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PREVALENCE OF HEPATIC DYSFUNCTION IN DENGUE FEVER IN CHILDREN PRESENTING AT TERTIARY CARE HOSPITAL, KARACHI.

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ABSTRACT

Objective: To determine the prevalence of hepatic dysfunction in children presenting at a tertiary care hospital, Karachi. **Method:** A prospective, cross-sectional study has been conducted at Ziauddin University Hospital, Karachi, from the month of June 2015 to December 2016. Children, who were admitted to the setting were included in the study on the basis of diagnosis of dengue after the serological confirmation by finding of dengue immunoglobin M captured by ELISA and screening as per the WHO guidelines for severity of the dengue infection. **Results:** 189 patients meeting the inclusion criteria were included in the study out of which 59.8% (113) were males and 40.2% (76) were females. The pediatric cases were distinguished into three cases i.e. 59.3% (112) of dengue infection, 25.4% (48) dengue hemorrhagic fever and 15.3% (29) dengue shock syndrome. **Conclusion:** Notable frequency of hepatic dysfunction has been observed with severity in dengue shock syndrome in comparison with dengue fever and dengue hemorrhagic fever.

KEYWORDS: hepatic dysfunction, dengue fever, dengue hemorrhagic fever, dengue shock syndrome

INTRODUCTION

Dengue is a rapidly spreading mosquito-borne acute febrile disease occurring in tropical and subtropical areas of the world.[1] Dengue virus belongs to the genus Flavivirus of the family Flaviviridae and has antigenically four distinct serotypes called DEN-1, DEN-2, DEN-3 and DEN-4.[2] The incubation period of the virus ranges between 3 and 15 days, usually 7-10 days.[3] The febrile phase is usually followed by a short afebrile phase and a relatively long convalescence phase.[4] According to the guidelines of World Health Organization (1997), dengue has been classified into three categories

I. Dengue Fever: Fever with at least two of the features that may include ocular pain, headache, muscle or joint pains, cutaneous rash, bleeding manifestations and reduced leukocyte count.
II. Dengue Hemorrhagic Fever: Fever with thrombocytopenia (< 100 x 10^9/L), bleeding manifestations and evidence of plasma leakage.
III. Dengue Shock Syndrome: DHF with tachycardia or low pulse pressure (< 20 mmHg) or hypotension (systolic blood pressure < 90 mmHg).

The pattern of dengue viral disease varies from classical dengue fever (DF) to life threatening dengue hemorrhagic fever (DHF), which frequently leads to hypovolemic shock i.e. dengue shock syndrome (DSS).[5, 6]

Classical dengue fever is characterized by the sudden onset of high grade fever that is often accompanied by severe retro-orbital headache, myalgias, artharlgias, nausea, vomiting and macular or maulo-papular rash.[7] Unusual findings include the involvement of liver, nervous system and heart in such condition that indicates fatal consequences.[8, 9] The severity of liver dysfunction varies from mild injury to fulminant hepatic failure and is more common in patients with complicated dengue.[10, 11, 12] Thus, in recent years, high morality have been reported in children with dengue infection with acute liver cell failure.[13]

MATERIAL AND METHOD

A prospective, cross-sectional, hospital based study was conducted in the department of pediatrics, Ziauddin Medical University Hospital, Karachi during the epidemic, i.e. June to December 2015. A total 189 suspected cases, between 2 months to 15 years of age, were admitted to the setting. They were screened as per the WHO guidelines and only serologically confirmed cases by dengue IgM capture ELISA were included in the study. A detailed history and a thorough clinical examination were done in all the cases. Ethical committee clearance was taken from the institution and

informed consent was taken from the guardian of every patient who took part in this study.

Data was collected via prewritten performa. The operative definition used for liver dysfunction in each study was the incidence of serum alanine transaminase (ALT) or aspartate transaminase (AST) level more than 200 U/L. Each degree of dengue has been recognized during the examination as explained in the introduction and explained by WHO.

