

Original Research Article

Analysis of predictors in outcome of fever with thrombocytopenia of pediatric age upto 12 years

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ABSTRACT

Background: It is well recognized that many fetomaternal and neonatal conditions are associated with thrombocytopenia. Study aimed to establish the possible etiology of children presenting with thrombocytopenia.

Methods: The study was carried out in 100 children 1 month-12 years, admitted at department of paediatrics, Narayana Medical College and Hospital, Nellore, Andhra Pradesh, India with fever and thrombocytopenia. A thorough history was obtained and a general and systemic examination done. Routine investigations were done in all cases and specific investigations as and when required.

Results: Total 100 cases were studied. Among them, 65% developed only fever, 10% developed fever with bleeding and 25% developed fever with shock. In total admissions 55% of children admitted with warning symptoms including abdominal pain, vomiting, reduced urine output and black colored stools. There is a significant influence of warning symptoms in predicting the outcome of fever with thrombocytopenia. 30% of children admitted with respiratory distress. 30% of children admitted with abdominal distension. 60% children admitted with hepatomegaly. In these children, 20% of them developed fever with shock and 13% of them developed fever with bleeding, 52% children admitted with platelet count less than 1 lakh. In these patients, 19% of them developed fever with shock and 9% of them developed fever with bleeding. 60% had dengue serology positive, 12% had positive Widal test, 8% children had positive urine culture and sensitivity. There was a significant influence of etiology in predicting the morbidity as 15% of children having positive serology for dengue developed fever with shock. 10% of children having positive serology for dengue developed fever with bleeding. Bleeding manifestations were seen most commonly in children with a platelet count less than 50000/ μ l.

Conclusions: The commonest cause of febrile thrombocytopenia in this study was dengue fever in Children. Platelet count was the predictive of bleeding manifestations.

Keywords: Bleeding manifestations, Hepatomegaly, Platelet count, Thrombocytopenia, Widal test

INTRODUCTION

Every child with fever has to be assessed carefully to find an etiology. Common causes of fever with thrombocytopenia are infections like malaria, dengue, leptospirosis, viral fever and septicaemia. Thrombocytopenia is defined as a platelet count below the normal range for the population, and a traditional

value of 150,000 per cubic millimeter is supported by the National Health and Nutrition Examination Survey as the lower limit of normal.¹ Many times they are asymptomatic. Some patients will develop symptoms like bruising, purpura, petechiae, nose bleeding and gum bleeding. Rarely, there may be life threatening symptoms like CNS bleeding, GIT bleeding when platelet count falls below 5000/ mm^3 . Infections with protozoa, bacteria

and viruses can cause thrombocytopenia with or without disseminated intravascular coagulation.² Commonly, dengue, malaria, scrub typhus and other rickettsial infections, *meningococci*, *leptospira* and certain viral infections present as fever with thrombocytopenia.³

Fever with thrombocytopenia is commonly seen in OPD setup especially during monsoon and perimonsoon period. Occasionally these patients can go on to develop a stormy course with multi-organ dysfunction requiring intensive care unit admission associated with high morbidity and mortality.⁴ Some of the infections are self-limiting but some patients should be continuously monitored to prevent lethal complications.⁵

With early recognition and prompt initiation of treatment, disease related morbidity and mortality can be limited. With there being an increasing number of cases detected, a study for the prognostic factors considered important.⁶

Hence the current study was designed to study the prognostic factors in patients with fever with thrombocytopenia at a tertiary care center.

METHODS

Prospective observational study was conducted at Department of Pediatrics, Narayana Medical College Hospital, Andhra Pradesh, India.

Study group

All cases of fever with thrombocytopenia with age 1 month to 12 years admitted in Paediatric Department of Narayana Medical College Hospital.

Inclusion criteria

All the patients between 1 month to 12 years presenting with the complaints of fever (>99.9°F) with thrombocytopenia (less than 1,50,000/ μ L).

