ORIGINAL RESEARCH PAPER

Paediatrics

STUDY OF THROMBOCYTOPENIA IN PAEDIATRIC PATIENTS

KEY WORDS:

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ABSTRACT

Introduction: Normal platelet count is 150-450 x 109 /L. Platelet count less than the 150 x 109 /L is called thrombocytopenia. **Materials And Methods:** A observational analytic retrospective study conducted over 2 year (from August 2016 to July2018). 100 cases were enrolled in the study after written informed consent for participation in study as well as usage of data for study purpose. **Observation And Conclusion:** Majority of patients had mild to moderate thrombocytopenia. Majority of patients had no Bleeding Manifestations - epistaxis, petechiae, ecchymosis were seen in patients with severe thrombocytopenia. Severe thrombocytopenia in patients of Viral illnesses showed a tendency for manifest bleed. Dengue illnesses, Malaria, Enteric fever and other illnesses had mild to moderate thrombocytopenia; severe thrombocytopenia was seen in patients of ITP and Snake bite. Thrombocytopenia was also observed in patients with nutritional deficiencies.

INTRODUCTION

Normal platelet count is 150-450 x 10^9 /L.[2,1] Thrombocytopenia is defined as a platelet count of less than 150 x 10^9 /L. It is clinically suspected when there is a history of easy bruising or bleeding in a child. It may also present as an incidental finding during routine evaluation or during investigations performed for other reasons thrombocytopenia. Laboratory evaluation is essential to reach the diagnosis. Management is decided by the severity of thrombocytopenia, associated risk factors and underlying illness.

Thorough history about the duration, severity and site of bleeds, associated systemic symptoms like fever, bone pains if any, previous history of transfusions, drug intake and family history are very vital to the etiological diagnosis. Clinical examination should focus on anthropometry, dysmorphic features and cutaneous markers which narrow down the etiology to bone marrow failure syndromes and findings such as lymphadenopathy and organomegaly points to an infiltrative disorder.

The peripheral blood smear must be carefully examined to estimate the platelet number, determine the platelet morphology, presence or absence of platelet clumping and also to assess if there are associated white and red blood cell abnormalities.[3]

CLASSIFICATION

Categorization based on mechanism of thrombocytopenia is most common:

1.Increased destruction of platelets
2.Decreased production of platelets
3.Sequestration and pooling of platelets

1.DESTRUCTIVETHROMBOCYTOPENIAS

A. Primary Platelet Consumption Syndromes

I. Nonimmunethrombocytopenias

a) Thrombocytopenia of infection
- Viral infection e.g.dengue[4,5,6]
- Protozoan e.g.malaria[4,5,7]
- Bacteremia or fungemia e.g. leptospirosis, scrubtyphus

b) Thrombotic microangiopathic disorders
- Hemolytic-uremicsyndrome
- Eclampsia, HELLPsyndrome
- Thrombotic thrombocytopenicpurpura
- Bone marrow transplantation-associated microangiopathy
- Drug-induced[2,8]

c) Platelets in contact with foreignmaterial[2,9]
d) Congenital heartdisease[10]
e) Drug-induced via direct platelet effects (ristocetin, protamine)[2]
f) Type 2BVWD or platelet-typeVWD[2]

ii.Immunethrombocytopenias[9]

a) Acute and chronic ITP
b) Drug-induced immune thrombocytopenia (including heparin- induced thrombocytopenia)
c) Autoimmune diseases with chronic ITP as amanifestation[2,12]
- Systemic lupus erythematosus
- Cyclic thrombocytopenia
- Evans syndrome
- Antiphospholipid antibodysyndrome
- Neoplasia-associated immune thrombocytopenia

d) Thrombocytopenia associated withHIV

e) Neonatal immunethrombocytopenia
- Autoimmune (e.g., maternal ITP)
- Alloimmune

f) Post transfusionpurpura
g) Allergy and anaphylaxis
h) Post transplant thrombocytopenia

B. Combined Platelet and Fibrinogen Consumption Syndromes
- Disseminated intravascular coagulation
- Kasabach-Merritt syndrome
- Virus-associated hemophagocytic syndrome

2. IMPAIRED PLATELET PRODUCTION

A. Hereditary disorders
- Wiskott-Aldrich syndrome
- Thrombocytopenia with absent radii syndrome(TAR)
- Congenital amegakaryocytic thrombocytopenia(CAMT)
- Giant plateletdisorders
- Bernard-Souliersyndrome

- Mutations of the nonmuscle myosin heavy chain gene(MYH9)[2,9]

B. Acquired disorders

a) Nutritional deficiency states (iron, folate, vitamin B12,anorexia nervosa)
b) Bone marrow failure orinfiltration[12,14]
c) Myelodysplastic syndrome
d) Osteopetrosis
e) Drug- or radiation-induced thrombocytopenia

3. SEQUESTRATION[2,13]

- Hypersplenism
- Hypothermia
- Burns

4. SPURIOUS (PSEUDO) THROMBOCYTOPENIA[10,16]

5. CLINICAL MANIFESTATIONS:

Thrombocytopenia may be asymptomatic or symptomatic. Symptomatic patients generally present with mucosal and/or cutaneous bleeding.

1. **Mucosal Bleeding:**

Usually manifested as epistaxis, gingival bleeding, and bullous hemorrhage, which appears on the buccal mucosa.

In postpuberal females, thrombocytopenia may present as menorrhagia (menstrual flow that does not taper after more than three days) and metrorrhagia (uterine bleeding between periods).

2. **Cutaneous Bleeding:**

Cutaneous bleeding is usually manifested as petechiae or superficial ecchymoses. Patients with thrombocytopenia also may have persistent, profuse bleeding from superficial cuts.

3. **Central Nervoussystem:**

Although rare, most common cause of death.

