



## CLINICO-PATHOLOGICAL STUDY ON EVALUATION OF IDIOPATHIC THROMBOCYTOPENIC PURPURA IN TERTIARY CARE HOSPITAL OF TELANGANA

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### ABSTRACT

**OBJECTIVES:** The study was designed to co-relate the pathological findings with clinical manifestations of ITP and to validate the diagnosis of ITP.

**METHODS:** A retrospective and prospective hospital based study was carried out over a period of three years (2017-2019).

**RESULTS:** Out of 57 cases, 19 cases (33%) occurred in the age range of 0-20 years, 27 cases (48%) in the range of 21-40 years and 11 cases (19%) in the range of 41-60 years. 39 cases (68%) occurred in male population and 18 cases (32%) in female population. The most common presentation was with petechiae in 21 cases (39%). 19 cases (35%) had a platelet count of less than 25,000 and 34 cases (65%) had a count between 25,000 and 50,000. A Mean Platelet Volume (MPV) value of 11-14 fL was seen in 78% of the cases. Platelet Distribution Width (PDW) of 15-17 fL was seen in 81% of cases.

**INTERPRETATION AND CONCLUSION:** No single laboratory result or clinical finding establishes a diagnosis of ITP; it is a diagnosis of exclusion. Bone Marrow Aspiration (BMA) is not needed for children with typical features of ITP; however BMA helps in diagnosis of ITP in patients who present with atypical features.

**KEYWORDS :** ITP;MPV;PDW; Bone marrow aspiration;anti-platelet antibodies.

### INTRODUCTION

The estimated incidence of Idiopathic Thrombocytopenic Purpura is 5.8 to 6.6 cases per year and about half of the cases occur in children<sup>1</sup>.

Adult onset and childhood onset Idiopathic thrombocytopenic purpura are strikingly different and present with varied clinical manifestations<sup>1</sup>. More than 28% of children who develop Idiopathic Thrombocytopenic purpura enter the chronic phase<sup>2</sup>.

Clinical experience and anecdote supported by published data let to believe that the true demographic features of this disease differ from the published literature<sup>3</sup>.

The diagnosis of Idiopathic Thrombocytopenic purpura requires clinical history, complete physical examination, complete blood count and examination of peripheral blood smear. Bone marrow aspiration is needed in Idiopathic Thrombocytopenic Purpura in patients who present with atypical features and for whom splenectomy is indicated.

The severity of thrombocytopenia reflects the balance between platelet destruction and production<sup>4</sup>. Platelets are involved in several aspects of hemostasis. One role is the passive surveillance of blood vessel continuity by filling the gaps caused by endothelial cell separation. The other functions are formation of primary hemostatic plug, serves as surface for coagulation factors to make secondary hemostatic plug and aid in healing injured tissue<sup>5</sup>.

When there is an endothelial injury platelets in the circulation which are normally inert get activated and the primary hemostatic plug is the result of transformation of platelets from an inactive state into an active state<sup>5</sup>.

If the platelet count is normal, approximately 8 to 15 platelets are seen in one oil immersion (X1000) field. There should be one platelet present for every 20 erythrocytes<sup>6</sup>.

Platelets are electronically counted by electrical or electro-optical detection. An upper threshold is needed to separate platelets from red cells and a lower threshold is needed to separate them from debris and electronic noise. Platelets can be counted between two thresholds 2 and 20 fl<sup>6</sup>.

The term Idiopathic Thrombocytopenic Purpura refers to thrombocytopenia in which apparent exogenous aetiological factors are lacking, and in which diseases known to be associated with secondary thrombocytopenia have been excluded<sup>7</sup>.

In patients with Idiopathic Thrombocytopenic Purpura, platelets are

coated with autoantibodies directed against platelet membrane antigens, resulting in splenic sequestration and phagocytosis by mononuclear macrophages. The resulting shortened lifespan of platelets in the circulation together with incomplete compensation by increased platelet production by bone marrow megakaryocytes results in decreased platelet count<sup>2,8</sup>.

To establish a diagnosis of Thrombocytopenia, other causes of Thrombocytopenia such as Leukemia, myelophthisic marrow infiltration, myelodysplasia, aplastic anemia or adverse drug reactions should be excluded.

In this study an effort is made to provide a current view of the demographics, clinical manifestations, diagnostic criteria and prognosis of Idiopathic Thrombocytopenic purpura.