Exclusion criteria

- Patient presenting with thrombocytopenia without fever.
- Diagnosed case of immune thrombocytopenic purpura.
- Patient with thrombocytopenia already diagnosed to have hematological disorder/malignancy or on treatment with chemotherapy and other immunosuppressive agent.
- Diagnosed cases of platelet disorder and dysfunction.
- Patients on treatment with antiplatelet drugs and other drugs causing thrombocytopenia.
- Patients with cirrhosis and chronic liver disease.
- The children of those parents who did not give consent to undergo study was excluded.

Procedure

Pre structured proforma was used to obtain information from the parents.

Following parameters at admission were studied to predict the outcome among the study group: age, sex, locality, day of fever, warning symptoms, general condition, respiratory distress, abdominal distension, hepatomegaly, dehydration, platelet count, PCV, RFT, Liver enzymes, serum proteins, coagulation profile, ascites, pleural effusion, CRP, etiology.

History regarding day of fever, warning symptoms including abdominal pain, vomiting, hematemesis, reduced feeding, reduced urine output, passing black colored stools were recorded at the time of admission. Clinical features included general condition, respiratory distress (tachypnea, retractions), abdominal distension, hepatomegaly, dehydration (dry oral cavity, increased thirst) were recorded at the time of admission.

Blood investigations including total count, platelet count, PCV, RFT, liver enzymes, serum proteins (normal total protein 6, serum albumin 4, serum globulin 2), coagulation profile, C-Reactive protein, Serology and culture sensitivity are recorded at the time of admission.

Chest x-ray, Ultrasonogram abdomen and chest findings including ascites, pleural effusion were also recorded.

Outcome

Outcome measured as morbidity in the form of only fever, fever with bleeding and fever with shock.

RESULTS

Among 100 cases taken, 65% children had only fever. 10% children had fever with bleeding. 25% children had fever with shock. In total admissions 40% children were less than 5 years and 60% were more than 5 years. 45 were male children and 55 were female children. 80% were from rural areas and 20% were from urban areas. 40% of children presented with fever less than 5 days and 60% of children presented with fever more than 5 days. There was a significant influence of day of fever at presentation in the outcome (p-value-0.001). Among 10% children developed fever with bleeding, 8% of them admitted with fever for more than 5 days. Among 20% children developed fever with shock, 18% of them admitted with fever for more than 5 days.

In total admissions 55% of children admitted with warning symptoms including abdominal pain, vomiting, reduced urine output and black colored stools. There was a significant influence of warning symptoms in predicting the outcome of fever with thrombocytopenia (p-value-0.001). Among 10% children developed fever with bleeding, 9% children admitted with warning symptoms.

Among 20% children developed fever with shock, 19% children admitted with warning symptoms.

In total admissions 30% of children admitted with respiratory distress. There was a significant influence of respiratory distress at presentation in the outcome (p-value-0.001). In these 30% children, 18% of them developed fever with shock and 7% of them developed fever with bleeding.

The 25% children admitted with abdominal distension. In these, 18% of them developed fever with shock and 6% of them developed fever with bleeding. There was a significant influence of abdominal distension at presentation in the outcome (p-value-0.001).

Totally 60% children admitted with hepatomegaly. In these children, 20% of them developed fever with shock and 13% of them developed fever with bleeding. In total admissions, 50 children had leukopenia, 30% children had normal count and 11% children had leukocytosis.

Totally 52% children admitted with platelet count less than 1 lakh. In these patients, 19% of them developed fever with shock and 9% of them developed fever with bleeding. There is a significant influence of initial platelet count at presentation in the outcome.

Among admissions 25% children admitted with PCV more than 40. Among these, 13% of them developed fever with shock and 7% of them developed fever with bleeding.

Totally 6% children had abnormal renal function. There was a significant influence of abnormal renal function test at presentation in the outcome. Among these patients, 5% of them developed fever with shock and 1% of them developed fever with bleeding.

In total admissions, 15% children had elevated liver enzymes. A 15% of children admitted with respiratory distress, 2% of them developed fever with shock and 5% of them developed fever with bleeding.

