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STUDY TO SEE THE USE OF ULTRASOUND IN THE DIAGNOSIS AND MANAGEMENT OF DENGUE FEVER (DF)

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ABSTRACT

This study was conducted to evaluate ultrasonic (USG) finding in Dengue fever cases and effect of climate changes. 109 patients (age 5 to 70 year) who were serologically diagnosed as having DF between July, 2014 and October, 2014 were referred for USG, the imaging findings and the effect of climate analyzed. Out of 109 patients, all patients showed G.B. wall thickening, 72% honeycomb pattern , 69% hepatomegaly, 77% have spleenomegaly, 88% Rt. Pleural effusion was seen and B/L pleural effusion was in 23%, 58% having ascites and pericardial effusion observed in 9%. Sonographic features of thickened GB wall, pleural effusion, ascites, hepatomegly and spleenomegaly strongly favour the diagnosis of DF in patients presenting with fever and associated symptoms, especially correlation with climatic or seasonl changes either due to decrease in virus virulence or herd immunity.

KEYWORDS: Dengue fever, Ultra sound, Management, Diagnosis.

INTRODUCTION

One of the common causes of fever in the tropics is dengue virus. 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, Sri Lanka, Bangladesh and India. Dengue is transmitted by mosquito *Aedes aegypti*, widely distributed throughout tropical and sub-tropical areas of the world.[1-3] There are four known serotypes of dengue, but severe form of dengue fever is caused by infection by more than one serotype. 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. Hemorrhagic diathesis and thrombocytopenia with concurrent hemoconcentrations are a constant finding.[4-7]

In mid 2014 there was an outbreak of DF in Lucknow, India. USG become an important adjunct to clinical & Laboratory profile in diagnostic DF. The hall mark of the pathogenesis of DF is the loss of endothelial integrity, which is assumed to be the result of an abnormal immune response against the virus. Clinical studies have shown that the level of cytokines and immune mediates are significantly increase in patients suffering from DF.[8, 9]

Mosquito –borne disease transmission is climate sensitive for several reasons; mosquitoes require standing water to breed, and a warm ambient temperature is critical to adult feeding, behavior and mortality, the rate of larval development, and speed of virus replication.[10] If the climate is too cold, viral development is slow and mosquitoes are unlikely to survive long enough to become infections. Although a suitable climate is necessary for disease transmission, other factors are needed for an epidemic to take place, including a source of infection, vector population and a susceptible human population.[11-12]

MATERIAL AND METHODS

All ultrasound examinations were performed with a machine using 3.5 MHz and 5 MHz probes. Abdominal scanning was done after 6 h of fasting to allow better distension of gall bladder. GB wall thickening, which was the consistent finding in all the serologically positives cases, was measured by placing the calipers between the two layers of anterior wall. Thoracic scanning was done in either sitting or supine posture.[13] Both the pleural spaces were evaluated through an intercostals approach. Pericardial space was also evaluated for effusion subcostally. In all the patients ultrasound was performed prior to serology.[14] Serology tests using NS1 was performed to confirm the diagnosis in all the 122 patients which revealed 109 patients to be serologically positive for DF. The remaining 13 patients were serologically negative and not included in the study. GB wall thickening was considered when it in more than 3 mm, hepatomegaly was considered when cranio-candal measurement exceeds 13 cm in mid clavicular line and spleenomegly was taken when volume exceeds 180ml. The 13 cases which were serologically negative, 8 cases shows, mild thickening of GB wall (4-5 mm) and mild hepatospleenomegaly, But none have polyserositis The remaining 5 cases of fever shows no significant finding in USG.[15]

RESULT

Out of 109 patients, 32 patients admitted in July-14, 45 Patients in August, 26 Patients in September and only 6 patients in October -14. GB wall thickening was observed in all the patients and rages from 4 mm to 11mm. patients seen in July and August GB wall thickening was 8-11 mm in compression with patients seen in September & October having GB thickening 4-8 mm. Perichole cystic fluid seen in 100% cases of DF in July and August, while in September 80% & in October 33%. Honeycomb pattern of GB walls seen in 93% cases in July and 95% cases of August while only 23% cases of September and in October no cases shows honeycomb pattern. Average incidence of hepatomegaly seen in 69% and spleenomegaly 77%, polyserositis slows a decreasing trend in cases of DF admitted in months of September and October in comparison to patients admitted in month of July & August (Table-1).

