

## A study of clinicopathological correlation of thrombocytopenia in neonates, infants and children in a tertiary care teaching hospital, ahmedabad

Patel D.D.<sup>1</sup> Kokani M.J.<sup>2</sup> Patel A.D.<sup>3</sup>

<sup>1</sup>Dr. Devang D Patel, Tutor Vedanta Institute of Medical Science, Dahanu, <sup>2</sup>Dr. Mayur J. Kokani, Associate Professor NAMO Medical Education and Research Institute, Silvassa, <sup>3</sup>Dr Ankita D. Patel, BDS

**\*Corresponding Author:**

**Dr. Mayur Kokani**

Associate Professor NAMO Medical Education and Research Institute, Silvassa

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

### ABSTRACT

**Introduction:** Thrombocytopenia is a commonly encountered condition with varying aetiologies ranging from infective to chronic conditions and malignancies. Knowledge of causes and pattern of disease is helpful in management of cases. **Aims & objectives:** The present study was conducted to assess the causes, clinical profile and findings of laboratory investigations of patients suffering from thrombocytopenia. Thus helping in further evaluation and management. **Material & Methods:** The present observational hospital based study was conducted in the department of Pathology at V. S. general hospital, Smt.NHL municipal medical college, Ahmedabad over a period of one year from may 2017 till may 2018 of 150 cases of patients up to 12 years of age suffering from thrombocytopenia. Detailed clinical history, physical examination and reports of laboratory investigations were noted. **Results:** Total 55.3% male and 44.7% female pediatric patients had thrombocytopenia. Thrombocytopenia was mild (1,00,000-1,50,000) in 30.6% patients, moderate (50,000-1,00,000) in 32.7% and severe (<50,000) in 36.7%. In cases of neonates, septicemia (70%) was the most common cause of thrombocytopenia. In cases of Infants, malaria (12%) was the commonest cause of thrombocytopenia followed by dengue fever (10%), pneumonia (8%), sepsis (8%), megaloblastic anemia (6%), hepatitis (6%) were observed. In cases of children malaria (32%) was the commonest cause of thrombocytopenia followed by dengue fever (12%), idiopathic thrombocytopenic purpura (8%), enteric fever (8%), megaloblastic anemia (8%) were found. A total of 74 cases (49.4%) showed bleeding tendency. Most common site observed for bleeding was skin and mucous membrane where bleeding manifested in the form of petechiae, purpura and ecchymosis (15.3%). Gum bleeding was seen in 16 cases (10.7%), epistaxis in 11 (7.3%), hematemesis in 9 (6%), hematuria in 6 (4%) and vaginal bleeding in 4 cases (2.7%). Associations with anemia were observed in 64.6% cases whereas 12% and 26.7% cases were associated with leucopenia and leukocytosis respectively. Isolated thrombocytopenia was observed in 12.7% cases. In present study total 14 cases (9.33%) showed pancytopenia. Out of that 4 (28.6%) cases due to megaloblastic anemia were observed. **Conclusion:** Infections like malaria, dengue and septicemia were the common causes of thrombocytopenia along with megaloblastic anaemia. Whenever thrombocytopenia is detected further investigations can help us in reaching a correct diagnosis in the majority of the cases so that appropriate treatment can be given. Knowledge of causes and pattern of disease is helpful in management of cases.

**Keywords:** Observational Study, Platelet Count, Thrombocytopenia

### INTRODUCTION

Platelets (Thrombocytes) are non-nucleated cellular fragments derived from cytoplasmic fragmentation of bone marrow cells called megakaryocytes. As the megakaryocytes mature, the cytoplasm fragments and large numbers of platelets are released into the circulation. Each megakaryocyte produces 1000 to 5000 platelets, leaving behind a "bare" nucleus which is removed by macrophage. They measure 2 to 3  $\mu$ m in diameter. Once released, the life span of platelets is about 7 to 10 days, after which they are removed from the circulation by cells of the monocyte-macrophage system.<sup>1</sup>

Normal platelet count ranges from 150,000-450,000 per  $\mu$ L with mean values of 2,66,000 and 2,37,000 per  $\mu$ L in females and males, respectively. About 70 % cells circulate in the blood while 30 % of them remain arrested by the spleen. Its life span ranges from 7-10 days after which these are degraded in the liver or spleen.<sup>2</sup>

Decrease in platelet count is termed as thrombocytopenia. Based on severity of decrease, it is subdivided into three groups. Platelet count between 100,000 to 150,000 per  $\mu$ L is classified as mild thrombocytopenia, platelet count between 50,000 to 99,999 per  $\mu$ L as moderate thrombocytopenia and <50,000 per  $\mu$ L as severe thrombocytopenia.<sup>3</sup>

Severe thrombocytopenia has increased risk of bleeding problems. Decrease in platelet count leads to delayed clot formation and prolongation of bleeding time. It can manifest as bleeding in skin and mucous membranes in the form of petechiae, ecchymosis and purpura, epistaxis, gum bleeding, menorrhagia etc.<sup>4</sup>

