



CLINICO-EPIDEMIOLOGICAL PROFILE OF DENGUE PATIENTS ADMITTED IN ADULT CRITICAL CARE UNIT OF RURAL TERTIARY CARE HOSPITAL, LONI, MAHARASHTRA.

Anaesthesiology

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ABSTRACT

Background and aim: According to the estimates by World Health Organization, the last decades have shown that although not a new disease, dengue has become a major vector-borne viral disease of mankind, in a relatively short time. Considering the uniqueness of each area, this study was conducted with an aim to observe the clinico-epidemiological characteristics and outcome of dengue patients admitted in adult critical care unit of a rural tertiary care hospital of Loni, Maharashtra. **Methodology:** After obtaining approval from the Institutional ethics committee, this observational record-based study was conducted from 1st January 2018 to 31st December 2019. Data of all patients (more than 12 years age), found positive for either non-structural protein1 (NS1) antigen or dengue IgM or IgG antibodies, admitted in adult critical care unit of the hospital was collected. The demographic data, laboratory parameters, treatment course and the outcome of patients was recorded. The data collected was expressed as percentages. **Results:** Of the 50 patients included in the study, majority were in the age group of 21 to 30 years (30%) being admitted in the months of September to December. 78% patients tested positive for NS1 antigen. Thrombocytopenia was observed in 66% cases. However, only 3 patients required blood transfusion. Majority of patients (72%) were treated and shifted to general wards while fatality was seen in 24% patients. **Conclusion:** In conclusion, this study finds that young population is at greater risk of dengue disease. Creating awareness among rural population, along with undertaking measures for mosquito control during monsoon period, will aid in dengue virus prevention and control strategies.

KEYWORDS

dengue, rural, critical care, laboratory, outcome

INTRODUCTION:

Dengue virus (DENV) infection is the most common arthropod-borne virus (arbovirus) disease affecting many countries around the world.[1,2] The disease caused by the four dengue virus serotypes is currently considered the most important mosquito borne viral disease in the world. Most of DENV infections are asymptomatic, however some lead to more severe infections. DENV infections cause wide ranging clinical symptoms from asymptomatic to severe manifestations such as dengue Haemorrhagic Fever (DHF) and dengue Shock Syndrome(DSS).^[3]

The high burden of disease continues in the state of Maharashtra, India. In recent years, the number of dengue patients has risen dramatically. As per data from National Vector Borne Disease Control Programme (NVBDGP), the number of cases recorded has increased from 4936 cases in the year 2015 to almost 12374 cases in the year 2019.^[4] Quite clearly, DENV infection is threatening the lives of billions of people around the world.

Conducting an integrated study in a local area has become significant due to the difference and uniqueness of each area/region. The aim of this study is to obtain an in-depth perspective as well as better understanding of DENV transmission considering a rural tertiary care hospital of Maharashtra as model area. We studied several important clinico-epidemiological variables, such as demographic characteristics, laboratory parameters and outcome of such patients.

Materials & methods:

After obtaining the Institutional Ethical Committee (IEC) approval (Registration no.-PIMS/DR/RMC/IEC-UG-PG/2020/104), this observational record based study was conducted at a rural tertiary care hospital in Maharashtra, India. The data were collected from 1st January 2018 to 31st December 2019.

All patients found positive for either non-structural protein1 (NS1) antigen or dengue IgM or IgG antibodies and admitted to the adult critical care unit of the hospital were included in the study. Patients admitted in the general wards and those with age less than 12 years were excluded from the study. The data was collected from the medical

records.

A total of 50 patients were included in the study. Socio-demographic characteristics including age, gender, residence (in terms of distance from the hospital) and month of admission were noted. The laboratory investigations like blood group, rhesus (Rh) typing, dengue markers and platelet count were included. During the course of treatment, any requirement of blood products transfusion, duration of ICU stay and requirement of ventilator support were also noted. Outcome of the patients in terms of transfer to general wards, referral to higher center, discharge against medical advice and death was recorded. The data was collected and expressed in terms of percentages.

Results:

A total of 50 patients were included in the study. The socio-demographic profile of the patients has been shown in table 1. Majority of the cases (30%) were in the age group of 21 yrs to 30 years. All the patients were from rural areas around Loni, with majority of them residing at a distance of 21 to 40 km from the hospital.

