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Original Article

Incidence of Different Sonographic Findings in Dengue Fever- A Study of 60 Patients

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Abstract:

Dengue fever and dengue hemorrhagic fever emerged as major health problem in South East Asia and Bangladesh as well. The purpose of this study is to determine the use of ultrasound as an important adjunct to clinical and laboratory profile in diagnosing dengue fever and in predicting the severity of the disease. Sixty serologically diagnosed dengue fever patients between August and October 2019 referred for ultrasound scanning of the abdomen and thorax were selected for the study and the findings were analyzed. Out of the 60 patients, 19 (31.67%) had hepatomegaly, thick walled gall bladder, ascites with bilateral pleural effusion; 15 (25%) had hepatomegaly, thick walled gall bladder, ascites and only right sided pleural effusion; 6 (10%) had hepatomegaly and right sided pleural effusion; 5 (8.35%) had hepatomegaly and ascites; 3 (5%) had thick walled gall bladder; 1 (1.66%) patient had left sided pleural effusion and hepatomegaly; 1 (1.66%) patient had only hepatosplenomegaly; 1 (1.66%) had ascites with pericardial effusion and no abnormal sonographic findings was found in 9 individuals (15%). Ultrasound findings should strongly favor the diagnosis of dengue fever in patients presenting with fever and associated symptoms, particularly during an endemic. A simple ultrasound examination will effectively expedite the diagnosis and justifies initiation of specific treatment for dengue fever pending serological confirmation. Ultrasound also helps substantially in estimating the severity of the disease.

Key words: Dengue fever, Dengue hemorrhagic fever, Hepatomegaly, Ascites, Pleural effusion, Splenomegaly, Thick walled gall bladder, Ultrasound findings.

Introduction:

Dengue is the most rapidly spreading mosquito-borne viral disease in the world. Both dengue fever (DF) and dengue hemorrhagic fever (DHF) are endemic in western pacific region including Bangladesh. In recent years, dengue has become a major global public concern. Approximately 2.5 billion people, living mainly in urban areas of tropical and subtropical regions, are estimated to be at risk of acquiring dengue infection[1]. While dengue is endemic in more than 100 countries, most cases are reported from Southeast Asia and the Western Pacific regions[2]. In 2008, South East Asia and Western Pacific accounted for 70% of the global burden of dengue fever. The countries with a high incidence are Indonesia, Thailand, Myanmar, Srilanka, Bangladesh and India[3]. In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries[4].

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Dengue is transmitted by mosquito *Aedes aegypti and Aedes albopictus*. There are four known serotypes of dengue, but severe form of dengue fever is caused by infection by more than one serotype[5]. Clinically dengue manifests with sudden onset of high fever with chills, intense headache, muscle and joint pain, retro-orbital pain and severe backache. Fever usually lasts for about 5 days, rarely for more than 7 days[6]. DF with evidence of plasma leakage shown by either a fluctuation in hematocrit >20% during the course of illness or clinical signs of plasma leakage, such as ascites, pleural effusion, or hypoproteinemia is defined as DHF[7]. DHF occurs throughout the year with a peak during monsoon and post-monsoon due to high vector density.

Dengue infection vary in severity, ranging from influenza-like self-limiting illness to life-threatening dengue hemorrhagic fever and dengue shock syndrome(DSS) which, if left untreated, are associated with mortality as high as 20%[2]. The various manifestation of dengue may not have distinct line of demarcation: apart from the classic features, reports of rare presentation have recently become more frequent[8,9]. Some presentations that are not classifiable under the World Health Organization (WHO) definitions may be potentially serious and may lead to increased morbidity and mortality of the disease. Many

of these manifestations may remain unrecognized and unreported due to lack of awareness among primary care physicians. The purpose of this study is to find out the incidence of different sonographic findings of dengue fever, identify if ultrasound can become an important adjunct to clinical and laboratory profile in diagnosing dengue fever.

Materials and Methods:

This study was done in a few private diagnostic centers situated in front of Faridpur Medical College Hospital. Sixty patients who were serologically diagnosed as having dengue fever between August and October 2019 were referred for ultrasound scanning of the abdomen and thorax and the findings are analyzed. All ultrasound examinations were performed with ultrasound machine using 3.5 MHz probe. Gall bladder wall thickening was measured by placing the calipers between the two layers of the anterior wall. Thoracic scanning was done in either sitting or supine posture. Both the pleural spaces were evaluated through an intercostal approach. Gall bladder wall thickness more than 3 mm was considered as thickening of gall bladder, liver measuring more than 15 cm was taken as hepatomegaly and spleen measuring more than 12 cm was taken as splenomegaly.

Results:

Here, the table I shows the combination of different sonographic findings of individual patient. Out of the 60 patients, 19 (31.67%) had hepatomegaly, thick walled gall bladder, ascites with bilateral pleural effusion; 15 (25%) had hepatomegaly, thick walled gall bladder, ascites and only right sided pleural effusion; 6 (10%) had hepatomegaly and right sided pleural effusion; 5 (8.35%) had hepatomegaly and ascites; 3 (5%) had thick walled gall bladder; 1 (1.66%) patient had left sided pleural effusion and hepatomegaly; 1 (1.66%) patient had only hepatosplenomegaly; 1 (1.66%) had ascites with pericardial effusion and no abnormal sonographic findings had 9 individuals (15%).