Decrease in platelet count may be caused by decreased production, increased breakdown or trapping of platelets in the spleen. Decreased production of platelets may be due to selective or generalized bone marrow suppression. Viral infections like dengue, malignancies like lymphoma, nutritional deficiency of Vit. B<sub>12</sub> and folic acid or cytotoxic drugs and toxic chemicals. Increased breakdown is seen in immunological conditions like idiopathic thrombocytopenic purpura, haemolytic uremic syndrome and thrombocytopenia of pregnancy. Increased trapping of platelets in spleen is seen in conditions associated with splenomegaly. Notable conditions are bacterial or parasitic

infections, certain malignancies, liver diseases and toxins like vinyl chloride.<sup>5</sup>

Thrombocytopenia should be suspected when a child presents with a history of easy bruising or bleeding, particularly mucosal or cutaneous bleeding. However, the most common often presentation of a patient who has isolated thrombocytopenia is the unexpected discovery of a low platelet count when a complete blood count (CBC) is obtained for unrelated reasons.

The symptomatology may vary greatly and the underlying cause may be either inconsequential or life threatening. Aetiology of thrombocytopenia varies from place to place and is dependent upon the locally prevalent infections and environmental exposures. In a tropical country like India, infectious causes predominate and are usually associated with fever and also sepsis, autoimmunity, genetic causes, nutritional deficiency, DIC, malignancy etc. are among the leading cause of thrombocytopenia. Pseudothrombocytopenia should always be ruled out first by peripheral smear examination. The presence of thrombocytopenia in a hemogram should alert the physician to identify the underlying etiology for the prompt management of the patient.<sup>6</sup>

Yasmeen Khatib *et al* reported that malaria (29.67%) was the most common cause followed by megaloblastic anaemia (15.67%), septicemia (12.67%), dengue (10%), liver disorders (7.33%), leptospirosis (6.67%), HIV infection (3.33%), idiopathic thrombocytopenic purpura (ITP) (3.33%), leukemia (1.67%) and tuberculosis (1.67%) and miscellaneous causes of thrombocytopenia were found in 9% cases.<sup>13</sup> A study done by Amarpreet kaur *et al* at PICU reported that sepsis (25.84%) was the most common diagnosis of thrombocytopenia followed by pneumonia (19.40%), meningitis (13.48%), malaria (5.48%), enteric fever (7.86%), congenital heart disease (5.62%), viral fever (4.49%), tubercular meningitis (3.37%), burns (3.37%), brain hemorrhage (2.25%), hepatic abscess (1.12%), and other causes.<sup>12</sup>

Early recognition of degree of thrombocytopenia and its aetiology is helpful in treating the condition in initial stages and preventing the development of complications. More severe and life-threatening

bleeding like intracranial haemorrhage can thus be avoided.<sup>9</sup>

Management of thrombocytopenia should be guided by an understanding of its cause and clinical course. The principal management goal in all patients who have thrombocytopenia is to maintain a safe platelet count to prevent significant bleeding. What constitutes a safe platelet count in a specific patient varies, depending on the cause of the thrombocytopenia and consideration of all other aspects of hemostasis, as well as the patient's expected level of activity.<sup>1</sup>

Few studies have been conducted regarding causation of thrombocytopenia in this area. Hence, the present study was conducted to explore the common causes of thrombocytopenia in this area.

### Aims & objectives

The present study was conducted to find out the most common causes of thrombocytopenia in neonates, infants and children. It also aimed to correlate the clinical features and laboratory finding to come to conclusion of thrombocytopenia and thus helping in further evaluation and management. It also helped to list the features of the complete blood count and peripheral blood smear that suggest a serious disorder associated with thrombocytopenia.

### Material and Methods

**Study setting:** The prospective observational study was undertaken in the department of Pathology at V. S. general hospital, Smt.NHL municipal medical college, Ahmedabad for a period of one year from may 2017 till may 2018. Total 150 cases of pediatric patients up to 12 years of age were divided into three groups (50 cases of neonates (28 days), 50 cases of infants (1 year), 50 cases of children (12 years old) with platelet count  $<1,50,000/\mu\text{l}$  presenting with true thrombocytopenia (confirmed by peripheral blood smear examination) was included in present stud. A routine CBC and platelet count were done by automated analyser (Siemens Advia 2120i) and peripheral blood films were prepared and stained by Field's stain.

**Study subjects:** paediatric patients up to 12 years of age admitted in the hospital and in who had a platelet count of  $<1.5$  lakh/microliter were included in the study

**Sample size:** 150 cases

**Sample division:** (50 cases of neonates, 50 cases of infants, 50 cases of children)

**Study design:** Observational study

**Sample design:** Purposive sampling

**Study duration:** The present study was conducted from may 2017 to may 2018 (one year)

**Inclusion criteria:**

Neonates, Infants and Children ( $<12$  Years)

Platelet count  $<1,50,000/\mu\text{l}$

**Exclusion criteria**

Platelet count  $>1,50,000/\mu\text{l}$

Age more than 12 years

Congenital malformations.

