Sonography in the Diagnosis and Assessment of Dengue Fever: A Retrospective Study

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Abstract

Background: The exact clinical picture is varying from subject to subject which depends on serotype of dengue virus, immunity status and sub type of dengue fever. Dengue viral infections were classified among dengue fever, undifferentiated fever and dengue hemorrhagic fever and dengue shock syndrome.

Material & Methods: The present cross-sectional, retrospective study was conducted at department of radiology of our tertiary care hospital. The study duration was of one year. A sample size of 100 was calculated at 95% confidence interval at 5% acceptable margin of error by epi info software version 7.2.

Results: In the present study, the spectrum of findings in our study included gall bladder wall thickening, hepatomegaly, splenomegaly, pleural effusion and ascites. Out of 100 patients, 46% had gall bladder wall thickening, 32% had hepatomegaly, 20% had splenomegaly, 13% patients had hepatosplenomegaly and 28% patients had normal ultrasound studies. Out of the total patients 08% patients had ascites. Out of the total patients 06% had bilateral pleural effusion, 09% had right sided pleural effusion. There were no cases of isolated left pleural effusion.

Conclusion: We concluded from the present study that gall bladder wall thickening was seen among majority of patients who had platelet count less than one lakh. The commonest finding in our study was gall bladder wall thickening which was followed by hepatomegaly and splenomegaly.

Keywords: Ultrasound, Hepatomegaly, Dengue fever.

Introduction

In India the burden and prevalence of dengue viral infection is increasing as trends reported globally. Hence, along with global pandemic concern dengue has become major public health concern in India [1]. According to the World Health Organization about forty percent of the world's population reported that in current

scenario is at risk for encountering dengue viral infection [2]. The prevalence of dengue viral infection has risen globally in the recent decades [3]. Due to its high incidence and prevalence rates of dengue viral infections in India, national vector borne diseases control program is initiated for integrated management of vector, surveillance and monitoring and diseases prevention along with treatment [4].

World health organization also reported that as the high prevalence of dengue infection seen worldwide it requires immediate action and planning to combat the situation [5]. It is reported that globally more than 2.5 billion of population living in the areas which are endemic for dengue viral infection. Approximately near about 50 million new dengue infections reported each year with estimated mortality of more than 25000 globally [6]. The etiology behind dengue is reported as vector borne viral diseases which is transferred to humans by the bite of the infected Aedes mosquito [7].

The exact clinical picture is varying from subject to subject which depends on serotype of dengue virus, immunity status and sub type of dengue fever. Dengue viral infections were classified among dengue fever, undifferentiated fever and dengue hemorrhagic fever and dengue shock syndrome [8]. Dengue fever affects multiple organ systems namely nervous system, heart and liver, which resulting in encephalitis, myocarditis and hepatitis. The complete clinical profile should be evaluated before the treatment protocol to save the patient's life. Hence, present study was conducted to assess the role of ultrasonographic features in the diagnosis of dengue infection at tertiary care center.

Materials & Methods

The present cross-sectional, retrospective study was conducted at department of radiology of our tertiary care hospital. The study duration was of one year from January 2019 to December 2019. A sample size of 100 was calculated at 95% confidence interval at 5% acceptable margin of error by epi info software version 7.3. All the patients, who had positive dengue NS1 antigen of positive IgM or IgG antibodies for dengue infection of aged equal to or more than 18 years of were included in the study. Institutional Human Ethics Committee clearance was obtained before start of study and written and informed consent for the procedure was obtained from all the patients. Strict confidentiality was maintained with patient identity and data and not revealed, at any point of time.

