Research Article

A STUDY TO ESTABLISH THE IMPACT OF PLATELET ESTIMATION IN VARIOUS FEVER CASES AND THEIR OUTCOME

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A R T I C L E   I N F O

A B S T R A C T

Background: A study to establish the impact of platelet estimation in various fever ses and their outcome.

Materials and Methods: 55 patients who were admitted with fever over a span of 2 months from October 10th to 10th December 2019 in King George Hospit al,AMC, Visakhapatnam, were studied retrospectively.

Results: In this study irrespective of the size of the sample a marked predominance of males (60%) over females (40%) was noticed. In the present study 33 patients (60%) were males and 22 (40%) were females. The highest incidence was found in the age groups of 21 - 30 years (27%) followed by 31 -40 years (18%). Females were chiefly presented with body pains while males were presented with a combination of body pain and head ache. In the present study it was significantly found that the highest difference is seen in the presentation of viral fever cases. In viral fever out of 15 cases, 13cases (87%) of thrombocytopenia with viral fever are found against 2 cases (13%) of viral fever with normal platelet count. Out of 55cases fever 9(16%) cases were presented with various bleeding manifestations associated with severe thrombocytopenia (<50,000). Severe thrombocytopenia (platelets less than 50,000) seen in 16 cases (43%) out of 37 cases of fever with thrombocytopenia. This study reveals that the incidence of fever cases and fever with thrombocytopenia is more during early winter. In this study 4 cases out of 55 had mortality.

Conclusion: Majority of cases of thrombocytopenia were asymptomatic, but the presence of bleeding manifestations in a significant number of cases require prompt management to prevent life-threatening complications. Serial platelet estimation is more useful than extensive etiological evaluation in management of febrile thrombocytopenia.

INTRODUCTION

Fever is one of the most common medical signs.[1] It has been recognized as a cardinal manifestation of diseases since ancient times, as recorded by ancient scholars like HIPPOCRATES [2], an AM temperature of more than 37.2 degrees Celsius (98.9 degrees Fahrenheit) or PM temperature of more than 37.7 degrees Celsius (98.9 degrees Fahrenheit) would define fever.[3] Fever can be caused by many medical conditions ranging from non-serious to life-threatening.[4] This includes viral, bacterial and parasitic   infections such   as the common cold, urinary tract infections, meningitis, malaria and   appendicitis   among   others.[4] Non-infectious causes include vasculitis, deep vein thrombosis, side effects of medication, and cancer among others.[5] Even though malaria is endemic throughout the tropics, dengue has higher fatality rate that is above 1% over the last 10 years.

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Recently fever associated with thrombocytopenia is the commonest presentation and it helps to narrow the differential diagnosis and management. Even though in most of the cases low platelet count is transient and self limiting, serial estimation of platelets in all fevers is necessary to prevent complications like intracranial hemorrhage. Hence platelet estimation has a vital role in fever management.

Hence it needs for study to know the importance of serial platelet estimation in all types of fever cases as a basic investigation to establish correct diagnosis and prevent fatal outcome which is preventable.

Aim: Study to establish the impact of platelet estimation in various fever cases and their outcome

MATERIALS AND METHODS

Sample was collected retrospectively from cases admitted with fever in King George Hospital, Visakhapatnam over a span of 2 months (October 10th to 10th December 2019). Detailed history, clinical examination and all investigations were noted. Age, sex, complications and mortality were noted.

