SD		Total	
	Cases	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**
Blood Transfusion	01	14.29 %	25	19.53 %	14	93.3 %	40	26.67 %
PICU Admission	00	00 %	29	22.67 %	15	100 %	44	29.33 %

Table-12: Distribution of Complications in DFWOWS, DFWWS & SD

Complications	**DFWOWS**		**DFWWS**		**SD**		**Total**	
	Cases	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**	**Cases**	**(%)**
Hepatitis	00	00%	01	0.78%	00	00%	01	0.67%
ARDS	00	00%	00	00%	01	06.67%	01	0.67%
Encephalitis	00	00%	00	00%	O9	60.00%	09	6.00%

Table-13: Distribution of Outcome

Outcome	DFWOWS		DFWWS		SD		Total	
	Cases	(%)	Cases	(%)	Cases	(%)	Cases	(%)
Improved & Discharged	07	100%	128	100%	14	93.33%	149	99.33%
Deaths	00	00%	00	00%	**01**	**06.67%**	01	0.67%
Total	07	100%	128	100%	15	100%	150	100%

V. Discussion

Total 150 cases of seropositive dengue children presented at Mahatma Gandhi Mission Medical College & Hospital during the study period and the epidemiological, clinical features, laboratory findings, complications and outcome of these patients has been described. As only hospitalised patients were included in this study number of patients having dengue fever with warning signs was significantly more than that without warning signs. Male: Female ratio of 1.73:1 found in present study is comparable to other studies like Agarwal et al [4] reported ratio of 1.4:1, Chandrakant et al [9] study with ratio of 1.6:1, Ashwini Kumar et al [10] study with ratio of 1.8:1. However, Rasul CH et al [11] study reported ratio of 1.21:1 among males and females. The commonest age group in present study was 11-15 years. Gomber et al [12] showed a similar finding with common age group of 6-15 years (78.9%) whereas Rasul CH et al [11] study shows the common age group being 5-9 years (57.1%). Majority of the cases were admitted in the rainy and winter (post monsoon) season, that is from June to December. Thus present study throws further light on the relation between dengue infection and the monsoon season. Similar findings have been found in studies from Ludhiana [13] Kerala [14] and Karachi. [15] This shows that the prevention measures to be taken against dengue should be aggressively followed specially during the periods of water stagnation after the initial episodes of rainfall and towards the end of rainy season as concluded by Ashwini Kumar et al. [10]

Rural patients comprised 60% of the cases at our hospital. It has been stated that the rural spread of dengue infection is comparatively a recent phenomenon which is supposed to be linked with the scarcity of water in rural areas, designing of schemes for water supply to the rural areas and development of newer water transport system in the rural places. [16]

With regards to clinical features, Fever was the most common presenting symptom seen in 100% of the cases. Studies by Sajid et al [17] and Misra et al [18] also reported fever in 100% cases whereas Aggarwal et al [4] reported fever in 93% cases and Narayanan M et al [5] reported fever in 98.3% cases. Vomiting was among the presenting symptoms in 64.67% cases in our study. Other studies like Narayanan M et al study [5] reported vomiting in 83% cases and Misra et al [18] in 58% cases. Hemorrhagic manifestations were seen in 46.67% of cases in our study. Narayanan M et al [5] study reported hemorrhagic manifestations in 66.1% cases.

In our study, Tourniquet test was positive in 52 (28.85%) cases. In the study conducted by Aggarwal et al [4] & Gomber et al [12] tourniquet test was positive in 32% and 25% of cases respectively. Hepatomegaly was found in 52% cases in present study. It was reported in 72% cases in Aggarwal et al study [4], 52.5% cases in Narayanan M et al study. [5]

In the present study, platelet counts of more than1 lakh was seen in 4.67% cases, count of 40000 to 1 lakh in 56% cases, count of 20000-39999 in 33.33% cases and count less than 20000 in 6.67% cases. Aggarwal et al [4] reported counts greater than 50000 in 31% cases, counts of 25000 to 50000 in 47% cases and count less than 25000 in 22% cases. Mean platelet count in this study was 44467 ± 22425 cells per cubic millimetre. Mean duration of hospital stay in DFWOWS, DFWWS and SD were 4.86, 4.95 and 9.53 days respectively.

In our study 9 cases i.e. 6% patients had complications in the form of encephalitis. Tripathi et al reported similar complication in 4% cases. Mortality in our study was 0.67%. Ratageri et al reported no single mortality in their study whereas higher mortality was found in studies by Aggarwal et al [4] i.e. 6% mortality and Narayanan M et al study [5] with mortality of 3.3%. However, these studies were conducted during epidemics in Delhi and Chennai respectively probably contributing to higher mortality.

Limitations of present data include leaving out all out-patient department cases. Also, entomological data could not be collected. Education and intervention strategies by government agencies could be taken into consideration for correlation and impact in future studies. Further studies need to be done on a broad scale so as to understand dengue infection in depth which can help in designing effective interventions at community level for prevention and management of Dengue infection.

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