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RESEARCH ARTICLE

ROLE OF USG IN EARLY DETECTION AND PREDICTING SEVERITY OF DENGUE INFECTION

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Dengue, Ultrasound, Gallbladder Wall Thickening, Pleural Effusion, Early Detection, Severity

Abstract

Background: Early detection and severity assessment are crucial for managing dengue fever. Ultrasound (USG) imaging can help identify key features such as capillary leakage and organ involvement, aiding in diagnosis and prognosis.
Aims: To correlate ultrasound findings with the severity of dengue infection. To evaluate USG's sensitivity in detecting early capillary leakage and its prognostic value.
Methods: The study involved 66 patients (40 males, 26 females; aged 12-70) with serologically confirmed dengue, observed from August 2022 to October 2023. USG was performed within 3 days of fever onset and again after 1 week.
Results: Day 1-3: Gallbladder wall thickening (60.6%) and pericholecystic fluid were common. Pleural effusion (34.8%) was observed in milder cases. Day 7: Gallbladder wall thickening persisted in 89.4%. New findings included ascites (24.2%), bilateral pleural effusion (31.8%), and pericardial effusion (9.1%). Severe cases showed hepatomegaly and splenomegaly.
Conclusion: USG is a valuable tool for early detection and severity assessment of dengue fever. Key findings like gallbladder wall thickening and pleural effusion can help predict disease severity and guide clinical management.

Aims & Objectives:-

- To demonstrate the severity of dengue fever by co-relating the ultrasound features.
- To evaluate the early sensitivity of USG in measuring capillary leakage in patients with dengue fever along with its prognostic value.

Materials & Methods:-

- Ultrasound was done in BTGH over a period of 3 months, 66 patients (40 Male and 26 Female; age range of 12-70 years with serological confirmation between August 2022 to October 2023).
- Common clinical manifestations were quite variable. Fever was the most common symptom associated with severe headache, body aches, joint pain, and purpuric spots on the body.

Materials & Methods:-

- Hematological investigation in almost all the patients revealed thrombocytopenia.

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- Trans-abdominal ultrasound was performed using GE LOGIQ P9 and LOGIQ P5 with 3-5 MHz transducer.
- Initial scans were done on 3 days of fever with follow up scan after 1week of fever.

Statistical Analysis:

- Emphasis was made on gallbladder wall thickness, any measurement greater than 3 mm was considered as abnormal.
- Liver, spleen, pancreas and any free fluid in the peritoneal or pelvic cavity were also recorded.
- Evaluate pleuralcavity for any free pleural fluid.
- Both the pleural spaces were evaluated through an intercostal approach.
- Pericardial space was also evaluated for effusion subcostally.
- The patients were scanned during first3days after onset of fever.Followup scan was done after1week of fever.

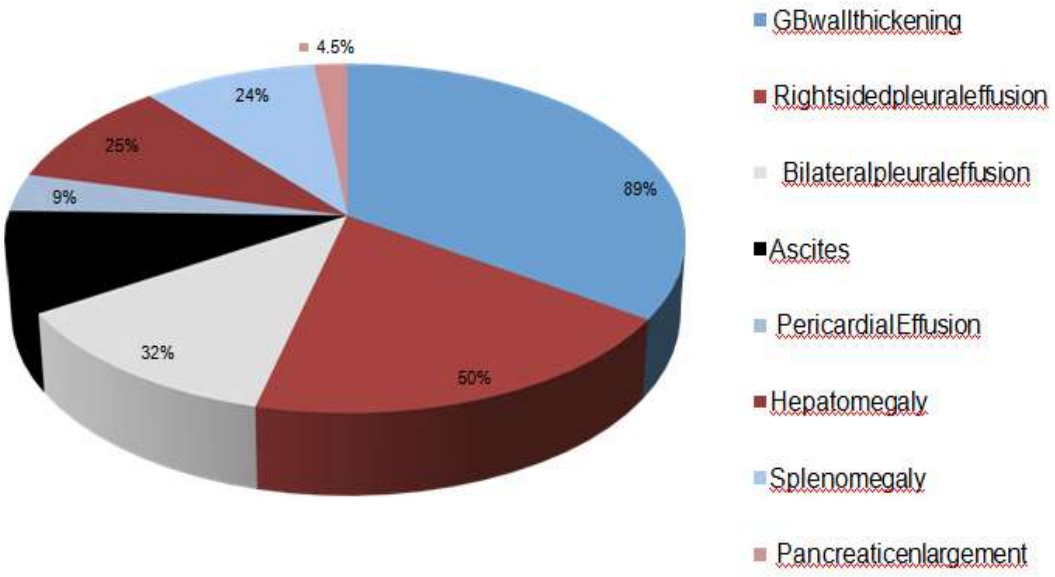
Results:-

- Out of 66 patients, there were 44 patients (66.66%) in whom sonographic features of serositis were found on the transabdominal scanning during the first 3days of onset of fever.
- Patients scanned during first 3 days after onset of fever revealed that gall bladder wall thickening in 40 cases (60.60%), the most consistent finding in all the serologically positive cases of dengue fever ranging from mild to severe form.
- GB wall thickening was almost exclusively associated with pericholecystic fluid.
- There were 23 patients with right-sided unilateral pleural effusion (34.84%), found more in the mild and moderate severity of the disease. None had ascites or pericardial effusion during the first 3 days of fever.

