Clinical and Laboratory Parameters Differentiating Dengue from Other Causes of Acute Febrile Illnesses in A Tertiary Care Centre in South India

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Research Article

Abstract: **Aims:** To study the utility of clinic-laboratory parameters in differentiating dengue fever from other common causes of acute febrile illness with thrombocytopenia. **Material and methods:** This is a retrospective study conducted in patients, admitted to a tertiary care facility in South India between 1rst June & 31rst December 2012, with the diagnosis acute febrile illnesses with thrombocytopenia like Dengue fever (DF), malaria, leptospirosis, viral infections and typhoid fever. Their clinical and laboratory parameters were compared for the diagnostic utility in acute febrile illness with thrombocytopenia. **Results:** Out of 200 cases were collected for the entire study 80 cases were dengue positive, 70 cases were malaria positive, 25 cases were IGM Leptospira positive, 20 cases were diagnosed as viral fever and 5 cases were diagnosed as typhoid based on widal and blood culture. Among the total 200 cases 110 were males and 90 were females. The most common age group affected in our study was 20-40 years of age. Malaria usually presented with fever with chills (100%) associated with headache(72.85%), myalgia(55.72%) and nausea/vomiting(62.85%). In Leptospirosis the common manifestations are fever followed by severe myalgia associated with headache, join pain and bleeding manifestations. But the chance of developing complications like thrombocytopenia, bleeding manifestations and renal failure/MODS were high (36%). Among 80 cases of dengue fever 45 were positive for leucopenia(56.25%) and 69 were positive for thrombocytopenia(86.25%) and most of them showing anicteric hepatitis(67.5%). In malaria out of 70 cases 49(70%) were showed features of thrombocytopenia and leucopenia was present in 34 cases and it also showed icteric hepatitis. In leptospirosis most of them showed leucocytosis (24 out of 25) with thrombocytopenia and icteric hepatits and elevated renal parameters. **Conclusion**: Thorough clinical and laboratory evaluation would be helpful to evaluate different causes of fever with thrombocytopenia and they may replace the need of costly serological investigations in diagnosis.

Keywords: Dengue fever, Leptospirosis, Malaria.

Introduction

Dengue fever (DF), is the most common mosquito borne arbo-viral infection in humans. Undifferentiated febrile illnesses are very common in tropical countries like India which may mimic like dengue ie. malaria, leptospirosis, influenza, salmonella typhi etc [1-8]. The clinical presentation and differential diagnosis of these infections are almost similar to dengue, so that the absolute diagnosis without laboratory confirmation will not be easy. According to WHO, annually 50 million cases of DF occur world over with a mortality of 2.5%[9]. Approximately 112 countries that experience dengue transmission. Among the estimated 2.5 billion people at risk globally for dengue, about 1.8 billion (i.e., more than 70%) reside in Asia Pacific countries[10]. Currently the disease is endemic in all continents except Europe. DENGUE viruses belong to the genus flavi virus. These single stranded RNA viruses are of four serotypes which are designated as DEN-1, DEN-2, DEN-3 and DEN-4[11-12]. In spite of antigenic similarity they are different enough to elicit cross-protection only for a few months after infection by any one of them. The clinical spectrum of DF varies from mild febrile illness to its grave form of dengue haemorrhagic fever (DHF)[13]. Classical DF is characterised by the presence of fever, headache, myalgia, retroorbital pain, joint pain, vomiting, nausea and maculopapular rashes which last for 5-7 days[14]. But there are many other infectious diseases which present with similar clinical picture like leptospirosis, malaria, typhoid fever etc. Though expensive, the specific serological tests facilitate early diagnosis of most of the diseases. But the inadvertent use of these tests increases the total cost of the treatment. So in our study we are trying to find out whether we could differentiate these diseses with clinico-laboratry parameters without going for the costly investigations.

Materials and Methods

Source of data

Patients admitted in Father Muller Medical College Hospital between 1stjune & 31rst December 2012 with

diagnosis of dengue fever, malaria, leptospirosis, viral infections, typhoid fever by serological evaluation and culture were studied.

