Clinical Spectrum and Epidemiology of Patients With Dengue Fever Attending a Tertiary Care Hospital in North Karnataka: a   Cross Sectional Study

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ABSTRACT *Background: Dengue fever , a vector borne viral disease of major public health importance, presents with a wide spectrum of clinical manifestations.*

Objectives: To study the clinical epidemiology of dengue fever patients attending a tertiary care government hospital in North Karnataka.

Methods: It is a hospital based retrospective study where in all the serologically confirmed dengue fever patients admitted to the tertiary Care Government hospital were evaluated for socio-demographic data, clinical presentations , laboratory findings and their out comes

Results: Varied clinical manifestations were noted. Thrombocytopenia was an important clinical finding.

Conclusion: Continuous surveillance and timely interventions are needed to minimize complications, outbreak and mortality rates among dengue fever cases.

Introduction: Dengue is a vector borne viral disease caused by one of the four serotypes of dengue virus belonging to the family Flaviviridae. There is an increasing incidence of Dengue infection and has become major public health problem of global concern. According to WHO, 50-100million cases of Dengue occur each year world wide with more than three lakhs being cases of Dengue hemorrhagic fever. It accounts for than 24,000 deaths per year.[1, 2] It is endemic in more than 100 tropical and subtropical countries. Its manifestations may have a wide spectrum ranging from mild asymptomatic illness to severe fatal Dengue hemorrhagic fever(DHF)/Dengue Shock syndrome (DSS)[3]. Also as the outbreaks of Dengue are affecting different geographical areas , different clinical presentations are being reported. Thus the present study was conducted to study the spectrum of clinical presentations, laboratory profile and outcome of patients with dengue fever attending a tertiary care hospital in North Karnataka.

Materials and Methods: The present study is a retrospective observational study conducted in a tertiary care hospital in North Karnataka. All patients diagnosed with dengue fever over the period of one year were evaluated for the clinical, demographic, serological and hematological parameters. Patients with other causes for thrombocytopenia or fever were excluded from the study. The classical clinical presentation of fever supported by laboratory findings of thrombocytopenia and /or , serological evidence of dengue with positive NS1 and/or IgM positivity, and/or IgG positivity were the criteria used for diagnosis of Dengue fever. The details about the clinical parameters like age and sex of the patients, place of residence, type of presentation, duration of illness, duration of stay in the hospital and the outcome of patients were obtained from case records of the patients. The laboratory details evaluated were hemoglobin, total white blood cell count and platelet count. The hemoglobin and total white blood cell count was done at the time of admission and platelet counts were done on the day of admission followed by repetition of platelet counts on day 2, day3 and day of discharge. The hematological parameters were evaluated on a three part counter in a laboratory attached to the hospital and were reported by qualified pathologists. The serological test for detection of NS1, IgG, IgM were done on the day of admission or during the stay in the hospital.

Results: A total of 139 cases were included in the study. Majority were in the age group of 10-40years. (Table 1). The male to female ratio was 1.5:1(Fig1). These patients came from places in and around Belgavi.(Table 2). Seasonal distribution of the Dengue patients revealed clustering of cases in mansoon season with majority being admitted in the month of June(29.5%) followed by July and August. (Fig 2).

Majority of the patients presented with fever(98.6%). Vomiting, arthralgia, head ache, abdominal pain, body ache, diarrhea, giddiness and convulsions were the other clinical manifestations(Fig 3). Hemorrhagic manifestations were seen in only 3 cases(2.16%). The duration of illness at admission was less than 5 days in majority of patients(55.4%) with only 4% presenting with duration of more than 10days.(Table 3). The systolic blood pressure was normal ie systolic blood pressure between 90-140mm of mercury in most of the 95.7% patients. Hypertension(systolic blood pressure >140mmHg) and hypotension (Systoloc B.P</= 90 mmHg) was seen in 4 and 2 cases respectively..

The hemoglobin levels on admission in majority of the patients was greater than 10 gm%(84.2%)(Table 4). The total white blood cell count(WBC) was within a normal range (ie 4000-11000cell/cmm) in 71.22%. 24.5% of the cases had total WBC count of less than 4000cell / cmm with 4.32% of them a total WBC count of less than 2000cell/cmm(Table 5).