Onfollow-Upscan (DAY7):

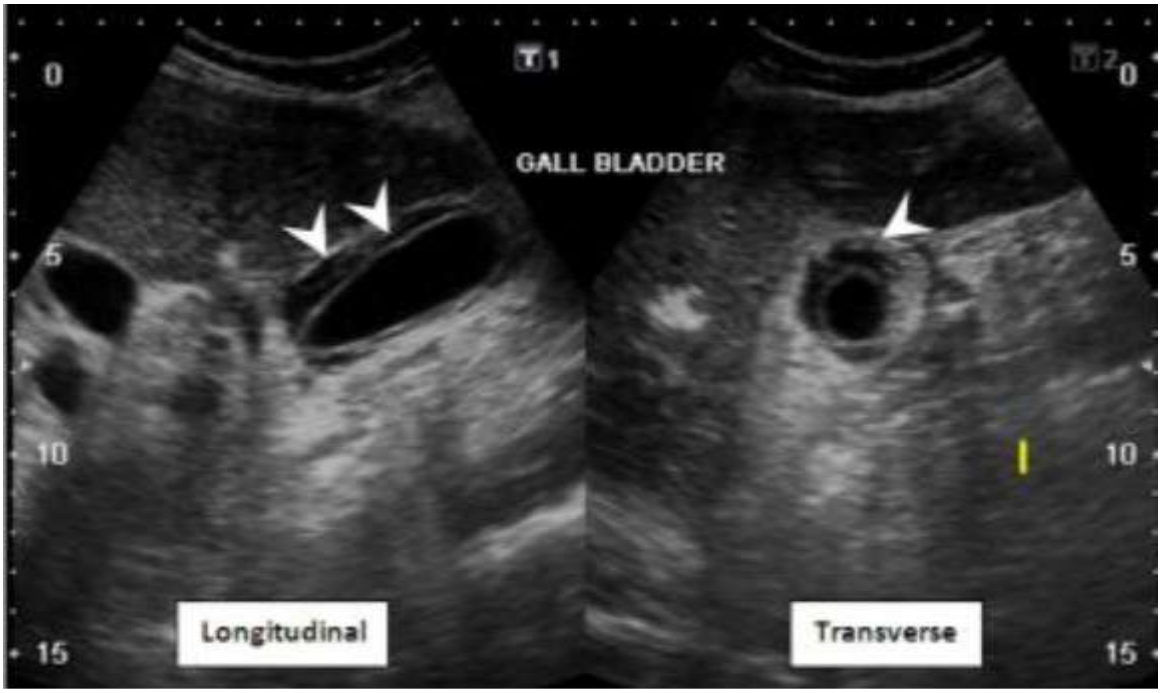
- Gallbladder wall thickening with pericholecystic edema was consistent and demonstrated in 59 cases (89.39%).
- Minimal to mild ascites were noted in 16 patients(24.24%).
- Right sided pleural effusion increased in overall cases, found in 33 (50%); bilateral pleural effusion was demonstrated in 21 patients (31.81%).We didn't find isolated leftsided pleuraleffusion in our study.
- Pericardial effusion depicted in 6 patients(9.09%).
- Hepatomegaly, splenomegaly and diffuse pancreatic enlargement were found in 17 (25.7%), 16 (24.2%) and 3 (4.5%) cases respectively.
- These findings were more common in severe formof disease.
- Renal appearances were normal in all cases.
- No Para-renal and Peri-renal space fluid collections were found in any of the cases.