Inclusion Criteria

1. Both sexes
2. Aged more than 12 years
3. Who were admitted with fever

Exclusion Criteria

1. Pregnant patients.
2. Age less than 12 years
3. Diagnosed cases of platelet disorders and dysfunction.
4. Patients on antiplatelet therapy.
5. Thrombocytopenia without fever

Table 1 Sex Distribution of Cases

MALE	33 (60%)
FEMALE	22 (40%)

Table 2 Distribution of Cases According To Age and Gender

	MALE	FEMALE	
11-20	2(6 %)	4(18 %)	6(11%)
21-30	6(18 %)	9(41%)	15(27%)
31-40	7(21%)	3(14 %)	10(18%)
41-50	7(21 %)	2(9%)	9(16%)
51-60	5(16 %)	0	5(9%)
61-70	6(18 %)	3(14 %)	9(16%)
71-80	0	1(4%)	1(2%)
TOTAL	33(60%)	22(40%)	55
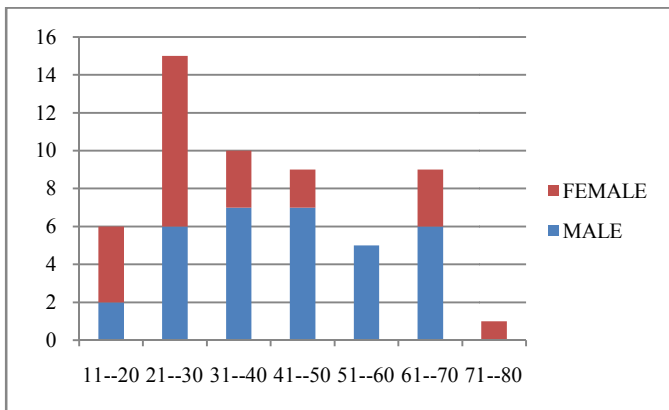
Figure 1 distribution of cases according to age and gender

Table 3 Symptoms –Gender Wise

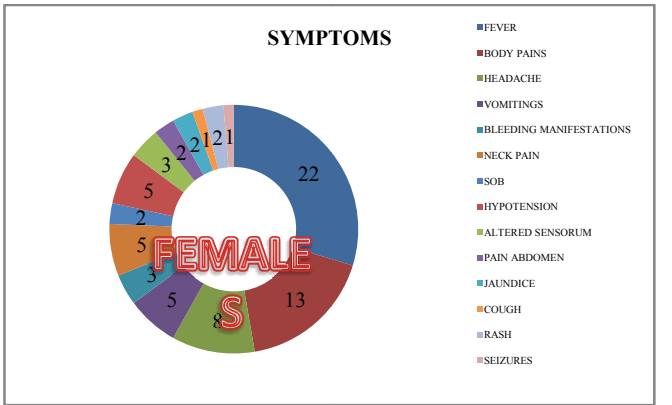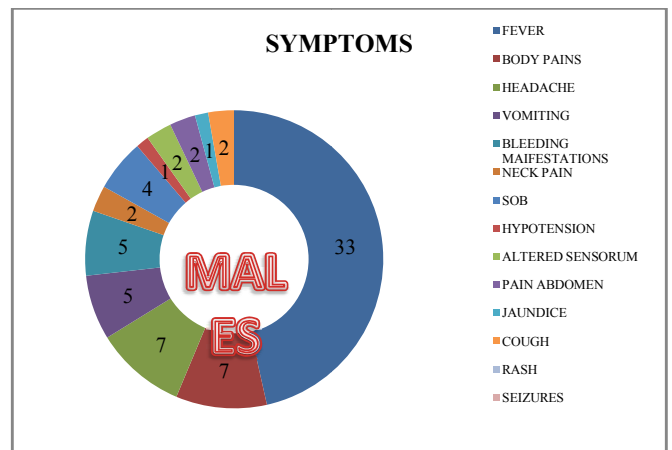| SYMPTOMS	GENDER		TOTAL(n=55)
	MALE (n=33)	FEMALE (n=22)	
Fever	33(100%)	22(100%)	55(100%)
Body pains	7(21%)	13(59%)	20(36%)
Headache	7(21%)	8(36%)	15(27%)
Vomiting	5(15%)	5(23%)	10(18 %)
Bleeding manifestations	5(15%)	3(14%)	8(14%)
Neck pain	2(6%)	5(23%)	7(13%)
Sob	4(12%)	2(9%)	6(11%)
Hypotension	1(3%)	5(23%)	6(11%)
Altered sensorum	2(6%)	3(14%)	5(9%)
Pain abdomen	2(6%)	2(9%)	4(7 %)
Jaundice	1(3%)	2(9%)	3(5%)
Cough	2(6%)	1(5%)	3(5%)
Rash	0	2(9%)	2(4%)
Seizures	0	1(5%)	1(2%)

