Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Der Pharmacia Lettre, 2013, 5 (3):76-80
(http://scholarsresearchlibrary.com/archive.html)

Der Pharmacia Lettre
Scholars Research Library
ISSN 0975-5071
USA CODEN: DPLEB4

To assess the severity of dengue fever in patients attending a tertiary care teaching hospital using WHO grading system

Sarwat Fatima, Md. Ashraf Ul Abeddin and Fakeha Firdous

Decccan College of Medical Sciences.

ABSTRACT

To check the profile of dengue fever applying WHO grading system. To know the outcome of patients according to the grading system. Background- Dengue virus causes spectrum of clinical manifestations which can be graded according to WHO grading system. Our study included 131 laboratory confirmed cases of dengue infection. WHO criteria were applied to them and patients were classified into Dengue Fever , Dengue Hemorrhagic fever and Dengue shock syndrome. Patients were followed up throughout their course of hospital stay till discharge/death .Patients were classified on basis of interventions done-like fluid replacement, blood transfusion. Classical Dengue fever (classical DF), Dengue Haemorrhagic fever (DHF), Dengue Shock syndrome (DSS), Platelet count. Out of 131 patients 60% were found to have Dengue fever,36% with Dengue hemmorhagic fever and 4.5% with Dengue shock syndrome. Majority of patients with Dengue hemmorhagic fever and Dengue shock syndrome required interventions and had longer duration of hospital stay. WHO criteria for grading of dengue helps us to assess the severity and also segregate the patients who need aggressive management.

INTRODUCTION

Introduction – Dengue is an acute viral infection with potentially fatal complications .It has become a world wide public health problem [1]. It is endemic in many countries of south east Asia and western pacific regions are more seriously affected [1]. In India infection with multiple serotypes has been observed [2]. Dengue can be self limiting infection or can be associated with multiple complications which are life threatening like haemorrhage , hypotension and shock. Though mortality of dengue is as high as 20% but if managed properly can be as low as 2%. [2]. Specific antibody detection has been the mainstay of diagnosis which is prone for both false positive and false negative reactions. The new parameter dengue NS1 antigen appears to be highly specific and reliable for diagnosis of dengue fever from first day of fever [14]. WHO has formulated a classification system to differentiate between self limiting dengue fever and potentially lethal DH F[2]. DHF is defined by presence of fever , thrombocytopenia, heamorrhagic tendencies and evidence of plasma leakage due to increased vascular permeability. The more severe cases with circulatory failure are subdivided as DSS [2].WHO classification system can be applied for diagnosis, management and early identification of patients with risk of dengue related complications. This system can also be used for assessment of global disease burden and it can also help in developing treatment algorithms to decrease the mortality rate of DHF[3].Several studies have evaluated the performance of WHO classification system for estimating the severity of dengue infection[18].

MATERIALS AND METHODS

Study population included suspected dengue cases admitted in wards and ICU of Princess Esra Hospital from July 2012 to January 2013.Patients with complaints of fever, headache, myalgia, arthralgia,retroorbital pain, rashes and bleeding manifestations who where serologically positive for dengue were included in the study. Informed consent was taken.

Detailed clinical history and physical examination of the patient was carried out at the time of admission . Routine investigations like Complete blood picture, Liver function test , Renal function test, Chest Xray for pleural effusion , Ultrasound abdomen and pelvis for as cites were performed. Tourniquet test was also done. Blood sample for serological evidence of dengue was collected at the time of admission .Dengue specific antibodies IgG and IgM were demonstrated by capture ELISA as per the manufacturer's instructions using J MITRA.CO. PVT. LTD. Dengue NS1 antigen detection was carried out using NS1 antigen microlisa from the same company. Platelet count and haematocrit values were recorded at the time of admission and repeated when ever required. Patients were followed through out the hospital stay . Increased vascular permeability or plasma leakage was documented by presence of one of the following :

1. Signs of plasma leakage like pleural effusion, ascites, hypoproteinemia.
2. Rise in haematocrit equal to or greater than 20%.
3. Drop in haematocrit equal to or greater than 20% of the baseline following replacement therapy.

