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Original Research Article

Cardiac involvement in adult patients with febrile thrombocytopenia diagnosed by bedside 2-D echocardiography

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ABSTRACT

Background: Febrile thrombocytopenia due to various etiologies is very common in India. Its clinical manifestations range from asymptomatic infections to severe disease. Cardiac involvement in such systemic illness should be evaluated. Aim of present study is to evaluate cardiac involvement in patients with Febrile thrombocytopenia with platelets count less than 50,000/µL with the help of handheld echocardiography.
Methods: Two hundred patients who had fever with thrombocytopenia were enrolled in the study. ECG and echocardiogram were done to all the patients. One-way ANOVA, Chi square test and correlation coefficient from Pearson correlation and P value of < 0.05 was taken as significant.
Results: Out of 200 patients there were 146 males and 56 females. The mean age was 24.12yrs in males 28.32yrs in females .Rhythm abnormalities were present in 60 patients and the most common abnormality was sinus tachycardia; 17 patients had ascites and right pleural effusion; 24 patients presented with pericardial effusion and incidental diagnosis of CHD, RHD, and CAD were made; two patients had myocarditis as evidenced by global hypokinesia of left ventricle. All of those cardiac manifestations were common in Dengue Shock Syndrome.
Conclusions: Cardiovascular manifestation in Febrile thrombocytopenia is relatively common ranging from pericarditis to myocarditis. Clinician should routinely screen patients with pyrexia with thrombocytopenia for cardiac manifestations. Early diagnosis at bed side may improve the outcome. Management of patients with pre-existing cardiac diseases should be individualized.

Keywords: Dengue shock syndrome, Fever with thrombocytopenia, Hand held echocardiogram

INTRODUCTION

Thrombocytopenia may be defined as a subnormal number of platelets in the circulating blood. A normal human platelet count ranges from 1,50,000 to 4,50,000 platelets/µL of blood. Often patients with thrombocytopenia are asymptomatic and are diagnosed by routine complete blood count. Occasionally, there may be bruising, purpura, petechiae, nose bleeding and gum bleeding.[1] Fever is defined as an elevation of the body temperature above the normal circadian range as the result of a change in the thermoregulatory center located in the anterior hypothalamus. An am temperature of >37.2°C (98.9°F) or a pm temperature of >37.7°C(99.9°F) would define fever though thrombocytopenia is encountered in various diseases, it is for sure that potentially fatal bleeding due to thrombocytopenia is rare.[2,3] Dengue fever is an acute febrile infectious disease, caused by any serotypes (1,2,3 or 4) of a virus from the genus flavivirus. Dengue is transmitted by mosquitoes of the genus Aedes. The mosquito *Aedes aegypti* breeds in clean water bodies and bites during day time. The disease has an incubation period of 4-10 days before the symptoms starts

appearing. The characteristic symptoms include fever, body ache, headache, multiple joint pain including both small and large joints of body, retro orbital pain, myalgia, itching and rash. Cardiac manifestations in dengue can range from asymptomatic bradycardia to life threatening myocarditis. The incidence of cardiac manifestations has been correlated with severity of the disease.[3] Patients with more severe form of the disease like Dengue Hemorrhagic Fever or Dengue Shock Syndrome are more prone for developing cardiac manifestations.[4] The aim of present study was to evaluate cardiac abnormalities using handheld echo cardiogram.

METHODS

Two hundred adult patients who had febrile thrombocytopenia and had been hospitalized were enrolled in the study.

Inclusion criteria

Two hundred adult patients who were suffering from pyrexia with thrombocytopenia with platelet count less than 50,000/µL were enrolled in present study.

Exclusion criteria

- Patients having platelet count more than 50000/µL
- Patients having inherited platelet abnormalities
- Patients who were on corticosteroid treatment
- Patients who were known case of cardiomyopathies.

A detailed medical history, clinical examination and relevant laboratory investigations were done as indicated in each patient. It was a non-randomized prospective observational study. The duration of the study was August 2017 to December 2017. The collaborating departments were Department of Cardiology, Government Rajaji Hospital, Madurai and Department of Medicine, Government Rajaji Hospital, Madurai, Tamil Nadu, India.

Statistical analysis

The information collected regarding all the selected cases were recorded in a master chart. Data analysis was done with the help of computer by using SPSS 16 software and Sigma Stat 3.5 version (2012).

Using this software mean, standard deviation and 'p' value was calculated through Student 't' test, One way ANOVA, Chi square test and correlation coefficient from Pearson correlation and P value of < 0.05 was taken as significant.

Echocardiogram

Echocardiography was performed immediately after the patient diagnosed and admitted in present hospital as pyrexia with thrombocytopenia. Screening was done using hand held portable ultrasound equipment. Echo machine was 2D model. 2-5 MHZ probe was used.

RESULTS

In present study there were 138 male patients and 62 female patients.

