A STUDY TO EVALUATE THROMBOCYTOPENIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND

Thrombocytopenia is defined as platelet value less than 150 × 10^3 per µL or 50% decrease from the baseline. It can be idiopathic, immune mediated and drug induced, or disease induced.

The aim and objective of the present study was undertaken to evaluate the incidence and causes of thrombocytopenia, severity based on disease specific conditions and to study the management of thrombocytopenia in adult patients.

MATERIALS AND METHODS

It was a prospective observational study undertaken at a tertiary care hospital. A structured pro forma was prepared and data was collected from patients of either gender ≥18 years with platelet count less than 150 × 10^3 per µL during their hospital stay. Details regarding platelet levels, demographics, and laboratory parameters, prescribed and discharged medications were collected. Aetiology was categorised as either drug induced, disease induced or immune mediated.

RESULTS

Data from 200 inpatients with thrombocytopenia was collected during the study period among which 66 % were males. Mild thrombocytopenia was found in 40.5% cases followed by moderate 26% and severe 33.5%. Out of the established cases, co-morbidities like cancer, dengue, malaria and few undetermined co-morbidities were seen in 28%, 6%, 5% and 5.5% patients respectively. Patients were treated with either a steroid or a platelet transfusion or with combination of drugs and platelet transfusion.

CONCLUSION

In the present study, mild thrombocytopenia was most prevalent followed by severe and moderate. Cancer was a major co-morbid condition. Steroids were the first line treatment followed by platelet transfusions.

KEYWORDS

Cancer, Dengue, Malaria, Platelets, Thrombocytopenia.

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BACKGROUND

Thrombocytopenia is defined as a platelet count of less than 150 × 10^3 per µL or less than 50% of the baseline count. Thrombocytopenia results from decreased bone marrow production, increased breakdown of platelets in the bloodstream or splenic sequestration.[1]

Platelets are released from the megakaryocyte, under the influence of flow in the capillary sinuses. The normal blood platelet count is 1,50,000 - 4,50,000/µL. The major regulator of platelet production is the hormone thrombopoietin (TPO), which is synthesized in the liver. Synthesis is increased with inflammation specifically by interleukin 6. TPO binds to its receptor on platelets and megakaryocytes, by which it is removed from the circulation. Thus, a reduction in platelet and megakaryocyte mass increases the level of TPO, which then stimulates platelet production. Platelets circulate with an average life span of 7–10 days. Approximately one-third of the platelets reside in the spleen, and this number increases in proportion to splenic size, although the platelet count rarely decreases to < 40,000/L as the spleen enlarges.[1]

Objectives of our study included study of incidence and causes of thrombocytopenia in adult inpatients, observation and reporting of the severity of thrombocytopenia based on disease specific conditions, study of the management of thrombocytopenia and finally to study the therapeutic outcomes in patients diagnosed with thrombocytopenia.

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MATERIALS AND METHODS

The study was approved by the Institutional Ethics Committee (SVCP/2015/30) and was carried out at Apollo hospitals, Jubilee Hills, Hyderabad, India for duration of 6 months. The study population included adult inpatients (patients of either gender with age ≥ 18 years); ICU patients and ward patients while out patients and pediatric population were excluded. A data collection form was designed, and the required data was collected, which included patient demographic details, laboratory parameters and medications. When the platelet levels were below 50% from the base line, then the observed thrombocytopenia was categorized into mild, moderate or severe thrombocytopenia. The etiology of thrombocytopenia was considered and categorised as either drug induced, or disease induced or immune mediated thrombocytopenia. Response to the medications prescribed was monitored to understand the therapeutic outcomes in the patients.

RESULTS AND DISCUSSION

Of the total 200 patients, majority were males. Cancer was the most prevalent comorbid condition observed in one-third of the study population. A combination of hypertension and diabetes Mellitus was observed in majority of the patients followed by hypertension, diabetes mellitus, idiopathic thrombocytopenic purpura (ITP), chronic kidney disease, pneumonia, urinary tract infection and a human immunodeficiency virus infection (HIV) in a patient. The incidence of thrombocytopenia in intensive care unit (ICU) was found to be relatively higher than other units, which correlates with a previous study on thrombocytopenia where Sepsis was observed in majority of the patients admitted or shifted to (ICU) on development of one or more bleeding manifestations. Patients with thrombocytopenia had more episodes of major bleeding, increased incidence of acute kidney injury, and prolonged ICU stay.[2] Patients identified with thrombocytopenia in the age group of 56-64 years were relatively higher than other age groups (table 1).

Out of the 200 patients, clinical signs were not observed in majority of population. Rash, epistaxis, bleeding gums, purpura and petechiae were observed in severe thrombocytopenia and majority of ITP cases. Melena, hematemesis and haematuria were observed in moderate thrombocytopenia followed by menorrhagia in mild thrombocytopenia. In a previous reported study, a hypothesis stating whether patients with primary immune thrombocytopenia are at increased risk for venous thromboembolic events were tested. However, none of the venous thromboembolic event was observed in the study population.[3]

The aetiology of the thrombocytopenia was assessed with the help of clinical expertise (table 2). Cancer was the major cause followed by liver dysfunction, dengue, idiopathic thrombocytopenic purpura and malaria. Thrombocytopenia was found to be a common feature of acute malaria which correlates with results of previous studies.[4] The probable cause of thrombocytopenia included infections (sepsis, urinary tract infection and HIV) and drug induced thrombocytopenia (DIT). DIT disorders can be a consequence of decreased platelet production (bone marrow suppression) or accelerated platelet destruction as suggested by previous studies which is in consonance with present study.[5] The cause of thrombocytopenia remained undetermined in the remaining patients.

