Original Research Article

A study to evaluate thrombocytopenia-A Hospital based study

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Abstract

Introduction: Thrombocytopenia is a common clinical condition with a wide variety of etiological causes. This may result from reduced development of platelets, increased destruction of platelets and differentiation in the distribution of platelets. While temporary suppression of the bone marrow and invasion of the marrow by malignancies are important causes, certain non-malignant conditions, such as infections and medications, are equally important as their treatment is easy and full recovery is the norm. Accurate aetiology identification is critical for specific treatment and prognosis.**Aims**: To study of thrombocytopenia clinical results in patients diagnosed with thrombocytopenia.**Materials and methods:**The prospective study was carried out at the department of Pathology, Fathima Medical College, Kadapa, Andhra Pradesh, during the period from January 2017 to June 2020. A total of 90 patients for whom bone marrow aspiration was recommended were included. At the time of diagnosis, the age of the study group ranged from 6 months to 80 years.**Results:** In our study out of 90 patients 29(32%) patients were dengue positive and 61(68%) were dengue negative, with male female ratio of 3:2. The age of the study group ranged from 6 months to 80 years. Most of the patients in study are seen in age 11-20 years (36.7%) followed by 21-30 years (16.7%). Most of the patients in study presented with epistaxis (15.6%)followed by rash (14.4%). In study are of Mild (46%) forms followed by sever(30%). The most common cause for thrombocytopenia in this study was dengue infection seen in 29 cases(32%). ITP in 22 cases(24.4%) followed by chronic liver disease in 16 cases(17.8%), post-medication in 9 cases(10%), gestational in 7 cases(7.8%).**Conclusion:** In our study leading cause of thrombocytopenia is preventable and treatable. The frequency of thrombocytopenia would therefore be minimised by raising socioeconomic status and avoiding infection.

Keywords: Thrombocytopenia, Dengue, ITP(IdiopathopathicThrombocytopenia)

Introduction

Thrombocytopenia is characterised as a platelet count below 1.5 lac/ mm^3. It is the most common cause of defect in primary haemostasis and can cause bleeding.Platelets are important for preserving the integrity of the endothelium and for the creation of the haemostatic plug by aggregating and adhering to each other (primary hemostasis). The function of secondary factors (coagulation system) comes later when the injury is widespread.The major regulator of platelet development is the hormone thrombopoietin (TPO), which is synthesised in the liver. Synthesis is increased with interleukin-specific inflammation. TPO binds to its receptor on platelets and megakaryocytes through which it is withdrawn from circulation. As a result, the decrease in platelet and megakaryocyte mass increases the TPO amount, which then stimulates the development of platelets. Platelets have an average life span of 7–10 days. Approximately one-third of the platelets reside in the spleen and this amount increases in proportion to the spleen size, although the platelet count seldom decreases to< 40,000/L as the spleen enlarges[1].In contrast to the widespread use of red blood indices for understanding the aetiology of anaemia, the use of platelet-derived indices is minimal. These indices (Mean Platelet Volume, Platelet Distribution Width, Plateletcrit , Large Cell Ratio) are not used in the clinical context, primarily due to lack of knowledge of their potential utility and also due to the difficulties encountered in standardising their values. The MPV is considered a proxy marker for bone marrow operation and compares the average size of the platelet[2].The objectives of our study included the study of the occurrence and causes of thrombo-cytopenia in adult patients, the observation and reporting of disease-specific thrombocytopenia severity,the study of thrombocytopenia treatment and, finally, the study of clinical results in patients diagnosed with thrombocytopenia.