Among admissions 12% children admitted with abnormal coagulation profile. There was a significant influence of abnormal coagulation profile at presentation in the outcome. Among 12% of children, 2% of them developed fever with shock and 10% of them developed fever with bleeding.

Totally 72% children had ascites demonstrated by ultrasonogram abdomen. In these, 15% of them developed fever with shock and 11% of them developed fever with bleeding. There was a significant influence of ascites at presentation in the outcome.

Among admissions, 85% children had pleural effusion. Among admissions 40% children had positive C-reactive protein.

There was a significant influence of C-reactive protein at presentation in the outcome. Among 40% of children admitted with positive C-reactive protein, 19% of them developed fever with shock and 10% of them developed fever with bleeding.

Among admissions, 60% had dengue serology positive, 12% had positive Widal test, 8% children had positive urine culture and sensitivity. There was a significant influence of etiology in predicting the morbidity as 15% of children having positive serology for dengue developed fever with shock. 10% of children having positive serology for dengue developed fever with bleeding.

Table 1: Etiology and outcome.

Etiology	Only fever (n=65)	Fever with bleeding (n=10)	Fever with shock (n=25)	Total
Dengue	35	10	15	60
Widal	11	0	1	12
Urine culture	8	0	0	8
Blood culture	2	0	3	5
Lepto-IgM	3	0	2	5
Scrub-IgM	4	0	1	5
Malaria	2	0	3	5

DISCUSSION

Thrombocytopenia is defined as a platelet count of $<150,000/\mu\text{L}$. It is clinically suspected when there is a history of easy bruising or bleeding, or it may present as an incidental finding during routine evaluation or during investigations performed for other reasons. It is common in infants and children. Unlike in adults, however, the overwhelming majority of pediatric thrombocytosis cases are reactive, i.e., secondary and benign. Bacterial, viral, or parasitic infections- particularly common in infants during recovery phase of an infection. The approach to evaluating a child with unexplained thrombocytopenia and/or bleeding symptoms and the details of specific causes of thrombocytopenia (e.g. immune thrombocytopenia, leukemia, aplastic anemia) are important. In some children it can lead to deadly bleeding and shock and leads to death. Concerning the occurrence of dengue all over the world, the diagram has ascended observably in later decades and more than 40% of the total populace is presently at chance from dengue.

It has been evaluated that there may be 50 to 100 million dengue contaminations all around per year.

In present study, totally 100 cases were studied. Among them, 65% developed only fever, 10% developed fever with bleeding and 25% developed fever with shock.

In total 100 children, 60% children presented with fever more than 5 days. Among these 60% children, 20% children developed fever with shock and 10% children developed fever with bleeding (p value 0.017). So day of fever shows significant correlation with outcome. This result was comparable with other study done by Aroor AR et al.⁷

In total admissions 55% of children admitted with warning symptoms including abdominal pain, vomiting, reduced urine output and black colored stools. There is a significant influence of warning symptoms in predicting the outcome of fever with thrombocytopenia (P-value-0.001). Among 10% children developed fever with bleeding, 9% children admitted with warning symptoms. Among 20% children developed fever with shock, 19% children admitted with warning symptoms. This result was comparable with the study done by Shewale NS et al, which also showed there was more morbidity if the child presenting with warning signs.⁸

In total admissions 30% of children admitted with respiratory distress. There is a significant influence of respiratory distress at presentation in the outcome (p-value-0.001). In these 30% children, 18% of them developed fever with shock and 7% of them developed fever with bleeding. This result was comparable with other study done by Aroor AR et al, which also showed that children presenting with respiratory distress had poor prognosis.⁷

There was a significant influence of abdominal distension at presentation in the outcome with p-value of 0.001. Among 30% of children admitted with abdominal distension, 21% of them developed fever with shock and 7% of them developed fever with bleeding. This was comparable with the study done by Shewale NS which also showed there was more morbidity if the child presenting with clinical abdominal fluid collection.⁸

In present study, there was a significant influence of hepatomegaly at presentation in the outcome with p-value of 0.001. Totally 60% children admitted with hepatomegaly. In these children, 20% of them developed fever with shock and 13% of them developed fever with bleeding.

