REVIEW ARTICLE

Many Faces of Dengue Cholecystitis: A Pictorial Review

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ABSTRACT

This article aims to review cholecystitis patterns in known dengue patients as well as the variation in wall thickening involving the gall bladder, which will ultimately aid in imaging-based diagnosis. Awareness of atypical dengue manifestations aids in the early detection of dengue and the prevention of sequelae. The data acquisition of this retrospective study is performed from January 2022 to June 2023 in the Department of Radiology in Shifa International Hospital. Patients with positive dengue serology were identified retrospectively through the RIS database in years, 2022 and 2023. Clinicolab departments identified these patients with Dengue Hemorrhagic Fever, and their ultrasound scans were done and analyzed using several devices, including the Xario 100 and 200. The literature study was also conducted to discover various gall bladder wall thickening patterns associated with this condition. Different gall bladder wall thickening patterns including uniform, striated, asymmetric, tram track, and honeycombing were included. DHF has a wide variety of sonological manifestations. Recognizing diverse gall bladder wall thickening patterns on sonological imaging is crucial for a correct diagnosis and aids in therapy planning. Conservative treatment with continuous observation is advised to avoid morbidity and mortality in dengue fever patients. The crux is that patterns of gall bladder wall thickening may be used to forecast the prognosis of the disease and, when paired with the kind of pattern in serial ultrasonography, can be used to identify the severity of the condition.

Keywords: *Dengue fever, cholecystitis, gall bladder, ultrasound, radiology.*

INTRODUCTION

In recent years, a series of epidemics have increased the mortality toll in our region [1]. Four serotypes of dengue fever are known, (DEN-1, DEN-2, DEN-3, or DEN-4) [2]. DF outbreaks have demonstrated a variety of clinical manifestations, delaying identification and treatment [3]. Some of the current studies have indicated that ultrasonography plays an essential function as a prognostic marker for assessing patients at risk of entering the critical phase by measurement of the thickness of the gall bladder wall [4-6].

Dengue, a viral ailment caused by the flavivirus primarily transmitted by Aedes aegypti mosquitoes, is a significant global health concern [7]. Dengue fever (DF) stands as a highly endemic, transmissible disease, exerting substantial socioeconomic and healthcare repercussions on tropical and subtropical regions worldwide. Notably, Pakistan has borne a substantial burden for the past two decades, dating back to its initial outbreak in 1994. This mosquito-borne viral disease is characterized by a spectrum of clinical manifestations encompassing nausea, headache, weakness, severe muscular and joint pain, lymphadenitis, and skin rashes. Furthermore, distinctive symptoms such as palmar and plantar edema, gingivitis, and ocular pain are prevalent hallmarks of dengue fever [8]. Dengue viral infection demonstrates a diverse array of clinical severity, ranging from mild to severe in intensity. Mild disease including febrile illness however when severe can cause dengue shock syndrome. Additionally, atypical clinical presentations have been documented, involving multiorgan systems and resulting in encephalopathy, pancreatitis, or acalculous cholecystitis [9]. Radiological evaluation elucidates the frequent observation of pleural effusion on chest radiographs. Abdominal ultrasonography, as a diagnostic modality, reveals several pertinent findings, including gallbladder wall thickening, ascites, and hepatosplenomegaly. Importantly, the extent of gallbladder wall thickening is indicative of the disease's severity, with a concurrent inverse correlation between platelet counts and the degree of gallbladder involvement. Of particular significance is the emergence of acute acalculous cholecystitis, a condition characterized by gallbladder inflammation devoid of calculi. Suspicions for this entity should be raised in patients who present with fever, right upper quadrant discomfort, abnormal hepatic function tests, and ultrasound evidence of gallbladder wall thickening in the absence of concretions. The pathogenesis of acute acalculous cholecystitis in the context of dengue is ascribed to increased vascular permeability, culminating in the edematous thickening of the gallbladder wall. Worth noting is the self-limiting nature of dengue viral infection, which implies the potential reversibility of gallbladder wall thickening. Consequently, this underscores the consideration that surgical intervention for acute acalculous cholecystitis in dengue patients may not be an immediate imperative, except in scenarios complicated by diffuse peritonitis [10]. Few studies are reported till date on the diverse patterns of GBWT in DF, and relatively few research have been conducted so far [11, 12]. This is one of the

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Received: May 23, 2024; Revised: September 30, 2024; Accepted: October 05, 2024
DOI: https://doi.org/10.37184/nrjp.3007-5181.1.6

 ISSN: 3007-519X (Online)

first articles to demonstrate these wall patterns in dengue disease in the Pakistani community.

The study emphasizes the significance of patterns of cholecystitis in dengue illnesses, which would be helpful in diagnosing and treating patients at risk, especially during outbreaks.