Medical illness in mother

Maternal medications like aspirin, warfarin etc.

**Data collection procedure:** Medical Superintendent of the hospital was informed about the purpose and importance of this study and permission was obtained. The patients were selected on the basis of haematological findings from the department of Pathology.

The data for this study was collected by consent taken from patients and evaluation which was done by detailed history taking, clinical examination and relevant investigations using a pro forma specially designed for this study. They were followed from admission till recovery, discharge or death whichever is earlier

Routine investigations like complete blood count, examination of blood smear, liver function test and renal function test were done for all cases. Laboratory tests for malaria (PS examination), dengue (NS1 antigen), leptospirosis (leptocheck, dridot antibody), HIV and HbSag (ELISA test) and liver function tests were done in all cases. Some hematological tests like bleeding time, clotting time, prothrombin time, activated prothrombin time, D-dimer and bone marrow examination, chest X ray, ultra sound, lymph node biopsy and other specific investigations were done in selected cases depending on the requirement of the individual case.

**Data analysis:** Data entry was done in Microsoft Excel 2010 and data analysis was done using Statistical Package for Social Sciences (SPSS) v 16.0. Quantitative data was expressed in terms of frequency and percentage.

**Ethical consideration & permission:** Permission was obtained from Institutional Ethics Committee for the study. All the study subjects were informed about the study and consent was taken from them. Those who did not give consent were not included. Confidentiality of records was maintained and data was saved safely.

## Observation and Results

A total of 150 patients (50 cases of neonates, 50 cases of infants, 50 cases of children) were included in the present study. The clinical profile of thrombocytopenia in neonates, infants and children and its correlation with different related diseases were analysed. Patients were evaluated with history and all basic investigations with necessary specific investigation for evaluating thrombocytopenia were done.

Age and Sex distribution of study subjects as represented in Table-1. It is seen that 55.3% of them were males while females constituted another 44.7%.

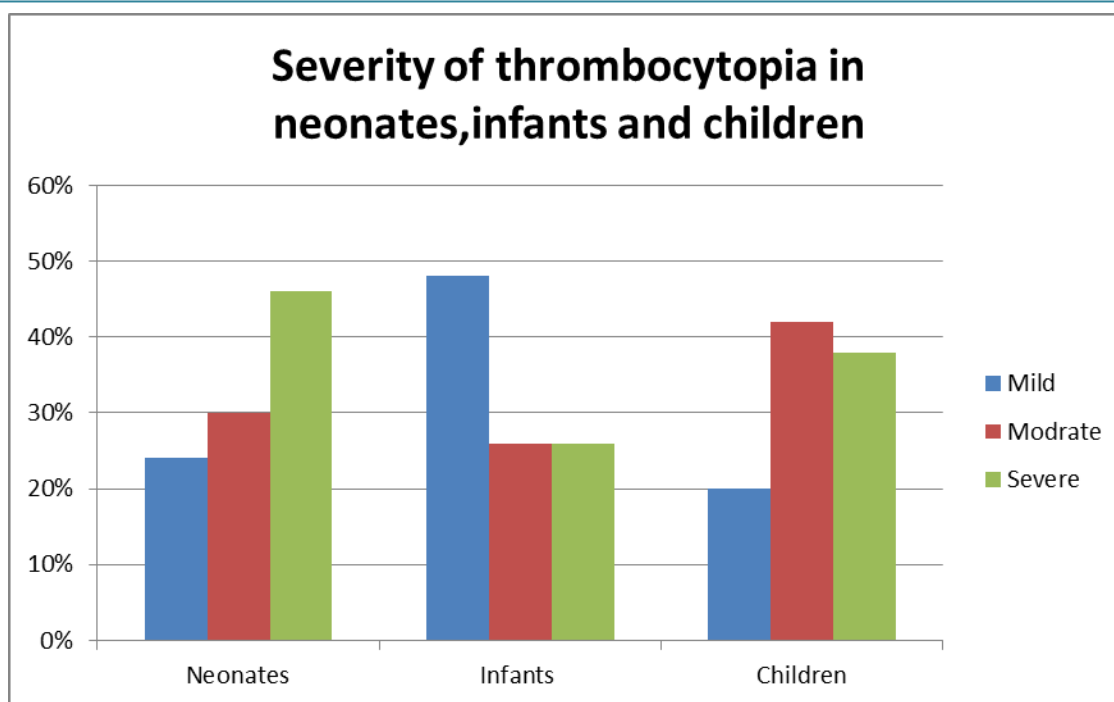
**Table 1: Gender wise distribution of thrombocytopenia**

Category	Male	Female	Frequency
Neonates	21(42%)	29(58%)	50
Infants	32(64%)	18(36%)	50
Children	30(60%)	20(40%)	50
<b>Total</b>	<b>83(55.3%)</b>	<b>67(44.7%)</b>	<b>150</b>

Table-2 signified the severity of thrombocytopenia. It was mild (1,00,000-1,50,000  $\mu$ l) in 30.6% patients, moderate (50,000-1,00,000  $\mu$ l) in 32.7% and severe (<50,000  $\mu$ l) in 36.7%.