MATERIALS AND METHODOLOGY

- Type of study - Observational Analytical Retrospective study
- Study period - 2 yrs (from August 2016 to July2018)
- Written, informed consent was taken from the parents/relatives for utilizing the data for research purpose.

- **Inclusion Criteria-**

Pediatric patients (6 months to 12 years) admitted in pediatric ward with documented thrombocytopenia (platelet count < 1.5 lac / cubic mm) on admission or at any point of time during hospitalisation.

100 randomly selected cases were enrolled.

- **Exclusion Criteria-**

Those patients with suspected malignancy or marrow infiltration were transferred to higher centre and hence not included in study.

- Data was collected from case report files and proforma were filled
- Data was analyzed using standard definitions and guidelines.
  Grades of Thrombocytopenia
  Mild – platelet count 100,000/μL to<150,000/μL
  Moderate – platelet count 50,000/μL to<100,000/μL
  Severe – platelet count<50,000/μL
- Data was analysed and conclusions were derived

RESULT AND DISCUSSION

Out of 100 cases studied, 8 (8%) were between 6 months to <1 year age, 35 (35%) were 1 year to <5 years age and 57 (57%) were 5 years to 12 years age.

Age	Number	Percentage
6 months to <1 year	8	8%
1 year to <5 years	35	35%
5 years to 12 years	57	57%
Total	100	100%

Out of 100 patients studied, 49 (49%) were males and 51 (51%) were females. Male:Female ratio was 0.96, which is not statistically significant. No gender discrimination is seen in the study.

Gender	Number	Percentage
Male	49	49%
Female	51	51%
Total	100	100%

Out of 100 patients, 39 (39%) patients had mild thrombocytopenia, 26 (26%) patients moderate thrombocytopenia, and 35 (35%) had severe thrombocytopenia.

Thrombocytopenia	Number of patients	Percentage
Mild thrombocytopenia	39	39%
Moderate thrombocytopenia	26	26%
Severe thrombocytopenia	35	35%
Total	100	100%

Out of 100, 44 (44%) patients had Dengue illnesses, followed by Malaria – 16 (16%) and other Viral Illnesses – 16 (16%), Enteric Fever – 7 (7%), Infective Hepatitis – 5 (5%), Severe Acute Malnutrition – 4 (4%), Pneumonia – 2 (2%), Immune Thrombocytopenic Purpura – 1 (1%), Infantile Tremor Syndrome – 1 (1%), Snake bite – 1 (1%) and other causes including TBME, Organic acidemia and Simple Febrile Seizures in 3 patients (3%).

Diagnosis	6 months to <1 year	1 year to <5 years	5 years to 12 years	Number of patients
Dengue illnesses	6	15	23	44
Malaria	0	4	12	16
Other Viral illness	0	6	10	16
Enteric fever	0	2	5	7
Infective Hepatitis	0	2	3	5
Pneumonia	0	1	1	2
SAM	0	4	0	4
ITP	0	0	1	1
Infantile tremor syndrome	0	1	0	1
Snake bite	0	0	1	1
TBME	1	0	0	1
Organic academia	1	0	0	1
Simple febrile seizure	0	0	1	1
Total	8	35	57	100

7 (7%) patients showed bleeding manifestations, of which 3 (3%) had Epistaxis, 2 (2%) had Petechiae, 1 (1%) had Ecchymosis and 1 (1%) had malena. Other 93 (93%) patients with thrombocytopenia did not show any bleeding manifestations.

Occurrence of bleeding manifestations	Number of patients	Percentage
Asymptomatic	93	93%
Epistaxis	3	3%
Petechiae	2	2%
Ecchymosis	1	1%
Malena	1	1%
Intra-cranial bleed	0	0%

Out of 35 patients with severe thrombocytopenia, bleeding

manifestations were observed in 6 patients, and of 26 patients with moderate thrombocytopenia, 1 showed bleeding manifestations. None of the patients with mild thrombocytopenia showed bleeding manifestations.

Thrombocytopenia	Total patients	Bleeding manifestations
Mild	39	0
Moderate	26	1
Severe	35	6
Total	100	7

Out of 7 patients with bleeding manifestations, 3 had Dengue illnesses, 3 had Malaria and 1 had ITP.

Disease and bleeding manifestations

Disease	Number of patients
Dengue illnesses	3
Viral illnesses	3
ITP	1
Total	7

CONCLUSION

In the present study,

- Majority of patients had mild to moderate thrombocytopenia.
- The illnesses observed were
- Dengue illnesses, Malaria, Viral illnesses, Enteric fever, Infective Hepatitis, Nutritional deficiencies.
- Majority of patients had no Bleeding Manifestations - epistaxis, petechiae, ecchymosis were seen in patients with severe thrombocytopenia. Severe thrombocytopenia in patients of Viral illnesses showed a tendency for manifest bleed. The frequency of severe thrombocytopenia observed in Malaria was high, but manifest bleed was not seen.
- Dengue illnesses, Malaria, Enteric fever and other illnesses had mild to moderate thrombocytopenia; severe thrombocytopenia was seen in patients of ITP and Snake bite. Thrombocytopenia was also observed in patients with nutritional deficiencies (Serum B12 and SAM).
- Though patients with Dengue illnesses and Malaria showed mean platelet count in range of mild to moderate thrombocytopenia, significant number of patients with Malaria had severe thrombocytopenia as compared to Dengue illnesses.
- All patients were managed according to underlying illnesses. Out of 100 patients with thrombocytopenia, 35 had severe thrombocytopenia, of which only 3 patients with Dengue illnesses and other Viral illnesses required Platelet transfusion.

Authors Contribution :

All authors have provided constructive input in drafting the article. They assure that this article is original and has not been published elsewhere.

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