MATERIAL AND METHODS

A retrospective research is conducted at the Radiology Department of Shifa International Hospital between January 2022 and June 2023. Clinicolab departments identified these patients with Dengue Hemorrhagic Fever, and their ultrasound scans were done and analyzed on several pieces of equipment, including the xario 100 and 200. A literature study was also conducted to uncover distinct gall bladder wall thickening patterns associated with this disease's involvement.

RESULTS

Different cholecystitis patterns were seen in dengue patients ranging from mild to severe in grading. The GBWT pattern may also be utilized to anticipate illness severity as well as the patient's recovery or worsening [13]. Different patterns are hereby listed **(Figs. 1-5)**:

Fig. (1): Uniform pattern.

Fig. (2): Tramtrack pattern.

Fig. (3): Striated pattern.

Fig. (4): Asymmetric pattern.

Fig. (5): Honeycomb pattern.

DISCUSSION

Dengue is the leading cause of arthropod-borne viral disease in the world. It is the fastest-spreading viral disease worldwide and has become a major public health concern in the last few decades. Approximately 400 million cases and 22000 deaths occur due to dengue each year globally [14, 15]. Dengue fever is a viral disease that has surged about 30-fold in the previous 50 years. An estimated 2.5 billion individuals are at risk of illness, with 390 million infections emerging annually in 125 countries [16]. It was identified in Japan in 1943, and the virus expanded through its major vector, Aedes aegypti, as a result of urbanization and globalization [17]. Until present, five serotypes of DENV have been identified: DENV 1-4 and DENV 5, which was found in 2013. Female mosquitoes are the primary vectors of transmission (**Fig. 6**) [18].

Fig. (6): Wall thickness of a normal gall bladder.

There is a scarcity of information on the varied forms of gall bladder wall thickening in dengue fever and their importance in predicting illness severity [19]. Although dengue fever often causes fever, headache, retro-orbital discomfort, myalgia, arthralgia, and vomiting, it can also cause atypical symptoms such as acalculous cholecystitis.

The clinical picture varies from an asymptomatic illness like dengue fever to a severe illness like dengue hemorrhagic fever or even in a few cases as dengue shock syndrome. The most typical dengue symptoms include high-grade fever, headache, bone and joint aches, and rash. Major manifestations of dengue hemorrhagic fever and dengue shock syndrome are hemorrhage, shock, circulatory failure, which can progress to DIC, and multi-organ failure, endangering the life of the patient. The critical period lasts 3-7 days. Atypical symptoms of expanded dengue illness include presentations like acalculous cholecystitis, fulminant hepatitis, encephalopathy, cardiomyopathy, and acute pancreatitis [20]. Ultrasonography is a useful tool for early detection of acalculous cholecystitis. Major findings are a thickened gallbladder wall, non-visualization of stones, and pericholecystic fluid [21].

While the honeycomb pattern was more common in cases of severe dengue fever, the uniform echogenic pattern was more common in cases of dengue fever without warning symptoms. The severity of the condition can be predicted by seeing a shift in the gall bladder wall thickening pattern on consecutive serial ultrasonography scans. Because of the paucity of literature on the pattern of gall bladder wall thickness, we designed our study to emphasize the significance of patterns of cholecystitis in dengue illnesses that would be helpful in diagnosing and treating patients at risk, especially during outbreaks.

CONCLUSION

We observed different unique GBWT patterns in our investigation. Five different GBWT patterns were presented in the current investigation. In contrast to severe dengue fever, the normal gall bladder wall and the uniform echogenic pattern were shown to be more common in dengue fever without warning signs and in dengue fever with warning signals, whereas the honeycomb pattern was more common in dengue fever with severe symptoms. Furthermore, it was shown that these patterns represented a spectrum of gall bladder wall thickening, ranging from a uniform echogenic pattern or normal wall thickening in DF without warning signals to a honeycomb pattern in cases with severe dengue fever. A change in the gall bladder wall thickening pattern on subsequent ultrasound scans from a honeycomb pattern to a uniform echogenic pattern/normal wall thickening or from a normal/uniform echogenic pattern to a honeycomb pattern should suggest the clinical recovery or deterioration of the disease, respectively. As a result, identifying the GBWT pattern can aid in determining the severity of the disease.

These should be kept in mind while reporting dengue patients. The DHF has a diverse variety of sonological manifestations. Recognizing diverse gall bladder wall thickening patterns on imaging is required for a correct diagnosis and is beneficial in therapy planning. Conservative treatment under continuous supervision is suggested to reduce morbidity and mortality in dengue fever patients.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

Declared none.

AUTHORS' CONTRIBUTION

Khurram Khaliq Bhinder: Write-up and idea

Aroosa Kanwal: Write-up

Madiha Saeed Wahla: Review

Amna Mehboob: Critical analysis

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