

## A Study on the Etiology and clinical profile of patients with thrombocytopenia admitted in ICU

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### Abstract

**Background:** The present study was conducted to assess the etiology of Thrombocytopenia in various patients admitted in ICU. The proportion of patients with bleeding manifestations, The percentage of patients requiring special therapy like platelet transfusions, steroids, and length of ICU stay in patients with thrombocytopenia. **Material and methods:** The present study was an observational study, conducted at Department of Medicine, Mallareddy Womens Medical College, Telangana among 100 patients admitted in to ICU. Approval was taken from institutional ethical committee before starting the present study. Informed consent was obtained from the study participants before enrolling the present study subjects. **Results:** The commonest bleeding manifestation in patients secondary to thrombocytopenia was Gastrointestinal bleed which was seen in 9 patients. Petechial rash was seen in 8 patients, epistaxis in 3 patients. Menorrhagia, gum bleed and hematuria was seen in one patient each. **Conclusions:** Majority of the bleeding occurs with platelet count less than 10,000. This study shows that Sepsis is the commonest diagnosis made in patients who are detected to have thrombocytopenia at admission to the medical ICU.

**Keywords:** Thrombocytopenia, bleeding manifestations, ICU care, complications

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### Introduction

Thrombocytopenia refers to a reduction in platelet count below 1.5 lakh/microliter[1]. It is the commonest abnormality encountered in clinical practice with variable clinical expression. The symptomatology may vary greatly and the underlying cause may be either inconsequential or life threatening[2]. In a tropical country like India, infectious causes predominate and are usually associated with fever, also drugs, autoimmunity, Hypersplenism, DIC, malignancy are among the leading causes of thrombocytopenia. Pseudo thrombocytopenia should always be ruled out first by peripheral smear examination[3]. Because platelet counts are prone to error, a single platelet count that is lower than normal should be confirmed by a second count. It should also be confirmed by inspecting the blood film[4,5]. The life span of platelets once they enter the circulation is about 8- 10 days. About 10% of the population is destroyed each day[5]. Thrombocytopenia may result from impaired platelet production, accelerated platelet destruction, or dilution/splenic sequestration[4,5]. Of these infections being the commonest cause of thrombocytopenia[6]. Thrombocytopenia is a common entity in ICU settings. Many patients admitted in ICU with different kinds of serious illness develop thrombocytopenia at some point during the ICU stay. Thrombocytopenia has got many implications in the course of disease process and its management. It prolongs ICU stay, necessitates platelet transfusion on few occasions, complicates various invasive procedures required for effective management of patients and there by increases the overall mortality rate of patients in ICU settings[7-9]. Many studies have concluded that thrombocytopenia is a common entity in ICU admissions and is a prognostic marker of severity of illness. This study attempts to determine the common etiologies responsible for thrombocytopenia among patients admitted in to ICU and their clinical profile with relevance to variables like bleeding manifestations, requirement of platelet transfusions/steroids and overall impact on mortality of the patients. The present study was

conducted to assess the etiology of Thrombocytopenia in various patients admitted in ICU. The proportion of patients with bleeding manifestations, The percentage of patients requiring special therapy like platelet transfusions, steroids, and length of ICU stay in patients with thrombocytopenia.

### Materials and methods

The present study was an observational study, conducted at Department of Medicine, Mallareddy Womens Medical College, Secunderabad, Telangana among 100 patients admitted in to ICU. Approval was taken from institutional ethical committee before starting the present study. Informed consent was obtained from the study participants before enrolling the present study subjects.

### Inclusion criteria

Patients admitted in Medical ICU at Department of Medicine, Mallareddy Womens Medical College, Telangana between February 2019 to September 2020, Age > 18 years and Patients with a platelet count of less than 1.5 lakhs/mm<sup>3</sup> were included in the study.

### Exclusion criteria

Patients with Age < 18 years, Patients who have already received platelet transfusions prior to admission, and Patients who were earlier diagnosed to have conditions that are known to cause thrombocytopenia were excluded from the present study.

