Original Research Article

Clinico-etiological profile of children with thrombocytosis at SRTRH GMC, Ambojogai

Sambhaji Chate[1], Sunil Holikar[2], Shubhangi Indorkar[3*]

[1]Professor, [2]Associate Professor, [3]Junior Resident, Department of Pediatrics, Swami Ramanand Teerth Rural Government Medical College, Ambajogai, Beed-431517, Maharashtra, INDIA.
Email: shubh25989@gmail.com

Abstract

Background: Thrombocytosis (TS) or elevation in the peripheral blood platelet count to values >400,000/µL is common in infancy and childhood, occurring in 3 to 13% of children **Aims and Objectives:** To Study of Thrombocytosis in pediatric age group. Methodology: This was cross-sectional study carried out in the department of pediatrics at tertiary health care centre in the patients who showed thrombocytosis on CBC during the One year period were studied. During the one year there were 102 patients who showed thrombocytosis. The causative factor in each patient was identified. The data was entered in excel sheet and analyzed by excel software for windows 10. **Result:** The majority of the patients were in the age groups 6m-2yr were 53.92% followed by 1m-6m; Were 18.62%, 2yr-6yr were 14.70% 6yr-12yr were 12.74%. The majority of the patients were Male were 57.84% and Female were 42.15%. The Majority of the patients with Severe thromocytosis were in the age groups 6Y-12Y were - 15.38%, Moderate were common in 2Y-6Y - 13.33% and 1M-6M were 10.53%; Mild were more common in 6M-2Y -92.73% followed by 2Y-6Y - 86.67%. All the patients were of Secondary thrombocytosis, no patient of primary thrombocytosis found.The most common causes were Infection- i.e. Respiratory tract infection in 48% followed by Gastrointestinal tract infection in 18.60%, Central nervous system infection in 4.90%, Urinary tract infection in 2.94%, Skin infection in 0.98%, Connective tissue infection in 0.98%; Nutritional causes were Iron deficiency anemia-4.90%, SAM-1.96%, SAM with megaloblastic anemia in 0.98%; Hymolytic anemia in the B Thalassemia was 3.92%, Diamond blackfan syndrome was 0.98%, In Inflammation – Arthritis was 0.98%; In Tumors- Post auricular rhabdomyosarcoma was 0.98%, Postsplenectomy was 0.98%, In Allergic, Urticaria was 1.96%, Miscellaneous were 1.96%; Soap ingestion was 0.98%; Post MR vaccination was 0.98%; Fever(unspecified) was 3.92% **Conclusion:** It can be concluded from our study that majority of the patients were were in the age groups 6m-2yr, The majority of the patients were Male, The Majority of the patients with Severe thromocytosis were in the age groups 6Y-12Y, Moderate were common in 2Y-6Y , Mild were more common in 6M-2Y, The most common causes were Infection- i.e. Respiratory tract infection in 48% followed by Gastrointestinal tract infection , Nutritional causes were Iron deficiency anemia.

Key Word: Thrombocytosis(TS), IDA (Iron deficiency Anemia), SAM (Severe Acute Malnutrition, LRTI (Lower Respiratory Tract Infection).

***Address for Correspondence:**
Dr. Sunil Holikar, Associate Professor, Department of Pediatrics, Swami Ramanand Teerth Rural Government Medical College, Ambajogai, Beed-431517, Maharashtra, INDIA.
Email: shubh25989@gmail.com

Received Date: 10/02/2019 Revised Date: 16/03/2019 Accepted Date: 02/04/2019
DOI: https://doi.org/10.26611/10141011

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 05 April 2019

INTRODUCTION

Thrombocytosis (TS) or elevation in the peripheral blood platelet count to values >400,000/µL is common in infancy and childhood, occurring in 3 to 13% of children[1]. Extreme thrombocytosis (platelets >1,000,000/µL) is uncommon, occurring in less than 2% of children[2], but may be more common in critically ill children[3]. Thrombocytosis is classified according to its origin into primary and secondary forms. Primary (clonal) thrombocytosis is a myeloproliferative disorder, caused by abnormal and uncontrolled expansion of haematopoietic cells, which is likely to be complicated by thromboembolism[4]. Secondary (or reactive) thrombocytosis is due to a variety of underlying

How to cite this article: Sambhaji Chate, Sunil Holikar, Shubhangi Indorkar. Clinico-etiological profile of children with thrombocytosis at SRTRH GMC, Ambojogai. *MedPulse International Journal of Pediatrics.* April 2019; 10(1): 01-04.
http://medpulse.in/Pediatrics/index.php

conditions like infection, inflammation, iron deficiency, tissue damage, hemolysis, severe exercise, malignancy, hyposplenism, and other causes of an acute phase response[5]. In older adults an elevated platelet count can signify an underlying hematological disease, in children in almost every case the elevated platelet count is due to another medical condition, such as acute infection, chronic inflammation, collagen vascular and renal diseases, Langerhan's cell histiocytosis, iron deficiency, hemolytic anemia, and Kawasaki disease (KD)[6-7]. Drugs are another less frequent cause of secondary thrombocytosis in children[8-9] So we have studied Thrombocytosis in pediatric age group with respect to various etiology in the pediatric age group.

