Medical Science Journal for Advance Research

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Vol. 3 , No. 3 , September 2022
e-ISSN: 2774-4892

Role Of Ultrasound For The Diagnosis Of Complications Of Dengue Fever In Gujrat

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ABSTRACT

Background *: The purpose of this study is to evaluate if ultrasonography may be used as an useful addition to clinical and radiology profiles in diagnosing dengue fever and predicting virus severity by comparing imaging findings. The difference in sonographic characteristics observed in patients of various ages was also investigated.*

Objective : The goal of this study *is to determine role of ultrasound for diagnosis of complications of dengue fever in Gujrat*

Materials and Methods: *This is a retrospective study. From October and December 2021, 79 patients who were serologically confirmed with dengue fever were referred for ultrasound scanning of the abdomen at Aziz bhatti shaheed hospital Gujrat, and the imaging data were evaluated. The statistical kit for social science (spss) is used for data analysis.*

Results: *out of 76 positive dengue patients there are 71(89.9%) male and 8(10%) are female .48 (60.8%) patients showed splenomegaly, 24(30%) patients showed ascites in which 8 (10%) have pelvic ascites and 16 (20.3%) abdominal ascites, 63 (79.7%) patients showed edematous GB wall thickening, 21(26.6%) showed pleural effusion while 18 (22.8 %) have bilateral pleural effusion and 3 (3.8%) have right sided.*

Conclusion: *In patients presenting with fever and concomitant symptoms, sonographic signs of thickening GB wall, pleural effusion (bilateral or right side), ascites, and splenomegaly should strongly help in early diagnosis of dengue fever, especially during an outbreak.*

Keywords: Ascites, Dengue Fever, Severity, Gallbladder Wall Thickening, Pleural Effusion, Splenomegaly, Ultrasonography Features.

Article Information
Received: June 28, 2022; Revised: Auguest 20, 2022; Online: September 4, 2022

INTRODUCTION

Dengue fever has become the most frequent flavivirus illness on the planet.[1] Dengue virus is currently among the most serious public health issues in tropical developing nations; with significant epidemiological and societal consequences.[2] There is presently no particular antiviral or other medicine that is useful in treating acute dengue infection.[3, 4]. The illness has three clinical phases: febrile, critical, and recovery. Dengue complications arise throughout the critical and healing phases.[3, 5] The first sign of dengue fever is a high-grade fever, which is transmitted by the bite of an Aedes mosquito.[6] From high-grade fever to life-threatening hemorrhages and shock, clinical findings range from mild to severe. Fever, muscle discomfort, joint pain, myalgia, and rashes are some of the most prevalent symptoms .Pakistan has also been a hotspot for endemic dengue fever in recent years.[7] Dengue virus is divided into four serotypes (DEN1–DEN4), each of which gives lifetime immunity to that serotype alone. Aedes mosquitos, particularly Aedes aegypti and Aedes albopictus, transmit all serotypes between people.[1] To overcome the disease's burden and effectively control the disease's outcome, a new diagnostic tool or model must be developed. One of

https://doi.org/10.46966/msjar.v3i3.46
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the tools that have been investigated in certain research is ultrasonography/ultrasound. Ultrasonography is a non-invasive procedure that is available in most emergency rooms and urgent care facilities. A handheld portable ultrasonography instrument that can be used in rural regions has also been tested. Ultrasonography may help in the diagnosis and act as a supplement to clinical and laboratory investigations in the event of a dengue outbreak. Dengue is highly supported by findings such as a thicker gallbladder wall with pericholecystic fluid, pleural effusion, and ascites. Hepatomegaly, splenomegaly, and pericardial effusion are some of the other symptoms that have been documented.[10] For a better prognosis of dengue hemorrhagic fever, early detection of plasma leak is critical. Because ultrasonography is a very sensitive and non-invasive method of detecting ascites, and gall bladder wall edema, moderate pleural effusion, it is extremely beneficial in the initial finding of plasma leak and dengue hemorrhagic fever.[16] Gall bladder wall thickening is a common sign in Dengue fever patients (GBWT).

According to a few recent studies; ultrasonography can be used as a prognostic indicator in screening individuals who are at risk of advancing to the crucial phase by determining GB wall thickening. However, no research on the medical importance of GBWT forms and the intensity of Dengue fever has been done.[17] If diagnosed and suspected of having DF early in primary care, the problems may be reduced. We need to comprehend the scope of the problem in terms of transmission, clinical manifestation, diagnosis, management, and prevention.

Because of numerous overcrowded cities, contaminated drinking water, inadequate sanitation, a significant number of refugees, and low vaccine coverage, Pakistan is at great risk of severe epidemics. As a result of these conditions promoting the spread of infectious illnesses, a huge number of epidemics/outbreaks occur each year in various sections of the nation, resulting in increased morbidity and death[18].

