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Evaluation of Clinical and Hematological Parameters among Febrile Children with Thrombocytopenia-A Cross-Sectional Study

Varsha Patel[1], Sumit Naraniya[2], Raj Kumar Paliwal[3]*

[1]Senior Resident, Department of Pathology, Government Medical College, Satna, M.P, India
[2]Assistant Professor, Department of Surgery, Pacific Medical College & Hospital, Udaipur, Rajasthan, India
[3]Associate Professor, Department of Surgery, Pacific Medical College & Hospital, Udaipur, Rajasthan, India

***Address for Correspondence:** Dr. Raj Kumar Paliwal, Associate Professor, Department of Surgery, Pacific Medical College & Hospital, Udaipur, Rajasthan, India
E-mail: rkpyash@gmail.com

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ABSTRACT

Background: Many acute febrile infections in tropical countries like India have an infectious aetiology, and many of them are linked to thrombocytopenia. Most viral diseases, dengue, enteric fever, and malaria are frequently linked to thrombocytopenia. The goal was to investigate the laboratory and clinico-etiological characteristics of children with thrombocytopenia, who were feverish and in a tertiary care hospital.

Methods: The study included 190 children between the ages of 1 and 18 who had thrombocytopenia and fever. Data was recorded in a pre-structured proforma after a thorough history, clinical examination, and any required laboratory tests were completed.

Results: Maximum cases (41.1%) belonged to the 1-5 years age group, predominantly males (58.9%). The most common etiology was dengue (52%), followed by enteric fever (11%), viral causes other than dengue (9%) and malaria (7%). The majority of the patients (58.9%) had mild thrombocytopenia. The common symptoms associated were headache (70.5%), body ache (50.5%), retro-orbital pain (36.8%), pain abdomen (27.4%) and Vomiting (26.3%). The common signs were pallor (42.1 %) and hepato-splenomegaly. The mean haemoglobin level was low suggestive of anaemia. The ESR and liver enzymes were normal to increased values.

Conclusion: Dengue fever was a common cause of febrile thrombocytopenia. Patients with febrile thrombocytopenia typically benefit from a thorough clinical and hematological examination to determine the cause and enable prompt, appropriate treatment.

Key-words: Febrile, Thrombocytopenia, Dengue, Etiology, clinical profile, hematological profile

INTRODUCTION

Acute febrile illnesses are frequently associated with thrombocytopenia and have an infectious aetiology in tropical nations such as India. Most viral diseases, dengue, enteric fever, and malaria are frequently linked to thrombocytopenia. In addition to this, thrombocytopenia is linked to nutritional anaemia, such as Megaloblastic anaemia [1].

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Due to its high morbidity, febrile thrombocytopenia has become a prevalent clinical presentation that necessitates hospitalisation in recent years. Since some of these infants may come with shock with hemodynamic instability and bleeding symptoms, evaluating them for the aetiology would aid in therapy [2]. A platelet count below the normal range, often less than 1,50,000 per microlitre, is referred to as thrombocytopenia [3].

There are three stages of thrombocytopenia: mild thrombocytopenia, (platelet count 1-1.5 lakh/µl), moderate thrombocytopenia (platelet count 50,000-100,000/µl) and severe thrombocytopenia (platelet count less than 50,000/µl) [4]. Most people with severe thrombocytopenia will appear poorly and exhibit

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haemodynamic instability or bleeding symptoms. A typical laboratory event that results in faux thrombocytopenia is a decreased platelet count brought on by EDTA [5]. Feverish thrombocytopenia can occasionally also be caused by non-infectious conditions, such as primary haematological abnormalities [6].

In haematological practice, examination of bone marrow is a useful and reasonably priced diagnostic technique. Bone marrow aspiration is used to identify neoplastic and non-neoplastic haematological disorders. The hallmark of thrombocytopenia is bleeding, usually from tiny blood vessels. This can show up as skin petechiae, gastrointestinal and genitourinary tract mucosal bleeding, and occasionally even more serious outcomes including intracranial haemorrhage.