Table 1 – WHO grading of Dengue

SNO	Grade	Signs and symptoms	Lab investigations
1	DF Classical	Fever with two or more of the following – Headache, myalgia, retrobulbar pain , arthralgia.	Leucopenia thrombocytopenia < 1lakh. No plasma loss.
2	DHF I	Above + positive tourniquette test	Thrombocytopenia < 1 lakh Haematocrit >20%
3	DHF II	Above + spontaneous bleeding	Above + plasma loss
4	DSS III	Above + circulatory failure (weak pulse ,hypotension , restlessness)	,,
5	DSS IV	Above +profound shock (no BP /PR)	,,

Patients who fell in the DHF GRADE II and DSS were admitted in ICU for further management and observation . Patients with platelet count < 50,000/cumm were admitted in ICU for platelet transfusion.

RESULTS

A total of 494 patients of suspected dengue fever were admitted to the hospital with symptoms consistent of dengue. Out of which 131 patients were found to be serologically positive for dengue fever. figure -1.

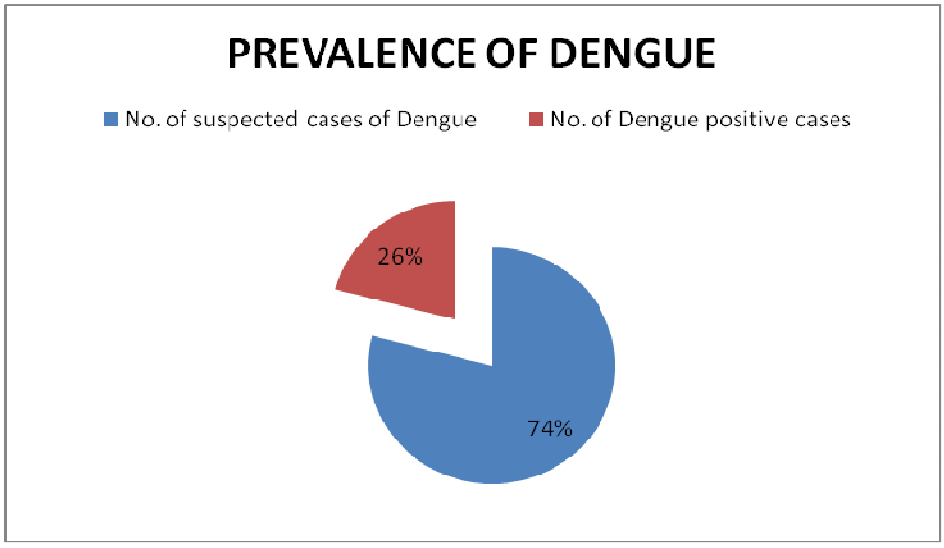

Figure -1 showing prevalence of dengue fever

38 patients were admitted to ICU and remaining to wards . Among the 131 patients majority of the patients had fever 99% followed by rash 22.13%. Out of the 131 patients who were seropositive for dengue 35 (27%) were IgM positive, 63 (48%) were positive for both IgM and IgG and 65 (50%) were NS1 Ag positive. We categorised patients according to the range of platelet count. Equal no. Of patients had platelet count less < 50,000/cumm and between 50,000 – 1, 00,000 /cumm. Figure -2