METHODOLOGY

This was cross-sectional study carried out in the department of pediatrics at tertiary health care centre in the patients who showed thrombocytosis on CBC during the One year period were studied. During the one year there were 102 patients who showed thrombocytosis. After written and explained consent all details of the patients like age, sex, clinical features, undergone routine investigations like CBC, X-ray, other necessary investigations if needed was carried out. The causative factor in each patient was identified. The data was entered in excel sheet and analyzed by excel software for windows 10.

RESULT

Table 1: Distribution of the patients as per the age

Age	No.	Percentage (%)
1m-6m	19	18.62%
6m-2yr	55	53.92%
2yr-6yr	15	14.70%
6yr-12yr	13	12.74%
Total	102	100%

The majority of the patients were in the age groups 6m-2yr were 53.92% followed by 1m-6m Were 18.62%, 2yr-6yr were 14.70% 6yr-12yr were 12.74%.

Table 2: Distribution of the patients as per sex

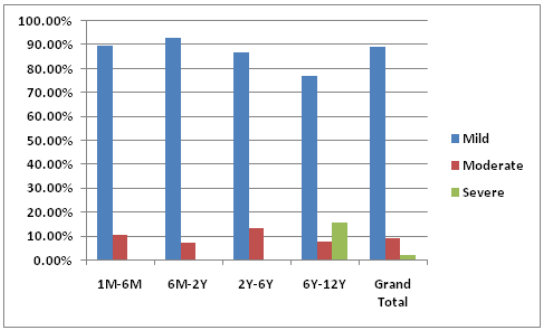
Sex	No.	Percentage (%)
Male	59	57.84%
Female	43	42.15%
M:F	1.4:1	100%

The majority of the patients were Male were 57.84% and Female were 42.15%

Table 3: Distribution of the patients as per severity of thrombocytosis and age group

Row Labels	1M-6M	6M-2Y	2Y-6Y	6Y-12Y	Grand Total
Mild	89.47%	92.73%	86.67%	76.92%	89.22%
Moderate	10.53%	7.27%	13.33%	7.69%	8.82%
Severe	0.00%	0.00%	0.00%	15.38%	1.96%
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%

The Majority of the patients with Severe thromocytosis were in the age groups 6Y-12Y were - 15.38%, Moderate were common in 2Y-6Y - 13.33% and 1M-6M were 10.53%; Mild were more common in 6M-2Y -92.73% followed by 2Y-6Y - 86.67%.



Graph 1: Distribution of the patients as per severity of thrombocytosis and age group

Table 4: Distribution as per the type of thrombocytosis

Type of thrombocytosis	No.	Percentage(%)
Primary	0	0
secondary	102	100
Total	102	100

All the patients were of Secondary thrombocytosis, no patient of primary thrombocytosis found.

Table 5: Distribution as per the etiology of thrombocytosis

Cause	No.	Percentage (%)
Infection		
Respiratory tract infection	49	48%
Gastrointestinal tract infection	19	18.60%
Central nervous system infection	5	4.90%
Urinary tract infection	3	2.94%
Skin infection	1	0.98%
Connective tissue infection	1	0.98%
Nutritional		
Iron deficiency anemia	5	4.90%
SAM	2	1.96%
SAM with megaloblastic anemia	1	0.98%
Hymolytic anemia		
B Thalassemia	4	3.92%
Diamond blackfan syndrome	1	0.98%
Inflammation		
Arthritis	1	0.98%
Tumors		
Postauricular rhabdomyosarcoma	1	0.98%
Postsplenectomy	1	0.98%
Allergic		
Urticaria	2	1.96%
Miscellaneous	2	1.96%
Soap ingestion	1	0.98%
Post MR VACCINATION	1	0.98%
Fever(unspecified)	4	3.92%