**Table 2: Distribution of thrombocytopenia according to severity**

Category	1,50000-1,00000/ $\mu$ l (Mild)	1,00000-50,000/ $\mu$ l (Moderate)	<50,000/ $\mu$ l (Severe)	Frequency (n=150)
Neonates	12(24%)	15(30%)	23(46%)	50
Infants	24(48%)	13(26%)	13(26%)	50
Children	10(20%)	21(42%)	19(38%)	50
<b>Total</b>	<b>46(30.6%)</b>	<b>49(32.7%)</b>	<b>55(36.7%)</b>	<b>150</b>



[Figure-1 represented the finding of severity of thrombocytopenia in neonates, infants and children ]

**Table 3: Aetiology of thrombocytopenia**

Table-3(i) highlighted the aetiology of thrombocytopenia in cases of neonates, septicemia (70%) was the most common cause of thrombocytopenia followed by pneumonia (14%), Necrotising enterocolitis (4%), cyanotic heart disease (4%), intracranial hemorrhage (4%) and Neonatal alloimmune thrombocytopenia (4%) were observed.

**(i) In neonates (Total no. of cases: 50)**

Final diagnosis	Frequency(n=50)	Percentage(%)
Septicemia	35	70.00
Pneumonia	7	14.00
NEC	2	4.00
Cyanotic heart disease	2	4.00
ICH	2	4.00
NAIT	2	4.00
<b>Total</b>	<b>50</b>	<b>100</b>

Table-3(ii) highlighted the aetiology of thrombocytopenia in cases of infants, malaria (12%) was the commonest cause of thrombocytopenia followed by dengue fever (10%), pneumonia (8%), sepsis (8%), megaloblastic anemia (6%), hepatitis (6%), burns (4%), tubercular meningitis (4%), DIC (4%), enteric fever (4%), chickengunya (4%), acute leukemia (4%), necrotizing enterocolitis (4%), bacterial meningitis (2%), Diabetic ketoacidosis (2%), brain haemorrhage (2%), hepatic abscess (2%), viral meningitis (2%), aplastic anemia (2%) and others were observed.

**(ii) In infants (Total no. of cases: 50)**

Final diagnosis	Frequency(n=50)	Percentage (%)
Malaria	6	12.00
Dengue fever	5	10.00
Septicemia	4	8.00
Pneumonia	4	8.00
Megaloblastic anemia	3	6.00
Hepatitis	3	6.00
Congenital heart disease	2	4.00
Burns	2	4.00
Tubercular meningitis	2	4.00
Chickengunya	2	4.00
Bacterial meningitis	2	4.00
Enteric fever	2	4.00
DIC	2	4.00
Brain hemorrhage	2	4.00
ALL	2	4.00
NEC	2	4.00
Viral meningitis	1	2.00
Hepatic abscess	1	2.00
Aplastic anemia	1	2.00
ITS	1	2.00
DKA	1	2.00
<b>Total</b>	<b>50</b>	<b>100</b>

Table-3(iii) highlighted the aetiology of thrombocytopenia in cases of children malaria(32%) was the commonest cause of thrombocytopenia followed by dengue fever(12%), Idiopathic Thrombocytopenic Purpura(8%), enteric fever(8%), megaloblastic anemia(8%), chickengunya(4%), pneumonia(4%), Disseminated Intravascular Coagulation(4%), Acute leukemia(4%), aplastic anemia(4%), hepatitis(4%), bacterial meningitis(2%), tubercular meningitis(2%), brain hemorrhage (2%)and burns(2%) were observed.

**(iii) In children (Total no of cases:50)**

Final diagnosis	Frequency(n=50)	Percentage (%)
Malaria	16	32.00
Dengue fever	6	12.00
Megaloblastic anemia	4	8.00



ITP	4	8.00
Enteric fever	4	8.00
DIC	2	4.00
Chickengunya	2	4.00
Pneumonia	2	4.00
Aplastic anemia	2	4.00
ALL	2	4.00
Hepatitis	2	4.00
Brain hemorrhage	1	2.00
Tubercular meningitis	1	2.00
Burns	1	2.00
Bacterial meningitis	1	2.00
<b>Total</b>	<b>50</b>	<b>100</b>

Table-4 represented the haemorrhagic manifestations in these cases. A total of 74 cases (49.4%) showed bleeding tendency. Most common site for bleeding was skin and mucous membrane where bleeding manifested in the form of petechiae, purpura and ecchymosis (15.3%). Gum bleeding was seen in 16 cases (10.7%), epistaxis in eleven (7.3%), hematemesis in 9 (6%), hematuria in 6 (4%) and vaginal bleeding in four cases (2.7%) and. Bleeding manifestations were not seen in 50.7% cases.