### MATERIALS AND METHODS:

The samples for the present study were collected from various clinical departments and wards like Medicine, Pediatrics, MICU and PICU at government Medical college and Teaching Hospital, suryapet, Telangana state. The study was performed as one year retrospective and one year prospective observation from february 2017 to march 2019.

Clinical history was collected from the patients and medical record files.

Physical examination of the patients was done to see the clinical manifestations of the disease and to exclude other possible causes of present symptoms.

Laboratory studies were conducted to diagnose Idiopathic Thrombocytopenic purpura. Blood was collected using standard phlebotomy procedures.

Blood sample was processed in Sysmex automated Hematology cell counter. Platelet count, Mean Platelet Volume (MPV) and Platelet Distribution Width (PDW) values were taken from the counter reading.

### INCLUSION CRITERIA:

- Patients of all the age groups will be included in this study.
- Platelet count less than  $50 \times 10^3$  per microlitre.
- The absence of any morphologic evidence for WBC abnormalities in the peripheral blood.
- No previous treatment with corticosteroids or immunosuppressant.

**EXCLUSION CRITERIA:**

- Platelet counts more than 50x10<sup>3</sup>per microlitre.
- Other known secondary causes of thrombocytopenia like those associated with pregnancy, liver cirrhosis, HIV, SLE, etc

**STATISTICAL ANALYSIS:**

Descriptive statistics to describe the base line characteristics such as age, sex, and other demographic variables.

**RESULTS**

Out of 57 cases, 19 cases (33%) occurred in the age range of 0-20 years, 27 cases (48%) in the 21-40 years and 11 cases (19%) in 41-60 years.

39 cases (68%) occurred in male population and 18 cases (32%) in female population.

The most common presentation was with petechiae observed in 21 cases (36%) followed by ecchymoses (10 cases, 18%), epistaxis (09 cases, 15%), hematuria (07 cases, 12%), melena (05 cases, 9%) and menorrhagia (05 cases, 9%). Major serious hemorrhage like intracranial bleeding or hemopericardium was not seen.

19 cases (35%) had a platelet count of less than 25,000 and 34 cases (65%) had a count between 25,000 and 50,000. Majority of children had a count of less than 20,000. Platelet count did not correlate with the type or severity of bleeding.

A Mean Platelet Volume (MPV) value of 11-14 fL was seen in 45 cases (78%) and 15-18 fL in 12 cases (22%). MPV upto 15 fL was seen in patients having a platelet count of more than 25,000 (majority adults) and a higher value upto 18 fL was noted for a count less than 25,000 (mainly children). MPV correlated well with degree of thrombocytopenia.

Platelet Distribution Width (PDW) of 15-17 fL was seen in 44 cases (75%) and of 18- 20 fL in 13 cases (25%). It also correlated with platelet count, showing higher values for platelet count of less than 25,000 and vice-versa, indicating the inverse relationship between the two.

**DISCUSSION**

In the present study 57 clinically suspected cases of ITP were evaluated pathologically for final diagnosis. The duration of the study was of 3 years.

**Table No.1: No. of cases studied in different studies**

Authors	Year and duration	No.of cases
Kuwana M et al <sup>11</sup>	2006(2 years)	112
Westerman et al <sup>12</sup>	1999(1 year)	100
Reid M et al <sup>15</sup>	1995(1 year)	92
Bizzoni L et al <sup>14</sup>	2006(5 years)	178
Louis M. <sup>4</sup>	2004(3 years)	205
Present study	2019(3 years)	57

**Table No. 2: Percentage of male and female cases**

Authors	Year	Male	Female
Westerman et al <sup>12</sup>	1999	55.5%	44.5%
Louis M et al <sup>8</sup>	2004	50%	50%
Reid M et al <sup>15</sup>	1995	53.5%	46.5%
Lowe et al <sup>13</sup>	2002	55%	45%
Present study	2019	68%	32%

**Table No.3: Mean Platelet Volume (MPV) in children**

Authors	Year	MPV
Tomita et al <sup>9</sup>	1980	14-18 fL
Ntaios et al <sup>10</sup>	2008	15-17fL
Jayabose et al <sup>16</sup>	2004	14-17fL
Present study	2019	15-18fL

In the present study Mean Platelet Volume (MPV) in children was between 15-18 fL and showed a good correlation between platelet count ie MPV was inversely related to the count. Large platelets accounted for the increase in MPV in these cases. This was similar to other studies.