Clinical examination history, ultrasound findings and detailed history of routine blood investigations were including BT, CT and INR were recorded from hospital records after institutional permission. Patients with other tropical infections example malaria, scrub typhus and hepatitis, typhoid were excluded from the study. Ultrasound evaluation of abdomen and thorax was done using ultrasound machines with 3-5 MHz transducers. Data were entered in the MS office 2010 spread sheet and Epi Info v7.3. Data analysis was carried out using SPSS v22. Qualitative data was expressed as percentage (%) and Pearson's chi square test was used to find out statistical differences between the study groups and sensitivity, specificity, positive predictive value and negative predictive value were calculated. If the expected cell count was < 5 in more than 20% of the cells then Fisher's exact test was used. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05 and highly significant if p value less than 0.01.

Results

In the present study a total of 100 study participants who had positive dengue NS1 antigen of positive IgM or IgG antibodies for dengue infection of aged equal to or more than 18 years of were included in the study. Out of them 52% patients were

male and 48% patients were female and the male to female sex ratio was 1.08: 1. Age of study participants was ranged from 18- 56 years of age with the mean age of 32 ± 9.4 years. The mean BMI of study participants was 25.6 ± 2.4. (Table 1)

Table 1: Distribution of study participants according to study parameters.

Preoperative parameters	Number of patients
Mean age	32 ± 9.4 years
Males	52%
Females	48%
BMI (kg/m2)	25.6 ± 2.4

In the present study, the spectrum of findings in our study included gall bladder wall thickening, hepatomegaly, splenomegaly, pleural effusion and ascites. Out of 100 patients, 46% had gall bladder wall thickening, 32% had hepatomegaly, 20% had splenomegaly, 13% patients had hepatosplenomegaly and 28% patients had normal ultrasound studies. Out of the total patients 08% patients had ascites. Out of the total patients 06% had bilateral pleural effusion, 09% had right sided pleural effusion. There were no cases of isolated left pleural effusion. (Table 2)

Table 2: Distribution according to incidence of different sonographic findings in dengue fever.

Ultrasound findings	Cases
Gall bladder wall thickening	46
Hepatomegaly	32
Splenomegaly	20
Hepatosplenomegaly	13
Right sided pleural effusion	09
Ascites	08
Bilateral pleural effusion	06
Normal study	28

In the present study, gall bladder wall thickening was seen among majority of patients who had platelet count less than one lakh which was followed by patients with platelet count less than 1.5 lakh and patients with platelet count more than 1.5 lakh. Other common findings in cases with platelet less than 50000 included ascites and pleural effusion. The commonest finding in our study was gall bladder wall thickening which was followed by hepatomegaly and splenomegaly.

Discussion

In previous researches, it was reported that dengue viral infection has affect the liver and the liver functions were deranged. However, liver functions are not deteriorated in the early phases of dengue fever. The etiology behind this deterioration was multifactorial because of direct viral injury or hypoxic injury or immune mediated damage [9]. In the present study a total of 100 study participants who had positive dengue NS1 antigen of positive IgM or IgG antibodies for dengue infection of aged equal to or more than 18 years of were included in the study. Out of them 52% patients were male and 48% patients were female and the male to female sex ratio was 1.08: 1. Age of study participants was raged from 18- 56 years of age with the mean age of 32 ± 9.4 years. The mean BMI of study participants was 25.6 ± 2.4.

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with platelet count less than 1.5 lakh and patients with platelet count more than 1.5 lakh. Other common findings in cases with platelet less than 50000 included ascites and pleural effusion. The commonest finding in our study was gall bladder wall thickening which was followed by hepatomegaly and splenomegaly. Similar results were found in a study conducted by Venkata Sai PM et al among patients who were serologically positively diagnosed for dengue fever and reported similar findings as present study [10]. Similar results were found in a study conducted by Nayanigari Krishnaveni et al among patients who were serologically positively diagnosed for dengue fever and reported similar findings as present study [11].

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Conclusion

We concluded from the present study that gall bladder wall thickening was seen among majority of patients who had platelet count less than one lakh which was followed by patients with platelet count less than 1.5 lakh and patients with platelet count more than 1.5 lakh. Other common findings in cases with platelet less than 50000 included ascites and pleural effusion. The commonest finding in our study was gall bladder wall thickening which was followed by hepatomegaly and splenomegaly.

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