**Table-4: Haemorrhagic manifestations.**

Bleeding site	Frequency(n=150)	Percentage (%)
Skin and mucous membrane	23	15.3
Gum	16	10.7
Epitaxis	11	7.3
Hematemesis	9	6.0
Hematuria	6	4.0
Per vagina	4	2.7
Others	3	2.0
Multiple sites	2	1.3
No manifestations of bleeding	76	50.7
<b>Total</b>	<b>150</b>	<b>100</b>

Table-5 signified the findings of peripheral smear examination. Anaemia was present in 64.6% cases, leucopenia in 12.0% and leucocytosis in 26.6%. Isolated thrombocytopenia was seen in 12.6% cases.

**Table 5: Correlation between thrombocytopenia and other cytopenias (all 150 cases)**

Associated cytopenias	Neonates (out of 50 cases)	Infants (out of 50 cases)	Children (out of 50 cases)	Frequency (n=150)
Anemia	15(30.0%)	42(84.0%)	40(80.0%)	97(64.6%)
Leucopenia	4(8.0%)	5(10.0%)	9(18.0%)	18(12.0%)
Leukocytosis	16(32.0%)	15(30.0%)	9(18.0%)	40(26.6%)
Isolated	5(10.0%)	10(20.0%)	4(8.0%)	19(12.6%)

Table-6 signified association between pancytopenia and clinical diagnosis. In present study total 14(9.33%) cases showed pancytopenia. Out of that 4(28.6%) cases due to megaloblastic anemia, 2(14.3%) cases due to aplastic anemia and 2(14.3%) cases due to DIC and others were observed.

**Table 6: association between pancytopenia and clinical diagnosis**

Category	No of patients	Diagnosis
Neonates	1	Pneumonia
Infants	1	Megaloblastic anemia
	1	Viral hepatitis
	1	DIC
	1	Aplastic anemia
Children	3	Megaloblastic anemia
	2	Aplastic anemia
	1	P.falciparum
	1	DIC
	1	Typhoid fever
	1	Dengue fever

## Discussion

The present observational study included 150 patients suffering from thrombocytopenia. Sema Yilmaz et al showed that 57.1% of thrombocytopenia was associated with the male gender whereas 42.9% were females with male to female ratio 1.31<sup>10</sup>. In study of Anubha Sharma et al 53.5% of males developed thrombocytopenia compared to 62.5% of female<sup>11</sup>. A study done by Amarpreet kaur et al at tertiary care teaching hospital showed 61.09% males and 38.91% females had thrombocytopenia<sup>12</sup>. In present study 21(42%) male and (29)58% female neonates,

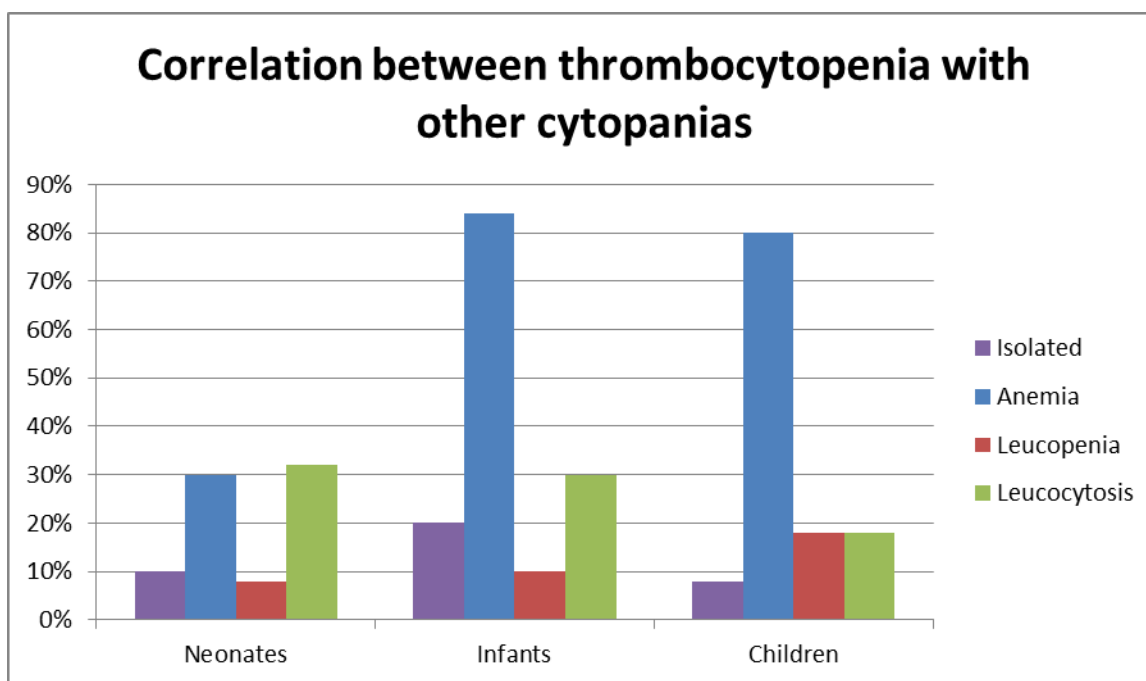
32(64%) male and 18(36%) female infants whereas 30 (60%) male and 20 (40%) female children showed thrombocytopenia. Total 83 (55.3%) male and 67 (44.7%) females showed thrombocytopenia. Male: female ratio of 1.3:1 was observed.