Figure 2 Symptoms –Gender Wise

Table 4 Cases Distribution According To Platelet Count--Gender

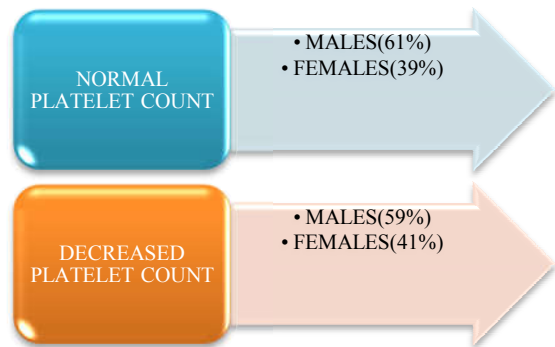| platelet count	no.of fever cases(n=55)	males	females
NORMAL	18(33%)	11(61%)	7(39%)
DECREASED	37(67%)	22(59%)	15(41%)

Figure 3 Cases Distribution According To Platelet Count—Gender

Table 5 Disease Distribution—Platelet Count

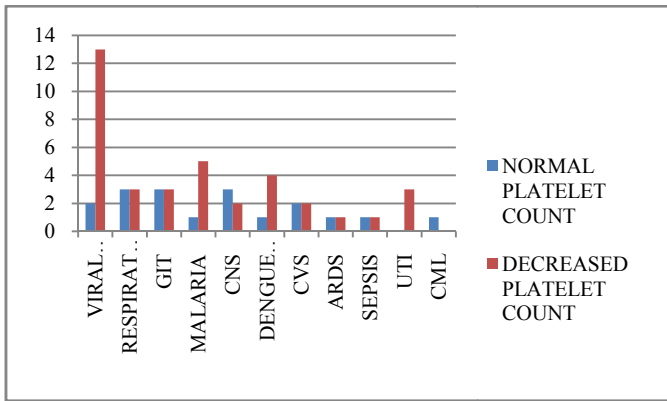| Disease	Normal platelet count	Decreased platelet count	Total
Viral fever	2(13%)	13(87%)	15
Respiratory system	3(50%)	3(50%)	6
Git	3(50%)	3(50%)	6
Malaria	1(17%)	5(83%)	6
Cns	3(60%)	2(40%)	5
Dengue fever	1(20%)	4(80%)	5
Cvs	2(50%)	2(50%)	4
Ards	1(50%)	1(50%)	2
Sepsis	1(50%)	1(50%)	2
Uti	0	3(100%)	3
Cml	1(100%)	0	1

Figure 4 Disease Distribution-Platelet Count

Table 6 Disease Distribution—Platelet Count Severity

Disease	<50,000	50,000-1,00,000	>1,00,000-1,50,000
Viral fever	10(62%)	3(17%)	0
Respiratory system	1(6%)	1(5%)	1(33%)
Git	0	3(17%)	0
Malaria	0	5(28%)	0
Cns	0	1(5%)	1(33%)
Dengue fever	2(12%)	2(10%)	0
Cvs	1(6%)	0	1(33%)
Ards	0	1(5%)	0
Sepsis	0	1(5%)	0
Uti	1(33%)	1(5%)	0
Cml	0	0	0
Total	16	18	3