Fortunately, thrombocytopenia seldom causes potentially catastrophic bleeding, even though it can occur in a variety of illnesses [7]. Fever with thrombocytopenia patients may initially only have a basic fever, but with time, they may develop serious, unanticipated side effects, including death. As a result, we examined the clinical characteristics of fever patients with thrombocytopenia in our investigation. Many lives were saved because of the early diagnosis and suitable treatments that helped avoid negative results. Examining the clinical and analytical features of febrile children with thrombocytopenia in a tertiary care hospital is the goal of the study.

MATERIALS AND METHODS

Place of study- This cross-sectional observational study was conducted in the pediatric wards and outpatient departments of a tertiary care hospital in India, affiliated with the Department of Surgery, Pacific Medical College & Hospital, Udaipur, Rajasthan.

Inclusion criteria

- Children ages 1 to 18 of both sexes.
- Children with thrombocytopenia (platelet count <1.5 lakhs/mm3) and fever (rectal temperature ≥38°C)
- Written informed consent was given by the children's parents or guardians.

Exclusion criteria

- Children who have thrombocytopenia but no fever or those who have a fever but no thrombocytopenia
- Previously identified diseases such as ITP, cirrhosis, chronic liver disease, and cancer that can cause thrombocytopenia
- Patients on drugs causing thrombocytopenia were excluded
- Whose parents or guardians provide written informed consent

Methodology- Every case underwent a comprehensive clinical examination and a detailed history was collected, paying particular attention to the bleeding signs.

Hemograms, blood cultures, Widal, smears for malarial parasites, dengue virus antibody titers, C-reactive protein, and viral hepatitis screening were among the investigations that were sent. In certain cases, coagulation studies, bone marrow aspiration, L.F.T., C.S.F, R.F.T., analysis, and other radiological examinations were performed as required. The platelet count was periodically recalculated.

Statistical Analysis- The statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 22.0, the Statistical Package for the Social Sciences. The chi-square test was used for qualitative components, while the t-test was used for quantitative ones. Statistical significance was defined as a value of $p<0.05$.

RESULTS

This study comprised 190 children who had febrile thrombocytopenia. The age groups of 1–5 years and 6–10 years comprised the majority of cases (41.1%) and 28.4%, respectively. Males are more prevalent among these instances (58.9%) than females (41.1%) (Table 1).

Table 1: Distribution of febrile thrombocytopenia by age and gender

Age (years)	Males	Females	Total
1-5 years	46 (24.2%)	32 (16.8%)	78 (41.1%)
6-10 years	31 (16.3%)	23 (12.1%)	54 (28.4%)
11-15 years	28 (14.7%)	20 (10.6%)	48 (25.3%)
>15 years	7 (3.7%)	3 (1.6%)	10 (5.3%)
Total	112 (58.9%)	78 (41.1%)	190 (100)

Frequent symptoms of patients with febrile thrombocytopenia were headache in 70.5% of cases,

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body soreness in 50.5%, retro-orbital pain in 36.8%, and abdominal pain in 27.4%, Vomiting in 26.3%, cough 25.3% and Chills and rigors 24.2% cases (Table 2).

Table 2: Clinical symptoms of the cases with febrile thrombocytopenia

Features	Number	Percentage
Fever	190	100%
Headache	134	70.5%
Body ache	96	50.5%
Chills and rigors	46	24.2%
Petechial rashes	22	11.6%
Abdominal pain	52	27.4%
Vomiting	50	26.3%
Loose motion	32	16.8%
Bleeding manifestation	24	12.6%
Cough and dyspnea	48	25.3%
Weight loss	10	5.3%
Retro-orbital pain	70	36.8%
Altered sensorium	10	5.3%

Most children had pallor (42.1%) on general examination upon admission, with hepatomegaly (71.6%) being the most common clinical finding upon palpation, followed by splenomegaly (31.6%), lymphadenopathy (28.4%), oedema (21.1%), abdominal distension (21.1%), and jaundice (12.6%) being a less common presentation (Table 3).