Study design

This is a retrospective study among patients with acute febrile illness with above diagnosis

Objectives

1. To study the utility of clinic-laboratory parameters in differentiating dengue fever from other common causes of acute febrile illness with thrombocytopenia
2. To study the classical clinical signs and symptoms of different acute febrile illnesses

Methods

This is a retrospective study conducted in patients admitted in Father Muller Medical College Hospital between 1stjune & 31^{rst} December 2012 with diagnosis of acute febrile illness including dengue fever, malaria, leptospirosis, viral infections and typhoid fever by serological and culture studies. The clinical details and laboratory parameters of all patients were obtained from the records and captured to the preformatted data sheet. The clinical details includes fever, headache, myalgia, joint pain, retroorbital pain, rashes over body and bleeding manifestations were documented. The detailed evaluation of laboratory parameters also documentd which includes haemoglobin, packed cell volume, total count, platelet count, serum albumin, serum bilirubin, alanine transamiases (SGOT), aspartate transaminases(SGPT), urea, creatinine

The preformatted data sheet is enclosed.

Clinical features	fever, headache, myalgia, retro-orbital pain, rashes over body, bleeding manifestations
Laboratory parameters	haemoglobin, packed cell volume, total count, platelet count, serum albumin, serum bilirubin, SGOT, SGPT,urea, creatinine

Inclusion criteria

1. Patients above the age of 18.
2. Cases of acute febrile illness due to dengue fever and other causes of acute febrile illness diagnosed by serological and culture evaluation.

Exclusion criteria

1. Patients with coexisting infections, chemotherapy, radiotherapy, renal failure will be excluded.

Data Analysis

The data obtained was analysed by percentage, mean, frequency, chi-square test

Results

Case distribution

Total 200 cases were collected for the entire study. In that 80 cases were dengue positive, 70 cases were malaria positive, 25 cases were IGM leptospira positive, 20 cases were diagnosed as viral fever and 5 cases were diagnosed as typhoid fever based on widal and blood culture. (table 1)

Sex distribution

Among the total 200 cases 110 were males and 90 were females.(table 2)

Table 1: Case Distribution

Total cases	DENGUE	MALARIA	leptospirosis	Viral fever	typhoid
200	80	70	25	20	5

Table 2: Sex Distribution

Total cases	Male	Female
200	110	90

Table 3: Age Distribution

Age range	Dengue (80)	Malaria (70)	Leptospirosis(25)	Viral fever(20)	Typhoid fever(5)
20-29	27	22	7	8	2
30-39	25	20	8	5	1
40-49	14	13	5	3	1
50-59	10	7	3	3	1
60-69	3	5	2	1	0
>70	1	3			
Total	80	70	25	20	5

Age distribution: Commonest age group affected in most of these infections was 20-40 years of age

Table 4: Clinical Presentation

Clinical features	Dengue	Malaria	Leptospirosis	Viral fever	Typhoid
Fever	80	70	25	20	3
Headache	70	51	22	16	2
Myalgia	61	39	23	14	1
Joint pain	68	38	11	12	0
Nausea/vomiting	48	44	10	6	2
Retroorbital pain	42	1	0	0	0
Bleeding manifestations	5	3	9	0	0

The classical presentation of dengue fever is fever, headache followed by joint paina and myalgia.Retroorbital pain was present in 42 out of 80 cases.Total five patients developed complications .Malaria usually presented with fever with chills associated with headache, myalgia and nausea/vomiting. Retroorbital pain is a very rare clinical manifestation of malaria. Leptospirosis the common manifestations are fever followed by severe myalgia associated with headache,join pain and bleeding manifestations. The chance of developing complications is much higher in leptospirosis compared to other type infections. Viral infections the clinical presentation is almost similar to dengue fever.The differentiation is very difficult based on the clinical background

Table 5: Laboratory Parameters

Lab parameters	Dengue fever	Malaria	Leptospirosis	Viral infection	Typhoid fever
Anemia	4	10	16	2	1
Leucopenia	45	34	0	16	3
Leucocytosis	0	4	24		
Thrombocytopenia	69	49	21	15	2
Renal function test	9	8	22	2	1
AST/ALT	54	30	21	13	
Bilirubin	1	28	20	1	

Among 80 cases of dengue fever 45 were positive for leucopenia and 69 were positive for thrombocytopenia and most of them showing anicteric hepatitis. In malaria out of 70 cases 49 showed features of thrombocytosis and leucopenia was present in 34 cases and it also showed icteric hepatitis. In leptospirosis most of them showed leucocytosis (24 out of 25) with thrombocytopenia and icteric hepatits and elevated renal parameters.