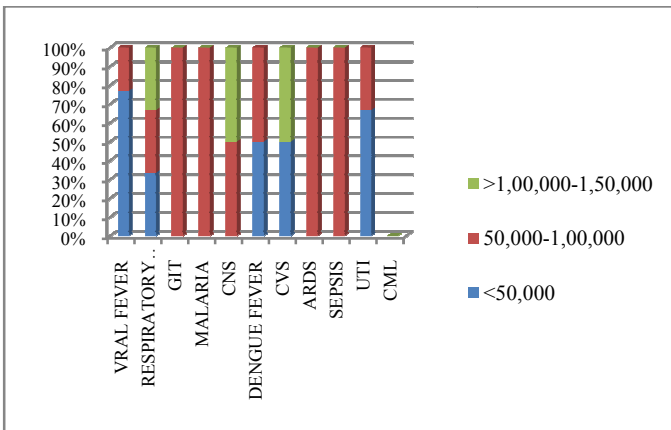**Figure 5** Disease Distribution-Platelet Count Severity

Table 7 Bleeding Manifestations

Presentation	No.of Cases	Platelet Count
Melena	3(5%)	35,000
Hematemesis	2(4%)	38,000
Petechiae	2(4%)	30,000
Gum bleed	1(2%)	20,000
Hematuria	1(2%)	12,000

Table 8 Seasonal Variations of Cases

	October	November	December
Normal platelet	3(25%)	12(35%)	3(33%)
Decreased platelet	9(75%)	22(65%)	6(67%)
Total	12	34	9

Table 9 Outcome

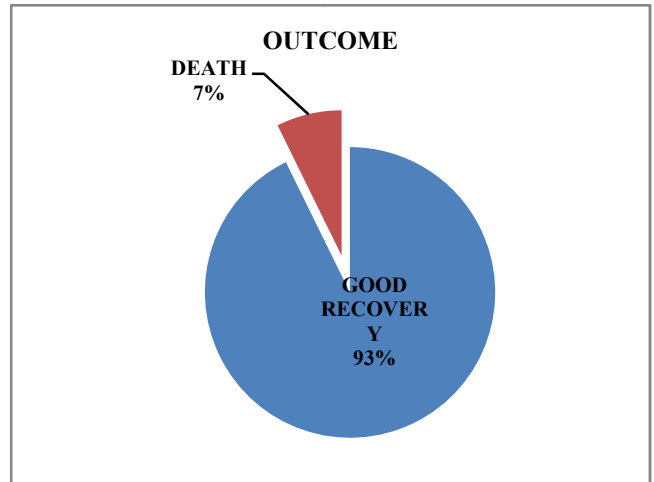| Recovery	No.of Patients	Percentage
Good recovery	51	93%
Death	4	7%

Figure 6 Recovery

RESULTS

were analyzed for various parameters like platelet count, QBC, dengue serology, x-ray, U/S abdomen etc.

In this study irrespective of the size of the sample a marked predominance of males (60%) over females (40%) is noticed. It may be attributed to engagement of men in outdoor work which results in an increased exposure to infections etc. (Table1)

In the present study 33 patients (60%) were males and 22 (40%) were females. The highest incidence was found in the age groups of 21 - 30 years (27%) followed by 31 - 40 years (18%). The present study reveals that female population was most affected in between the age group 21-30 years which is earlier than males. It is also observed that as the age advances the males surpass their female counterparts.

The present study also revealed that age up to 50 years constitutes 72% and above 50 years constitutes 28% (Table 2). Table 3 shows that fever (100%) was the most common symptom followed by body pains (36%), headache (27%) and vomiting (18%). While in a prospective cross-sectional observational study conducted by Modi T *et al*[5] at PDUMC and Civil Hospital, Rajkot, Gujarat, India from 1st November 2014 to 31st March 2016 on clinical profile of febrile thrombocytopenia, whereas fever was the most common symptom followed by Headache (49.61%), Body aches (36.38%) and Vomiting (25.69%).