Table 3: Clinical signs of patients with fever and Thrombocytopenia

Features	Number	Percentage
Pallor	80	42.1%
Jaundice	24	12.6%
Oedema	40	21.1%
Cutaneous bleed	30	15.7%
Hepatomegaly	136	71.6%
Splenomegaly	60	31.6%
Abdominal distention	40	21.1%
Hypotension	20	10.5%
Lymphadenopathy	54	28.4%

Common causes of febrile thrombocytopenia in this study were dengue (52%), enteric fever (11%), viral causes other than dengue (9%), malaria (7%), septicemia (6%), scrub typhus (4%), leukemia's (3%) and undiagnosed fever in 8% cases (Fig. 1).

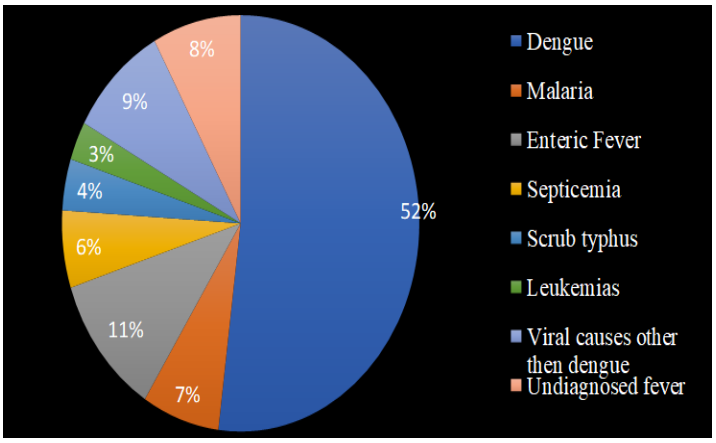

Fig. 1: Aetiology of fever with thrombocytopenia

The majority of the patients (58.9%) had mild thrombocytopenia, 26.3% patients had moderate thrombocytopenia and 14.8% cases had severe thrombocytopenia (Fig. 2).

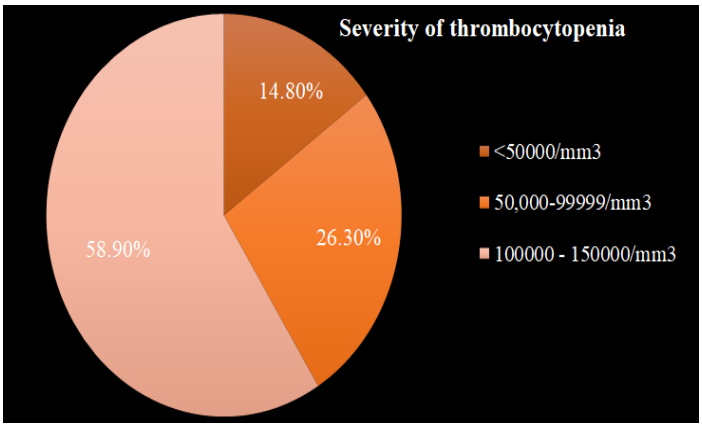

Fig. 2: Distribution of cases based on severity of thrombocytopenia

Table 4 displayed the mean and standard deviations of several laboratory parameters for the children, who were enrolled. The low mean hemoglobin level indicated anemia. It is consistent with the clinical examination's

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finding of pallor. The results of the liver enzymes and ESR varied from normal to elevated. Likewise, the admission platelet count was less than 1.5 lakh/cumm

Table 4: Laboratory Parameters of febrile thrombocytopenia cases

Lab Parameters	Value (Mean+SD)
HB (haemoglobin) gm/dl	9.8±1.76
WBC (cells per cu.mm)	7400±5080
Platelet count [At admission] (cells/cu.mm)	91000±36000
Platelet count lowest (cells/cu.mm)	72000±23000
SGOT U/L	99.5±78.9
SGPT U/L	91.7±70.7
TSB (total serum bilirubin) mg/dl	0.84±0.36
ESR (mm/hr)	16.5±2.34

