Ultrasound Findings in Dengue Fever: A Single Center Study

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ABSTRACT

Dengue fever is the most quickly spreading and transmitted mosquito bite disease, with an annual incidence of around 50 million people. Plasma leakage during dengue fever results in the development of serious consequences.

Objectives: To determine the ultrasonography findings used for diagnosing plasma leakage in patients managed with diagnosis of dengue fever.

Study Design: Cross sectional descriptive study

Setting: Department of Radiologist, Bahawai victoria hospital Bahawalpur.

Duration of Study: 4 months (August to November, 2021)

Methodology: All the patients of dengue fever admitted in the dengue isolation ward of the hospital, diagnosed using anti-dengue serology were enrolled to be included in the study after a written informed consent from the parents or attendants. All these patients were sent to a consultant radiologist for ultrasound abdomen to look for ascites, pleural effusion, gall bladder thickness, liver size, hepatomegaly, spleen size and splenomegaly.

Results: Dengue fever is one of the most frequent diseases in our region of the globe. It manifests itself in a variety of ways, but early detection and treatment can help to reduce case fatality rates. This demonstrates the ultrasonography results that might be observed in Dengue Fever patients showing capillary leakage are seen in around thirty percent of the patients. Further studies should be done to correlate ultrasonography findings with the severity of dengue.

Conclusion: Dengue fever is one of the most frequent diseases in our region of the globe. It manifests itself in a variety of ways, but early detection and treatment can help to reduce case fatality rates. This demonstrates the ultrasonography results that might be observed in Dengue Fever patients showing capillary leakage are seen in around thirty percent of the patients. Further studies should be done to correlate ultrasonography findings with the severity of dengue.

Keywords: Dengue, splenomegaly, Ultrasonography, Ascites, Pleural effusion, Gall bladder thickness

INTRODUCTION

Dengue Viral infection is the most rapidly distributed and transmitted mosquito bite disease, with an annual recurrence rate of around 50 million people. The vectors of this RNA Virus (DEN) include Aedes Aegypti and Aedes Albopictus from the flavi virus family; however, Aedes Aegypti producing Dengue fever is more common in our urban areas.

Dengue fever has increased dramatically in the previous decade, and more than 40% of the population is now at risk. Dengue infection can cause moderate febrile sickness to severe hemorrhagic disease and Dengue Shock Syndrome. Fever, arthralgia, myalgia, retro-orbital discomfort, and rash are common symptoms of classic dengue. Dengue patients might potentially have hemorrhagic manifestations (e.g. subconjunctival hemorrhage, petechiae, epistaxis, etc.) with or without shock.

Clues regarding plasma leakage in the dengue fever can be picked using radiography for effusions in the pleural and pericardial spaces, fluid in the abdomen, thickness of the gallbladder wall, and hypoprothrombinaemia / hemococoncentration. Ultrasonography is an excellent non-invasive method for detecting plasma leakage, and region specific hematocrit values may be used to demonstrate plasma leakage.

Dengue fever has become a serious health concern in Pakistan in recent years. To lessen the disease's impact, quick diagnosis and treatment are required. Thus, the clinical characteristics, laboratory profiles, and seropositivity test findings of dengue patients from Pakistan should be studied.

Early detection of plasma leakage and, thus, DHF is important for the outcome of this disease; in the early period, ascites and effusion cannot be diagnosed by simple radiology and clinical examination, whereas Ultrasonography is a good means for detection of these in minimal amounts at any stage of this disease, assisting in DHF diagnosis at an earlier stage. The goal of this study was to establish the ultrasonography findings utilised to diagnose plasma leakage in patients with dengue fever.
Dengue fever has grown rapidly in recent years and has become a substantial worldwide burden. Dengue fever incidence has increased in recent years as a result of uncontrolled urbanisation involving unregulated infrastructure development and insufficient sanitary amenities, which has resulted in an abundance of mosquito breeding places. Capillary leakage is the major complication leaking to many clinical findings in these patients. Early detection of effusions and edema in many regions of the body showing capillary plasma leakage, a characteristic of severe dengue pathogenesis, is crucial in the management of ICU patients.

In our study, data analysis of ultrasonography findings showed that signs of capillary leakage were seen in terms of pericholecystic edema was present in around 39.4% patients, pleural effusion in 32.4%, ascites in 38%. Data of these findings was stratified for age and gender, majority of these were common among the patients of age 21 to 40 years (p value 0.09) and among male patients, p value 0.9. (as shown in the table no. 2)

Splenomegaly and hepatomegaly was also seen on ultrasonography of the patients of dengue. Splenomegaly was present in 22 of 71 patients (31%) while only 6 patients of 71 (8.4%) showed enlarged liver. Almost all the patients with enlarged spleen were of 21 to 40 years age and male gender.