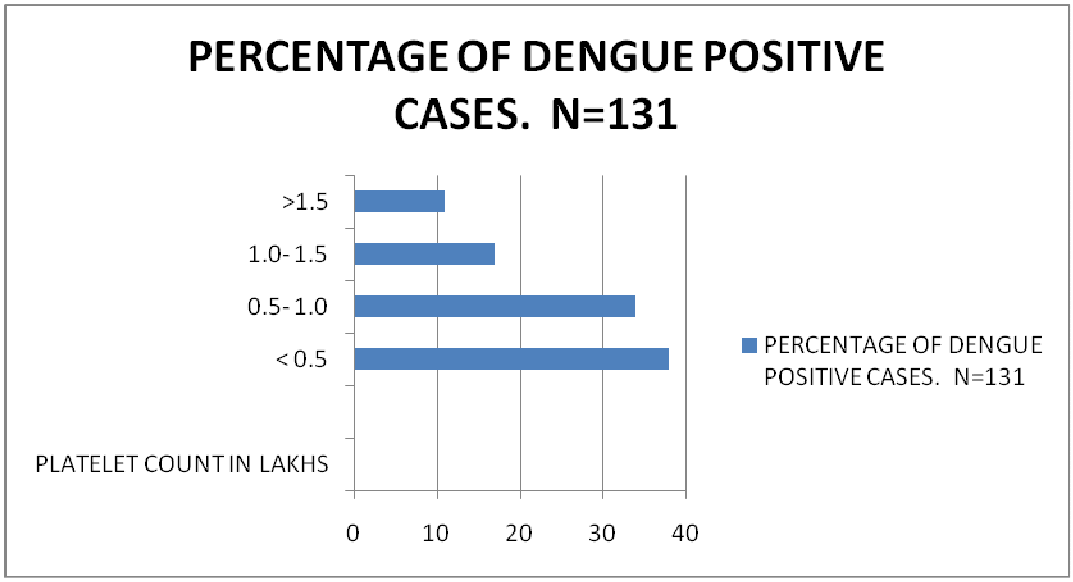

Figure -2 showing platelet count in serologically positive cases of dengue fever

There was no inverse relationship between bleeding tendencies and platelet count.

Bleeding manifestations were noted in 22%, Malena 8% hematemesis – 2%,5% had hematuria, 1% had ecchymotic patches , 3% had hematochazia. Figure -3

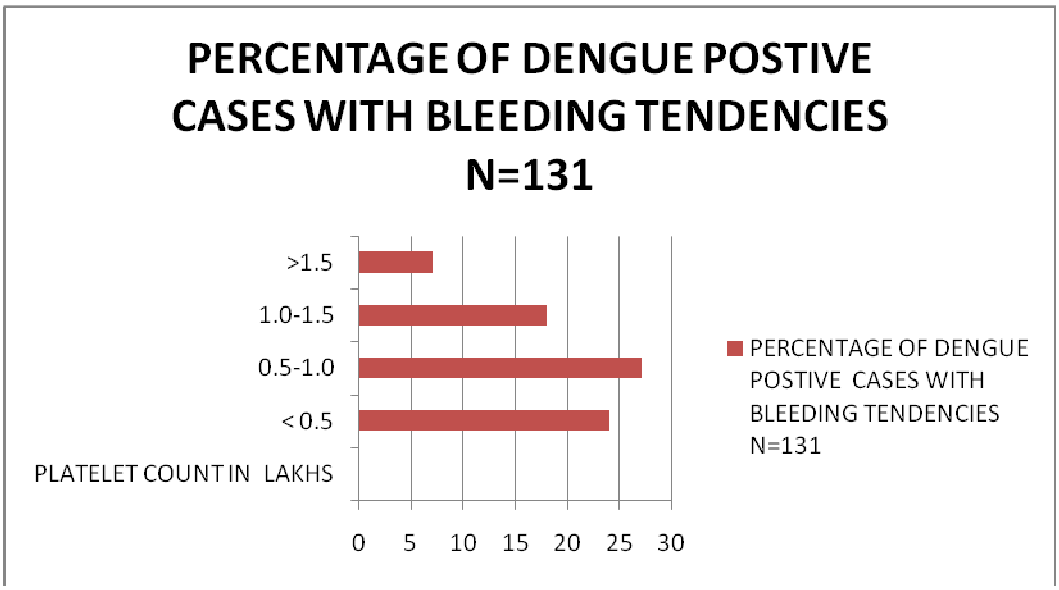

Figure -3 showing percentage of bleeding tendencies in serologically positive cases in relation to platelet count

Patients were categorised into different grades of DF according to WHO classification.

Majority of the patients fell in classical DF 60% and DHF I (15%), DHF II 21% and DSS III 4.5% and DSS IV 0%.Figure -4