Table 2 depicts the month wise distribution of the dengue cases for both the years. We found that maximum patients were admitted from September to December in the year 2018 (80% patients) as well as in 2019 (77% patients). It was also observed that the number of dengue cases admitted to adult critical care unit drastically increased in 2019 (45 patients) as compared to 2018 (5 patients).

As far as the laboratory investigations are concerned, figure 1 shows the serological markers of the patients. Out of 50 patients, 39 patients (78%) were tested positive for NS1 antigen, 9 patients were found to be IgM antibody positive and 2 patients were tested IgG antibody positive. The commonest blood group found in our study was B positive (26% patients) as depicted in figure 2. For 34% patients in our study blood grouping and Rh typing was not done. Out of 50 patients in our study, thrombocytopenia (platelet count less than one lakh) was noted in 33 patients (66%) as depicted in table 3. The highest platelet count recorded in our study was 667000 per cubic millimetre (mm³) while the lowest count was 9000 per mm³.

Considering the treatment course, it was observed that for majority of

patients (74% patients), the duration of ICU stay was 1 to 3 days (figure 3). Of all the patients, only 5 patients (10%) required ventilator support during the treatment course. As shown in figure 4, only 3 patients required blood and platelet transfusion requiring a total of 2 packed cell volume (PCV), 2 single donor platelets (SDP) and 4 random donor platelets (RDP). The outcome of the patients is shown in figure 5. A total of 36 patients (72%) were shifted to the wards while fatality was reported in 24% patients.

DISCUSSION:

Dengue is not a new disease, however, the recent widening of endemic areas and increase in severe disease forms has made dengue one of the most important mosquito-borne viral diseases of mankind. In recent decades, the dengue incidence has increased significantly in India. Dengue virus infection can be asymptomatic or a febrile disease that may develop further to severe disease forms involving hemorrhagic symptoms. The incubation period from the infectious mosquito-bite to onset of symptoms can range from 3-14 days.

The number of cases admitted in our hospital (as per record from preventive and social medicine department) has alarmingly increased from 324 cases in the year 2018 to 1709 cases in 2019. Of these, a total of 50 patients were admitted in the adult critical care unit. Considering the socio-demographic distribution of these 50 patients, majority of the patients (30%) were in the age group ranging from 21 yrs to 30 yrs. Similar results have been observed by Naik et al[5] and Kumar et al[6] who found that maximum patients, affected by dengue, were up to 45 years of age. The young population being actively involved at work, is at higher risk of DENV infection due to travelling and contact with other people. This result emphasizes the importance of human mobility and movement in the process of DENV transmission. The female preponderance seen in our study is contrary to the result of other studies by Kumar et al[6], Gupta et al[7] and Suryawanshi et al[8]. This male-female difference in the number of reported dengue fever cases may be attributed to differences in health care seeking behaviour, physiology or immunological differences.^[9]

All the patients in our study belonged to rural area adjoining the hospital, with a maximum distance of 120 km from the hospital premises. Similar observation was made by Naik et al, where 97% patients belonged to rural area.[5] However, this is contrary to the result found by Kendre et al who found 51% of the patients belonging to urban population.[10] This difference could probably be related to high population density and high mobility for instance through travel as evident by results from other studies.^[11,12]

As far as the monthly distribution of dengue cases is concerned, almost 80% cases in our study were reported from October to December. This is in accordance with most other studies where maximum number of cases has been reported during or after the monsoon period i.e. from September to December.^[5,6,10] The requirement of aquatic habitats for the larvae and pupal stages could be the probable reason for seasonal variation in dengue cases.