The trends of platelet counts over the period of 3days and on discharge are given in Fig 4.

The distribution of blood groups these patients is shown in the table (Table 6). 64 patients were given platelet transfusion and majority of them were given random donar platelet packs.(RDP).(Table 7)

The duration of stay in majority of patients ranged from 5-10days and majority of them had improved on discharge.13% of the patients were discharged against the medical advice and were lost to follow up. (Table 8) 2 cases who had bleeding manifestations and a platelet count of less than 25000 cells/cmm succumbed to Dengue fever.

The serological investigations revealed the results as shown in Table 9. USG of abdomen was done in 26 cases and showed the following findings(Table 10) .

Discussion:

Dengue is one of the rapidly spreading mosquito borne viral disease with a rapidly expanding geographical limits and has become a major disease of public health importance . In 1964, the serotype1 and 4 of dengue virus were isolated. Since then , intermittent reports of dengue epidemics and its seuelae have been reported from various parts of the country[4]. Literature reveals changing trends in clinical manifestations in the recent outbreaks in India[5].

The predominant age group affected in our study was 10-40years which is similar to a study done in North Indian referral hospital where the commonest age group affected was 20-40years. The study saw a male male preponderance as was seen in the present study [6].

The increased activity of seasonal transmission in the post monsoon season has been noted and was also observed in our study. Stagnated water resources favoring the breeding of mosquito vector could explain the the seasonal trends in the disease transmission[4].

During these pre-monsoon and monsoon periods public awareness, vector control and improvements in sanitation and hygiene are needed to be taken up seriously for necessary action by the concerned authority 7.

According to WHO and CDC guidelines the classic dengue fever (DF) is characterized by fever, headache , retro-orbital pain , myalgia , arthralgia, nausea, vomiting and often rash. The features of more serious form of disease Dengue hemorrhagic fever(DHF) are decline in fever, hemorrhagic manifestations and may develop hemoconcentration. These patients may progress to Dengue shock syndrome (DSS) with severe abdominal pain, protracted vomiting and a notable change temp from fever to hypothermia[8] . Fever was the commonest manifestation in our study similar to other studies. Vomiting, arthralgia, headache, abdominal pain body ache, diarrhea , giddiness ,convulsions were the other symptoms .Hemorrhagic manifestations were seen only 2.16% of cases. Literature reveals variable prevalence of hemorrhagic manifestation ranging from 5% to 93% [6,9,10]. Low platelet count and leakage from blood vessels are the proposed causes for bleeding diathesis [9]. However most of the studies did not see any association between the platelet counts and bleeding diathesis. Rash is another common manifestation noted in literature which may range from maculopapular rash , petechiae, flushing or even desquamation. The rash may be because of thrombocytopenia

or because of other immunological mechanisms resulting from cytokine release which occurs when the dengue virus interacts with host cells[9].

Other uncommon manifestations which have been reported in literature include neurological manifestations, ascites , pleural effusion, altered liver function and   pancreatitis [11].In the present study ascites, pleural effusion, hepatomegaly/ hepatitis were seen on 7.91%, 5.04% and 6.47% cases respectively which was evidenced on ultrasound studies done on patients.

The serological evaluation showed a prevalence of NS1 positivity in 34.85% cases, IgM positivity in 62.59% and IgG positivity in75.54%. Our findings were similar to a study done done in North Indian referral hospital which showed   NS1 positivity in 36.6%,Ig M positivity in46.6%. However their percentage of IgG positivity was only 16.6%[6].

The commonest blood group of the patients was 'A'(37.4%) followed by B , O , and AB . Majority of them were Rh positive(97.84%).A study conducted in Karimnagar Andhrapradesh showed the distribution of blood as "O" in 57.6%, "B" in 34.8%, "A" in 7.6% and "AB"in none[7]. Another study by Kalayanrooj et al showed an association of AB blood group with increased risk of severe Dengue [12].

The hemoglobin levels were greater than 10gm% in majority of the cases(87.4%) with 15.83% patients having hemoglobin levels less than 10gm%. In a study by Fugimoto etal the nearly half of the cases (45%) had anemia[13].