This result was comparable with the study done by Jain H et al, which also showed increased morbidity with children presenting with hepatomegaly.⁹

In present study, there was a significant influence of initial platelet count at presentation in the outcome with p-value of 0.001. Totally 52% children admitted with platelet count less than 1 lakh. In these patients, 19% of them developed fever with shock and 9% of them developed fever with bleeding. This result was comparable with the study done by Ramachandran GS et al which also showed that increased morbidity in children presenting with low platelet count.¹⁰

In present study, there was a significant influence of packed cell volume at presentation in the outcome with p-value of 0.001. Among admissions, 25% children admitted with PCV more than 40. Among these, 13% of them developed fever with shock and 7% of them developed fever with bleeding. This result was comparable with the study done by Balasubramanian S et al which also showed children with increased hematocrit at presentation had more morbidity.¹¹

There was a significant influence of abnormal renal function test at presentation in the outcome with p-value of 0.001. Totally 6% children had abnormal renal function. There is a significant influence of abnormal renal function test at presentation in the outcome. Among these patients, 5% of them developed fever with shock and 1% of them developed fever with bleeding. This was comparable with the study done by Haas CS et al, also showed increased morbidity in children presenting with altered renal functions.¹²

In the present study, there was a significant influence of elevated liver enzymes at presentation in the outcome with p-value of 0.001. Among 15% of children admitted with elevated liver enzymes. This result was comparable with the study done by Wahid SF et al, which also showed that the morbidity was high if the children presenting with elevated liver enzymes.¹³

There was a significant influence of abnormal coagulation profile at presentation in the outcome with p-value of 0.001. Among 12% of children admitted with abnormal coagulation profile, 2% of them developed fever with shock and 10% of them developed fever with bleeding. This result was comparable with the study done by Fariz-Safhan MN et al, which also showed increased morbidity in children presenting with abnormal coagulation profile.¹⁴

In present study, there was a significant influence of ascites at presentation in the outcome with p-value of 0.001. Among 72% of children admitted with ascites, 15% of them developed fever with shock and 11% of them developed fever with bleeding. This result was comparable with the study done by Shewale NS which also showed there was more morbidity if the child presenting with clinical abdominal fluid collection.⁸

There was a significant influence of pleural effusion at presentation in the outcome with p-value of 0.001. Among 85% of children admitted with pleural effusion. This result was comparable with the study done by Shewale NS, which also showed there was more morbidity if the child presenting with pleural fluid collection.⁸

There was a significant influence of C-reactive protein at presentation in the outcome with p-value of 0.001. Among 40% of children admitted with positive C-reactive protein, 19% of them developed fever with shock

and 10% of them developed fever with bleeding. This result was comparable with the study done by Chen CC et al which also showed increased morbidity in children presenting with positive C-reactive protein.¹⁵

In present study, among admissions, 60% had dengue serology positive, 12% had positive Widal test, 8% children had positive urine culture and sensitivity. There is a significant influence of etiology in predicting the morbidity as 15% of children having positive serology for dengue developed fever with shock. 10% of children having positive serology for dengue developed fever with bleeding. This result was comparable with the study done by Aroor AR et al, which also showed that children having serology positive for dengue among the causes for fever with thrombocytopenia had more morbidity.⁷

CONCLUSION

Age, sex and locality of the children didn't show much influence in outcome. Late visit to hospital with prolonged fever and warning symptoms influence poor outcome in these children. Children presenting with altered sensorium, respiratory distress, abdominal distension, hepatomegaly and dehydration had poor outcome as bleeding and shock. Children with platelet count less than 1 lakh, elevated hematocrit, abnormal renal function test, elevated liver enzymes and abnormal coagulation profile at the time of admission had poor outcome as bleeding and shock. Chest X-ray, ultrasonogram chest and abdomen revealing pleural effusion and ascites at the time of admission showed more morbidity. Common causes of thrombocytopenia in this study were dengue fever, undiagnosed viral fever.

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