Discussion:

Dengue has emerged as one of major health problem in South East Asia. Of all arthropod-born viral diseases, dengue fever is the more common. Dengue fever is one of the most important emerging of tropical and sub-tropical areas. Dengue fever and hemorrhagic fever is endemic in Bangladesh in 2019. Dengue fever started during the rainy season when breeding of vector of mosquitoes is generally abundant. Dengue cases are usually more during August to October in Bangladesh. Patients usually come to hospital in severe form of

Table I: Distribution of patients according to demographic characteristic (n=110)

Sl No	Combination of USG Findings	No. of Patient with percentage
1	Hepatomegaly, Thick walled GB, Ascites with Bilateral pleural effusion	19(31.67%)
2	Hepatomegaly, Thick walled GB, Ascites with right sided pleural effusion	15(25%)
3	Hepatomegaly, Right sided pleural effusion	6(10%)
4	Hepatomegaly, Ascites	5(8.35%)
5	Only Thick- walled GB (more than 3 mm)	3 (5%)
6	Hepatomegaly, Left sided pleural effusion	1(1.66%)
7	Hepatosplenomegaly	1(1.66%)
8	Ascites with Pericardial effusion	1(1.66%)
9	Normal study	9(15%)

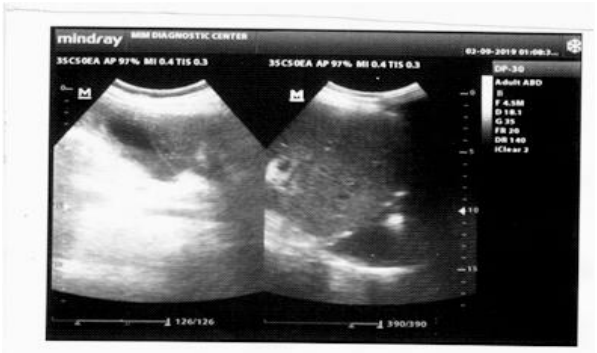

Figure 1: Left sided Pleural effusion

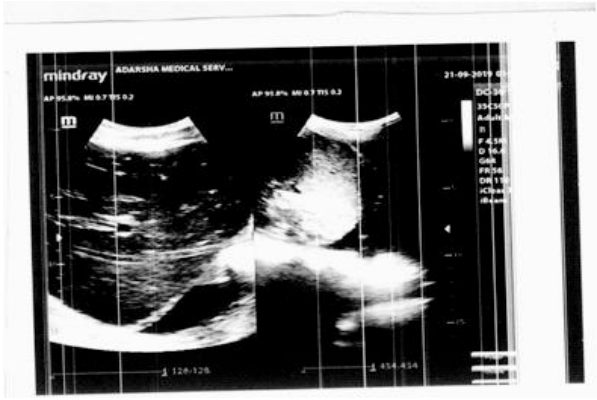

Figure 2: Bilateral Pleural effusion & Hepatomegaly

dengue fever. Severe form of dengue fever is caused by infection with more than one serotype because the first infection probably sensitizes the patient while the second infection with different serotype appears to produce an immunological catastrophe.

Serology is the mainstay in the diagnosis of dengue fever. Hemagglutination inhibition antibodies usually appear at detectable levels by day 4-6 of febrile illness. Ultrasound findings in early, milder form of dengue fever are gall bladder wall thickening, minimal ascites, pleural effusion and hepato-splenomegaly. Severe forms of the disease are associated with the collection of fluid in the perirenal and pararenal regions, hepatic and splenic sub-capsular fluid, pericardial effusion, pancreatic enlargement and hepato-splenomegaly. However in this study, pericardial effusion was seen in only one patient and no patient is seen with pancreatic enlargement. Ultrasound findings of dengue fever such as hepatomegaly, thick walled gall bladder, ascites, pleural effusion and splenomegaly are reasonably accurate in the diagnosis of dengue fever. This helps in starting appropriate management of the patient as soon as ultrasound is done. While serological tests are confirmatory in the diagnosis of dengue fever, ultrasound can be of value in the assessment of severity.

In this study, the most common findings were hepatomegaly, pleural effusion and ascites and most uncommon findings were pericardial effusion, splenomegaly and only left sided pleural effusion. The severity of the course of the disease, which is directly linked to the platelet count, can also be assessed by ultrasound. If a patient shows all ultrasound findings associated with dengue fever it indicates the platelet count is likely to be less and the patient may require blood transfusion. This allows the physician to arrange for blood after ultrasound examination before platelet count values are available.

Conclusion:

Dengue viral infections are among the most important mosquito-borne diseases of the subcontinent. Serology is the mainstay in the diagnosis of dengue fever. But a simple ultrasound examination will effectively expedite the diagnosis and justifies initiation of specific treatment for dengue fever pending serological confirmation. Ultrasound also helps substantially in estimating the severity of the disease. Early detection of DHF and dengue shock syndrome (DSS) can go a long way in managing patients and reducing morbidity and mortality. Clinicians should have a high index of suspicion and knowledge of ultrasound findings, particularly in view of the increasing burden of dengue on the health-care system.

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