Leucopenia was seen in 28.78% of cases similar to a study conducted in eastern India when leucopenia was seen in 29.73% cases[9]. However results have been obtained by various studies with few having a leucopenia in as low as 4.1% to as high as 90%[10,14].Virus induced inhibition or destruction of myeloid progenitor cells may cause leucopenia in dengue fever [9].

Thrombocytopenia with a platelet count of less than one lakh / cmm was seen in 70cases (50.36%) on day one of admission, 46.76% on day 2 of admission, 37.41% on day 3 and 6.47 % on the day of discharge. However a platelet count of less than 25,000/ cmm   was seen in 6cases (4.22%) on the day of admission while none of the cases had platelet count of less than 25,000/cmm. Study done by Khan et al[6] showed a prevalence of thrombocytopenia in 74.3% cases while 42% cases had thrombocytopenia in study by Goyal et al[11]. Jagjit Singh et al found thrombocytopenia in 100% cases [15]. Decreased production and increased destruction of platelets could result in thrombocytopenia. Immune mediated destruction of the platelets is suggested by the detection of virus- antibody complexes [16].

The outcome of the disease is variable as evidenced by various studies. While study done by Jagjit Singh et al[16] showed a mortality in 5% cases , in our study 2 cases(1.44%) succumbed to the disease. A study conducted in King Abdul Aziz University hospital Saudi Arabia observed that mortality rate in Dengue patients ranged from0% to 25% over the period 2005-2008.A complex interaction between immunopathological, viral and human genetic factors result in varied outcome of the disease[17].

Clinical findings like abdominal tenderness, hepatomegaly, lethargy, cold extremity, and bleeding, and laboratory findings like platelet cell count of ≤ 75,000/mm3 and hematocrit value of 50%, or a rise of more than 22% from baseline hematocrit are suggested as early predictors of severe Dengue . Further, coexisting condition, and young and old ages may be used as early predictors of severe dengue, in addition to Caucasian race, and people with AB blood group[3].

Conclusion: Clinical presentation of Dengue vary with typical as well as atypical presentations. Thus continuous surveillance and timely interventions are needed which can minimize the complications, outbreak and mortality rates among Dengue fever cases.

TABLES

Table 1: showing the age distribution of dengue patients

Age	No.(n=139)	Percentage (%)
<10	08	5.76
10-20	35	25.18
20-30	37	26.62
30-40	29	20.86
40-50	13	9.35
>50	17	12.23

Table 2: Showing the residential areas of places of the dengue patients attending the tertiary care centre

Place	No.(n=139)	Percentage(%)
Belgaum	39	28.06
Hukkeri	16	11.51
Khanapur	09	6.47
Ramdurg	19	13.67
Ankalgi	01	0.72
Raibag	08	5.76
Chikkodi	19	13.67
Gokak	05	3.60
Bailhongal	14	10.07
Saudatti	01	0.72
Nippani	01	0.72
Jamkhandi	01	0.72
Raichur	01	0.72
Dharwad	01	0.72
Karwar	01	0.72
Kolhapur	03	2.16

Table 3: Showing the duration of illness on presentation and the stay in the hospital

No. of days stay in hospital	No. (n=139)	Percentage (%)
<5 days	36	25.90
5-10 days	86	61.87
10-15 days	15	10.79
≥15 days	02	1.44
Duration of illness on admission		
<5 days	77	55.39

5-10 days	56	40.28
10-15 days	03	2.15
>15 days	03	2.15

Table 4 : Showing distribution of patients according their ABO blood group

Blood group(ABOtype and Rh)	No. (n=139)	Percentage (%)
A+	52	37.41
B+	35	25.18
AB+	16	11.51
O+	33	23.74
A-	0	0.00
B-	1	0.72
AB-	1	0.72
O-	1	0.72

Table 5:Showing hemoglobin levels among Dengue patients

Haemoglobin on admission		
<7 gm	08	5.76
7-10 gm	14	10.07
>10 gm	117	84.17

Table 6: Showing the total counts in Dengue patients

Total count		
<2,000	6	4.32
2,000-4,000	34	24.46
≥4000	99	71.22

Table7: Showing the number of and type of platelet transfusions given

Platelet transfusion	No. N=64	Percentage (%)
1	15	10.79
2	23	16.55
3	12	8.63
>3	14	10.07
Type of transfusion		
RDP	50	78.12
SDP	14	21.87