Among the study population, majority of patients did not receive any treatment specific to thrombocytopenia and were provided with treatment for the underlying condition (table 3).The remaining one-fifth of the population was treated with either non-pharmacological [blood transfusions, random donor platelets (RDP), single donor platelets (SDP) and splenectomy], Pharmacological [steroids, anti-D, intravenous immunoglobulin (IVIG) and methylcobalamin] or a combination. This correlates exactly with the results of previous studies with all the treatment options specified above.[3,6]

Duration of thrombocytopenia was 4 to 6 days in one-third of the population (table 4). In the remaining patients, it was less than 3 days followed by 7 to 14 days. Patients with severe thrombocytopenia had duration of more than 14 days. Majority of patients did not receive any treatment specific to thrombocytopenia and were provided with treatment for the underlying conditions. The mean duration of thrombocytopenia was highest in liver dysfunction induced thrombocytopenia.

Characteristics	n=200	Percentage (%)
Gender		
Males	126	66%
Females	74	34%
Age (years)		
18-25	19	9.5%
26-40	28	14%
41-55	50	25%
56-64	57	28.5%
>65	46	23%
Co-Morbidities		
Cancer	56	28%
HTN+DM	42	21%
HTN	27	13.5%
DM	20	10%
ITP	11	5.5%
Sepsis	8	4%
CKD+ HTN+ DM	7	3.5%
Pneumonia	6	3%
Urinary Tract Infection	2	1%
HIV	1	0.5%
None	20	10%

HTN-Hypertension; CKD-Chronic Kidney Disease; DM-Diabetes Mellitus; HIV-Human Immunodeficiency virus

Table 1. Demographics of the Study Population

Clinical Signs	n=200
Rash	6 (3%)
Epistaxis	5 (2.5%)
Bleeding gums	3 (1.5%)
Purpura + Petechiae	3 (1.5%)
Melena	2 (1%)
Hematemesis	2 (1%)
Hematuria	1 (0.5%)
Menorrhagia	2 (1%)
None	176 (88%)
SEVERITY	n=200
Mild (1,00,000-1,50,000/µL)	81 (40.5%)
Moderate(50,000-1,00,000/µL)	52 (26%)
Severe(<50,000/µL)	67 (33.5%)

Table 2. Clinical Presentation of Thrombocytopenia

Management	n =200
Non-Pharmacological	
Splenectomy	2 (1%)
RDP	2 (1%)
Blood transfusion	2 (1 %)
Pharmacological	
Dexamethasone	10 (5%)
Methyl prednisolone	1 (0.5%)
Prednisolone	9 (4.5%)
IVIG	2 (1%)
Anti-D	2 (1%)
Methylcobalamin	2 (1%)
Methyl prednisolone+ Prednisolone	3 (1.5%)
Non-Pharmacological+ Pharmacological	
RDP + Methylprednisolone	1 (0.5%)
RDP + SDP + Dexamethasone + Methylprednisolone	1 (0.5%)
RDP + Methylprednisolone + Prednisolone	2 (1%)
None specific to thrombocytopenia	161(80.5%)

Table 3. Management of Thrombocytopenia

RDP-random donor platelets; SDP-single donor platelets.

Duration (in days)	n=200
1-3	60 (30%)
4-6	64 (32%)
7-14	44 (22%)
>14	18 (9%)
More laboratory tests needed or discharged	14 (7%)
Mean Duration (in days)	AETIOLOGY
9.2	DLD
7.2	DIT
5.6	Dengue
5.5	Cancer
3.3	ITP
2.8	Malaria

DIT-Drug Induced Thrombocytopenia; ITP- idiopathic thrombocytopenic purpura;

Table 4. Duration of Thrombocytopenia

CONCLUSION

Cancer, malaria, dengue and severe liver dysfunction can induce thrombocytopenia. Severity of the underlying condition can prolong the duration of thrombocytopenia. Risk assessment has to be done for appropriate and timely management to decrease the complications like bleeding. Management options for thrombocytopenia include Steroids, IVIG, anti-D, platelet transfusions and splenectomy. Treatment of the thrombocytopenic cancer patient remains a challenge, and can be managed with steroids and platelet transfusions. Initiation of therapy in drug induced thrombocytopenia (DIT) is done by withdrawal of the suspected drug. The pharmacist must be aware of the possibility of drug-induced and disease induced thrombocytopenia, which is essential in patients presenting with unexpected thrombocytopenia and closely monitor the use of suspected drug. Development of guidelines for management of thrombocytopenia will assist in its uniform treatment in all specialities of health care.

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