### Methodology

Platelet count of all the patients admitted in ICU were verified. It was calculated by automated analyser. Patients with platelet count less than 1.5 lakhs/microlitre were included in the study. Daily platelet counts were noted. Patients were investigated for the cause of thrombocytopenia. Patients were followed daily and analysed based on the need for platelet transfusion/steroids, severity of thrombocytopenia, development of bleeding manifestations, duration of hospital stay and the final outcome of ICU stay. The data was collected using standard, semi-structured, pre-validated case record proforma. The data was entered using Microsoft Excel sheets. The data was analysed using SPSS version 21 software. Mean, and median were considered for central tendency and standard deviation was derived to know the variation among the parameters. The data was represented in the form of tables and charts for frequency analysis.

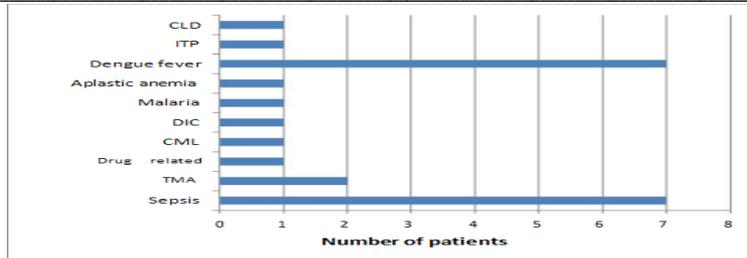
### Results

During the study period of 8 months, 100 patients satisfied the inclusion criteria and were included in the study. There were 70 males and 30 females in the study population. The commonest etiology for thrombocytopenia in patients admitted in to medical ICU was sepsis. 43 patients were diagnosed to be in sepsis making up 43% of the study population. Dengue/Dengue like illness was a close second with 23% of cases. CLD was responsible for thrombocytopenia in 7 cases making in third in the list. Malaria was diagnosed in 6 cases. Out of 6 cases, falciparum malaria was diagnosed in 4 cases, vivax malaria in two, mixed infection in 1 case. (Graph 1)

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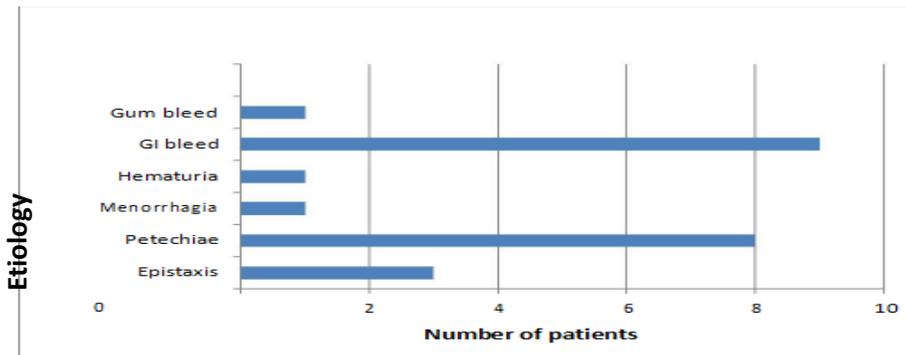
**Fig 1 : Etiology of thrombocytopenia responsible for bleeding manifestations**

Drug related thrombocytopenia was next in the list with 5 cases. It was suspected in patients where no other etiology except the medication was attributable to thrombocytopenia. Heparin was responsible in 1 patient, Trimethoprim-Sulfamethoxazole in 1 patient. Phenytoin, Piperacillin, Rifampicin were responsible in other cases. Hematological malignancies were responsible in 3 cases and DIC in 1 case. Out of 3 cases of malignancy AML, CML and Multiple Myeloma were responsible for 1 case each. ITP was the diagnosis in 3 cases. TMA and Aplastic anemia accounted in 3 and 2 cases respectively. Megaloblastic anemia and connective tissue disorders were responsible for 2 cases each. Most of the patients with sepsis as the cause of thrombocytopenia were diagnosed to have Pneumonia. Out of 43 patients with sepsis, 20(46%) were diagnosed to have pneumonia as the focus of sepsis. UTI was diagnosed in 5 cases and all the 5 were females. The source of sepsis was unidentified in 12 cases. Most of the patients with thrombocytopenia were having a platelet count between 50,000 and 1,00,000/mm<sup>3</sup> ( 56%). Platelet count between 21 and 50 thousand was seen in 24% of patients. 7% of patients had platelet count between 11 and 20 thousand. 6% of patients had very severe thrombocytopenia with a platelet count of less than 10,000. 7% of patients had mild thrombocytopenia with a count between 1 to 1.5 lakhs.