Table 1: Gender distribution of patients in present study.

Sex	No. of patients	%
Male	138	69
Female	62	31
Total	200	100

Table 2: Age distribution of patients in present study.

Age	No. of patients
12- 20 years	70
21-30 years	45
31-40 years	39
41-50 years	30
51-60 years	8
>60 years	8

In present study most of the people are below 20 and implies high prevalence of pyrexia with thrombocytopenia in young patients.

Table 3: Types of fever.

Fever type	No. of patients
Dengue fever	10
DHF	140
DSS	50

In present study there is high prevalence of DHF.

Table 4: Cardiac symptoms.

Cardiac symptoms	No. of patients
No	160
Yes	40

In the study population cardiac symptoms like giddiness, palpitations and syncope were present in 40 patients (20%) implies high prevalence of cardiac symptoms in febrile thrombocytopenia.

Table 5: Pulse.

Pulse (BPM)	No. of patients
Less than 60	6
60-100	173
>100	21

A total of 21 patients (10.5%) had tachycardia at the admission time and 6 patients (3%) had bradycardia at the time of admission.

Table 6: Blood pressure at the time of admission.

Blood pressure (mmhg)	Patients
<90	53
90-120	116
120-160	10
>160	1

In the study population a total of 53 patients (26.5%) had hypotension during admission.

Table 7: PCV at the time of admission in pyrexia with thrombocytopenia.

PCV	No. of patients
<30 g/dl	15
31-40 g/dl	150
41-50 g/dl	35

In present study, most patients had PCV between 30-40.

Table 8: Platelets count at the time of admission.

Platlet/cmm	No. of patients
<10000/cmm (severe thrombocytopenia)	6
10000-20000/cmm	48
20000-30000/cmm	48
30000-40000/cmm	50
40000-50000/cmm	48

Authors studied only whose platelets were less than 50000 and only 6 patients (3%) had platelets less than 10000.

Table 9: ECG at the time of admission.

ECG	No. of patients
RAD, RBBB	1
1-degree AV block	2
Sinus bradycardia	4
Sinus tachycardia	21
WNL	172

Table 10: Chest X ray and USG at the time of admission.

CXR and USG	No. of patients
NAD	185
Right plural effusion and ascites	17

Table 11: Cardiac chambers in pyrexia with thrombocytopenia.

Chambers	No. of patients
LV dilated	2
Normal	196
RA, RV dilated	2

In present study 21 patients (10.5%) had sinus tachycardia and 4 patients (2%) had sinus bradycardia.

In the study population 17 patients (8.5%) had pleural effusion and ascites.

In present study cardiac chambers were normal in 196 patients. 2 patients had dilated LV in the form of myocarditis and 2 patients had dilated RA, RV.

Table 12: Cardiac valves of patients with pyrexia with thrombocytopenia.

Valves	No. of patients
AV sclerosed	1
MVP	2
Normal	196
RHD, MR	1

In present study 2 patients (1%) had MVP, and one patient (0.5%) had RHD and one patient had sclerosed AV valve (0.5%).

In present study two patients had Regional Wall motion abnormality. They were newly diagnosed as CAD and managed accordingly.

Table 13: Pericardial effusion in patients with febrile thrombocytopenia.

Pericardial effusion	No. of patients
No	176
Yes	24

Pericardial effusions were present in 24 patients (12%) patients indicates significant asymptomatic pericardial effusion in patients of pyrexia with thrombocytopenia.

Table 14: Myocarditis in patients of pyrexia with thrombocytopenia.

Myocarditis	No. of patients
No	198
Yes	2

In present study two patients (1%) had myocarditis as evidenced by global hypokinesia of left ventricle.

Table 15: Prevalence of cardiac abnormalities in pyrexia with thrombocytopenia.

Types of fever	Cardiac abnormalities	%
DSS	22	11%
DHF	4	2%

In present study cardiac manifestations were present commonly in DSS. In present study there were 138 male patients (69%) and 62 females (31%) patients (Table 1). 70 patients (35%) were below 20 age and 45 patients

