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Original Research Article

A Study of Correlation between Ultrasonographic Finding with Special reference to gallbladder Wall Thickness and Severity of Dengue Fever

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Abstract:

Background: Dengue fever is a major public health problem with an increase incidence in recent years. Dengue fever is an acute – mosquito transmitted viral infectioncausedby1to4serotypes (DEN-1, DEN-2, DEN-3 and DEN-4) of the genus flavivirus. It is the most common arboviral disease in the world. Dengue fever has been known for more than a century in the tropical area of south East Asia and the Western Pacific regions. Dengue fever is the most rapidly spreading mosquito borne viral disease of mankind, with a 30 fold increase in global incidence over the last five decades. This study is to identify ultrasonographic findings in Dengue fever & to study the clinical significance of Gall Bladder Wall thickness in persisting the severity of Dengue fever. This is a Observational prospective study of 100 patients admitted with seropositive for dengue fever at tertiary care hospital, who fulfilled the inclusion and exclusion criteria during the period of July 2018 to June 2020.

Results: Majority of cases of dengue fever was occurred in patients age range from 18 to 27 years with mean age 31.2. In present study Dengue Fever was diagnoses in 70% of all cases while Dengue Hemorrhagic Fever in 22% and Dengue Shock Syndrome in 08% of them. Fever is most common clinical feature (96%) followed by Myalgia (61%). In this study we found that in patient with dengue, in USG findings over all frequency of GBWT was 65% followed by ascites 30%, Pleural effusion 23%, Hepatomegaly 19% and Splenomegaly 16%. In the present study GBWT did not show any relation to biochemical blood test or hematological parameters. Hemoconcentration once thought to be significantly linked to increased Dengue se- verity, appears unlinked to dengue severity as measured by plasma leakage and GBWT.

Conclusion: Gall Bladder Wall thickness is one of the most common finding in Dengue Fever. GB wall thickness more than 6mm is associated with severe Dengue fever with significant statistical correlation.

Keyword: Dengue fever, Gallbladder wall thickness, Flavivirus, Arboviral disease.

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Introduction

Dengue is the most significant mosquito-borne viral disease in the world today. Approximately 3 billion people worldwide live in areas at risk for transmission of the dengue flavivirus by the Aedes aegypti mosquito, and an estimated 100 million people worldwide are infected with the virus each year.[1]

Dengue viral infection is the most rapidly spreading vector borne disease, attributed to changing demographics, urbanization, environment and global travel. It continues to be a threat in over hundred tropical and sub-tropical countries, affecting pre dominantly children, Adolescents and young adults.

Dengue also carries the hefty financial burden on the health care system in affected areas, as those infected seek care for their symptoms. The increase of DF is due to uncontrolled population growth and urbanization in the absence of appropriate water management, global spread of dengue strains via

travel and trade and due to erosion of vector control programs.[2] In India the problem is even more acute because since 1963, more than 50 outbreaks have been reported by the National Institute of Communicable diseases, New Delhi.[3] Dengue has been identified as one of the 17 neglected tropical diseases by WHO as mentioned in their first report on neglected tropical diseases (2010).[4]

Dengue virus comprises 4 serotypes namely DEN-1, DEN-2, DEN-3 and DEN-4. It is transmitted by female species of Aedes aegypti. The incubation period of the virus within a human host lasts for about 3-14 days, while patients usually recover within 7-10 days. Though it is self-limiting disease, sometimes it tends to progress severely to Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).

Symptoms can vary from high-grade fever, rashes and musculoskeletal pain in a majority of patients to hepatomegaly, circulatory failure (hypotension and shock), fluid in cavity (pleural, abdominal, and cardiac) and internal bleeding phenomenon.[5] Dengue virus targets bone marrow progenitor cells causing thrombocytopenia, leukopenia and lymphopenia.[6] In mild dengue fever, the hemorrhagic manifestations are quite mild and may consist of gingival bleeding and petechiae, in contrast severe dengue will have progressive thrombocytopenia with increased bleeding manifestations like Malena, hematuria and ecchymoses.[7]

Significant plasma leakage is an important feature of severe dengue infection. Plasma leakage will be depicted by an elevation of haematocrit by ≥ 20% from the baseline. In addition to this pleural effusion, ascites or hypoproteinaemia/ hypoalbuminemia also indicates plasma leakage.[8]

Plasma leakage can lead to hypotension and shock. Predicting the progress of the illness to severe form is critical. Mere clinical examination will not be helpful for plasma leak.[8] Rise in haematocrit as a marker of plasma leakage may not be of clinical benefit.[8]

Pleural effusion and/or a scites detected by ultrasonography are helpful in diagnosing plasma leakage. Leakage of plasma into the interstitium precedes its collection in the serous cavities, which can be decided by abdominal ultrasonography as increased thickness of gall bladder wall.[8] This finding will help to treat patients in a better manner to avoid complications. Reticular pattern of Gall bladder wall thickness is a trustworthy sign of plasma leakage in DF.[9]

Only few studies are available to predict the severity of dengue by GBWT in the early phase of the disease. So this study's aim was to identify ultrasonographic findings in Dengue fever & to study the clinical significance of GallBladder Wall thickness in persisting the severity of Dengue fever.

Materials and Methods:

This was an Observational prospective study of 100 patients admitted with seropositive for dengue fever at tertiary care hospital, who fulfilled the inclusion and exclusion criteria during the period of July 2018 to June 2020.