**Bleeding manifestations**

Of the total 100 patients with Thrombocytopenia, bleeding manifestations occurred in 23 patients (23%). Of all the patients with thrombocytopenia the frequency of bleeding manifestations were more in patients with platelet count

less than 10000. 6 out of 6 patients(100%) with platelet count less than 10000 showed bleeding manifestations. Among 6 patients with platelet count between 11000-20000, 4 patients(66%) showed bleeding manifestations. 8 patients(33%) out of 24 patients with platelet count between 21000-50000 showed bleeding manifestations. Bleeding complications were least in patients with platelet count more than 50000. Among 56 patients with platelet count between 51000-100000, 4 patients(7.14%) showed bleeding manifestations. Among 7 patients with platelet count of more than 1 lakh, none of them had any bleeding manifestations. The commonest bleeding manifestation in patients secondary to thrombocytopenia was gastrointestinal bleed which was seen in 9 patients. Petechial rash was seen in 8 patients, epistaxis in 3 patients. Menorrhagia, gum bleed and hematuria was seen in one patient each. Out of 43 patients with sepsis, 7 patients(16.2%) had bleeding manifestations out of which 3 patients had GI bleed, 4 patients developed petechiae. Out of 23 patients with Dengue/Dengue like fever, 7 patients(30.4%) developed bleeding manifestations among which 3 developed petechiae, 2 developed GI bleed, 1 patient developed epistaxis, 1 patient developed Menorrhagia. 1 patient with CLD developed petechiae. 1 patient with aplastic anemia developed GI bleed. 1 patient with TMA developed hematuria and the other one developed GI bleed. One patient with DIC developed gum bleed. One patient each with CML, ITP developed epistaxis. One patient with drug related thrombocytopenia developed GI bleed. (Graph 2)



**Fig 2: Bleeding manifestations in various cases of thrombocytopenia**

**Interventions**

Out of 100 patients with Thrombocytopenia, 16(16%) patients were given platelet transfusions. 13 patients(81.25%) out of 16 received therapeutic platelet transfusion and 3 patients out of 16(18.75%) received prophylactic transfusion. All 6 patients with platelet count less than 10000 received therapeutic platelet transfusion and all 7 patients with platelet count between 11000 and 20000 received platelet transfusion, out of which 3 were prophylactic transfusions and 4 were therapeutic transfusions. Out of the remaining patients who received platelet transfusion all 3 patients had platelet count between 21000 and 50000, out of which 2 were therapeutic transfusions and one was prophylactic transfusion. (Table 1)

**Table 1: Indications for platelet transfusion and steroids**

Indication		Number of Patients
Indication for Platelet Transfusion	Aplastic Anemia	1
	Sepsis	4
	Dengue/dengue like fever	4
	ITP	2
	Malaria	1
	TMA	2
	Drug related	1
	CLD	1
Indication of steroids	Sepsis	4 (To improve hemodynamics)
	Viral fever	2 (To improve platelet count)
	Aplastic anemia	2 (To improve platelet count)
	ITP	3 (To improve platelet count)
	Drug related	2 (To improve platelet count)
	Connective tissue disorder	2 (To improve platelet count)

Coming to disease wise platelet transfusion, 4 patients (9.3%) with sepsis received platelet transfusion. 4 patients with dengue (17.3%) received platelet transfusion. 2 patients with ITP (66%) received transfusion. 2 out of 3 patients (66%) with TMA received platelet transfusion. One patient each Aplastic anemia, Malaria, CLD and drug induced thrombocytopenia also received platelet transfusion.

**Steroid therapy:** Out of 100 patients with thrombocytopenia, 15 patients were given steroid therapy. All the patients with ITP, Connective tissue disorder, Aplastic anemia received steroid therapy. 4 patients out of 43 patients with sepsis were given steroid therapy. It was given in cases of refractory septic shock to improve hemodynamic status but not for thrombocytopenia. All the other 11 patients were given steroid therapy aiming an improvement in platelet count. (Table 1)

**Duration of ICU stay:** Apart from the primary disease platelet count also influenced the duration of hospital stay. Patients with severe thrombocytopenia and patients with bleeding manifestations required prolonged ICU stay. Among patients with different range of thrombocytopenia, patients with platelet count of less than 10000 had an average ICU stay of 13.7 days. Patients with platelet count from 11000-20000 had an average stay of 7 days and similarly it was 5.58 days for patients with platelet count between 21000 to 50000. Patients with platelet range from 51000- 100000 stayed for an average of 5.08 days in ICU. Average ICU stay was 4.14 days for patients with platelet count greater than 1 lakh.

