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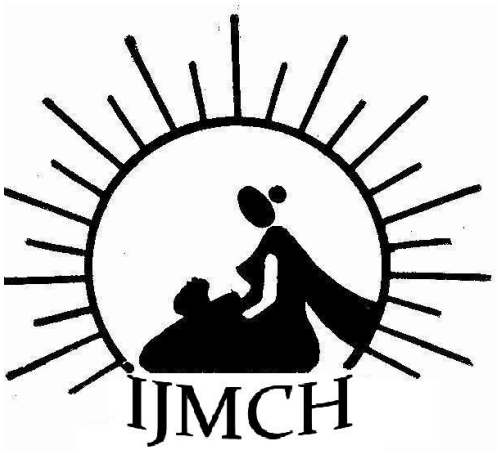

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A Study on Clinical Profile and the Utility of Ultrasound Abdomen in Dengue Fever

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ABSTRACT

Aim: The aim of this study was to evaluate the clinical and sonographic findings of dengue fever which may be useful as an early diagnostic tool.

Settings: KEMPEGOWDA INSTITUTE OF MEDICAL SCIENCES, Bangalore, India.

Study Design: It was a cross sectional observational study.

Participants: 200 paediatric cases of serologically confirmed dengue fever, admitted in the year 2013, were included in this study.

Methodology: The participants were clinically and serologically evaluated. All underwent Dengue serology (NS1 antigen/ IgM/ IgG antibody) examination in our pathology lab. Then these patients also underwent USG abdomen and chest, within the first week of the illness in our radoiology department.

Results: Out of the 200 confirmed dengue cases, 106(53%) cases were males and the remaining 94 cases (47%) were females. The most common age group was school going chidren (42%) and adolescents (36%). All the cases had fever (100%), 144 cases (72%) had vomiting, 92 cases (46%) had abdominal pain, 67cases (33.5%) had hepatomegaly, 21 cases (10.5%) had rashes, 4 cases (2%) had splenomegaly, 26 cases (13%) had bradycardia and 47 cases (23.5%) went in for hypotension and shock. Out of these 200 cases, lab investigations showed, 194 cases (97%) with thrombocytopenia, 189 cases (94.5%) with hemoconcentration, 126 cases (63%) with leucopenia< 4000/mm^3 and 83 cases (41.5%) with raised liver enzymes. The ultrasonographic findings in these patients were : 84 cases (42%) had hepatomegaly, 33 cases (16.5%) had splenomegaly, 61 cases (30.5%) had gall bladder wall thickening, 93 cases (46.5%) had pleural effusion and 74 cases(37%) had ascites. In this study 4 cases (mortality was 2%) expired. All the 4 cases had gone into shock and ARDS.

Key Words: Dengue Fever (Df), Usg (Ultrasonogram)

INTRODUCTION

Dengue is a serious mosquito-borne viral disease which in recent years has become a major international public health concern. It is the most serious viral haemorrhagic fever in the world with an annual incidence of 100 million cases per year[1] It is now endemic in more than 100 countries and threatens the health of more than 2500 million i.e. 40% of the world's population.

Nearly 90% of the dengue infections occur in children with risk of dying during a secondary attack which is nearly 15-fold higher than that of adults. Its mortality ranges from 1-5%

treated patients to a maximum of 50% for untreated or poorly treated patients resulting in at least 12,000 deaths annually mainly among children[2,3].

Dengue viruses cause symptomatic infections or asymptomatic seroconversion. Symptomatic dengue infection is a systemic and dynamic disease. It has a wide clinical spectrum that includes both severe and non-severe clinical manifestations[4].Previously WHO had classified the disease as classic dengue, the milder form of the disease and dengue hemorrhagic fever (DHF), the severe form which was further divided into four grades. Changes in the epidemiology of dengue, especially with an increasing number of cases (with and without co-morbidities) and the expansion of dengue into other regions of the world, has led to problems with the use of the existing WHO classification. As there have been many reports of difficulties in the use of the previous classification which were summarized in a systematic literature review the dengue classification has been revised and is classified as Dengue fever with or without warning signs and Severe Dengue fever[5, 6].

Positive serology (anti dengue antibody) is the mainstay in the diagnosis of DF. But serology takes approximately 7 days to give a positive result[7,8]. The diagnosis of DF is often delayed owing to time taken for availability of serology test results[2.]

