A study of evaluation of severity of Dengue Fever in relation to ultrasound findings

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ABSTRACT

Introduction : Dengue fever (DF) is a major public health problem with an increased incidence in recent years. A few recent studies have reported that ultrasound plays an important role as a prognostic indicator in assessing patients at risk for progressing to the critical phase by measuring Gallbladder wall thickening (GBWT). Some authors have described a few patterns of GBWT. There is a paucity of literature regarding the correlation of GBWT in DF and its significance in predicting the severity of disease.

Aims & Objectives: To study the role of ultrasound in patients with dengue fever, correlating gall bladder wall thickening with disease severity. This study was done to assess severity of the disease by ultra sound findings and to correlate the ultrasound findings with the severity of the disease.

Materials & Methods: A total of 56 serologically confirmed cases of DF were referred to the Radiology Department for ultrasound. A thickened GB wall was defined as being >3 mm and was measured by placing calipers between the two layers of anterior wall. GBWT was measured and was correlated with the severity of disease.

Results: Out of 56 seropositive patients, 24 patients had no gall bladder wall edema and 32 patients had either just edematous gall bladder or thickened gall bladder wall with pericholecystic edema.

Conclusion: Dengue fever is one of the most common viral infections with variable clinical presentations and degrees of severity. Gall bladder wall thickening is one of the most common findings in dengue fever, and patients with lower platelet count are more likely to have gall bladder wall thickening.

Keywords: Dengue.Gall bladder wall thickening.Serositis

INTRODUCTION

Dengue fever (DF) is a major public health problem with an increased incidence in recent years. DF epidemics in recent years have shown varied clinical presentations thus delaying diagnosis and treatment. DF epidemics in recent years have shown varied clinical presentations thus delaying diagnosis and treatment. Gall bladder wall thickening (GBWT) has been reported as one of the common findings in DF. Gall bladder wallthickening (GBWT) has been reported as one of the common findings in DF. A few recent studies have reported that ultrasound plays an important role as a prognostic indicator in assessing patients at risk for progressing to the critical phase by measuring GBWT. Some authors have described a few patterns of GBWT[1, 2].

MATERIALS AND METHODS

The present study is a prospective observational study. A total of 56 serologically confirmed cases of DF were referred to the radiology department for ultrasound. The clinical manifestations included fever, frontal headache, retroocular pain, muscle and joint pains, nausea, vomiting, rash, leucopenia, and thrombocytopenia.

The diagnosis of DF was confirmed by NS1 antigen test or Dengue IgM or IgG antibody test.

Abdominal ultrasound was performed on a GE LOGIQ P6 unit, equipped with a 4C wide bandwidth (1.5 to 4.6 MHz) convex probe and 11L wide bandwidth (4 to 12 MHz) linear probe. The abdominal ultrasound was done in all cases after 4?hrs of fasting for better visualization of the gall bladder (GB). A single radiologist performed the ultrasound examinations and the serial ultrasound examinations were performed every consecutive alternate day. Monitoring lasted until clinical improvement of the patients.

A thickened GB wall was defined as being >3 mm and was measured by placing calipers between the two layers of anterior wall. GBWT was measured and was correlated with

the severity of disease. The severity of disease (DF without warning sign, DF with warning sign and severe DF) wasassessed with the help of the "suggested dengue case classifications and levels of severity" proposed by WHO in 2009

The study was approved by institutional ethics committee and scientific research committee.

All adult subjects provided informed written consent for the study.

Statistical methods

Statistical testing was conducted with the Statistical Package for the Social Sciences (SPSS) version 17.0. Continuous variables are presented as mean±SD or median if the data is unevenly distributed. Categorical variables are expressed as frequencies and percentages. The comparison of normally distributed continuous variables between the groups was performed using Student's t-test. Nominal categorical data between the groups was compared using Chi-square test or Fisher's exact test, as appropriate. For all statistical tests, a "p" value less than 0.05 was taken to indicate a significant difference.

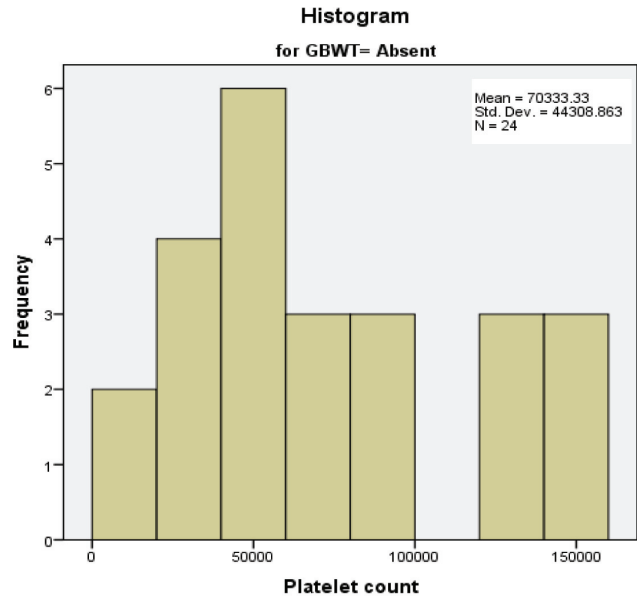**Table 1: Showing Age and Sex Group Statistics**

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Age	Female	21	41.71	16.383	3.575
	Male	35	34.60	15.244	2.577