Other causes of hepatitis such as malaria, viral hepatitis, enteric fever and malignancies were excluded by history, examination and investigations. All the cases were subjected to following investigations: dengue IgM capture ELISA, serum bilirubin, alanine transaminase (ALT), aspartate transaminase (AST), ultrasound of abdomen and thorax. Statistical analysis was done using SPSS version 16. Quantitative data was presented as frequencies and percentages. Post stratification chi square test and statistical significant level was set with a P value < 0.05.

RESULTS

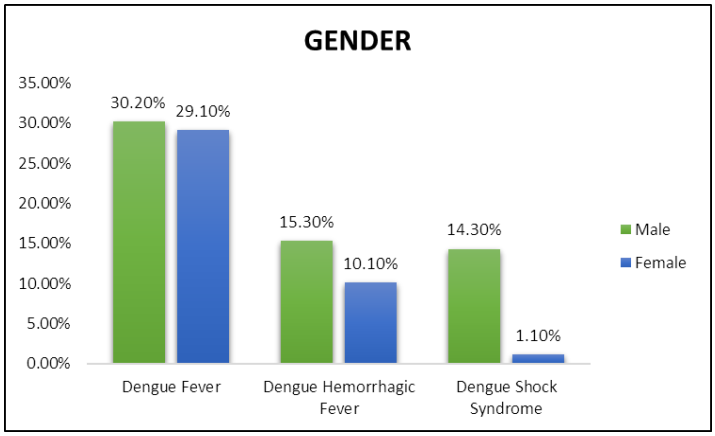

Figure 1: The figure shows the incidence of dengue fever, dengue hemorrhagic fever and dengue shock syndrome in the two genders. The high prevalence of dengue fever can be noted in male children with largest occurrence of 30.20% (n=57) affected males by dengue fever.

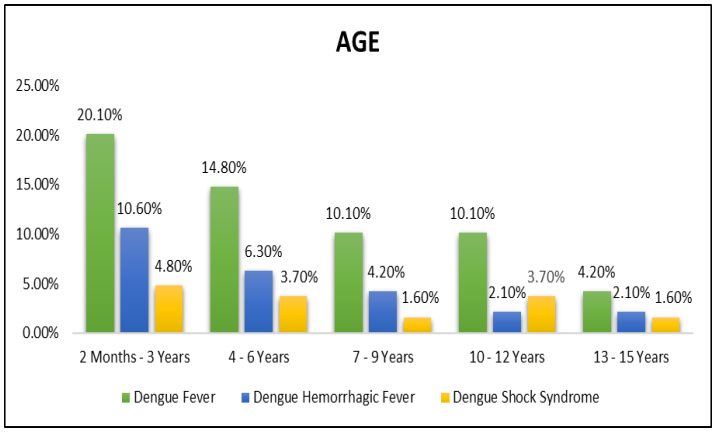

Figure 2: The figure shows the incidence of dengue fever, dengue hemorrhagic fever and dengue shock syndrome cases in different age groups. The high prevalence of dengue fever in every group can be noted with largest occurrence of 20.10% (n=38) in the study group of age 2 months to 3 years.

Table 1: Clinical and Biochemical Parameters of Dengue

Symptoms	Dengue Fever (n=112)	Dengue Hemorrhagic Fever (n=48)	Dengue Shock Syndrome (n=29)
Fever	100% (n=112)	100% (n=48)	100% (n=29)
Body Aches	100% (n=112)	100% (n=48)	100% (n=29)
Vomiting	100% (n=112)	100% (n=48)	100% (n=29)
Facial Puffiness	33.9% (n=38)	43.7% (n=21)	62% (n=18)
Maculopapular Rash	40.1% (n=45)	22.9% (n=11)	27.5% (n=8)
Petechial Spots	25.8% (n=29)	37.5% (n=18)	30.7% (n=12)
Signs			
Jaundice	37.5% (n=42)	27% (n=13)	58.6% (n=17)

Hepatomegaly	65.1% (n=73)	87.5% (n=42)	79.3% (n=23)
Hepatic Tenderness	50% (n=56)	64.5% (n=31)	51.7% (n=15)
Hepatic Dysfunction			
Elevated ALT	52.6% (n=59)	81.2% (n=39)	82.7% (n=24)
Elevated AST	64.28% (n=72)	75% (n=36)	89.6% (n=26)
Elevated Bilirubin	37.5% (n=42)	27% (n=13)	58.6% (n=17)
Ascites	12.5% (n=14)	58.3% (n=28)	65.5% (n=19)
Gall Bladder Wall Thickening > 5mm	1.78% (n=2)	16.6% (n=8)	37.9% (n=11)

The table 1 shows that the incidence of symptoms, signs and hepatic dysfunction in dengue fever, dengue hemorrhagic fever and dengue shock syndrome.