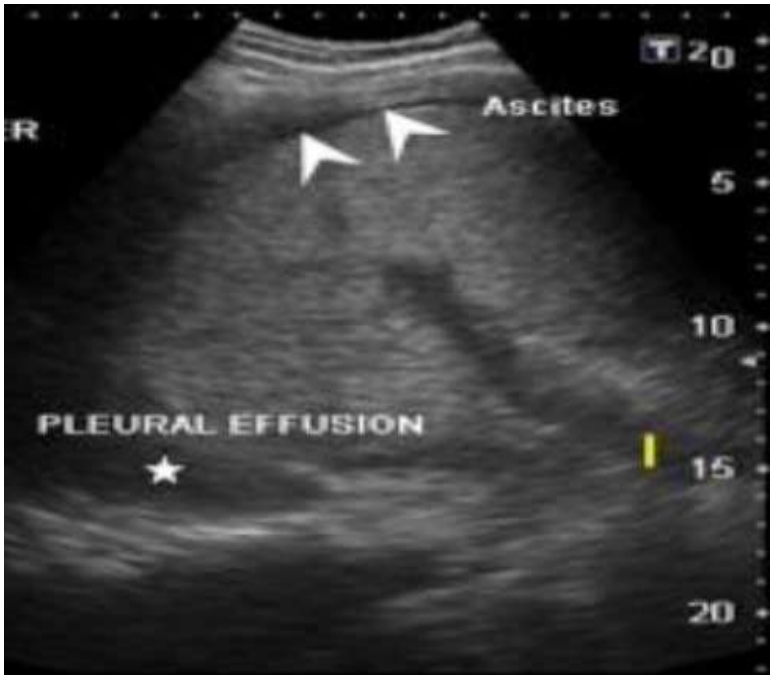
USG FINDINGS ON FOLLOWUP SCANS (DAY 7)

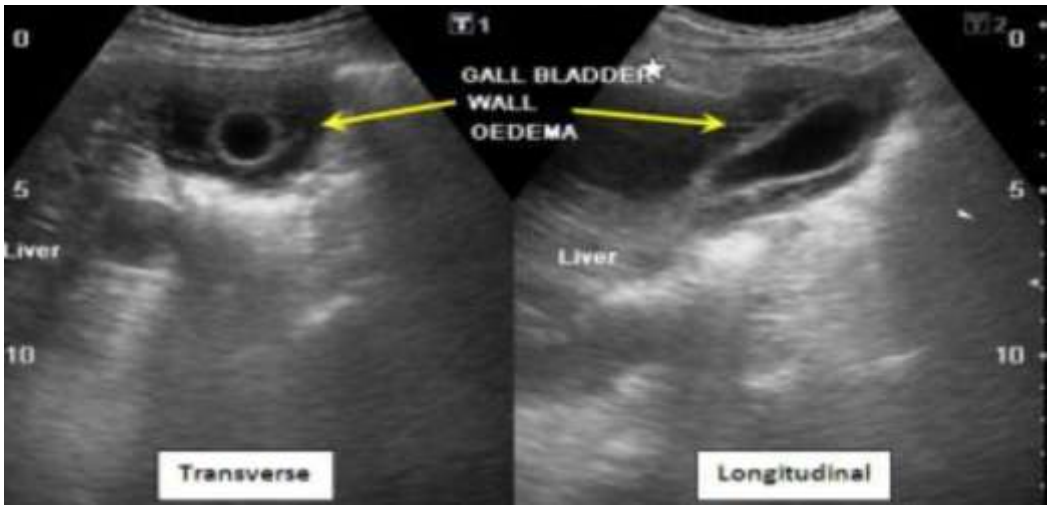


Results:-

- We found that gallbladder wall thickening was the most sensitive sonographic markers in the early course of dengue fever, i.e. in the milder form of disease.
- We also demonstrated that thickened GB wall along with Peri-cholecystic edema was the most common and consistent ultrasound finding on initial as well as later scans followed by pleural effusion, ascites and pericardial effusion. Hepatomegaly, splenomegaly and pancreatic enlargement were noted in few patients with severe disease.







USG of a patient with 2 days h/o dengue fever demonstrates mild right pleural effusion and ascites. Marked gall bladder wall thickness with moderate pericholecystic edema.

Discussion:-

- Dengue virus is a DNA arbovirus with four different serotypes DEN-1, 2, 3 and 4.
- However dengue hemorrhagic fever and dengue shock syndrome are most commonly associated with DEN 2 and 3.
- Dengue viruses are transmitted to humans through the bites of infective female Aedes aegypti mosquito.
- The incubation period of the disease is 3–14days.
- The onset of the disease is recognized by the sudden onset of high fever, retro-orbital pain, thrombocytopenia and haemorrhagic manifestations.

Discussion:-

- Common laboratory findings include pancytopenia, neutropenia, increased hemoconcentration, thrombocytopenia and prolonged bleeding time.
- Ultrasound can be used to detect small amounts of transudate in serous cavities in the patients with DF.

Interpretation & Conclusion:-

- Trans-abdominal USG is an important diagnostic tool to clinical profile in diagnosing Dengue fever early in its course compared with other modes of diagnosis before any clinical manifestations are apparent.
- Sonographic findings of gall bladder wall thickening with or without polyserositis in a febrile patient should raise the suspicion of DF/DHF.
- The degree of thrombocytopenia showed a significant direct relationship to abnormal ultrasound features.

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