As can be seen from the above table, the mean age goup among females patients was 41 and that in males was 34 [Table 1]
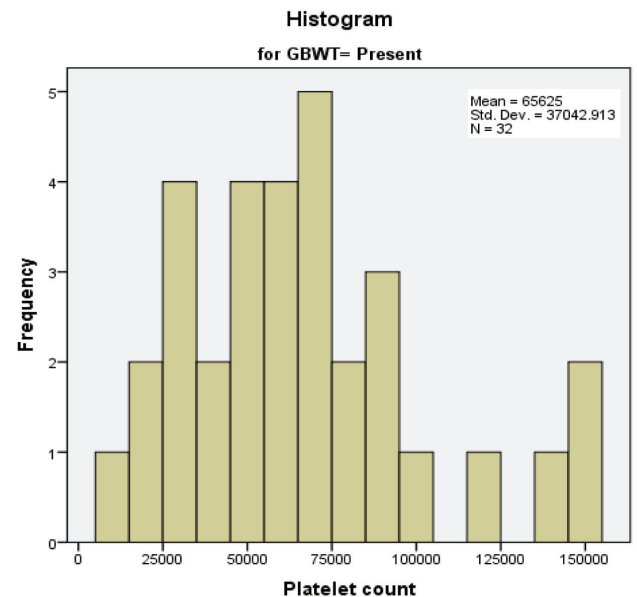
Table 2: Showing SEX & GBWT Cross tabulation

			GBWT Present	Total	
Sex	Female	Count	11	10	21
		%within Sex	52.4%	47.6%	100.0%
	Male	Count	13	22	35
		%within Sex	37.1%	62.9%	100.0%
Total		Count	24	32	56
		%within Sex	42.9%	57.1%	100.0%

GBWT was present in 47.6% of females and 62.9% of males, but the difference is not statistically significant (p value 0.282) [Table 2]

Figure 1

The mean platelet count in those who did not have GBWT was around 70000 cells/cu.mm, While in those who had GBWT, it was 66,625. The difference though was not statistically significant (p value 0.403) [Figure 1&2]

Figure 2

Table 3 : Showing Group Statistics

	GBWT	N	Mean	Std. Deviation	Std. Error Mean
Plate-let Count	Absent	24	70333.33	44308.863	9044.509
	Present	12	65625.00	37042.913	6548.324

Table 4: Showing Platletgroups & GBWT Cross tabulation

| | | | GBWT | | Total |
			Absent	Present	
Platlet Groups	15k to 50k	Count	10	13	23
		%within GBWT	41.7%	40.6%	41.1%
	50k to 100k	Count	8	15	23
		%within GBWT	33.3%	46.9%	41.1%
	>100K	Count	6	4	10
		%within GBWT	25.0%	12.5%	17.9%
Total		Count	24	32	56
		%within GBWT	100.0%	100.0%	100.0%

The number of patients who had gall bladder wall edema among the platelet group (15000 to 50000) were 13 when compared to 10 patients who had normal gall bladder wall, though the difference was not stastistically significant.[Table 4]

Similarly, there were 15 patients who had and 8 patients who had no gall bladder wall edema among the platelet group of 50000 to 1lakh. In those whose platelet count was more than 1 lakh, 4 had gal bladder wall edema and 6 had normal gall bladder.

RESULTS

Out of 56 seropositive patients, 24 patients had no gall bladder wall edema and 32 patients had either just edematous gall bladder or thickened gall bladder wall with pericholecystic edema. A thickness of less than 3mm was considered a normal gall bladder wall.

Table 5: Showing Ultrasound findings in relation to platelet count.

	15000-35000	36000-55000	56000-75000	76000-1 lac	Above 1 lac
GBWT	7	7	8	5	5
Without GBWT	6	6	3	3	6
Ascites	2	2	-	-	-
Splenomegaly	-	-	1	2	2
Hepatomegaly	5	1	-	1	-

In total, number of patients who had gall bladder wall edema, were more in low platelet groups, as can be seen in above table. Ascites was seen in 4 patients, splenomegaly in 5, hepatomegaly in 7 patients of serology proven dengue patients. [Table 5]

USG image showing gall bladder wall edema

DISCUSSION

Dengue virus is a small single-stranded RNA virus comprising four distinct serotypes. These closely related serotypes of the dengue virus belong to the genus Flavivirus, family Flaviviridae. Various serotypes of the dengue virus are transmitted to humans through the bites of infected Aedes mosquitoes, principally Aedesaegypti. DF is an acute febrile illness. Its manifestations are from mild febrile illness with associated symptoms of frontal headache, retroocular pain, muscle and joint pain, nausea, vomiting, and rash to severe dengue fever with hemorrhagic manifestation and shock syndrome. Common laboratory abnormalities include neutropenia, lymphocytosis, increased liver enzymes and thrombocytopenia [3-6].

Efficient and accurate diagnosis of dengue is of primary importance for clinical care, surveillance activities, outbreak control, pathogenesis, academic research, vaccine development, and clinical trials. Laboratory diagnosis methods for confirming dengue virus infection may involve detection of the virus, of the viral nucleic acid, of the antigens or antibodies, or a combination of these techniques. The major diagnostic methods available presently are viral culture, viral nucleic acid detection by recombinant polymerase chain reaction, and serological tests such as IgM capture enzyme-linked immunosorbent assay (ELISA). After the onset of illness, the virus can be detected in serum, plasma, circulating blood cells, and other tissues for 4-5 days. During the early stages of the disease, virus isolation, nucleic acid or antigen detection can be used to diagnose the infection that gives a definitive diagnosis of dengue. At the end of the acute phase of infection, serology is the method of choice for the diagnosis [7-9].

The aim of our study was to evaluate the radiological findings in DF, to find whether ultrasound of the abdomen is an important adjunct to clinical and laboratory profile in diagnosing DF.

CONCLUSION

Dengue fever is one of the most common viral infections with variable clinical presentations and degrees of severity. Gall bladder wall thickening is one of the most common findings in dengue fever.

Limitations of the study

Patterns of GBWT cannot be studied in patients with a history of cholecystectomy or gall bladder diseases.

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