**Mortality:** Out of 100 cases with thrombocytopenia admitted in to ICU the mortality rate was 24%. Mortality was highest in patients with sepsis induced thrombocytopenia (32.5%). Out of 23 patients with Dengue 4 patients expired in the ICU (mortality

#### Discussion

A total of 100 patients were included in the study during the study period of 8 months from February 2012 to September 2013 which was done in Medwin hospital, Hyderabad. Sepsis was the most common etiology of Thrombocytopenia admitted into ICU. A total of 43 patients (43%) were diagnosed to be having sepsis with thrombocytopenia. There were 70 males and 30 females in the study population. The mean age of the study population was 52.92 years. A similar type of study was done in UK critical by Stanworth SJ, Walsh TS et al 2013 [10] It concluded that 9% of patients with severe thrombocytopenia (that is platelet count <50,000) required platelet transfusion. In the present study the platelet transfusion was done in 16% of patients with severe thrombocytopenia. The mortality rate in patients with severe thrombocytopenia was 35.4% in Stanworth study and it was 35.1% in the present study. Vanderschueren, Steven; De Weerd, Annick; Malbrain, Manu et al [11] did a study on the prognosis of patients with thrombocytopenia in ICU in July 2000 and concluded that patients in ICU with thrombocytopenia had greater risk of bleeding manifestations, prolonged ICU stay and increased rate of Mortality. Bleeding manifestations were seen in 52.6% of patients in that study where as in the present study it was only 23.6% in patients with a platelet count of less than 1,50,000/mm<sup>3</sup>. The mortality rate was 19.5 % in that study and it was 24% in present study. ICU stay was prolonged in patients with thrombocytopenia. It was 8 days in Vanderschueren study and 5.58 days in present study. Comparison of bleeding manifestations in patients with Dengue/Dengue like fever Bleeding manifestations in suspected Dengue fever in a study done in Hawaii in 2001-02 found petechiae to be the common bleeding manifestation followed by menorrhagia and epistaxis. In the present study, patients with Dengue/Dengue like illness were found to be having petechiae more often followed by GI bleed. 2 out of 7 patients (28.5%) with CLD expired. One patient (16.6%) with Malaria expired. One out of 4 patients with malignancy expired. One patient of Aplastic anemia and one patient of TMA also expired during ICU stay. Most of the patients who presented as sepsis with thrombocytopenia were diagnosed with Pneumonia as the cause of Sepsis. A study done by Chakradhar Venkata et al found Pneumonia to be the cause of sepsis with thrombocytopenia in 38.8% and in present study pneumonia was responsible for 46.5% of the cases of sepsis with thrombocytopenia.

**Conflict of Interest:** Nil

**Source of support:** Nil

#### Conclusion

Majority of the bleeding occurs with platelet count less than 10,000. This study shows that Sepsis is the commonest diagnosis made in patients who are detected to have thrombocytopenia at admission to the medical ICU. Patients with febrile illness with thrombocytopenia are also likely to be suffering from dengue/dengue like fever. Malaria and chronic liver diseases are also high in the list of diseases presenting as thrombocytopenia. One fifth of patients with platelet count less than 1,00,000/pL tend to have bleeding manifestation, commonest being GI bleed, petechial rash and epistaxis. In patients with sepsis bleeding is not related solely to platelet count but coagulopathy also contribute to it. The proportion of patients receiving therapeutic platelet transfusion was higher compared to prophylactic transfusion. Majority of the patients received prophylactic platelet transfusion if the platelet count was less than 20000. Patients with severe thrombocytopenia required a prolonged ICU stay and mortality rate was also higher in that patient group.

#### Recommendations

Avoid drugs that are known to cause thrombocytopenia especially in critical care settings and when needed use with caution by monitoring platelet count. Avoid unnecessary platelet transfusions to prevent immunological reactions, and Monitor the platelet count daily in critically ill patients with thrombocytopenia and carefully look for bleeding manifestations.

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