Original Research Article

A study on correlation of gall bladder wall thickness with severity of Dengue fever

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ABSTRACT

Background: Dengue is an acute viral infection with potentially fatal complications. This study was done to describe the correlation of Gall bladder wall thickness with severity of Dengue fever and to predict the fatal outcome of Dengue fever at the earliest to prevent serious consequences by timely interventions.

Methods: This was a hospital based prospective observational study conducted at Niloufer Hospital, a tertiary care pediatric hospital attached to Osmania Medical College, Hyderabad, Telangana, India from October 2017 to November 2018. All children between 1 year to 12 years of age that had clinical features of dengue and who were serologically confirmed were included in this study.

Results: Age group most commonly affected was 5-8 years with maximum number of dengue cases without warning signs (55.7%). Majority of severe dengue cases (64.3%) had gall bladder wall thickness >5mm. The correlation between severity of dengue and gall bladder wall thickness was found to be highly significant indicating the higher the severity of dengue more the gall bladder thickness.

Conclusions: This study concludes gallbladder wall thickness (GBWT) measured by ultrasonography can be used in children for early prediction of the severity of DHF in children and authors can include gall bladder wall thickness as an admission criteria during epidemics.

Keywords: Dengue fever, Early predictor, Epidemics, Gallbladder wall thickness, Outcome, Severity

INTRODUCTION

Over the last three centuries Dengue epidemics are known to have occurred in tropical, subtropical and temperate areas of the world . In Philadelphia, Rush described dengue as "break bone fever" in 1780. It is an emerging infectious disease in India. Dengue hemorrhagic fever (DHF) was first reported in 1963 from Calcutta city.[1] It is estimated that 100 million cases of Dengue Fever (DF) and 0.5 million cases of Dengue Hemorrhagic Fever (DHF) occur worldwide annually.[2] DHF is a leading cause of death and serious illness in children in some Asian countries and 90% of DHF victims are children under 15 years old. At least 2.5% cases die, although case fatality could be twice as high. DHF case fatality can exceed 20% without proper treatment.[1] Given the variability in the clinical illness associated with dengue infection, WHO revised dengue classification in 2009 as dengue without warning signs, dengue with warning signs, and severe dengue.[3] As there is an upsurge of dengue cases noted in India , the present study is aimed to describe the correlation of gall bladder wall thickness with severity of dengue.

METHODS

This was a hospital based prospective observational study conducted at Niloufer Hospital, a tertiary care pediatric

hospital attached to Osmania Medical College, Hyderabad, Telangana from October 2017 to November 2018. All children between 1year to12 years of age that had clinical features suggestive of dengue and who were serologically confirmed were included in this study. Children with other significant disease were excluded from study. Informed consent was taken from parents. Study was conducted after the approval of Institutional Ethics Committee. A detailed history was taken to determine symptoms. Detailed clinical examination which include vitals, findings of general and systemic examination were recorded in a proforma at the time of admission. Laboratory parameters like hematocrit, daily platelet count, ultrasound abdomen for gall bladder wall edema and thickness were done in all patients. The patients were classified according to revised WHO guidelines and managed appropriately. The data was analysed using SPSS 19.0 version.

RESULTS

Of 140 children, males (78) out-numbered females (62). Male female ratio was 1.2:1(Figure 1). Age group most commonly affected was 5-8 year which had total 62 cases followed by age group year 1-4 years which had 40 cases and 9-12 years which had 38 cases (Table 1).
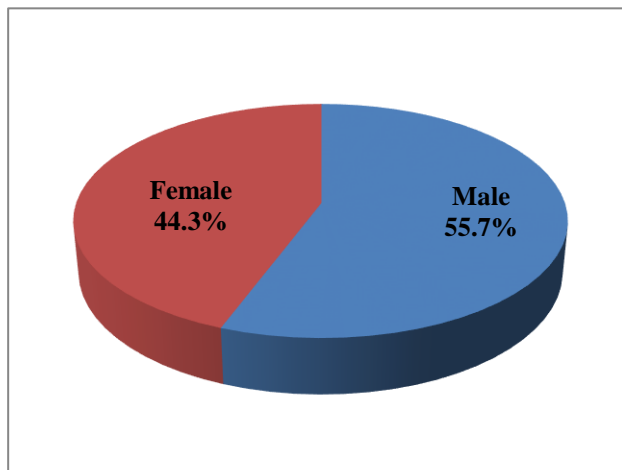
Figure 1: Sex wise distribution of the study population.

Table 1: Age wise distribution of the study population.

Age groups (years)	Number of cases	Percentage
1-4	40	28.6%
5-8	62	44.3%
9-12	38	27.1%
Total	140	100%

When authors compared the cases according to WHO classification (Table 2), we found that maximum number of dengue cases(55.7%) were without warning signs followed by 24.3% of cases with warning signs and 20% cases were of severe dengue.

Table 2: Classification of Dengue cases as per WHO.