Ultrasonography (USG) is a cheap, rapid and widely available non-invasive imaging method[9,10]

Sonographic findings of dengue fever have been described in several previous literatures. Some authors concluded that during an epidemic the ultrasound findings of gall bladder wall thickening with or without polyserositis in a febrile patient should suggest the possibility of DF [11,12]. Several studies concluded that ultrasonography of the chest and abdomen can be an important adjunct to clinical profile in diagnosis DF and diagnosis can be made early in the course of disease compared with other modes of diagnosis[2.] It can be used as a first-line imaging modality in patients with suspected dengue fever to detect early signs suggestive of the disease prior to obtaining serologic confirmation test results, especially in a dengue fever epidemic area[11]

These findings may also occur in other viral infections and enteric fever but in other viral infections the historical profile, symptom complex evolution and physical findings do not mimic those of dengue fever[2].One study attempted to investigate whether gall bladder wall thickening

measured by ultrasonography can be used to predict the onset of severe dengue fever. It is found that a thickness of 5 mm is useful as a criterion for identifying DHF patients at high risk of

developing hypovolemic shock[23]

The aim of this study was to evaluate the clinical and sonographic findings of dengue fever which may be useful as an early diagnostic tool .

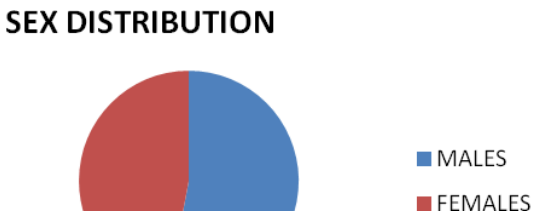
MATERIALS AND METHODS

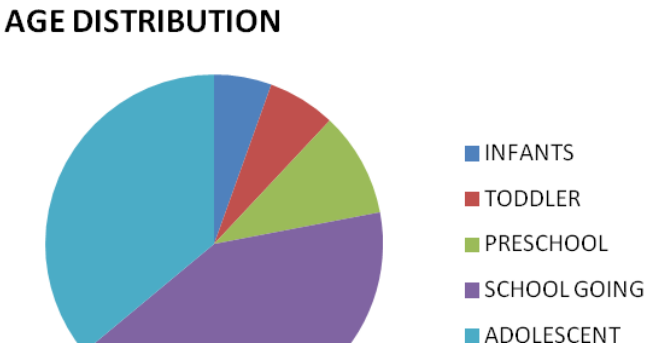
This cross-sectional observational study was carried out in the Department of Paediatrics, Kempegowda Institute of Medical Sciences, Bangalore. 200 paediatric cases of serologically confirmed dengue fever, admitted in the year 2013, were included in this study. All these patients were clinically and serologically evaluated. All underwent Dengue serology (NS1 antigen/ IgM/ IgG antibody) examination in our pathology lab. BioLine kit was used for

testing with NS1 antigen\ IgM\ IgG antibody. Then these patients also underwent USG abdomen and chest, within the first week of the illness in our radoiology department.

RESULTS

Out of the 200 confirmed dengue cases, 106(53%) cases were males and the remaining 94 cases (47%) were females. The most common age group was school going chidren (42%) and adolescents (36%).





CLINICAL MANIFESTATIONS	NUMBER OF CASES
FEVER	200 (100%)
VOMITING	144 (72%)
ABDOMINAL PAIN	92 (46%)
RASHES	21 (10.5%)
HEPATOMEGALY	67 (33.5%)
SPLENOMEGALY	4 (2%)
BRADYCARDIA	26 (13%)
HYPOTENSION	47(23.5%)

Among these 200 cases all the cases had fever (100%), 144 cases (72%) had vomiting, 92 cases (46%) had abdominal pain, 67cases (33.5%) had hepatomegaly, 21 cases (10.5%) had rashes, 4 cases (2%) had splenomegaly, 26 cases (13%) had bradycardia and 47 cases (23.5%) went in for hypotension and shock. The most common bleeding manifestation was petechiae (6.2%) followed by haemetemesis 4.1% and epistaxis (3.6%). In our study, 2 patients (1%) had presented with altered sensorium. Dengue encephalopathy was suspected in view of normal metabolic profile and CSF examination

Out of these 200 cases 194 cases (97%) had thrombocytopenia, 189 cases (94.5%) had hemoconcentration, 126 cases (63%) had leucopenia< 4000/mm^3 and 83 cases (41.5%) had raised liver enzymes.

LAB FINDINGS	**NUMBER OF CASES**
THROMBOCYTOPENIA	194 (97%)
HEMOCONCENTRATION	189 (94.5%)
LEUCOPENIA(<4000/mm^3)	126 (63%)
RAISED LIVER ENZYMES	83 (41.5%)

The ultrasonographic findings in these patients were : 84 cases (42%) had hepatomegaly, 33 cases (16.5%) had splenomegaly, 61 cases (30.5%) had gall bladder wall thickening, 93 cases (46.5%) had pleural effusion and 74 cases(37%) had ascites.