The symptoms of fever, body aches and vomiting are 100% in all the three degrees of dengue whereas facial puffiness is highly prevalent in DSS with 62%, maculopapular rash in DF with 40.1% and petechial spots in DHF with 37.5%.

The signs of jaundice are noted to be highly prevalent in 58.6% cases of the DSS, hepatomegaly in 87.5% cases of the DHF while 64.5% cases of the DHF.

The hepatic dysfunction is observed to be highly prevalent in DSS with incidence of elevated ALT in 82.7%, elevated AST in 89.6%, elevated bilirubin in 58.6%, and ascites in 6.5% along with gall bladder wall thickening in 37.9% of the cases.

DISCUSSION

Dengue virus infection presentation is usually variable from asymptomatic to undifferentiated high grade fever. After an average incubation period of 4-6 days (range 3-14 days), various nonspecific, undifferentiated, clinical features like fever, backache and general malaise may develop. Hepatic dysfunction is found to be 12.69% in contrast to prevalence reported by several observers between 36.4% - 96%[14, 15, 16, 17] However, another study indicted the prevalence to be 14.3%[18] Stratification of age and gender, with respect to pattern of dengue infection, presented that majority of the cases are in the age group of 2 months to 3 years with 35.4% (n=67), then 4 – 6 years with 24.9% (n=47), 7 – 9 years and 10 – 12 years with each 15.9% (n=30) and 13 – 15 years with 7.9% (n=15). Whereas, it also displayed that dengue infection occurred in 59.8% males and 40.2% females, which may be attributed to increase chances of getting bitten with mosquitoes due to their outdoor activities.[4, 8, 18]

Hepatic involvement in dengue infections is often demonstrated by hepatomegaly and mild-to-moderate increases in serum transaminase levels presenting with jaundice, hepatomegaly and hepatic tenderness. Similar results were observed in another study where majority of the dengue hemorrhagic fever and dengue shock syndrome had both hepatomegaly and hepatic tenderness.[13, 14, 15, 16]

Although liver is not the target organ of dengue virus yet it may get injured due to the direct effect of the virus or host immune response on the liver cells, circulatory compromise metabolic acidosis and hypoxia caused by hypotension or localized vascular leakage inside the liver.[17, 18] Studies have revealed that the prevalence of hepatic dysfunction in dengue virus is around 14.3%.[2] Among the children with hepatic dysfunction, the high prevalence has been recorded in the patients of dengue fever then dengue hemorrhagic fever and dengue shock syndrome. The elevated serum alanine transaminase has been noted with the incidence of 82.7%, 81.2% and 52.6%, in an aforementioned manner. Whereas, 64.2%, 75% and 89.6% patients with DF, DHF and DSS, respectively, displayed elevated AST. Similarly, bilirubin has been noted to be elevated in 37.5%, 27% and 58.6% in patents with DF, DHF and DSS. With reference to the group, according to WHO, classification and hepatic dysfunction, observed elevated ALT in 69.4% of DF, 84.6% of DHF and 96% of DSS.[23, 24] Hepatic enzymes were elevated significantly in DSS and DHF when compared to DF group which is similar to other studies.[14, 15, 16, 19, 20, 21, 22, 23]

CONCLUSION

Hepatic involvement in dengue varies with elevation of liver enzymes. Significant rise of liver enzymes signify severe dengue infection and progression. Hepatomegaly, hepatic tenderness and jaundice are important clinical sign that should arouse the suspicion of dengue viral fever in the children and must be taken in consideration while investigating such cases as it can be the alarming signs indicating the dengue shock syndrome.

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