Table8: showing the outcome of patients of dengue fever

Results		
Improved	124	89.21
Death	02	1.44
DAMA	13	9.35
Referred	00	0.00

Table 9: showing serological evidence of dengue fever

Dengue test	No.	Percentage (%)
NS 1 positive, IgM, IgG	22	15.83
NS 1 positive	18	12.95
IgM	06	4.32
IgG	30	21.58
IgM, IgG	49	35.25
NS 1 positive, IgM	10	7.19
NS 1 positive, IgG	04	2.88

Table10 : showing ultrasonography findings in dengue patients

USG	No.	Percentage (%)
Hepatitis /hepatomegaly	09	6.47
Ascitis	11	7.91

Pleural effusion	07	5.04
Cholecystitis	01	0.72
Fatty liver	03	2.16
cirrhosis	01	0.72
hepatospleno-megaly	02	1.44
Normal	05	3.60
Not done	113	81.29

Fig 4 Showing the trends of the platelet counts
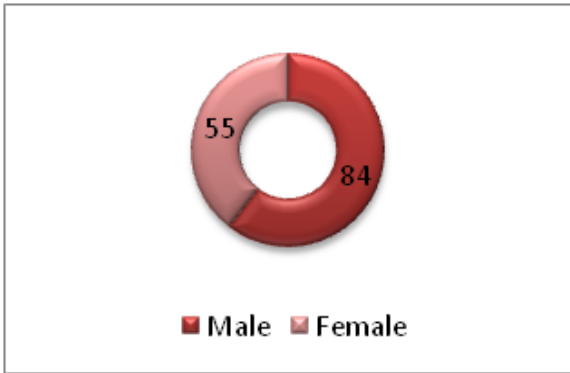

FIGURES

Figure 1:Showing the sex distribution

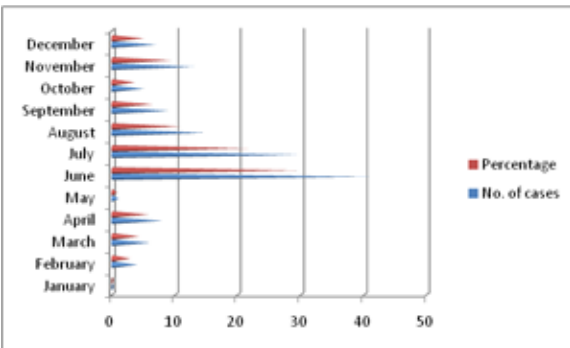Fig 2: showing the distribution of dengue cases over one year duration

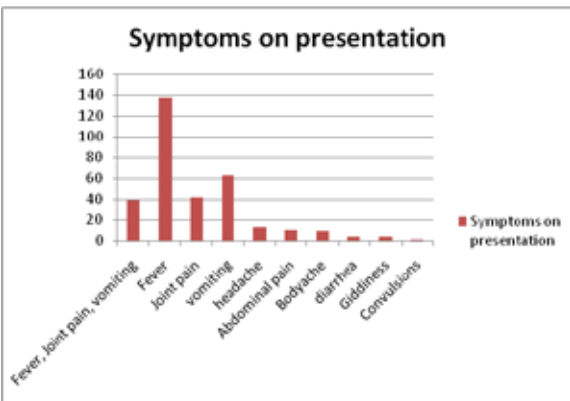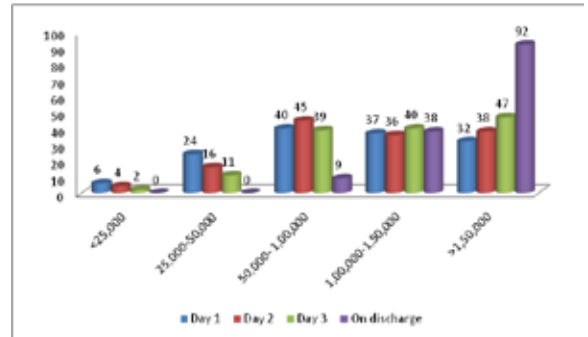Fig 3: Bar diagram showing the distribution of cases depending the their symptoms at presentation

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