ULTRASOUND FINDINGS	**NUMBER OF CASES**
HEPATOMEGALY	84 (42%)
GALL BLADDER WALL THICKENING	61 (30.5%)
SPLENOMEGALY	33 (16.5%)
PLEURAL EFFUSION	93 (46.5%)
ASCITES	74 (37%)

Out of the 47 cases which went for shock, all the cases had gall bladder wall thickening, moderate to severe ascites and bilateral moderate pleural effusion and 80% cases had hepatomegaly.

In this study 4 cases (2%) expired. All the 4 cases had gone into shock and ARDS.

DISCUSSION

Dengue viruses are transmitted to humans through the bites of infective female Aedes mosquito. The incubation period of the disease is 3–14 days. It is an acute febrile viral disease caused by flavi-virus having four different serotypes. Dengue has become a major international public health concern in recent years[13] . Hence, it will be useful in the proper management of dengue fever if symptoms, signs and laboratory parameters and sonographic findings associated with the
disease are identified early and the clinical severity is known. The main objective of their study
was to identify symptoms, signs and investigation findings of dengue fever and the ultrasonographic findings of dengue fever which could help in early diagnosis and proper management of cases.

Out of 200 patients there were 53% were males and 42% were females. This is consistent with previous study findings that dengue fever occurs more in male sex[2]

In this study fever and vomiting were the most frequent symptoms and hepatomegaly was the most frequent sign in these children, as observed in earlier studies[14,15].And in our study only 10.5% cases had rashes as a symptom which was similar to the studies by Ahmed FU et al[16]
where rashes were found in 12% of children. Headache and retroorbital were not seen in our study as compared to other studies[21]

In our study the most common bleeding manifestation was petechiae followed by hemetemesis which is different from few studies where haemetemesis is commoner[17,18.]

The one important laboratory finding is the rise in serum levels of liver enzymes (LFTs) as reported in various studies[11,19]. The high incidence of vomiting, hepatomegaly and elevated liver enzymes can serve as markers for suspicion of dengue during an epidemic. Subclinical hepatitis may contribute to the abdominal pain and vomiting in these children.

Mortality in the present study was 2%. All patients who expired went into hypotension, shock and ARDS. In the study by Anju et al[17] overall mortality seen was 6%, compared to 3% by Ahmed et al[16]. Dengue associated ARDS is associated with a high mortality[24].

In this study 79% cases were positive for NS1 antigen with or without antibodies and the remaining were positive only for antibodies. And it was found that out of the 78 cases (39%) which were positive for NS1 antigen alone, 56 cases (72%) had Ultrasound findings in the form of either hepatomegaly with polyserositis or gall bladder wall thickening with other consistent findings. This clearly shows that Ultrasound can be used as an early, non invasive and economical diagnostic tool. The ultrasound findings in our study showed gall bladder wall thickening in 30.5% cases whereas as Quiroz-Moreno et al found gallbladder thickening in 86% of the patients, Sai et al in 56% patients, Gonzalez et al in 35.1%[2,10,20]. This may be due to serotype of the causative dengue virus, secondary antibody patterns of the patients due to previous exposure to dengue viruses, race of the patients and other factors yet to be known[21].And in our study pleural effusion nor ascites was apparent on clinical examination

in many of them. But sonography diagnosed all of them. Similarly 17 cases of hepatomegaly and 29 cases of splenomegaly could not be diagnosed by clinical examination but were diagnosed correctly by ultrasonography. So this study clearly demonstrates the importance of abdominal and thoracic sonography in the accurate and complete clinical evaluation and management of dengue fever.All the cases which went into hypotension and shock showed gall bladder wall thickening, with moderate to severe pleural effusion and ascites which means that ultrasonography can also give the clinicians some idea about the severity of the disease process and thus help in more meticulous management of the patients.

CONCLUSION

In this study, it is clear that, in children, a strong possibility of dengue fever is present, especially in an epidemic setting like India, if they present with symptoms like fever, vomiting, and myalgia alongwith hepatomegaly, low platelet count and elevated liver enzymes.

The study mainly concludes that abdominal and thoracic sonography can be used as a first-line imaging modality in patients with suspected dengue fever to detect early signs suggestive of the disease prior to obtaining serologic confirmation tests which are costly, invasive and not affordable by all patients.

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