were between 21-30 (Table 2). In present study 140 patients had Dengue Haemorrhagic Fever (70%) (Table 3), 50 patients had Dengue Shock Syndrome. Cardiac symptoms like giddiness, palpitations and syncope were present in 40 patients, (20%) (Table 4) implies high prevalence of cardiac symptoms in febrile thrombocytopenia. A total of 21 patients (10.5%) had tachycardia at the admission time (Table 5) and 6 patients (3%) had bradycardia at the time of admission. 53 patients (26.5%) had hypotension (Table 6) during admission, 116 patients had BP between 90-120 mmhg. 150 patients had PCV (Table 7) between 30%-40%, 15 patients had PCV <30%.6 patients had severe thrombocytopenia <10000/µL, 146 patients (73%) had platelet count (Table 8) more than 20000/µL and 54 patients (27%) had less than 20000 /µL.21 patients (10.5%) had sinus tachycardia (Table 9),4 patients (2%) had sinus bradycardia,2 patients had first degree AV block and one patient had RBBB. 17 patients (8.5%) had (Table 10) right sided pleural effusion and ascites. Cardiac chambers were normal (Table 11) in 196 patients. 2 patients had dilated LV in the form of myocarditis and 2 patients had dilated RA, RV. Cardiac valves were normal (Table 12) in 196 patients.2 patients (1%) had MVP, one patient had RHD and one patient had sclerosed AV valve (0.5%). Two patients (1%) had Regional Wall motion abnormality. Pericardial effusions were present in 24 patients (12%) patients (Table 13) Two patients (1%) had myocarditis (Table 14) as evidenced by global hypokinesia of left ventricle. Here authors use Chi-square test to test the ECHO and BP, authors got the level of significance is .928 which is greater than p value (0.05) so authors conclude that BP was influenced by the abnormal ECHO and Platelet count. In present study cardiac manifestations were present most commonly in Dengue Shock Syndrome (Table 15).

DISCUSSION

In the present study of 200 patients, 138 (69 %) patients were males and 62 (31%) were females. The mean age was 29.43 ± 13.71 years. Most of the patients were less than 30yrs.Most patients had Dengue hemorrhagic fever [140 patients (70%)] followed by Dengue shock syndrome [50 patients (25%)] and dengue fever [10 patients (5%)]. Some review literatures show high prevalence of dengue hemorrhagic fever in their study. In present study, most common cardiac symptom was giddiness and the most common sign was crepitations. Most of the patients [146 Patients (73%)] had normal BP, 43 patients (21.5%) had hypotension and 11 patients (5.5%) had hypertension. In present study, blood pressure influences both platelet count and abnormal ECHO. In present study authors took patients only whose platelet counts were less than 50000/µL. Among them, 6 patients had severe thrombocytopenia <10000/µL, 146 patients (73%) had platelet count more than 20000/µL and 54 patients (27%) had less than 20000 /µL. 150 patients (75%) had PCV between 30 to 40%, 15 patients (7.5%) had PCV less than 30% and 35(17.5) patients had PCV more than 40%.

Gondhali MP et al study also states most patients had platelets count less than 50000/µL.[5] In present study, most commonly patients had sinus rhythm [172 patients (86%)] followed by sinus tachycardia [21 patients (10.5%)], sinus bradycardia [4 patients (2%)] and first-degree heart block (1%). In contrast to present study, Arora1 M, Patil RS study sinus tachycardia was less common.[6] Abhinandya study also states sinus bradycardia was more common than sinus tachycardia in their study.[7] In the study by Gupta et al, sinus bradycardia was found in 14.28%, and sinus tachycardia in 21.4% patients.[8] In present study 17 patients (8.5%) had pleural effusion and ascites and most of those patients were in Dengue Shock Syndrome. And all of the pleural effusions were right sided; so, dengue can be a differential diagnosis of right sided pleural effusion.

In present study 24 (12%) patients had pericardial effusion. In Abhinandya study there is 4% prevalence of pericardial effusion.[7] Cardiac chambers were normal in most of the patients.

RA and RV were dilated in two patients (1%) and they were found to have ASD. They were unfit for device closure due to deficient rims and hence referred for surgery. LV was dilated in two patients (1%). Cardiac valves were abnormal in 4 patients. Two patients had MVP, one patient had RHD-MR, one patient had sclerosed aortic valve as an incidental finding. They were followed and managed accordingly.

In present study 2 patients had RWMA. They were diagnosed to have CAD and treated accordingly. In Abhinandya study there was 2% prevalence of RWMA.[7] Miranda CH study also shows 2% RWMA.[9] In the study population, 2 patients had myocarditis described with global hypokinesia of the left ventricle.

In Abhinandya study 2% prevalence of myocarditis.[7] In a study conducted by Wali et al in 1998, 17 patients with DHF/DSS were studied.[10] 12 patients (70.59%) had global hypokinesia in echocardiography. Present study shows high prevalence of cardiac manifestation in DSS. The incidence of cardiac manifestations was stated to be high (53.33%) in patients with dengue shock syndrome compared to the patients with Dengue Hemorrhagic fever in Abhinandya study.[7] In Arora M, Rekha S study the incidence of cardiac manifestations was present in 53.33% of the patients with dengue shock syndrome compared to 35.29% of the patients with dengue hemorrhagic fever and 30% with dengue fever.[6]

CONCLUSION

Patients with pyrexia with thrombocytopenia were commonly having cardiac manifestations. Mild to moderate pericardial effusions were more common which

can be identified early by bed side screening ECHO. Even though Myocarditis is rare, by routine screening clinicians can detect asymptomatic patients and can monitor them. Early diagnosis at bed side may improve the outcome. Management of patients with pre-existing cardiac diseases should be individualized.

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