

Prognostic Value of Ultrasonography in Dengue Fever, Compared With Clinical and Laboratory Parameters

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I. Background

Dengue fever is one of the major epidemic that the state faces every year. Dengue shock syndrome and dengue haemorrhagic fever being the deadly form of the disease. Hence close monitoring of the patients are needed to manage with adequate hydration to prevent a profound dengue shock syndrome. Monitoring of the patients are usually done with laboratory parameters like platelet count, PCV and clinical monitoring of Blood pressure. An ultrasonography of chest abdomen pelvis along with the clinical and laboratory data can assist in assessing the severity of plasma leakage and can detect evidence of plasma leakage earlier. Hence appropriate management can be done to prevent a shock

Objectives:

To find the prognostic value of ultrasonography in dengue fever compared with clinical and laboratory parameters

II. Materials And Methods

The study will be conducted on 100 patients admitted to the Department of general medicine, Government Rajaji Hospital & Madurai Medical College with serologically proven dengue fever during the study period

We included IgM dengue positive patients age more than 13 yrs, did initial clinical assessment, ultrasonography, platelet and hematocrit values, BP monitoring

Inclusion Criteria

- History of fever
- IgM dengue positive
- Age > 13 years

Exclusion Criteria

- Chronic liver disease
- Cholelithiasis
- Chronic renal failure
- Congestive cardiac failure
- ITP

DATA COLLECTION:

Informed consent will be obtained from all patients/attenders to be enrolled for the study. In all the patients relevant information will be collected in a predesigned proforma. The patients are selected based on clinical examinations and biochemical tests.

LABORATORY INVESTIGATIONS

- a) Complete Hemogram
- b) Peripheral blood smear
- c) Liver function test

- d) Renal function test
- e) Fasting and Post prandial blood sugar
- f) IgM Dengue

Adult patients aged more than 13 years of age admitted with fever with IgM Dengue positive serology in the Department of Medicine of Government Rajaji Hospital, Madurai will be subjected to ultrasound abdomen, pelvis and chest . Platelet and hematocrit values, and blood pressure monitoring will be done

DESIGN OF STUDY:

Cross sectional study

PERIOD OF STUDY:

3 MONTHS

COLLABORATING DEPARTMENTS:

DEPARTMENT OF BIOCHEMISTRY

DEPARTMENT OF RADIOLOGY

DEPARTMENT OF PATHOLOGY

DEPARTMENT OF MICROBIOLOGY

ETHICAL CLEARANCE: Study proposal accepted by institute ethical committee ,MADURAI MEDICAL COLLEGE

CONSENT: Individual written and informed consent obtained

ANALYSIS: Statistical analysis will be performed using appropriate tests as required according to data.

CONFLICT OF INTEREST: NIL

FINANCIAL SUPPORT: SELF

III. Results

Age and sex distribution

Study was conducted among 100 serologically proven Dengue fever cases among which 48 were females and 52 were males . The mean age was 37 years. Minimum age was 14 and maximum was 74 years

Ultrasonographic findings

Most common ultrasound finding is gall bladder wall thickening. Next common finding is pericholecystic fluid. Least common finding is splenomegaly

Laboratory parameters

Most common laboratory parameter was thrombocytopenia present in 63 of 100 patients. But bleeding manifestations were present only in 27 patients. Rise in PCV was seen in 34 patients and a fall in pulse in 33

The relation between the ultrasonographic features and thrombocytopenia, PCV rise, fall in pulse pressure, bleeding manifestation are tabulated below

Ultrasound parameters		thrombocytopenia		Hematocrit rise		Fall in pulse pressure		Bleeding manifestation	
		Present	Absent	Present	Absent	Present	Absent	Present	Absent
Splenomegaly	Present	22	0	12	10	12	10	10	12
	Absent	45	63	10	85	23	85	18	90
Hepatomegaly	Present	27	40	13	14	15	12	11	16
	Absent	40	63	22	81	20	83	17	86
Perinephric edema	Present	36	2	24	14	22	16	22	16
	Absent	31	61	11	81	13	79	6	86
Ascites	Present	43	0	26	17	25	18	23	20
	Absent	24	63	9	78	10	77	5	82
Pleural effusion	Present	51	1	31	21	30	22	27	25
	Absent	16	62	4	74	5	73	1	77
Pericholecystic fluid	Present	55	6	31	30	29	32	26	2
	Absent	12	57	4	65	6	63	35	67

Thick gall bladder	Present	59	11	33	37	31	39	26	2
	Absent	8	52	2	58	4	56	44	58

From the chi square test we derive that there is stastically significant association between splenomegaly and thrombocytopenia(chi square value 24.9),splenomegaly and hematocrit rise(chi square value 10.270), splenomegaly and fall in pulse pressure (chi square value 10.270), splenomegaly and bleeding manifestation(chi square value 8.963)