Dengue fever with plasma leakage, shock or fluid overload, severe bleeding, or significant organ dysfunction was characterized as severe dengue. Dengue fever has a viremic phase that lasts for the first three days of sickness, followed by an immunological phase (also known as critical phase) that lasts from the third to the sixth day of illness, and a recovery phase that lasts beyond the sixth day of illness.Pleural effusions, ascites, and gall bladder wall oedema are all frequent during the critical period, according to ultrasonography studies, and they all correspond with disease severity. Furthermore, serial ultrasonography investigations are more effective than other indicators of plasma leakage, such as hematocrits and albumin tests, in forecasting future disease development.[20] The most frequent way of monitoring leakage is to identify relative hemoconcentration, which is established by following changes in successive haematocrit tests, with an increase of more than 20% from baseline considered evidence of severe leakage.

This approach, however, can be insensitive, especially if the patient is undergoing parenteral fluid treatment, and it is limited by the fact that the baseline value of a person is rarely known. According to ultrasound investigations, pleural effusions, ascites, and gallbladder wall oedema are common. During the critical period and correspond with disease severity. Furthermore, serial ultrasonography examinations outperform other indicators of plasma leakage, such as haematocrit and albumin tests, in forecasting future disease development.[20]

Though the death rate in dengue infection is low (1% with competent medical care), the expenditures associated with lost productivity and the financial burden of health services have a significant impact on economies and households. Dengue virus (DENV) infection appears to be a genuine risk for visitors visiting Southeast Asia. Several investigations in various locations have established the clinico-laboratory spectrum of dengue.[21]

MATERIALS AND METHODS:

This is a retrospective study was organized at radiology department at Aziz bhatti shaheed hospital Gujrat on October and December

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2021, the duration was 3 months in which 79 patients who were serologically confirmed with dengue fever were referred for ultrasound scanning of the abdomen A curvilinear probe of 2-5 MHz A water soluble gel was used for abdominal ultrasound on Toshiba Ultrasound machine and the imaging data were evaluated. Patient with negative dengue test and patients with other diseases were not included.

The age and gender of participated patients were assessed by given questionnaire in this hospital. Written consent was taken from patients in form of questionnaire and patients were asked about their condition. This study targeted the population with positive dengue test undergo ultrasound only. The patient data was collected from hospital data base with ethical consideration. The statistical tool SPSS version 25 was used to evaluate the data and compile the results.

RESULTS:

Out of 76 positive dengue patients, 71(89.9%) were male and 8(10%) were female (table no 2) most commonly splenomegaly shown in 48 (60.8%) patients , 31(38.8%)patients not presented with splenomegaly , most commonly ascites shown in 24(30%) patients in which 8 (10%) have pelvic ascites and 16 (20.3%) abdominal ascites, 55(68%) patients not presented with ascites, most commonly GBWT shown in 63 (79.7%) patients showed edematous GB wall thickening16(20%) patients not presented with edematous GB wall thickening, most commonly PE shown in 21(26.6%) patients while 18 (22.8 %) have bilateral pleural effusion and 3 (3.8%) have right sided 58(72.5%) patients not presented with plural effusion, Out of 79 patients 13 to 21 age group patients are 10(12.5%),22-27 age group patients are 13 (16.3%), 28-35 is most commonly dengue patients are shown in this age group patients are 21 (26.3%),36-43 age group patients are 11 (13.8%),44-50 age groupis least common with patients 9 (11.3%),51-66 age group patients are 15 (18.8%).

Table No.1: Shows out of 79 dengue patients 55 patients not presented with ascites, 8 patients. Presented with pelvic ascites while 16 patients shows abdominal ascities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	55	68.8	69.6	69.6
	Pelvic	8	10.0	10.1	79.7
	Abdominal	16	20.0	20.3	100.0
	Total	79	98.8	100.0	

Table No.2: Shows out of 79 dengue patients 88%patients are male 10% Patients are female.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	71	88.8	89.9	89.9
	Female	8	10.0	10.1	100.0
	Total	79	98.8	100.0	
Total		80	100.0		

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Table No 3: Shows Splenomegaly Status shows out of 79 dengue patients 31 patients not presented with splenomegaly , 48 patients presented with splenomegaly.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	31	38.8	39.2	39.2
	Yes	48	60.0	60.8	100.0
	Total	79	98.8	100.0	
Total		80	100.0		

Table No 4: Shows out of 79 dengue patients 55 patients not presented with ascities, 24 patients presented with ascities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	55	68.8	69.6	69.6
	Yes	24	30.0	30.4	100.0
	Total	79	98.8	100.0	