Females were chiefly presented with body pains while males were presented with a combination of body pain and head ache. Fever accompanied with rash or seizures were observed only in females. Hypotension and neck pain were seen more in females than their male counterparts. 5 cases of hypotension in females coincide with 1 case in male while the ratio remains 5:2 in case of neck pain. Bleeding manifestations were seen predominantly in males than in females.A marked predominance of thrombocytopenia over normal platelet count is observed in the present study sample of fever cases. (TABLE4)

In the present study out of 55 cases of fever: Cases presented as fever with thrombocytopenia are --UTI cases3 (100%), viral fever 13 (87%), malaria 5 (83%), dengue fever 4 (80%).Others constitute not more than 50%.

Comparison against normal platelet count cases: The study reveals that in nervous system only two (40%) out of five cases have decreased platelets. However 50% of cases of respiratory system (3) ,CVS(2),GIT(3),Sepsis(1)and ARDS (1) have been found to be associated with thrombocytopenia.

In the present study it is significantly found that the highest difference is seen in the presentation of viral fever cases. In viral fever out of 15 cases, 13cases (87%) of thrombocytopenia with viral fever are found against 2 cases (13%) of viral fever with normal platelet count.

In the present study it is noticed that out of 6 cases of falciparum malaria 5 cases had thrombocytopenia. Out of 5 dengue fever cases 4 cases had thrombocytopenia.(Table 5) Severe thrombocytopenia (platelets less than 50,000) seen in 16 cases (43%) out of 37 cases of fever with thrombocytopenia. Mild thrombocytopenia (platelet count 1, 50,000-100,000) is present in 3(8%) cases .Whereas mild to moderate (100,000-50,000) thrombocytopenia is found in 18(49%) cases. (TABLE 6)

The present study reveals that there is significance of platelet count among various diseases such as viral fever, malaria, dengue fever, Urinary tract infection. Severe thrombocytopenia is common in viral fever whereas moderate thrombocytopenia is seen in malaria and combination of severe to moderate thrombocytopenia is noted in dengue fever. In UTI moderate form is dominated by the severe one.

Out of 55cases fever 9(16%) cases were presented with various bleeding manifestations associated with severe thrombocytopenia (<50,000).These manifestations were seen in viral fever (5), dengue fever (2), GIT (1) and CVS (1). GI bleed was the major presentation followed by skin bleed. Hematuria and gum bleed were manifested equally. Similar pattern was observed by hematemesis and petechiae. All the cases were transfused with platelets. (TABLE7)

Whereas the studies conducted on fever with thrombocytopenia by Praveen Kumar and Kalpana Chandra[6] reveal that the bleeding manifestations were noted in 11.05% patients and GI bleed was the commonest manifestation. Present sudy coincides with this study. And the study conducted by Lohitashwa *et al*[7] observed bleeding manifestation in 49% cases and petechiae was the commonest bleeding manifestations. This study reveals that the incidence of fever cases and fever with thrombocytopenia is more during early winter (Table 8).

In this study 4 cases out of 55 had mortality. It is further observed that among the 4 cases 2- TB meningitis, aspiration pneumonia were associated with thrombocytopenia while the rest ARDS, MODS were in association with normal platelet count (Table 9).

DISCUSSION

Fever is a common manifestation of illness that it is not surprising to find accurate description of febrile patients in early recognized history[8].Fever is a result of endogenous pyrogens release mediated by cytokines. They are produced by activated immune cells causing increase in thermoregulatory

set point in hypothalamus.[9] Even though absence of bleeding manifestations mask the importance of thrombocytopenia, it is now mandatory to estimate serial platelet count to prevent life threatening complications like intra cerebral bleed etc. Infections cause decrease in a platelet count due to effects on both platelet production and platelet survival.[10]

In the present study the male to female ratio 3:2 is equal in total number of cases and also fever with or without thrombocytopenia cases. But total number of thrombocytopenia cases were more (67%) when compared to normal fevers (33%) indicating the importance of platelets in managing fever cases. Highest age incidence varies in both sexes. Females were affected more in 21-30 years, earlier than males. It is also observed that 82% females were affected at an earlier age (50 years) compared to males (66%). Warning signs like hypotension were present more in females (23%) than in males (3%).It may be attributed to the immune system activity in females. Complications like bleeding manifestations were equally present in both of them.