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Materials and methods

The prospective study was carried out at the department of Pathology, Fathima Medical College, Kadapa, Andhra Pradesh, during the period from January 2017 to June 2020. A total of 90 patients for whom bone marrow aspiration was recommended were included. At the time of diagnosis, the age of the study group ranged from 6 months to 80 years. Files recorded the age, gender, comprehensive medical records, physical exams and medications. Using electronic databases, laboratory findings were registered. Thrombocytopenia was identified in patients whose platelet counts were lower than 1, 50,000/cu.mm and were included in the analysis. By producing a peripheral blood film/smear, the blood samples were manually counter-checked and stained with the Leishman stain. The samples were analyzed in the automated cell counters. In the case of thrombocytopenia (Platelet count < 1.5 lac/mm^3), various platelet indices i.e.; Platelet count, Mean Platelet Volume (MPV), Platelet Distribution Width (PDW), Plateletcrit (PCT) and Large Cell Ratio (LCR) were noted. All of the above data was obtained, correlated and statistical significance was determined between the different indices derived from the platelet and the platelet count. The relationship

between both of these indices derived from platelets was associated with the cause/etiology of thrombo-cytopenia.The SYSMEX KX 21 automated cell counter conducted platelet count and the value was associated by direct peripheral and EDTA blood smear analysis. Neubaur's platelet counting chamber monitored values lower than <10,000/cu.mm. Via direct peripheral smear analysis, pseudo-thrombocytopenia was excluded. Normal procedures were used to perform the bone marrow analysis procedure and staining. Bone marrow trephine biopsy in selected cases was performed and analysed. In order to determine the cause of thrombocytopenia, bone marrow findings, clinical features and other studies are associated. The data was analysed using the Social Sciences Statistical Package (SPSS) 15. Based on the distribution of values, the mean or median was used for continuous variables. Using the Fisher's Exact Test and Chi-Square Tests or the Mann Whitney test, correlations between the outcome of critically ill children and different variables were estimated. It was found that a p value of <0.05 was statistically important.

Results

In our study out of 90 patients 29(32%) patients were dengue positive and 61(68%) were dengue negative.

Table 1:Number of Dengue Positive and Negative cases

	Male	**Female**	**Total**
Dengue +ve	20	9	29
Dengue -ve	40	21	61
Total	60	30	90

Males in the study are 60 cases (67%) followed by females 30 cases(33%). With male female ratio of 3:2.

Table 2:Age incidence of thrombocytopenia in present study

Age intervals	**Number of cases**	**Percentages**
6 months -10 years	3	3.33
11-20 years	33	36.7
21-30 years	15	16.7
31-40 years	13	14.4
41-50 years	12	13.3
51-60 years	6	6.7
61-70 years	4	4.4
>71 years	4	4.4
Total	90	100

The age of the study group ranged from 6 months to 80 years. Most of the patients in study are seen in age 11-20 years (36.7%) followed by 21-30 years (16.7%).

Table 3: Clinical manifestations of patients

Clinical signs	**Number of cases**	**Percentages**
Epistaxis	14	15.6
Rash	13	14.4
Purpura and petechiae	10	11
Bleeding gums	8	8.9
Melena	6	6.7
Hematemesis	4	4.4
Hematuria	2	2
Menorrhagia	1	1.1

Most of the patients in study presented with epistaxis (15.6%)followed by rash (14.4%).

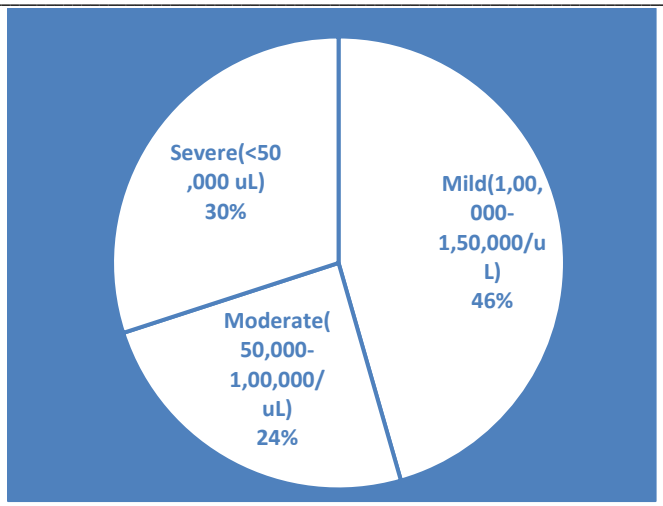

Fig 1: Severity of Thromobocytopenia

Most of the cases in study are of Mild (46%) forms followed by sever(30%).