Table No 5: Shows out of 79 dengue patients 16 patients not presented with edematous GB wall thickening, 63 patients presented with GB wall thickening.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	16	20.0	20.3	20.3
	Yes	63	78.8	79.7	100.0
	Total	79	98.8	100.0	
Total		80	100.0		

Table No 6: Shows out of 79 dengue patients 58 patients not presented with plural effusion,18 patients presented bilateral PE, 3 patients presented with right sided PE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	one	58	72.5	73.4	73.4
122	Bilateral	18	22.5	22.8	96.2
	Right Sided	3	3.8	3.8	100.0
	Total	79	98.8	100.0	
Total		80	100.0		

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DISCUSSION

The purpose of this study was to discuss sonographic results and the role of ultrasonography (USG) in the evaluation of a patient with Dengue fever and its effects, as well as to determine if ultrasound could be used to diagnose early Dengue fever in addition to a clinical and laboratory profile. Out of 76 positive dengue patients, 71(89.9%) were male and 8(10%) were female, most commonly splenomegaly shown in 48 (60.8%) patients , most commonly ascites shown in 24(30%) patients in which 8 (10%) have pelvic ascites and 16 (20.3%) abdominal ascites, most commonly GBWT shown in 63 (79.7%) patients showed edematous GB wall thickening16(20%) patients not presented with edematous GB wall thickening, most commonly PE shown in 21(26.6%) patients while 18 (22.8 %) have bilateral pleural effusion and 3 (3.8%) have right sided . Out of 79 patients 13 to 21 age group patients are 10(12.5%),22-27 age group patients are 13 (16.3%), 28-35 is most commonly dengue patients are shown in this age group patients are 21 (26.3%),36-43 age group patients are 11 (13.8%),44-50 age groupis least common with patients 9 (11.3%),51-66 age group patients are 15 (18.8%).according to Zahid bashir et al (2021) conducted that All dengue fever patients hospitalized to the hospital's dengue isolation unit and diagnosed with anti-dengue serology were recruited in the study after their parents or attendants signed a written informed permission form. All of these patients were referred to a radiologist for an ultrasound abdomen to examine for ascites, pleural effusion, gall bladder thickness, liver size, hepatomegaly, spleen size, and splenomegaly. Dengue fever is one of the most common illnesses in our part of the world. It appears in a number of ways, but early identification and treatment can significantly minimize case fatality rates. This reveals that ultrasonography data revealing capillary leakage in Dengue Fever patients are seen in around 30% of the patients. More research should be done to connect ultrasonography findings with dengue severity. In (2020) a study concluded by osam s abdo et al .50 patients with dengue fever reported with fever and were verified to have positive dengue NS 1 antigen in their blood. All patients had an abdomen ultrasonography for plasma leakage, which included gall bladder wall edematous, ascites, and pleural effusion. The prevalence of plasma leakage and its result in Yemeni dengue fever patients are similar to those seen in other studies throughout the world. According to Jitendra Parmar et al (2019) conducted that total of 244 DF patients were evaluated, with 84 categorised as having severe DF, 61 as having DF with warning signals, and 99 as having DF without warning indications. In severe DF patients, abdominal ultrasonography was used to examine GBWT patterns, hepatomegaly, splenomegaly, pancreatic dilatation, ascites, pleural effusion, and other abnormalities. The Pearson correlation test was used to provide a statistical comparison between the "Honeycomb" pattern of GBWT and clinically severe DF. Around in 244 patients, 145 were men and 99 were females, ranging in age from 1 to 81 years, with 14.34 percent (35 patients) falling into the paediatric category. In all, 65.57 percent (160 patients) had nonsevere DF, whereas 34.42 percent (84 patients) had severe DF. A total of 84 patients with severe DF had GBWT, with 71.42 percent having "Honeycomb" pattern, whereas a total of 160 patients with nonsevere DF had GBWT, with 45 percent having "Honeycomb" pattern and just 5.6 percent having "Honeycomb" pattern. In severe DF, the "Honeycomb" pattern of GBWT has a sensitivity of 71.4 percent, a sensitivity of 94.37 percent, a positive predictive value of 86.95 percent, and a negative predictive value of 86.28 percent.

CONCLUSION

USG is a useful and essential supplementary tool for detecting plasma leakage indicators and predicting disease severity, recognising moderate and severe instances of DHF Furthermore, as compared to other means of diagnosis, diagnosis can be achieved early in the course of disease. In patients presenting with fever and concomitant symptoms, sonographic signs of thickening GB wall, pleural effusion (bilateral or right side), ascites, and splenomegaly should strongly support the diagnosis of dengue fever, especially during an outbreak.

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Vol. 3 , No. 3 , September 2022
e-ISSN: 2774-4892

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https://doi.org/10.46966/msjar.v3i3.46
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