The laboratory investigations show that 94% patients in our study had thrombocytopenia. Similar results were found by Gupta et al and Kendre et al, reporting thrombocytopenia in more than 90% of their patients.[7][10] In an attempt to find association of blood group and DENV infection, we recorded the blood group of our study patients. The commonest blood group found in our study population was B-positive. Not many studies have focused on the blood group of dengue patients. The current laboratory diagnosis of dengue is based on detection of markers of DENV infection. These include viral components and antibodies that are present in the patient's serum at different time points of the infection. Majority of our cases (i.e. 78%) were tested positive for NS1 antigen. Similar results were observed in other studies by Gupta et al and Suryawanshi et al who found NS1 antigen positive in 86% and 64% cases respectively.^[7,8]

For majority of patients (74%) in our study, the duration of ICU stay was 1 to 3 days. Gupta et al observed a median ICU stay duration of 6 days, ranging from 3 to 7 days.^[7] During the treatment course in ICU, 4 patients in our study required blood and platelet transfusion. Laul et al in their study reported that 10 patients out of 115 in their study required blood and platelet transfusion.^[13] 5 out of 50 patients in our study required ventilator support during the treatment. In our study, while 72% patients were treated well and shifted to the wards, the case fatality rate was 24%, which is much more than that reported in other

studies. Naik et al and Kendre et al reported 2.39% and 5.32% case fatality rate respectively while Laul et al reported no fatalities in their study.[5][10][13]

Limitations of the study:

As per the institutional protocol, for patients with platelet count more than one lakh, blood group and Rh typing is not done. Hence, we could not collect the data of blood group. A prospective study may give more information on this disease in this rural area.

CONCLUSION:

In conclusion, the results of this study have outlined that more caution for people between the age group of 21 to 30 years of either gender should be considered. Since it is a mosquito borne disease, mosquito control measures should be undertaken during the months of September to December. Creating awareness among rural population should be considered. One should also understand that the blood and blood products are not frequently used in these patients.

List of tables and figures:

Table 1: Socio-demographic data of patients

Socio-demographic variable		Number of patients	Percentage of patients (%)
Age (in years)	12-20	10	20
	21-30	15	30
	31-40	12	24
	41-50	4	8
	51-60	1	2
	61-70	3	6
	71-80	4	8
Sex	Male	23	46
	Female	27	54
Residence	Rural	50	100
	Urban	0	0

Table 2: Month wise distribution of patients

Month	Number of cases in 2018	Number of cases in 2019
January-April	0/5 (0%)	2/45 (4.4%)
May-August	1/5 (20%)	8/45 (17.8%)
September-December	4/5 (80%)	35/45 (77.8%)
Total	5/5 (100%)	45/45 (100%)

Table 3: Platelet count of patients

Platelet count (per mm3)	Number of cases	Percentage of cases (%)
< 20000	08	16
20000 to < 50000	04	08
50000 to < 100000	21	42
100000 and above	17	34

Figure 1: Serological markers of patients

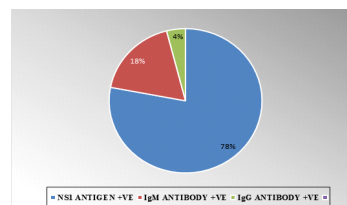


Figure 2: Blood group of patients

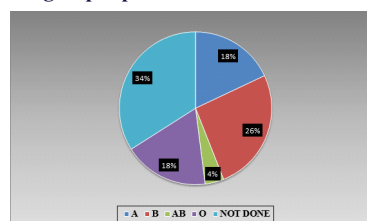
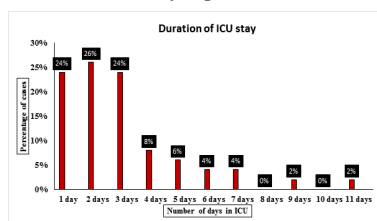
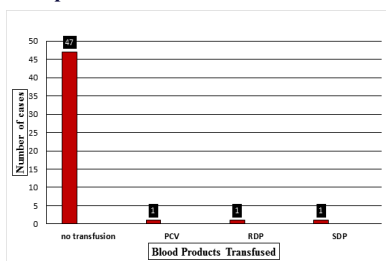
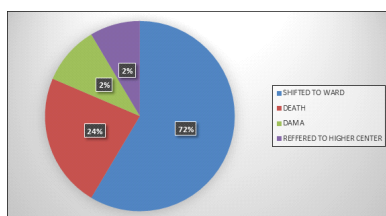


Figure 3: Duration of ICU stay of patients**Figure 4: Blood products transfused**

*PCV- Packed cell volume , RDP- Random Donor Platelets , SDP- Single Donor Platelets

Figure 5: Outcome of patients

*DAMA- Discharge Against Medical Advice

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