Table 3: Diagnosis of conditions in thrombocytopenia

Condition	Number of cases	Percentages
Dengue fever	29	32
ITP	22	24.4
Chronic liver disease	16	17.8
Post medication	9	10
Gestational	7	7.8
Multiple myloma	4	4.4
Multiple myloma	2	2.2
Other hemotic disorders	1	1.1
Total	90	100

The most common cause for thrombocytopenia in this study was dengue infection seen in 29 cases(32%). ITP in 22 cases(24.4%) followed by chronic liver disease in 16 cases(17.8%), post-medication in 9 cases(10%), gestational in 7 cases(7.8%).

Discussion

In severe thrombocytopenia, life-threatening bleeding may occur, so detecting the cause of thrombocytopenia and its treatment may be lifesaving. To investigate the cause of thrombocytopenia, medical history, physical examination and basic laboratory tests should be the preliminary steps. In our study out of 90 patients 29(32%) patients were dengue positive and 61(68%) were dengue negative, with male female ratio of 3:2.Nicolas Senn et al[3]observed thrombocytopenia is often described with DF and is a typical feature of DHF[4,5].These findings contrast with recent work in Cuba highlighting the use of thrombocytopenia as a predictor of dengue.Sachdev et al[6] reported 1.76:1 and Ali jan et al[7] reported 1.9:1.Such wide variations could be due to socio cultural differences.Most of the patients in our study are seen in age 11-20 years (36.7%) followed by 21-30 years (16.7%).PuspaWardhani et al[8] study showedmajority of patients (68%) were children younger than 15 years old. This finding was also similar to dengue cases described earlier in Indonesia, i.e., Jayapura[9], Palembang[10], and Semarang[11], but different from what we reported previously in Sukabumi[12] and Makassar[13]in which most of the cases occurred in adolescent and adult patients. The fact that more children patients observed in Surabaya was not align with the tendency of dengue incidence shifting from young children to older age groups in Indonesia (16.7%). Most of the patients in study presented with epistaxis (15.6%)followed by rash (14.4%). Ali jan et al[6] had more ITP cases. In ITP,milder mucosal bleeds are more common. Again, petechiae and purpura are more likely to be missed in the Indian population because of the dark complexion in our children. John D Grainger, Joanne L Rees et al [14] study shown that, Bruising (87.4%) and petechiae (73.9%) were the most common bleeding manifestations. In thepresent study Mild (46%) forms followed by severe(30%) forms of thrombocytopenia are observed which is similar to study done by Rajib Paul et al [15] mild thrombocytopenia was most prevalent followed by severe and moderate. In the present study most common cause for thrombocytopenia was dengue infection seen in 29 cases(32%). ITP in 22 cases(24.4%) followed by chronic liver disease in 16 cases (17.8%), post-medication in 9 cases(10%), gestational in 7 cases (7.8%). In the Indian setting dengue is one of the commonest causes of transient thrombocytopenia.Though transient, it is often very severe. Which is similar to study done by commonest etiology for newly diagnosed thrombocytopenia among children in the present

study was Dengue(58.8%).Ali jan et al[6] reported ITP as the commonest diagnosis(32%).

Conclusion

The clinico-hematological and etiological study of patients with thrombocytopenia in revealed dengue is typical aetiology of thrombocytopenia in developing countries due to lower socioeconomic status. So Dengue and ITP can cause thrombocytopenia in our study which is Mild (46 percent) forms followed by severe(30 percent) forms of thrombocytopenia. The period of thrombocytopenia can prolong the severity of the underlying condition. In order to avoid risks such as bleeding, risk assessment needs to be performed for effective and timely management.So, in our research, the leading cause of thrombo-cytopenia is preventable and treatable. The frequency of thrombocytopenia would therefore be minimised by raising socioeconomic status and avoiding infection. The causes are very complex for thrombocytopenia. The creation of recommendations for the management of thrombocytopenia in all health care specialties would assist in its uniform treatment.

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