Table-1: Ultra-sonographic investigations

Date	GB Wall Thickening	Honey comb	pericholecystic fluid	Hepato-megaly	Spleen	Rt Pleural effusion	B/L Pleural effusion	Ascites	Pericardial effusion
Jul-14	n=32 100%	n=30 93%	n=32 100%	n=22 70%	n=25 78%	n=27 85%	n=7 21%	n=22 70%	n= 5 15%
Aug-14	n= 45 100%	n =43 95%	n = 45 100%	n=34 75%	n=38 85%	n=37 82 %	n=12 27%	n=32 72%	n=5 12%
Sep-14	n= 26 100%	n=6 23%	n=21 80%	n=16 60%	n=18 69%	n=11 42%	n=5 19%	n=8 31%	n =nil
Oct-14	n=6 100%	n= nil	n=2 33%	n=3 50%	n=3 50%	n=2 34%	n=1 16%	n=1 16%	n=nil
Total	**109**	**79**	**100**	**75**	**84**	**97**	**25**	**63**	**10**
Total %	**100%**	**72%**	**92%**	**69%**	**77%**	**88%**	**23%**	**58%**	**9%**

DISCUSSION

Dengue is an acute febrile viral disease caused by flavivirus. It occurs in two forms: DF, a milder form of the disease and DHF. It is now endemic in more than 100 countries and threatens the health of 40% of the world's population. It is estimated that 50 million dengue infections occur each year with 5000000 cases of DHF and at least 12000 deaths annually mainly among children.[16] 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 programmes.[17] In India the problem is even more acute because since 1963, more than 50 outbreaks have been reported by the National Institute of Communicable Disease, New Delhi.

Dengue viruses are transmitted to humans through the bite of infective female *Aedes mosquito*. The incubation period of the disease is 3-14 days. The onset of the disease is recognized by the sudden onset of high fever, retro-orbital pain, thrombocytopenia and hemorrhagic manifestations. Common laboratory finding include pancytopenia and prolonged bleeding time. These finding are consistent with increased vascular permeability, plasma leakage, abnormalities of haemostasis and protein losing shock syndrome, which commonly occur in DF pathogenesis.[18]

Serology is the mainstay in the diagnosis of DF Haemagglutination inhibition antibodies usually appear at detectable level by day 5 to 6 of febrile illness. The diagnosis of DF is often delayed owing to time taken for availability of results. The aim of our study was to evaluate the ultrasound finding in DF, to find whether ultrasound of the abdomen is an important adjunct to clinical and laboratory profile in diagnosis.[19]

We have observed a seasonal climatic change in the USG finding patients of DF in the month of July & August, shows on sever forms of finding in term of greater GB Wall thickness (7-11mm), honeycomb pattern. Pericardial effusion & pleural effusion, while the patients came in the month of September, & October shows a milder form of DF, consisting of a mild increase in G.B. wall thickness, decrease incidence of poly serositis & absent of honey comb pattern in wall of GB.[20-23]

Many study have showed that humidity defined vapour Pressure of specific humidity is high only when rainfall and temperature are high and these conditions that are conducive to breeding and survival of vector population and rapid replication of the virus.[24-27] Month of July and August on having high humidity level in comparison to month of September & October. However due to small simple size the effect of humidity, could not be certainly assertion.

CONCLUSION

Sonographic features of thickened GB wall, pleural effusion, ascites, hepatomegly and spleenomegaly strongly favour the diagnosis of DF in patients presenting with fever and associated symptoms, especially correlation with climatic or seasonal changes either due to decrease in virus virulence or herd immunity.

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