Amarpreet kaur et al reported that mild thrombocytopenia was present in 24.7%, moderate in 27.91% and severe in 48.31%<sup>12</sup>. In study of Anubha sharma et al mild thrombocytopenia (100,000-150,000 per cu mm) was observed in 16.4% neonates, moderate thrombocytopenia (50,000-100,000 per cu mm) in 36.4% and severe



thrombocytopenia (<50,000 per cu mm) in 47.5%.<sup>11</sup> Vimal et al reported that majority of the patients (54.2%) presented with a platelet count between 50,000-1,00,000 and 25.8% presented with a platelet count between 1,00,000 to 1,50,000.<sup>14</sup> In present study 46(30.6%) pediatric patients had mild

thrombocytopenia whereas 49(32.7%) moderate and 55 (36.7%) had severe thrombocytopenia were observed. Out of that 23 (46%) neonates, 13(26%) infants and 19(38%) children showed severe thrombocytopenia.



[Figure-2 represented correlation between thrombocytopenia with other cytopanias]

A study done by Amarpreet kaur et al at PICU reported that sepsis (25.84%) was the most common diagnosis of thrombocytopenia followed by pneumonia(19.40%), meningitis(13.48%), malaria(5.48%), enteric fever(7.86%), congenital heart disease (5.62%), viral fever(4.49%) tubercular meningitis(3.37%), , burns (3.37%), brain hemorrhage(2.25%), hepatic abscess(1.12%), and other causes.<sup>12</sup> These findings were supportive to our observation. In cases of neonates, septicemia (70%) was the most common cause of thrombocytopenia followed by pneumonia (14%), necrotizing enterocolitis (4%), cyanotic heart disease(4%), intracranial hemorrhage(4%) and neonatal alloimmune thrombocytopenia(4%) were observed in present study. In cases of Infants, malaria(12%) was the commonest cause of thrombocytopenia followed by dengue fever(10%), pneumonia(8%), sepsis(8%), megaloblastia anemia(6%), hepatitis(6%), burns(4%), tubercular meningitis(4%), DIC(4%), enteric

fever(4%), chickengunya(4%), acute leukemia(4%), necrotizing enterocolitis(4%), bacterial meningitis(2%), diabetic ketoacidosis(2%), brain haemorrhage(2%), hepatic abscess(2%), viral meningitis(2%), aplastic anemia(2%) and others were observed in present study.

.Yasmeen Khatib et al reported that the most common cause observed was malaria (29.67%) followed by megaloblastic anaemia (15.67%), septicemia(12.67%), dengue (10%), liver disorders (7.33%), leptospirosis(6.67%), HIV infection(3.33%), idiopathic thrombocytopenic purpura (ITP)(3.33%), leukemia(1.67%) and tuberculosis(1.67%) and miscellaneous causes of thrombocytopenia were found in 9% cases.<sup>13</sup> The etiological diagnosis of patients in South India was reported by Vimal et al as dengue (21.67%), malaria (6.7%), enteric fever (5.9%), septicemia (5%), chronic liver disease (16.7%), chronic kidney disease (3.4%), diabetes (7.7%), malignancy (1.67%),