There is stastically significant association between hepatomegaly and thrombocytopenia(chi square value 32.043),hepatomegaly and hematocrit rise(chi square value 7.803), hepatomegaly and fall in pulse pressure (chi square value 14.200), hepatomegaly and bleeding manifestation(chi square value 8.963)

There is stastically significant association between perinephric edema and thrombocytopenia(chi square value 40.119),perinephric edema and hematocrit rise(chi square value 35.833), perinephric edema and fall in pulse pressure (chi square value 26.180), perinephric edema and bleeding manifestation(chi square value 41.998)

There is stastically significant association between ascites and thrombocytopenia(chi square value 60.417),ascites and hematocrit rise(chi square value 36.742), ascites and fall in pulse pressure (chi square value 31.824), ascites and bleeding manifestation(chi square value 38.811)

There is stastically significant association between pleural effusion and thrombocytopenia(chi square value 75.153),pleural effusion and hematocrit rise(chi square value 47.080), pleural effusion and fall in pulse pressure (chi square value 41.704), pleural effusion and bleeding manifestation(chi square value 47.347)

There is stastically significant association between pericholycytic fluid and thrombocytopenia(chi square value 68.650),pericholycytic fluid and hematocrit rise(chi square value 33.357), pericholycytic fluid and fall in pulse pressure (chi square value 24.832), pericholycytic fluid and bleeding manifestation(chi square value 30.233)

There is stastically significant association between thick gall bladder and thrombocytopenia(chi square value 65.120),thick gall bladder and hematocrit rise(chi square value 31.517), thick gall bladder and fall in pulse pressure (chi square value 23.239), thick gall bladder and bleeding manifestation(chi square value 21.853)

The degree of freedom of one P value was found to be <0.01 for all of the above associations between ultrasonogram features and clinical and laboratory parameters

LIMITATION:

- Study did not involve a follow up ultrasound and serial pulse pressure PCV and platelet monitoring. Hence the number of patients with earlier plasma leakage findings in ultrasound who have gone for further plasma leakage and shock could not be found.
- Many patients had diabetes and hypertension which might have already damaged the capillary endothelium.Hence plasmaleakage in this patients may be severe even in early stages of dengue. This was not taken into account

IV. Discussion

Dengue is at rapidly spreading viral disease in the world. In the last 50 years, there was a thirty fold increase in the incidence of Dengue . An estimated 50 million dengue infections occur annually. About 2.5 million people live in Dengue endemic areas in the world.

In our study 48 % were females and 52% were males. And the mean age was 37 years. Among the 100 dengue patients studied 63 had thrombocytopenia but only 27 had bleeding manifestations. PCV rise was seen in 34 % and a fall in pulse pressure was seen in 33 %.

Most common ultrasound finding was thickened gall bladder.. that was present in 70 % of the study population. Next common finding was pericholecystic fluid collection seen in 61 %. Pleural effusion was the third common finding. It was present in 50%. Ascitis was present in 43 % and perinephric edema in 36 %. Hepatomegaly was present in 24 % and splenomegaly in 19 percent.

Only 63 % had thrombocytopenia and rise in PCV was seen only in 34 %. But there was an ultrasonographic evidence of plasma leakage in the form of thickened gall bladder in 70 %.

In a similar study conducted during the epidemic in 1997 by Joshi et al., the most common age group affected was 20 to 40 years and right sided pleural effusion was the most common finding, like .In their study,the most common finding was pleural effusion .In their study, ascites was seen in only 50% of cases;

Thickened GB wall was first reported as a finding of Dengue Fever by Pramuljo et al.[15] It has been found in a lot of studies to be a consistent and common ultrasound finding of Dengue Fever. Venkata Sai et al.[1] had found it in hundred percent patients in their study as the most common first ultrasound finding. In fact, it has been propagated to be used in children as a reliable criterion to predict the onset.

Similar to the study conducted by Venkata Sai et al our study too found thickened gall bladder as the most common finding .

Javed et al. found hepatomegaly in 35.5% patients and splenomegaly in 28.9% patients. In our study hepatomegaly and splenomegaly was seen only in 24 % and 19 % respectively. That was the least common among the ultrasound parameters studied.

When comparing the statistical association, there was significant statistical association with thrombocytopenia, PCV rise , fall in pulse pressure and all the 7 ultra sound parameters studied.

V. Conclusion

Ultrasound abdomen can be used as a first line investigation modality in dengue fever suspected patients especially in the scenario of an epidemic of Dengue as it can detect early signs suggestive of the disease. Ultrasonogram of abdomen is useful for early prediction of the severity of dengue fever. Sonographic changes occurs even before a change appears in platelet count or haematocrit. Thus ultrasonography of abdomen helps in triage of cases and close monitoring can be done for those patients to prevent a profound dengue haemorrhagic fever and Dengue shock syndrome. Ultrasound abdomen supported with lab parameters like rising haematocrit and decreasing platelet count predicts the progression to severe form of the disease.

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