DISCUSSION

Both the cause and the clinical signs of fever with thrombocytopenia might vary. The cause is a combination of infectious and non-infectious disorders. Transient thrombocytopenia is a common side effect of systemic infections. Comparable to research conducted by Subramanian *et al.* [8] and Shah *et al.* [9], which discovered that most of the children in the research group were between the ages of one and five, with the majority being younger than five. Children in this age range typically favor outside play activities, which raises the possibility of mosquito bite exposure. The majority of study participants in our study were men.

Similar findings were obtained in studies by Jawed *et al.* [10] and Ramabhatta *et al.* [11], which suggested that males were more affected than females, probably as a result of outdoor activities and mosquito contact. In line with Deshpande *et al.* [12] and Mistry *et al.* [13], the post-monsoon season, which runs from August to October, had the highest number of instances of febrile thrombocytopenia. This is ascribed to the increased rate of mosquito growth brought on by rainfall, ambient temperature, and humidity. Our results showed that the most common cause of fever with thrombocytopenia was dengue fever, which was followed by malaria, enteric fever, and other undifferentiated viral fevers. These findings are consistent with research conducted by Nair *et al.* [14] and Bhalara *et al.* [15].

In the current investigation, headache, body discomfort, retro-orbital pain, abdominal pain, vomiting, coughing, and chills with rigors were the most prevalent clinical signs, aside from fever. Similar outcomes were observed in Khan *et al.* [16] and Gondhali *et al.* [17]. These clinical characteristics might have resulted from the fact that the majority of our patients had chikungunya and dengue, two viral illnesses. According to Shaoor *et al.* [18] and Lakshmi *et al.* [19], the most prevalent clinical symptoms in the study population were pallor, hepato-splenomegaly, oedema, and lymphadenopathy.

Our findings are in line with those of Krishna *et al.* [20], who found that the majority of the children in their research had mild thrombocytopenia, followed by moderate and severe thrombocytopenia. Since thrombocytopenia can occasionally result from sampling error, it is necessary to connect the laboratory results with the clinical signs, especially when it comes to platelet count. Although most children who have a low platelet count and an acute illness recover over time, those who have bicytopenia should be treated with caution.The current study's hematological characteristics revealed a low hemoglobin level, which is suggestive of anemia. Liver enzyme and ESR levels ranged from normal to elevated. Consistent results were seen in research conducted by Martha *et al.* [21].

CONCLUSIONS

An often-seen hematological condition, febrile thrombocytopenia is frequently brought on by infections such as dengue, various viral diseases, malaria, enteric fever, etc. Clinical symptoms include fever, headache, body ache, vomiting, pallor, and hepato-splenomegaly are typical. Additionally, there is no association between thrombocytopenia and morbidity or mortality. The etiology of pancytopenia is often determined by a thorough clinical, hematological, and bone marrow examination of the patient. Finding the cause of pancytopenia in the early course of illness is crucial for timely and appropriate patient care.

CONTRIBUTION OF AUTHORS

Research concept- Varsha Patel, Raj Kumar Paliwal
Research design- Sumit Naraniya, Raj Kumar Paliwal
Supervision- Varsha Patel, Sumit Naraniya
Materials- Varsha Patel
Data collections- Varsha Patel, Raj Kumar Paliwal

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Data analysis and interpretation- Varsha Patel, Sumit Naraniya, Raj Kumar Paliwal
Literature research- Sumit Naraniya, Raj Kumar Paliwal
Writing article- Varsha Patel
Critical review- Varsha Patel, Sumit Naraniya, Raj Kumar Paliwal
Article editing- Sumit Naraniya, Raj Kumar Paliwal
Final approval- Varsha Patel, Sumit Naraniya, Raj Kumar Paliwal

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