In a regional study, done in Bangladesh, Mahmood R, et al reported that most of the patients of dengue belonged to 20-40 years age sub-class, with common presentations like fever (93%), abdominal pain (30%), skin rash (25%), and diarrhea (20%). Complications were documented as breathing problems (41%), pleural effusion (39%), gum bleeding (11%), Ascites 29.4%, hepatomegaly 7.6% and splenomegaly 1.3%. Incidence of all these complications was similar to that reported in our study, apart from splenomegaly which was seen in 31% patients in our study. Zeb R, et al found in a research that included 56% men and 44% women, with a mean age of 6.53 SD 3.4 years. All patients with a confirmed diagnosis of dengue fever had hepatomegaly and splenomegaly, accounting for 28.4% of the total, with ascites accounting for 23.5 percent, pleural effusion accounting for 7.1%, and gallbladder thickness accounting for 7.1%. When all of these ultrasonography findings were connected to the severity of the sickness in terms of platelet count drop, a p-Value of 0.05 was established. Our study also showed similar results.

Another significant research on dengue patients found that 61% of patients had Dengue Fever, 35% had severe Dengue Hemorrhagic Fever, and only 4% had Dengue Shock Syndrome (DSS). Positive findings on ultrasonography of potentially impacted areas of the body were more common in severe dengue patients. Data analysis revealed that pericholecystic fluid accumulation was only detected in severe dengue illness, but gall bladder wall edema, or ascites, increased with disease severity. Study showed that risk of having gall bladder wall edema, ascites, were 2.74 and 2.04 times higher.

**DISCUSSION**

Dengue fever has grown rapidly in recent years and has become a substantial worldwide burden. Dengue fever incidence have increased in recent years as a result of uncontrolled urbanisation involving unregulated infrastructure development and insufficient sanitary amenities, which has resulted in an abundance of mosquito breeding places. Capillary leakage is the major complication leaking to many clinical findings in these patients. Early detection of effusions and edema in many regions of the body showing capillary plasma leakage, a characteristic of severe dengue pathogenesis, is crucial in the management of ICU patients.

In our study, data analysis of ultrasonography findings showed that signs of capillary leakage were seen in terms of pericholecystic edema was present in around 39.4% patients, pleural effusion in 32.4%, ascites in 38%. Data of these findings was stratified for age and gender, majority of these were common among the patients of age 21 to 40 years (p value 0.09) and among male patients, p value 0.9. (as shown in the table no. 2)
patients with non-severe dengue with warning symptoms than in patients with severe dengue. \( P=0.0001 \).\(^{12}\)

Baharuddin KA, et al also studied many dengue patients and documented warning signs in 2/3\(^{rd}\) of the dengue fever patients. Only 38 of these patients had subclinical plasma leakage at the time of their initial presentation, and 84.2 percent and 7.9 percent of them advanced to dengue fever with warning symptoms and severe dengue, respectively.\(^{13}\)

In another study, around 67 percent of patients exhibited edematous gallbladder (GB) wall thickening, 64.5 percent had ascites, 50% had pleural effusion, 17.7 percent had hepatomegaly, and 16.7 percent had splenomegaly. In all age groups, the most prevalent combination of observations was edematous GB wall thickening, ascites, and pleural effusion. Patients with 40,000 platelets were more likely to have edematous GB wall thickening, as well as ascites and pleural effusion.\(^{14}\) These findings were even higher than that reported in our study.

Balasubramanian S, et al. in his study on dengue patients analyzed radiographic and ultrasonographic findings in relation with hematocrit. Patients with plasma leakage proven on ultrasonography were around 91%. Both the area specific hematocrit and ultrasonography was found sensitive for diagnosing and ruling out plasma leakage.

Ultrasoundography is an ideal non-invasive investigation to detect plasma leakage and area specific hematocrit values are useful as evidence of plasma leakage.

CONCLUSION
Dengue fever is one of the most frequent diseases in our region of the globe. It manifests itself in a variety of ways, but early detection and treatment can help to reduce case fatality rates. This demonstrates the ultrasonography results that might be observed in Dengue Fever patients showing capillary leakage are seen in around thirty percent of the patients. Further studies should be done to correlate ultrasonography findings with the severity of dengue.

Limitation of the Study: The total number of patients with dengue included among was small. Furthermore, because to a shortage of facilities and funding, it was not feasible to properly study all participants and serotype the dengue cases. A detailed feature-by-feature comparison of all the patients was not possible.

REFERENCES