In any organ system involvement 50%cases were presented with thrombocytopenia but in viral fevers, malaria and dengue fever cases the incidence was more than 80% clearly showing that pathology of the thrombocytopenia has a vital role.

Viruses produce thrombocytopenia by various mechanisms like impaired platelet production as a result of direct viral invasion, toxic effect of viral proteins on thrombopoiesis, virus-induced hemophagocytosis and increased platelet destruction by binding of virus-induced auto antibodies or viral antigen-antibody complexes.[11] Thrombocytopenia in Dengue fever is caused by bone marrow suppression (i.e. decreased platelet synthesis and increased immune-mediated destruction of platelets).[12] Thrombocytopenia is common in malaria especially in falciparum type and is due to sequestration, immune mediated destruction with elevated platelet activated immunoglobulin.[13]

Out of 15 cases of viral fever 2 cases were observed with normal platelet count while 13 were presented with moderate to severe thrombocytopenia. Bleeding manifestations were seen in 38.4% cases. While dengue fever out of 5 cases 4 (80%)were presented with moderate to severe thrombocytopenia.50% cases have bleeding indicating different pathology in dengue fever .Even though in malaria 5 cases (83%) out of 6 were with moderate thrombocytopenia absence of bleeding indicates benign nature of disease.

Analyzing our study we found that out of 37cases of thrombocytopenia only 9(25%) cases had bleeding manifestations indicating the asymptomatic presentation of thrombocytopenia. Gastro intestinal bleed appears initially followed by petechiae and hematuria.

Platelets were transfused only in severe (<50,000) thrombocytopenia indicating self limiting nature of thrombocytopenia in fever cases. In our study, patients who were presented with platelet count between < 50,000 and <10,000 were transfused and a definite increase was noted. Similar findings were also seen in study done by Dash *et al*[14] who reported malaria as the commonest cause of febrile thrombocytopenia.

Out of the four death cases two had thrombocytopenia and TB meningitis / aspiration pneumonia. In the remaining two cases mortality was observed cases as they were undiagnosed and

presented with ARDS, MODS (may be due to early induction of empirical treatment and limitation of diagnostic modalities). Fevers with thrombocytopenia shown seasonal variations indicate the changing pattern of fever presentation especially due to viral mutations[15].

CONCLUSION

1. Accurate diagnosis of febrile illness in medicine means that the science and art come together.
2. Management of fever cases always needs a good laboratory support apart from knowledge over geographic, seasonal and endemicity of infectious diseases which have a major impact on aetiology.
3. 72% cases were seen in the age group below 50 years. Females were affected earlier in age than males.
4. The most common etiology of fever is viral infection. Febrile thrombocytopenia was seen in 67% of cases.
5. Not only viral fever, dengue fever—cardio vascular system, respiratory system and urinary tract infection can also cause severe thrombocytopenia.
6. Though there is no absolute relation between platelet count and severity of bleeding, however the risk of bleeding increases as the platelet levels fall below 40,000/μL.
7. GI bleed and petechiae were observed in platelet count between 30,000-40,000/ μL gum bleed and hematuria in 20,000/ μL or less.
8. Avoid prophylactic platelet transfusion to prevent allo immunization.
9. Majority of cases of thrombocytopenia were asymptomatic, but the presence of bleeding manifestations in a significant number of cases require prompt management to prevent life-threatening complications.
10. Serial platelet estimation is more useful than extensive etiological evaluation in management of febrile thrombocytopenia.

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