Inclusion criteria:

1. All indoor pts age more than 18 with signs and symptoms of dengue fever such as fever, head-ache, myalgia, rashes, vomiting, abdominal pain, retro orbital pain, arthralgia.
2. Patients with positive Dengue Igm and Dengue ns1 antibody.

Exclusion criteria:

1. Patients treated previously for dengue fever and currently asymptomatic.
2. Patients with Malaria, Hepatitis B, Hepatitis C, HIV, Typhoid fever, Acute Cholecystitis.

Statistical Tools: The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using statistics software. Due Ethical permission was taken and proformas of the pts were filled and relevant data extracted and analyzed.

Results:

The results of the study are shown in the tables as below. The baseline characteristics observed are as follows

Table 1: Age and Sex Distribution

Age In Years	Male	Female	Total
18-27	19	31	50
28-37	12	15	27
38-47	06	06	12
48-57	06	02	08
58-67	02	01	03
TOTAL	45	55	100

In present study the majority of cases were in the age group of 18-27yrs (n- 50) followed by 28-37yrs (n-27). There for in present study maximum number of cases was come from young people.There were 55 female patients and 45 male patients.

Table 2: Distribution of Clinical Features in Dengue Cases

Clinical Features	Total	Percentage
Fever	96	96%
Myalgia	61	61%
Arthralgia	23	23%
Headache	33	33%
Retro orbital Pain	18	18%
Abdominal pain	22	22%
Vomiting	17	17%

Among 100 cases 96% had fever, 61% Myalgia, 33% headache, 23% Arthralgia,22%Abdominal Pain,18%Retro-orbitalPainand17%Vomiting.

Table 3: Ultrasonographic Findings in Dengue Cases

Ultrasound findings	Present	Absent
GB Wall Thickness	65	35
Ascites	30	70
Pleural Effusion	23	77
Hepatomegaly	19	81
Splenomegaly	16	84

In our study most common ultrasonographic finding in dengue cases was Gall bladder wall thickness (65%) followed by Ascites (30%), Pleural Effusion (23%), Hepatomegaly (19%) and Splenomegaly (16%).

Table 4: Hematocrit Value in Dengue Cases

Hematocrit Range	Total	Percentage
Morethen55%	14	14%
45%to55%	38	38%
35%to44%	33	33%
25%to34%	11	11%
Lessthen25%	04	04%

In our Study severely increased Hemotacrit value (more than 55%)seen in14% cases. Hematocrit value between 45% to 55% seen in majority of cases (38%).

Table 5: Dengue Fever Grading

Dengue grading	Total	Percentage	Parmar JP study (2017)
Dengue Fever	70	70%	40.80%
Dengue Haemorrhagic Fever	22	22%	27.95%
Dengue Shock Syndrome	8	8%	31.18%

In our study majority of cases were Dengue Fever (70%) followed by Dengue Hemorrhagic Fever (22%) and Dengue Shock Syndrome (8%).

Discussion

The majority of cases were in the age group of 18-27yrs (50%) which correlates with study by Sami CA et al[7] in which (47.7%) were from young age group 21-30 years.

Majority patients were having fever & bodyache (96% & 61% respectively) which is consistent with study by Sami CA et al[7] and study by Islam S et al[8] & El-Gilany et al.[10] In our study most common ultrasonographic finding was Gall bladder wall thickness (65%) followed by Ascites (30%), Pleural Effusion (23%), which was consistent with study by Dewan N et al[9] in which The most common ultrasound findings in dengue were ascites (107, 60%), pleural effusion (102, 58%), and gallbladder wall thickening (97, 55%).

In Parmar JP[11] study, 40.80% patients showed Dengue fever, 27.95% patients showed Dengue Haemorrhagic Fever and 31.18% showed Dengue Shock Syndrome. In this study there was higher number of Dengue severity than our study. In Rama Krishnan [14] study, bleeding manifestations seen in 30% cases. Therefore severity rate in dengue fever is also consistent with other studies.

The study conducted by RamaKrishnan [14] suggested that here was high incidence of bleeding or DHF seen when GB wall thickness was increased. ParmarJP [11] study suggested that GB wall thickness was an important tool for diagnosis of severity of diseases. After comparing with other studies, Dengue severity increases with increase in GB wall thickening. This comparative data is suggestive of increased GB wall thickness is associated with severity of Dengue.

A recent study also linked GBWT with the categorization of dengue infection into 3 severity levels: dengue infection (DF), dengue hemorrhagic

fever (DHF) and dengue shock syndrome (DSS).[12] Gallbladder thickening is also listed as one of the admission criteria in Dengue guidelines for diagnosis, treatment, prevention and control, by World Health Organization (WHO).[13]

GBWT was documented frequently in patients suffering from severe dengue[11,15,16] In multiple studies, progressive raise was observed in thickness diameter of gallbladder wall as the severity of dengue progress.[11,12,15,16]

Conclusion

Majority of cases of dengue fever was occurred in patient's age range from 18 to 27 years with mean age 31.2. In present study Dengue Fever was diagnoses in 70% of all cases while Dengue Hemorrhagic Fever in 22% and Dengue Shock Syndrome in 08% of them.

Fever is most common clinical feature (96%) followed by Myalgia (61%). In this study we found that in patient with dengue, in USG findings over all frequency of GBWT was 65% followed by ascites 30% and Pleural effusion 23%. Gall Bladder Wall thickness is one of the most common finding in Dengue Fever. GB wall thickness more than 6mm is associated with severe Dengue fever with significant statistical correlation.

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