Type	Number of cases	Percentage
Dengue fever with warning signs	34	24.3%
Dengue fever without warning signs	78	55.7%
Severe Dengue	28	20%

The most frequent clinical features noted in the present study were fever (99%), myalgia/ arthralgia (64.15%), conjuctival congestion (60.3%), retro orbital pain (54.7%), Exanthem/ rash (43.3%) and abdominal pain (35.8%), malena (13.2%),persistent vomitings (27%). Petechiae were found in most (17.9%) of the cases followed by malena (13.2%).

In this study on the day of admission platelets were in the range of 80000-100000/cumm with mean platelet count of 81,978.4.±23,198.7 (SD)/cumm and by third day of admission it was mean of 58,735.3±17, 581.8 (SD)/cumm and by sixth day of admission it was 1, 21, 522.7±33, 363.9 (SD)/cumm.

Gall bladder wall thickness measurement showed newly half the proportion of cases (40%) had thickness in range of 1.0-2 mm followed by one fourth (25.7%) in 2.1-3 mm range group. 18 cases had gall bladder wall thickness more than 5 mm. With correlation to severity, out of 28 cases of severe dengue 18 cases (64.3%) had gall bladder wall thickness >5mm and only 1 case each of dengue fever with warning signs and dengue without warning signs had gall bladder wall thickness >5mm. (Table 3)

Table 3: Association between severity of Dengue and gall bladder thickness.

Severity of Dengue	Gall bladder thickness		Total
	<5mm	≥5mm	
Dengue fever with warning signs	33	01	34
Dengue fever without warning signs	77	01	78
Severe Dengue	10	18	28
Total	120	20	140

Table 4: Outcome.

Outcome	Number of cases	Percentage
Discharged	129	92.1%
Death	11	7.9%

The association between severity of dengue and gall bladder wall thickness was found to be highly significant statistically with $p < 0.000001$ indicating the higher the severity of dengue more the gall bladder wall thickness. In the present study, majority were discharged (92.1%) well and 11 cases of died (Table 4).

Out of 11death cases, 7 cases (63.6%) had gall bladder wall thickness >5mm. Only 10% of discharged patients had gall bladder wall thickness >5mm. The association between outcome and gall bladder wall thickness was found to be highly significant statistically with p=0.000001 (Table 5).

Table 5: Association between outcome and Gall bladder wall thickness.

Outcome	Gall bladder thickness		Total
	<5mm	≥5mm	
Discharged	116	13	129
Death	04	07	11
Total	120	20	140

DISCUSSION

Dengue is a major international health concern that is prevalent in tropical and sub-tropical countries. This study describes the correlation of gallbladder wall thickness with severity of dengue fever in children admitted to Niloufer Hospital, Hyderabad, India.

A total of 140 cases were included in this study. Age group most commonly affected was 5-8 years followed by 1-4 years. We found male preponderance in our study. This may be due to outdoor activities of these children, where chances of getting bitten with mosquitoes are more. Covered dress used by females may be another cause for fewer incidences. Similar finding was noted by Selvan T et al, Singh R et al, and Jain H.[4-6] In this study, 28 cases were severe dengue,34 cases were dengue with warning signs and 78 cases were dengue without warning signs similar to a study conducted by Jitendra Premjibhai Parmar et al.[17]

The most frequent clinical features noted in our study were fever (99%), myalgia/ arthralgia (64.15%), conjuctival congestion (60.3%), retro orbital pain (54.7%), Exanthem/ rash (43.3%) and abdominal pain (35.8%), malena (13.2%),persistent vomitings (27%). Similar findings were noted by Gaurav Mogra et al, Petechiae were found in most (17.9%) of the cases followed by malena (13.2%) similar to observations noted by Jonathan G. Lim et al, All 140 cases had gall bladder wall edema ,measurement of gall bladder wall thickness showed 18 out of 28 severe dengue cases had gall bladder wall thickness >5mm. Only 1 case each of dengue fever with warning signs and dengue fever without warning signs had gall bladder wall thickness >5mm, indicating the higher the severity of dengue more the gall bladder wall thickness similar to findings in a study conducted by Colbert J, Gordon A, Roxelin R, Silva S, Silva J, Rocha C et al, Jitendra Premjibhai Parmar et al, showed that the mean GB wall thickness was 3.32 mm in DF without warning signs, 4.95 mm in DF with warning signs and 8.80 mm in severe DF.[7-10] There is a significant correlation between GBWT and the severity of the disease.

Setiawan et al, showed a positive association between gallbladder wall thickening and the disease severity, and concluded that this finding can be utilized in the identification of patients with higher risk for progressing to shock. With regards to outcome and gall bladder thickness, out of 11 death cases, 7 cases (63.6%) had gall bladder wall thickness >5mm indicating more the gall bladder wall thickness higher the morbidity and mortality.[11-12]

CONCLUSION

Dengue is usually a short lasting and self-limiting disease. Appropriate confirmation of diagnosis, early institution of therapy, public awareness and control of vector are important factors to be taken into consideration in order to formulate policies on dengue prevention and management. Early predictors for severity of dengue infection are yet to be evaluated.

The results of this study show significant correlation between gall bladder wall thickness and the severity of dengue fever. To conclude our study recommends measurement Gall Bladder wall thickness has to be done in every dengue illness to predict severity .

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