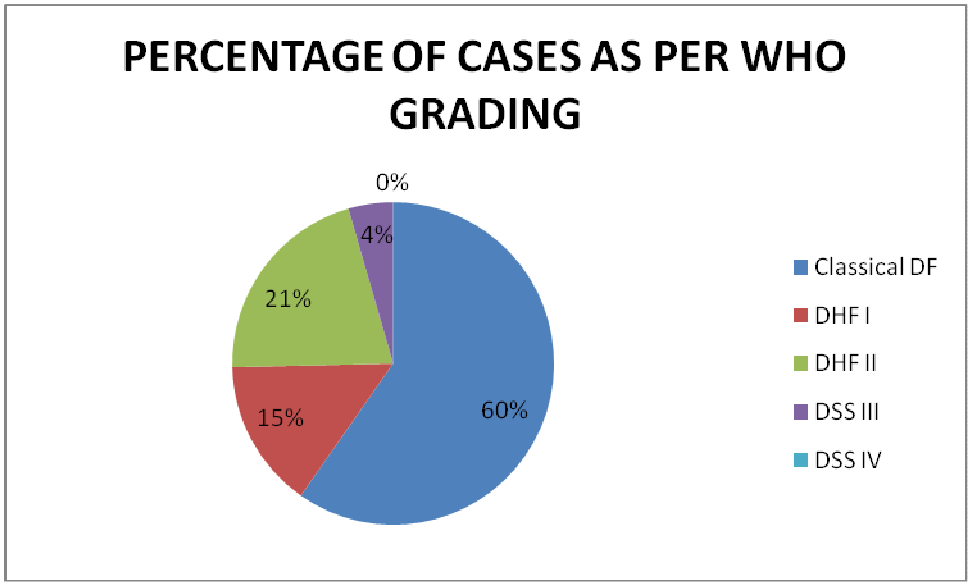

Figure -4 shows distribution of dengue fever cases as per WHO grading system

In our study as markers of plasma leakage rise in haematocrit was seen in 73 patients, evidence of pleural effusion in chest x-ray is seen in 25 patients, ascitis in 15 patients and hypoproteniemia in 10 . Thrombocytopenia was found in 78 out of 131 patients with classical DF, 47 out of 131 with DHF and 6 out of 131 patients with DSS. Plasma leakage marker was found in 12 patients with classical DF, 22 with DHF and 6 with DSS.We found that 15 patients with grade I- DHF, 25 patients with grade II DHF and 6 patients with DSS required intensive care , fluid replacement and blood transfusion.

Table -2 Showing management of patients

WHO grade	Observation	ICU care	Death
DF 78	50[64%]	28[36%]	0
DHFI[19]	04[21%]	15[79%]	0
DHFII[28]	03[11%]	25[89%]	0
DSSIII[6]	0	05[83.3%]	01[17%]
DSSIV	0	0	0

DISCUSSION

Since time period diagnosis of dengue infection has been mainly by detection of dengue IgG and IgM antibodies by using either rapid immunochromatography test[ICT] or by enzyme linked immunosorbent assay[ELISA].Among the various ELISA techniques the dengue IgM and IgG-capture ELISA has been found to be more sensitive an specific. Primary dengue infection is characterised by high titres of IgM antibodies. In secondary infection IgM is slow to appear and is seen in low titres. where as IgG levels rises to peak in 2-3 days.These two parameters failed to identify acute infection in window period.In dengue infection diagnosis during window period is possible by either detection of dengue virus in blood by PCR, which is quite expensive and available at referral centres. The new reliable parameter dengue NS1 antigen is a non structural protein which can be assessed in the patient's blood from day1 of the fever has been found to as equivalent to detection of viraemia by PCR [15,16,17]. And is affordable by the patients in developing countries.

In our study the WHO criteria have been applied prospectively in patients for classification of dengue severity. Out of 131 patients who were serologically positive 78 were diagnosed to have DF classical,47 had DHF and 6 had DSS. Majority of the patients in DHF had thrombocytopenia and bleeding manifestations. Many studies proved bleeding and thrombocytopenia as reliable indicators and prerequisites for DSS[4,8].The degree of thrombocytopenia was significantly more in grade II DHF followed by grade I DHF. Torniquet test is an important diagnostic parameter, as it is the only hemmorhagic manifestation in grade I DHF.

As marker of plasma leakage we assessed rise in hematocrit, hypoalbuminemia, pleural effusion and ascites individually. Clinical detection of pleural effusion and as cites is not reliable unless the volume of fluid is large[11].Chest x ray is more efficient in small amounts of pleural fluids. Even as cites can be diagnosed by ultrasonography[12,13].In our study we found pleural effusion to be a significant marker for plasma leakage than

ascites ,which is comparable to other studies[4].Thrombocytopenia and increased vascular permeability as marker of plasma leakage are very useful in differentiating and assessing DF from DHF. Out of 131 dengue confirmed cases 36% of classical DF,79% of DHF I, 89% of DHF II and all patients of DSS needed intervention.DHF as defined by WHO criteria correlated strongly with need for intervention[4].In a tertiary care centre where repeat platelet counts and hematocrit values can be performed along with assessing plasma leakage by radiography and ultrasound. WHO grading system has been found to be very useful in estimating the severity of DF.

