ORIGINAL RESEARCH

Study of Different Etiology and Clinical Presentations of Thrombocytopenia in A Tertiary Care Centre of Karnataka

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ABSTRACT

Introduction: A level below 150 x 10⁹/L of platelet in peripheral blood smear is labelled as thrombocytopenia.Any numerical deficiency or defect in platelet function may lead to bleeding. The accuracy of platelet counts is of particular clinical relevance when thrombocytopenic patients near the transfusion threshold. The study of automated platelet count and its relation to the various diseases aim in reduction of morbidity.The observation from this study highlights the importance of low platelet count and its association with various clinical conditions. This study also highlights that the platelet count has strong correlation with infectious diseases and other febrile conditions.Thrombocytopenia should also be confirmed by examination of the peripheral blood film as well. Automated counter save time and labour.

Material and Method: Cases who fulfill the inclusion criteria, blood samples were collected from them in EDTA vial were tested within five minutes after collection by using automated analyzers Beckman Coulterwhich is a type of aperture impedance counter. The platelet count including platelet volume and packed platelet count obtained from the Autoanalysers were analyzed and related to the patients clinical conditions.

Results:155 thrombocytopenic cases were studied in period of 2 years. Most of the cases complaints of febrile illness. Incidence was more in males. 37 Patients had platelet count less than 20000/mm³ but all are not associated with bleeding manifestations. Out of all cases of thrombocytopenia, Dengue predominated with 41 cases, although bleeding with count <20,000/mm³ or with severe thrombocytopenia appeared only is 50% of cases.

Conclusion: Thrombocytopenia is most commonly observed hematological disorder.Platelet counting by automated analyser can save time and provide more appropriate count. There is no strong correlation between platelet count and bleeding manifestation.Early detection of thrombocytopenia can reduce the morbidity .

Keywords:Thrombocytopenia,platelet count by autoanalyser ,bleeding manifestions

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INTRODUCTION

The normal platelet count at all ages is widely quoted as 150–400 x 10⁹/L of whole blood. A level below 150 x 10⁹/L i.e the lower limit of normal of peripheral blood platelet count is taken as deficiency and described as thrombocytopenia.[1] Platelet count should be accurate and precise enough to help in diagnosis and treatment of various pathological conditions.Standard count also help clinicians to take the decision of platelet transfusion in a thrombocytopenic patient.[2] Bleeding Time is more useful for disorders of platelet function. The former "gold standard" of manual or hand platelet counting has a long turnaround time and has questionable accuracy. Impedance principle was introduced as automated methods for platelet counting by Wallace Coulter. A number of factors interfere with automated platelet count despite technical advances in hematological analyzers.Counting by phase contrast microscopes,indepence analysis,optical light scatter /

fluorescence analysis,flow cytometric immune platelet counting are the four commonly used procedure to count the platelet.[4] Different etiology of thrombocytopenia includes impaired platelet production, platelet destruction or dilution and splenic sequestration and it is also found to be associated with various febrile illnesses.Though rare,severe bleeding is observed with count less than 10,000/μl. A natural complex and ingenious system which exists in humans to maintain blood in the vascular system free from clots and yet allow rapid formation of clots by platelets to prevent bleeding when a blood vessel is injured is called Haemostasis.[5] Severe thrombocytopenia needs urgent medical attention when platelet count of 10 x 10⁹/L and under such conditions the patient has bleeding manifestations.Now a days automated instrumentation has almost replaced the manual counting methods of platelets.Manual counting methods are unable to analyze the cell size thus discrimination of platelet and other similar sized particles.It is always needed to develop an optimized automated platelet counter to overcome the loopholes.[2] Although bone marrow examination may not throw much light , it is still recommended to exclude malignancy.[6] In this study,we correlated between platelet count done by automated instrument and clinical signs of bleeding in thrombocytopenia as early detection of thrombocytopenia. Though the electronic counters give the most reliable results,but it is always better to be cautious as sometimes errors in counting can arise because of clumping of platelets in the presence of EDTA anticoagulant and small extraneous particles mistaken for platelets.