Discussion

Dengue fever is one of the most common arboviral infection which affect humans. In all clinical scenarios where there is both fever and thrombocytopenia, we should evaluate for the possibility of dengue fever. The delay in diagnosis of dengue fever is because of the similar clinical presentation of other disease like malaria, leptospirosis and other viral infections. So in our study we are trying to differentia the various causes of fever with thrombocytopenia based on the clinical and laboratory parameters without going for the costly serological studies. In our study majority of the cases are dengue fever and malaria. The high incidence of dengue and malaria probably due to the regional variation. This study also showed that the chance of getting typhoid fever was drastically reduced nowadays. In our study we noticed that the male population was more affected than female population. The most common age group affected in our study were 20-40 years of age. The reason for this increased incidence in males has been attributed to the prolonged outdoor activities and thereby increased chance of exposure to mosquito bites[24]. These reports from Asia are in contrast to studies in South America, which have found either equal proportions of male and female dengue cases or a greater proportion of female cases[24-2] This study showed that the classical presentation of most of these infectious diseases were fever, headache, myalgia, bodyache, joint pain. But retroorbital pain is a classical symptom which may help to differentiate dengue fever from other infectious disease. Otherwise the clinical symptoms were almost similar for both both dengue and malaria. Rashes and breakbone type of severe joint pain were more common in dengue fever. The classical presentation of dengue fever is fever(100%), followed by headache(87.5%), myalgia and joint pain (85%). Retroorbital pain was present in 42 out of 80 cases(52.5%). Total five patients developed complications(6%) . These results are concordance with many other similar studies[27-30] Malaria usually presented with fever with chills (100%) associated with headache(72.85%), myalgia(55.72%) and nausea/vomiting(62.85%). Retroorbital pain is a very rare clinical manifestation of malaria. In Leptospirosis the common manifestations are fever followed by severe myalgia associated with headache, join pain and bleeding manifestations. But the chance of developing complications like thrombocytopenia, bleeding manifestations and renal failure/MODS are very much high (36%). These results are similar to many other studies[33,34]. The clinical presentation of viral fever is almost similar to dengue fever. The differentiation is very difficult based on the clinical background. Among 80 cases of dengue fever 45 were positive for leucopenia(56.25%) and 69 were positive for thrombocytopenia(86.25%) and most of them showing anicteric hepatitis(67.5%). In malaria out of 70 cases 49(70%) were showed features of thrombocytopenia and leucopenia was present in 34 cases and it also showed icteric hepatitis. In leptospirosis most of them showed leucocytosis (24 out of 25) with thrombocytopenia and icteric hepatits and elevated renal parameters. So thrombocytopenia and leukopenia both were very common clinical manifestations of all these infections. But it's more commonly seen in dengue fever. Leptospirosis usually present with leucocytosis rather leukopenia. Another differentiating feature which we noticed in this study was type of hepatic inflammation. In dengue fever we observed that anicteric hepatitis ie. normal bilirubin with raised liver enzymes was the classical presentation. In other type of viral fever also we got a similar kind of picture. But in leptospirosis 80-90 % patients presented with icteric hepatitis. Another major differentiating point we revealed in this study was renal involvement. In dengue and other kind of viral infections renal involvement was negligible, but in leptospirosis more than 50% patients were affected by some kind renal damage. These results are similar to many other studies[30-34]. So by the end of this study we demonstrated how to differentiate major infections like malaria and leptospirosis from dengue fever. The classical presentation of dengue fever is fever with myalgia, headache, retroorbital pain along with thrombocytopenia, leucopenia and anicteric hepatitis. But malaria the only difference we observed is retroorbital pain was less likely and the joint pain was not that severe. In leptospirosis fever with thrombocytopenia with renal and hepatic

complications. So a detailed clinical evaluation combined with laboratory parameters is essential to differentiate dengue fever from other similar infections. So all cases of fever with thrombocytopenia we should rule out other causes which can present with similar picture by doing a thorough clinical and laboratory evaluation.

Conclusion

Thorough clinical and laboratory evaluation would be helpful to evaluate different causes of fever with thrombocytopenia and they may replace the need of costly serological investigations in diagnosis.

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