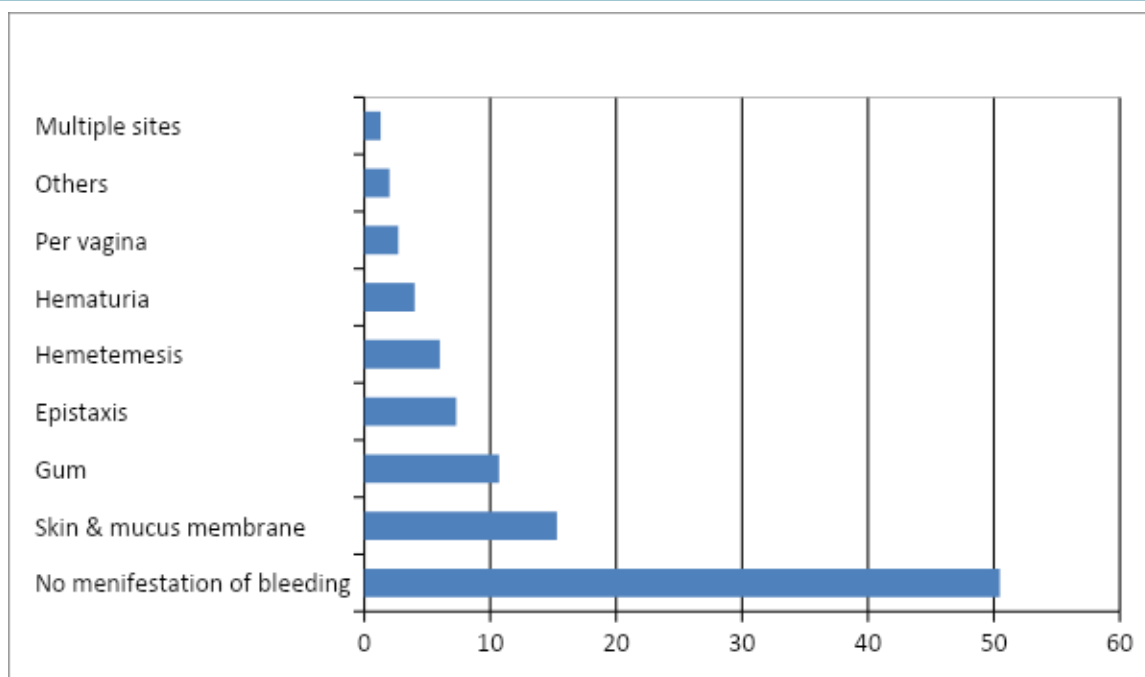
coronary artery disease (3.4%), hematological disorders (18.4%) and miscellaneous (5%)<sup>14</sup>. Paramjit et al observed in Pune that Infectious etiology was the most important cause, with malaria (57.7%) being the principal reason. Other common causes included dengue (27.7%), liver disease (7.7%), and sepsis (4.7%)<sup>8</sup>. Shah et al reported that the most common cause of thrombocytopenia was malaria (31%) followed by megaloblastic anemia (26%) and dengue fever (18%) that common causes of thrombocytopenia are related to locally prevalent infections and disease patterns. In areas with malaria and dengue, these constitute important causes. In other areas, other infections and chronic conditions are mainly responsible.<sup>15</sup> In present study in cases of children malaria (32%) was the commonest cause of thrombocytopenia followed by dengue fever (12%), Idiopathic Thrombocytopenic Purpura (8%), enteric fever (8%), megaloblastic anemia (8%), chickengunya (4%), pneumonia (4%), Disseminated Intravascular Coagulation (4%), Acute leukemia (4%), aplastic anemia (4%), hepatitis (4%), bacterial meningitis (2%), tubercular meningitis (2%), brain hemorrhage (2%) and burns (2%) were observed.

According to the study by K.R. Meena et al. for thrombocytopenia in children with malaria, out of 140 cases *P. vivax* was identified in 98 (70%) patients while *P. falciparum* in 28 (20%) and mixed infection in 14 (10%) patients. Thrombocytopenia was observed in 98 (70%) cases. Out of that 36 (25.71%) cases have mild, 20 (14.28%) cases have moderate and 40 (28.50%) cases have severe thrombocytopenia were observed.<sup>16</sup> In present study out of 22 cases of malaria with thrombocytopenia majority 9 (40.9%) were suffering from *P. falciparum* while *P. vivax* and

mixed malarial infections were 8 (36.4%) and 5 (22.7%) respectively. 11 (50%) out of 22 showed severe thrombocytopenia whereas 6 (27.3%) showed moderate thrombocytopenia and 5 (22.7%) showed mild thrombocytopenia. It was observed that presence of thrombocytopenia is not a distinguishing feature between two types of malaria. In any acute febrile illness with thrombocytopenia malaria should be kept in differential diagnosis.

It is evident from the above discussion that common causes of thrombocytopenia are related to locally prevalent infections and disease patterns. In areas with malaria and dengue, these constitute important causes. In other areas, other infections and chronic condition should be present.

Verma et al also found that skin manifestations in the form of petechiae, ecchymosis were most common bleeding manifestation and was seen in 13% patients. Gum oozing and epistaxis was present in 8.6% of cases<sup>7</sup>. Shah et al also had similar observation who commented that most common bleeding manifestation was in skin and mucous membrane (33%) followed by gum bleeding (25%) and bleeding per vagina (19%). The major clinical bleeding in the form of intracranial hemorrhage was detected in only one patient (3%).<sup>15</sup> In present study total of 74 cases (49.3%) showed bleeding tendency. Most common site for bleeding was skin and mucous membrane (15.3%). whereas bleeding manifested in the form of petechiae, purpura and ecchymosis (2%). Gum bleeding was seen in 16 cases (10.7%), epistaxis in 11 (7.3%) and vaginal bleeding in four cases (2%). Bleeding manifestations were not seen in 50.7% cases.