MATERIALS AND METHODS

This prospective study was conducted between November 2011 and November 2013 in the department of clinical pathology laboratory of VydehiInstitute of Medical Sciences Bangalore,Karnataka,on all the morning blood samplesreceived in EDTA vial from patients who fulfill the criteria and gave the consent. Patients of all age group irrespective of age, sex who had one or more of the following criteria i.e febrile illness,fatigue,any bleeding manifestations, clinically suspected thrombocytopenia and platelet count less than 1,50,000/cu mm were included in this study.Patients who had history of medications(eg.Aspirin,NSAIDS) or any form of blood loss during operation or road traffic accident were excluded. All samples were tested within five minutes after collection by using automated analyzers Beckman Coulter that is a type of aperture impedance

counter(Beckman coulter, coulter Aᶜ T5diff AL analyzer).The platelet count obtained fromtheAutoanalysers along with platelet histogram and parameters like platelet volume and packed platelet count were analyzed in the background of patient's clinical conditions. Automated methods provide the bestmethod of counting large number of cells and in minimizing statistical errors. Autoanalysers are better than manual counting. The degree of reproducibility is very high, which is not seen with the manual counters.Automated instruments provide data with increased reliability, precision, accuracy and reproducibility and has less turn around time than other methods.Tests of hemostasis reveal changes attributable to thrombocytopenia such as increased bleeding time and deficient clot retraction. Prothrombin time, partial thromboplastintime and fibrinogen levels are normal in uncomplicated thrombocytopenia. Investigations were ordered depending on the history and clinical examination to look for a possible cause of thrombocytopenia. All patients especially those presenting with fever were investigated for malaria by doing QBC-MP (Antigen rapid test), Typhoid (Blood culture or Widal), Dengue fever (IgM anibodies against Dengue) and TB.Tests to look for disturbances in other coagulation parameters which may also contribute to bleeding were done like BT, CT and LFT (Liver Function Test).

STATISTICAL ANALYSIS

It was done by using Mean, Standard deviation and Percentage calculation. Only discriptive statistics was used.

RESULTS

According to Table 1, Total of 155 cases who met the inclusion criteria were studied in 2 years.The maximum number of cases were in the age group 21-30 years .The least number of cases were in the 71 years and above age group with 3 cases.Table 2 showed, there were 108 males and 47 females in ratio of 2.3:1. From Table 3, it was interoperated that 119 patients had fever out of 155 patients.Fever was dominant chief complaint.12 patients had thrombocytopenia with fatigue or tiredness. Different types of bleeding manifestations showed by the thrombocytopenic cases were tabulated in Table 4. Out of 155 cases 127 cases did not show any bleeding manifestations. Only 28 cases had bleeding signs.Gum bleeding was the most common manifestation. 7 cases presented with epistaxis.

ITP cases showing platelet count were significantly reduced in ITP i.e less than 20,000/cumm in all the 6 cases studied. The mean platelet count in Dengue fever (n=41) was, 53621.95/Ml (SD32618.23), Viralfever (n=30) was, 55656.67/Ml (SD32648.03), Malaria (n=28) was, 52296.43/Ml (SD34649.52), Anaemia (n=18) was, 41444/Ml (SD 25465.6), Liver disease (n=7) was, 60923.67/Ml (SD 30960.89), ITP (n = 6) was, 54583.3/Ml (SD 34659.6), Cardiac diseases (n =5) was, 95200/Ml (SD 18015.55), TB (n = 4) was, 46941.2/Ml (SD 32646.2), Neurological diseases (n =2) was, 114500/Ml (SD 21920.31), Anaemia (n =18) the mean platelet count was, 41444/Ml (SD 25465.6) which was the lowest in all categories.

DISCUSSION

In this study, 155 cases of thrombocytopenia with clinical manifestations were studied during the period of 2 years from November 2009 to November 2011 VIMS & RC. The observation from this study highlights the importance of low platelet count and its association with various diseases.

In our study total number of sample was 155, including 108 males and 47 females in the ratio of 2.3:1 (Table 2). The maximum cases were seen in the age group of 21-30 years.The least number of patients were in the 71 and above age group with only 3 patients.In this study we also observed male are predominant comprising 69.7% and predominant age group is 21-30 (Table1). Similar observation was noted by Lye D C et al, who showed commonly affected mean age group was 35 years.[7]

According to table 3 it is observed that 119 patients had fever out of 155 patients .Fever was dominant chief complaint. 12 patients had thrombocytopenia with fatigue or tiredness. Fever was the most common symptom found in adult patients who had thrombocytopenia for the first time and were admitted in the Hospital. In this study most common chief complaint was acute onset of fever which was noted in 76.8% of cases.Similar complaint was noted in >50% of patients with fever of acute in onset, high grade and continuous in a study done by Shigeki H. et al.[8]

