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A CLINICAL AND ETIOLOGICAL SPECTRUM OF THROMBOCYTOPENIA IN ADULT PATIENTS OF CHANDIGARH REGION

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ABSTRACT

Objectives: Thrombocytopenia is not a disease but is a diagnosis. The detailed knowledge must be acquired from patients who have thrombocytopenia for diagnostic purposes. The present study aimed to determine the prevalence and clinical presentation of thrombocytopenia in adult patients of Chandigarh region, to identify and categorize the etiological factors contributing to thrombocytopenia, and to assess the outcomes and prognosis of thrombocytopenia based on etiological factors. **Methods:** To solve the purpose, a total of 100 confirmed cases of thrombocytopenia (49 males and 51 females) aged 18-60 years were taken from SAI Diagnostics Laboratory, Chandigarh, India during the period of January to June, 2024. The subjects were further subdivided into two age groups, i.e. age group 18-30 years (n=50; 26 males and 24 females) and age group 31-60 years (n=50; 23 males and 27 females). Informed consent was also taken from all participants. Platelet count was estimated by standard method. Results: Both in age group 18-30 years and age group 31-60 years, no significant differences ($p>0.05$) were found in age and platelet count statistically between the male and female patients. However, statistically significant differences ($p<0.043$-0.001) were noted both in the age and platelet count between these two age groups. **Conclusion:** From the findings of the present study, it might be concluded that age group,i.e. 31-60 years was found as one of the major risk factors for thrombocytopenia.

KEYWORDS: Thrombocytopenia. Clinical and Etiological Spectrum. Chandigarh.

INTRODUCTION

Platelets are essentially fragments of the megakaryocyte cytoplasm. In day to day practice, the normal platelet count is 1.5 lac – 4.5 lac/cmm. Thrombocytopenia is not a disease but is a diagnosis that means a reduction in platelet count [Awasthi et al., 2019]. Three major pathophysiological mechanisms in thrombocytopenia are - decreased platelet production, increased platelet destruction or consumption, or increased splenic sequestration (capturing of circulating platelets in the spleen) [Poonam and Ranjan, 2015]. Recently fever with thrombocytopenia is a common clinical presentation in tertiary-care hospitals. Established infective causes such as dengue are well known for fever with thrombocytopenia [Simmons et al. 2012], Malaria is a common infection in most parts of India and is commonly associated with mild thrombocytopenia [George et al. 1998; Cines and Blanchette, 2002]. Severe thrombocytopenia is common in isolated falciparum and mixed falciparum/vivax malaria. Detailed examination and laboratory tests should be done, which are related to etiology [Schulman, 2005].

Thrombocytopenia, defined as a platelet count below 150,000/μL, is a prevalent hematological disorder with diverse etiologies and clinical manifestations. This condition can lead to significant morbidity and mortality due to its association with bleeding disorders and potential progression to severe diseases such as leukemia and aplastic anemia [Hoffman et al., 2013]. Thrombocytopenia can arise from a variety of causes, including decreased platelet production, increased platelet destruction, sequestration, and dilutional effects. Understanding the etiological factors and clinical spectrum of thrombocytopenia is crucial for appropriate management and treatment. [McCrae, 2017].

The clinical presentation of thrombocytopenia in adults can range from asymptomatic cases, detected incidentally during routine blood tests, to severe cases presenting with life- threatening hemorrhages. Common symptoms include petechiae, ecchymoses, epistaxis, and gingival bleeding. Severe thrombocytopenia may lead to gastrointestinal bleeding, hematuria, and intracranial hemorrhages, which require immediate medical intervention. [Afdhal and McHutchison, 2004].

The etiological factors of thrombocytopenia are broadly classified into three categories: decreased production, increased destruction, and sequestration. Decreased production -this can occur due to bone marrow suppression or failure, which may be caused by conditions such as leukemia, aplastic anemia, myelodysplastic syndromes, and exposure to chemotherapeutic agents and radiation. Nutritional deficiencies, particularly of vitamin B12 and folate, can also impair platelet production. Increased destruction- autoimmune disorders such as immune thrombocytopenic purpura (ITP) lead to increased destruction of platelets. Infections, particularly viral infections like dengue, HIV, and atitis C, can also cause increased platelet destruction. Drug-induced thrombocytopenia is another common cause, where medications like heparin, quinine, and antibiotics trigger an immune-mediated destruction of platelets. [Aster and Bougie, 2007]. Sequestration- splenomegaly, due to various underlying conditions like liver cirrhosis, can lead to an increased pooling of platelets in the spleen, resulting in a reduced number of circulating platelets. The present study aimed to determine the prevalence and clinical presentation of thrombocytopenia in adult patients of Chandigarh region, to identify and categorize the etiological factors contributing to thrombocytopenia, and to assess the outcomes and prognosis of thrombocytopenia based on etiological factors.

MATERIALS AND METHODS

Partipants

A total of 100 confirmed cases of thrombocytopenia (49 males and 51 females) aged 18-60 years were taken from SAI Diagnostics Laboratory, Chandigarh, India during the period of January to June, 2024. The subjects were further subdivided into two age groups, i.e. age group 18-30 years (n=50; 26 males and 24 females) and age group 31-60 years (n=50; 23 males and 27 females). Informed consent was also taken from all participants. The age of the patients were confirmed from the hospital records.