**Table No.4: Mean Platelet Volume (MPV) in adults**

Authors	Year	MPV
Tomita et al <sup>9</sup>	1980	10-13fL
Ntaios et al <sup>10</sup>	2008	11-13fL
Jayabose et al <sup>16</sup>	2004	10.5-12.5fL
Present study	2019	11-14fL

In adults the Mean Platelet Volume (MPV) was between 11-14 fL and was inversely proportional to the platelet count. This finding was similar to other studies.

**Table No.5: Platelet Distribution Width (PDW) in adults**

Authors	Year	PDW
Tomita et al <sup>9</sup>	1980	14-16fL
Ntaios et al <sup>10</sup>	2008	15-18fL
McMillan et al <sup>7</sup>	2005	14.5-16.5fL
Present study	2019	15-17fL

PDW in adults was in the range of 15-17fL and was inversely proportional to the platelet counts. Other studies have showed similar results.

**CONCLUSION**

No single laboratory result or clinical finding establishes a diagnosis of Idiopathic Thrombocytopenic Purpura; it is a diagnosis of exclusion. Acute ITP and chronic ITP differ in initial presentation, therapy and prognosis.

Majority of children have history of antecedent infection and presents with abrupt onset of symptoms. Chronic ITP occurs mainly in the women of child bearing age group.

The hallmark of ITP is isolated thrombocytopenia and presence of anemia or neutropenia should suggest other disease as the potential cause of low platelet count. The Mean Platelet Volume (MPV) and Platelet Distribution Width (PDW) is elevated in all the cases of ITP and correlated significantly with severity of thrombocytopenia

**REFERENCES:**

1. Cines, Douglas et al. Medical Progress; "Immune Thrombocytopenic Purpura, Departments of Pathology and Laboratory Medicine and Medicine, University of Pennsylvania, Philadelphia (D.B.C.).
2. John P. Greer. Wintrob's Clinical Hematology. 11th edition; II Volume, 1533-39.
3. Drew Provan. Low platelets-BCSH Guidelines. Barts & The Royal London Hospital, 2003.
4. Annette J Neylon et al. Clinically Significant newly Presenting Autoimmune Thrombocytopenic Purpura in Adults; a prospective study of a population-based cohort of 245 patients. British Journal of Hematology. 2003; (122): 966-74.
5. Shirlyn B. McKenzie. Clinical Laboratory Hematology. 2nd edition, 710-719.
6. Marshall A Lichtman, Williams Hematology, 7th edition: 1758-61.
7. McMillan R. The effect of antiplatelet antibodies on megakaryocytopoiesis. Int J hematology. 2005 feb; 81(2):94-9.
8. Louis M et al. Prospective screening of 205 patients with ITP, including diagnosis, serological markers, and the relationship between platelet counts, endogenous thrombopoietin, and circulating antithrombopoietin antibodies. Am J Haematol. 2004 jun; 76(3):205-213.
9. Tomita E et al. Differential diagnosis of various thrombocytopenias in childhood by analysis of platelet volume. Pediatr Res. 1980 feb; 14(2):133-7.
10. Ntaios et al. Increased values of MPV and PDW may provide a safe positive diagnosis of ITP. Acta Hematologica. 2008 jun; 119(3): 173-77
11. Kuwana M et al. Preliminary laboratory based diagnostic criteria for immune thrombocytopenic purpura. J Thromb Haemost. 2006 sep; 4(9):1936-43
12. Westerman DA. The diagnosis of idiopathic thrombocytopenic purpura in adults: Does bone marrow biopsy have a place? Med J Aust. 1999 mar; 170(50):216-7.
13. Lowe EJ, Buchanan GR. Idiopathic thrombocytopenic purpura diagnosed during the second decade of life. J Pediatr. 2002; 141:253-258.
14. Bizzoni, L. Idiopathic thrombocytopenic purpura in the elderly: clinical course in 178 patients. Eur J Haematol. 2006 mar; 76(3):210-216.
15. Reid MM. Chronic idiopathic thrombocytopenic purpura: incidence, treatment, and outcome. Arch Dis Child. 1995; 72:125-128.
16. Jaybose et al. Recurrent immune thrombocytopenic purpura in children. Paediatr Hematol Oncol 2006; 23 :677-83