Table 4 showed that among 155 cases in our study, 28 patients had bleeding signs.Gum bleeding was the most common manifestation and epistaxis was observed in 7 patients. Only 28(17.5%) cases of thrombocytopenia had bleeding manifestations out of 155 cases.Bleeding manifestations like gum bleeding (39.3%),epistaxis

Age in years	Number of patients (n =155)	%
1-10	11	7.1
11-20	19	12.3
21-30	39	25.2
31-40	27	17.4
41-50	23	14.8
51-60	19	12.3
61-70	14	9.0
71 & above	3	1.9
Total	155	100.0

Table-1: Age distribution of cases studied

Gender	Number of patients (n=155)	%
Male	108	69.7
Female	47	30.3
Total	155	100.0

Table-2: Gender distribution of cases studied

Sl. No	Chief complaints	Number of patients (n=155)	%
1	Fever	119	76.8%.
2	Fatigue	12	7.7%
3	Abdominal complaints	9	5.8%
4	Chest pain	7	4.5%
5	Menorrhagia	3	1.9%
6	Liver disorders	2	1.3%
7	Neurological symptoms	2	1.3%
8	Repeated fractures	1	0.7%

Table-3: Clinical features of the thrombocytopenic cases

Symptoms & signs	Number of patients (n=155)	%
Absent	127(82.5%)	
Present	28(17.5%)	100
1. Gum bleeding	11	39.3
2. Epistaxis	7	25.0
3. Petechiae	3	10.7
4. Purpura	3	10.7
5. Haematuria	2	7.1
6. Bleeding PV	1	3.6
7. Ecchymosis	1	3.6

Table-4: Different types of bleeding manifestations showed by the thrombocytopenic cases

(25%). Petechiae (10.7%), Purpura(10.7%), Hematuria (7.1%), Echymosis (3.6%) were observed in our study.Among 155 cases of thrombocytopenia 127 cases (82.5%)had no bleeding manifestation.In this study ,there is no strict correlation between thrombocytopenia and different types of bleeding manifestations. This is also proposed by Wintrobe[9] and De Gruchy's.[10] A study by P.S. Nair et alshowed thatbleeding manifestations was not observed in 58.7% cases among the thrombocytopenic cases studied.Same finding was also supported by Lohitashwa SB et al.

In our study, Dengue was observed as the leading cause of thrombocytopenia.30% of the Dengue cases had mild to moderate thrombocytopenia in the range of 50,000 –1, 00,000/mm^3 and severe thrombocytopenia below 20,000/mm^3 were noted in 24.32% cases.In present study 25% of cases had platelet counts below 150,000/mm^3 with febrile illness.

This was comparable with the study by Ampaiwan C and Kanchana T.[13] A similar study by Lye D C et al showed commonly affected mean age group was 35 years in Dengue fever with platelet range 50,000 – 80,000/mm^3.[7] According to our study patient population was affected mainly by diseases like malaria and dengue. Malaria and Dengue together constitutes 69 cases, forming 44.4% of the total number of cases.This can be compared to a similar study by Park et al.[14]

In this study 6(3.9%) cases were diagnosed to have ITP. All of them had severe thrombocytopenia, below 20,000/mm^3. According to Wintrobes, platelet counts in ITP can be very low.[9] In acute ITP it is usually < 20000/mm^3 and in chronic ITP 30000-80000/mm^3. Primary ITP commonly seen in younger age groups.

Among 155 cases in our study 4 cases were diagnosed to haveTuberculosis associated with thrombocytopenia which was mild to moderate (20000-100000/mm^3).Isolated thrombocytopenia is rare in pulmonary tuberculosis and its pathogenesis is immune mediated.Similar observation was noted by Ankur Kalra et al , a case report of 19 years old male affected by Tuberculosis whose platelet count was 29000/cumm.[15]

CONCLUSION

Majority of the Thrombocytopenic patients were diagnosed to have infectious etiology and presented with the complaint of fever. Thrombocytopenia is also greatly associated with leukaemia and ITP.Though in severe thrombocytopenia cases no mortality was noted in this study,but early investigation can reduce the morbidity to a great extent.

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