Methods

Tools used in the study

Several instruments and laboratory tests were used to ensure a comprehensive and accurate data collection process. These materials and methods used are elaborated below.

Blood collection tools such as vacutainer, cotton, sterilizing fluid, tourniquet, plain vials (red top), for collecting blood from the jaundice patients were used.

The tourniquet was used to create temporary pressure and an artificial occlusion in the blood flow, for easier and clear identification of the veins.

Sterilizing fluid was used to clean and sterilize the site of the vein selected for drawing blood, for the reason of decontaminating the skin of patients as many bacteria do colonize the skin.

Blood collection tubes containing additives for either allowing the clotting of blood that is clot activator or preventing the blood from clotting such as EDTA vials were used.

Procedure

The procedure for counting platelets using a Neubauer chamber involved the following steps:

1. Preparation the blood sample - 20 µL of blood was diluted with 1.8 mL of 1% ammonium oxalate. This would lyses red and white blood cells, but leave platelets intact.
2. Mounting of the chamber - The chamber was placed on a flat surface and pressed down on the cover glass. The cover glass was checked so that it was in the correct position by looking for Newton's rings on each side.
3. Fillinf of the chamber - The diluted blood was allowed to flow under the cover glass to fill both sides of the chamber.
4. Settlement of the platelets - The chamber was placed in a moist chamber and the platelets were allowed to settle for 20 minutes.
5. Counting of the platelets - Using a microscope, focus was on the first square to be counted and put the 40x objective in place. The platelets was counted in the large central square labeled as P.
6. Checking for clumps - If clumps were seen or unevenly distributed platelets, the sample was remixed, cleaned and refilled the chamber.

Statistical analysis

Data was analyzed using SPSS (Statistical Package for Social Science) version 20.0. Descriptive statistics including mean, standard deviation and independent t-test were used in the study. A 5% level of probability was used to indicate statistical significance.

RESULTS

Table 1 showed the distribution of platelet count in male and female patients with thrombocytopenia in age group 18-30 years. Male patients had the higher mean values in age (24.23 years) and platelet count 100.85 /µL than their female counterparts (23.25 years and 100.46 /µL respectively. However, no significant differences ($p>0.05$) were found in age and platelet count

statistically between the male and female patients with thrombocytopenia in age group 18-30 years.

The distribution of platelet count in male and female patients with thrombocytopenia in age group 31-60 years were shown in Table 2. Male patients had the higher mean values in age (41.87 years) than the female patients (41.30 years) and had lesser mean value in platelet count 85.96 /µL than the female patients (90/59 /µL). However, no significant differences (p>0.05) were found in age and platelets count statistically between the male and female patients with thrombocytopenia in age group 31-60 years.

Table 3 highlighted the Age group -wise distribution of platelets in patients with thrombocytopenia. Statistically significant differences (p<0.043-0.001) were noted in both the age and platelet count between these two age groups.

Table 1: Distribution of platelets in Male and Female patients with thrombocytopenia in age group 18-30 years.

Gender	Age (Years)		Platelets count ($X10^3$./µL)		t-value	p- value
	Mean	S,D.	Mean	S,D.		
Males (n=26)	24.23	3.95	100.85	31.65	0.874	0.387
Females (n=24)	23.25	3.98	100.46	29.88	0.045	0.965

Table 2: Distribution of platelets in Male and Female patients with thrombocytopenia in age group 31-60 years.

Gender	Age		Platelets count		t-value	p- value
	Mean	S,D.	Mean	S,D.		
Males (n=23)	41.87	8.72	85.96	26.85	0.249	0.805
Females (n=27)	41.30	7.58	90.59	26.85	0.555	0.590

Table 3: Age group -wise distribution of platelets in patients with thrombocytopenia.

Parameters	Age group 18-30 years		Age group 31-60 years		t-value	p- value
	Mean	S,D.	Mean	S,D.		
Age	23.76	3.96	41.56	8.05	14.037	<0.001
Platelets count	100.66	30.36	88.46	29.22	2.047	<0.043

DISCUSSION

Thrombocytopenia is the commonest platelet abnormality encountered in the clinical practice. In the present study of 100 cases with thrombocytopenia, the mean age was 23.76 years in the age group 18-30 years and 41.56 years in the age group 31-60 years, and we observed that 31-60 years were the most common age group. In contrast to our observations, Yasmeen Khatib et al.[2016], Shah et al.[2015] and Kakanale et al.[2020] reported 21-30 years to be the most common age group in their studies. Also authors like Kumar et al.[2019], Unnikrishanan et al.[2015] and Lye et al.[2010] reported 60 to 65 years as the most common age group in patients presenting with thrombocytopenia. This variation in age groups in different studies may be attributed to difference in the population studied, geographical and seasonal variations and also the etiological factors causing thrombocytopenia in their studies. This variation in age groups in different studies may be attributed to difference in the population studied, geographical and seasonal variations and also the etiological factors causing thrombocytopenia in their studies. Small sample size was the limitation of the study.

Declaration by authors

The authors hereby declared that it was their original peace of research and had not been sent to any other journal for publication.

Ethical approval

Approved.

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Conflict of interest

The authors declared no conflict of interest.

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