In our study dengue NS1 antigen was positive in 65[50%]of the cases. which is almost 1/4th of the positive cases. This is similar to one reported by RD Kulkarni[14].Dengue IgG and IgM were positive in 63 cases[48%] which is higher when compared to RD Kulkarni study [14]and lower when compared to Neeraja M[19].

CONCLUSION

WHO grading system for dengue fever is a very helpful tool to identify patients who need observation and aggressive management. Plasma leakage markers and thrombocytopenia are the markers to differentiate DHF from DF. Further during outbreaks of dengue fever in resource poor settings a combination of dengue serology and dengue NS1 antigen detection in corroboration with other laboratory findings, help one to achieve diagnose of acute infections and even the potential fatal complications which would be missed otherwise by going for only antibody detection assays .

Limitations – In our study Dengue PCR which is a confirmatory test for Dengue fever could not be carried out because of lack of facilities.

REFERENCES

[1] SB Halstead *dengue lancet* **2007**;370:1644-1652
[2] WHO Geneva,DHF-diagnosis,treatment,prevention and control,2nd edition **1997**.
[3] S Kalyananarooj, DW Vaughn, S .Nimmannitya, S Green, S Suntayokorn, N Kunentrasai, W Viramitrachai,Ratanachu-Eke S,kiatpolpoj S,Innis BL,Rothman AL,Nisalak A, Ennis FA: *J infect Dis* **1997**;176;313-321.
[4] Anon Srikiatkhachorn,Robert V Gibbons,Sharone Green,Daniel H.Libraty. *Clinical infectious diseases* **2010**;50;1135-1143.
[5] J Rocha , W Idiaquez, RE Alonso, MA Delgado, LA Campo, F Acevedo , A Gonzalez, JJ Amador, A Balmaseda. *Amj Trop Med hyg* **2000**;63;5-11
[6] B Murgue, X Deparis , E Chungue, O Cassar, CRoche : *Trop med int .health* **1999**;4:765-773.
[7] Y Kabrask Jain, RM Pandey,Madhulika, T Singhal , P Tripathi, S Broor , P Seth, V Seth: *Trans R Soc Trop Med Hyg* **1999**;93:294-298.
[8] DH Libraty, TP Endy, HS Houng et al. *J Infect Dis* **2002**; 185 [9]: 1213-1221.
[9] CX Phuong, NT Nhan, B Wills et al. *Trop Med Int Health* **2002**; 7: 125-132.
[10] S Bandyopadhay, LCS Lum, A Kroeger: *Trop Med International Health* **2006**: 11:1238-1255.
[11] S Balasubramanian, L Janakiraman, SS Kumar, S Muralinath , S Shivbalan. *India pediatr* **2006**; 43: 334-339.
[12] A Srikiatkhachorn, A Krautrachue, W Ratanaprakarn et al. *Pediatr Infect Dis J* **2007**; 26 [4] 283-290.
[13] PM Venkat ,B Sai,Dev, R Krishnan: *Br J radiol* **2005**; 78:416-418.
[14] RD Kulkarni , SS Patil , GS Ajantha, AK Upadhya, AS Kalabhavi, RM Shubhada, PC Shetty, PA Jain. *Indian J Med Microbial* **2011**;29:359-362.
[15] DH Libraty, PR Young, D Prekening, TP Endy, S Kalyanarooj, S Green et al. *J inf. Dis* .**2002**;186:1165-1168.
[16] V Tricou, TV Hang, NV Quynh, CV Ngnyen, HT Tran, J Fairav et al. *BMC infect Dis* **2010**;10:142-9
[17] TV Hang, MN Nguyet, TD Trung, V Tricou, S Yoksan, ND Minh et al. *PLoSNegl.Trop. Dis* **2009**;3:e360.
[18] N Pavan kumar, M Swapna and Smitha *AlAmeenJ Med Sci* **2012**;5(4):388-93.
[19] M Neeraja, V Laksmi, PK Dash et al..*J of clinical and Diagnostic research* .**2013** march, vol -7(3): 457-61.