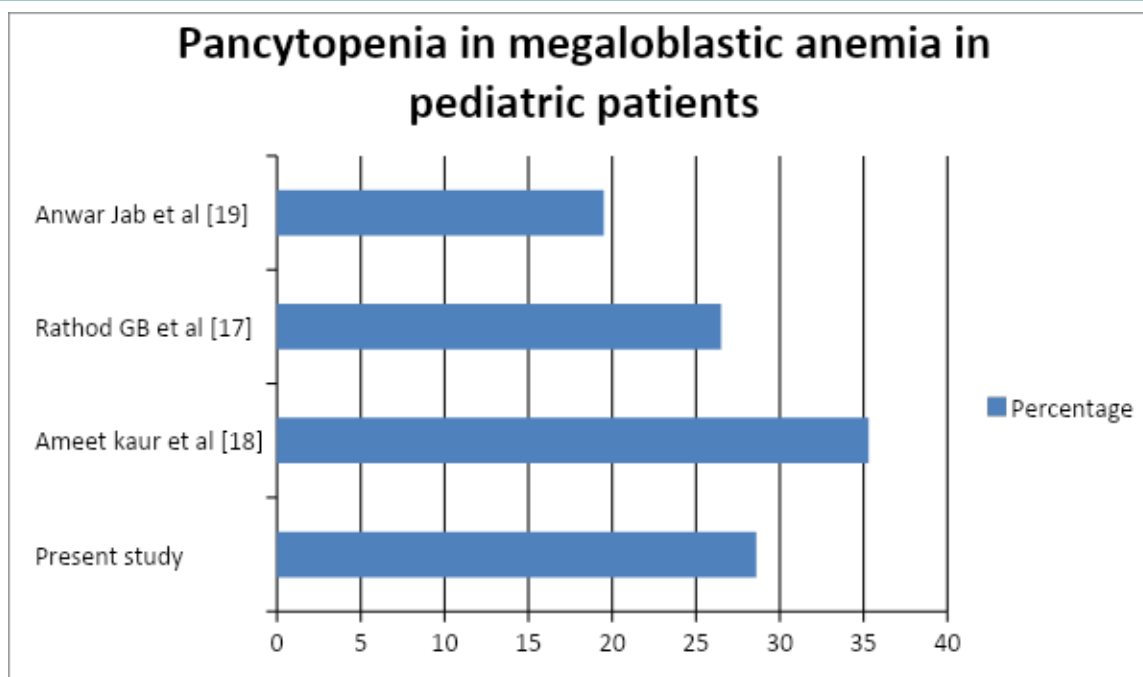


[Figure-3 represented the finding of bleeding manifestation from different sites]

Verma et al reported that isolated thrombocytopenia, thrombocytopenia with anemia, thrombocytopenia with leucopenia and pancytopenia was present in 29.1%, 37.1%, 31.2% and 2.5% patients respectively. Macrocytic anemia was present in megaloblastic anemia and in all other cases, it was mainly normocytic normochromic type. Anemia is an important accompaniment of thrombocytopenia. In all the patients with pallor and having high risk of thrombocytopenia, platelet count must be done to rule out this condition<sup>7</sup>. Vimal et al was of opinion that thrombocytopenia can occur as a combined or isolated finding in many hematological conditions like megaloblastic anemia, aplastic anemia and hypersplenism. Iron deficiency anemia is commonly associated with reactive thrombocytosis, but thrombocytopenia can occur in severe cases.<sup>14</sup> In present out of 150 cases of thrombocytopenia, 97(64.6%) cases were associated with anemia,

whereas 18 (12%) and 40 (26.6%) cases were associated with leucopenia and leukocytosis respectively. In 19(12.6%) cases isolated thrombocytopenia was observed.

Rathod GB et al reported that megaloblastic anemia (26.5%) was the most common cause of pancytopenia followed by Aplastic anemia (20.0%) while leukemia was found in 17.5% among 200 Paediatric cases.<sup>17</sup> A retrospective study done by Ameet kaur et al of 51 children aged upto 14 years admitted with the diagnosis of megaloblastic anemia showed pancytopenia was present in 18 cases (35.29%)<sup>18</sup>. Anwer Zeb Jan et al reported at department of pediatric that 19.6% children showed pancytopenia with megaloblastic anemia<sup>19</sup>. In present study total 14(9.33%) cases showed pancytopenia. Out of that 4(28.6%) cases due to megaloblastic anemia, 2(14.3%) cases due to aplastic anemia and 2(14.3%) cases due to DIC and others were observed.



[Figure-3 represented the comparison of present study with other study for pancytopenia in megaloblastic anemia]

### Conclusion

It might be concluded from the present study that thrombocytopenia should be suspected in any child presenting with a history of easy bruising or bleeding or petechiae, but it also may present as an incidental finding in an asymptomatic individual. Thrombocytopenia was more common in males than female in our study. About 1/3 patients had moderate to severe thrombocytopenia. Bleeding manifestation was seen in half of cases mainly in skin and mucous membranes. The commonest aetiology observed was septicaemia (70%) in neonates whereas in cases of infants and children, malaria was the commonest cause of thrombocytopenia followed by dengue fever. In any acute febrile illness with thrombocytopenia malaria should be kept in differential diagnosis. More than half of cases were associated with anemia. About 1/3 cases of pancytopenia were due to megaloblastic anemia. Proper laboratory work up by complete blood count and peripheral blood smear examination may reveal associated cytopenias like leucopenia and anemia having particular etiology e.g. megaloblastic anemia, leukemia etc. Early identification and timely treatment can help in proper management of cases.

### Contribution from the Author

Dr. Devang Patel: Data collection, analysis and preparation of manuscript.

Dr. Mayur Kokani: Analysis and preparation of manuscript & critical revision.

Dr. Ankita Patel: Analysis and preparation of manuscript & critical revision.

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