The most common causes were Infection- i.e. Respiratory tract infection in 48% followed by Gastrointestinal tract infection in 18.60%, Central nervous system infection in 4.90%, Urinary tract infection in 2.94%, Skin infection in 0.98%, Connective tissue infection in 0.98%; Nutritional causes were Iron deficiency anemia - 4.90%, SAM- 1.96%, SAM with megaloblastic anemia in 0.98%; Hymolytic anemia in the B Thalassemia was 3.92%, Diamond blackfan syndrome was 0.98%, In Innflammation– Arthritis was 0.98%; In Tumors- Postauricular rhabdomyosarcoma was 0.98%, Postsplenectomy was 0.98%, In Allergic , Urticaria was 1.96%, Miscellaneous were 1.96%; Soap ingestion was 0.98%; Post MR vaccination was 0.98%; Fever(unspecified) was 3.92%

DISCUSSION

Thrombopoietin (Tpo) is the key regulator of platelet production in humans, and is primarily expressed in the liver, and to a lesser extend the kidneys, bone marrow and other organs. It acts on the commitment of hematopoietic stem and progenitor cells into platelet-specific differentiation through its c-mpl receptor that is also expressed on pluripotent megakaryocytes, platelets, and endothelial cells. C-mpl receptors normally remove circulating Tpo by cellular absorption and internalization. Hepatic Tpo expression is unchanged in the presence of thrombocytopenia. Tpo serum concentrations are normal if thrombocytopenia results from platelet destruction, while are elevated if thrombopoiesis drops. Longitudinal Tpo measurements in infants and children with acute infections, surgical trauma and other conditions show that the elevation of circulating Tpo concentration precedes TS[10,11,12]) Tpo serum levels are significantly higher in patients with ET than in patients with reactive TS, although Tpo serum levels are not correlated with platelet counts in patients with ET(50). Besides Tpo, other cytokines or hematopoietic growth factors, such as stem cell factor, granulocytemacrophage colony stimulating factor, IL-6, IL-8 and IL-11 play a major role in certain steps of megakaryopoiesis and thrombopoiesis([13,14,15]).Secondary or reactive thrombocytosis in childhood results from increased thrombopoiesis, as a reactive process due to an

underlying infection, chronic inflammation, injury, malignancy, and surgical or functional splenectomy[16].In our study we have seen The majority of the patients were in the age groups 6m-2yr were 53.92% followed by 1m-6m; Were 18.62%, 2yr-6yr were 14.70% 6yr-12yr were 12.74%. The majority of the patients were Male were 57.84% and Female were 42.15%. The Majority of the patients with Severe thromocytosis were in the age groups 6Y-12Y were - 15.38%, Moderate were common in 2Y-6Y - 13.33% and 1M-6M were 10.53%; Mild were more common in 6M-2Y -92.73% followed by 2Y-6Y-86.67%. All the patients were of Secondary thrombocytosis, no patient of primary thrombocytosis found. The most common causes were Infection- i.e. Respiratory tract infection in 48% followed by Gastrointestinal tract infection in 18.60%, Central nervous system infection in 4.90%, Urinary tract infection in 2.94%, Skin infection in 0.98%, Connective tissue infection in 0.98%; Nutritional causes were Iron deficiency anemia -4.90%, SAM-1.96%, SAM with megaloblastic anemia in 0.98%; Hymolytic anemia in the B Thalassemia was 3.92%, Diamond blackfan syndrome was 0.98%, In Inflammation–Arthritis was 0.98%; In Tumors- Post auricular rhabdomyosarcoma was 0.98%, Postsplenectomy was 0.98%, In Allergic , Urticaria was 1.96%, Miscellaneous were 1.96%; Soap ingestion was 0.98%; Post MR vaccination was 0.98%; Fever(unspecified) was 3.92% These findings are similar to Sarangi R *et al*[17] they found Out of 2500 hemograms done in pediatrics age group, 272 (10.8%) patients showed thrombocytosis. About 99.6% of cases were of secondary thrombocytosis. Only one case of primary thrombocytosis was encountered. The most common cause of secondary thrombocytosis was infection (39.5%) alone followed by iron deficiency anemia (14.1%).

CONCLUSION

It can be concluded from our study that majority of the patients were were in the age groups 6m-2yr, The majority of the patients were Male, The Majority of the patients with Severe thromocytosis were in the age groups 6Y-12Y, Moderate were common in 2Y-6Y, Mild were more common in 6M-2Y, The most common causes were Infection- i.e. Respiratory tract infection in 48% followed by Gastrointestinal tract infection , Nutritional causes were Iron deficiency anemia.

REFERENCES

1. Sutor AH. Thrombocytosis in childhood. SeminThrombHemost 1995; 21: 330-339.
2. Yohannan MD, Higgy KE, al-Mashhadani SA, Santhosh-Kumar CR. Thrombocytosis. Etiologic analysis of 663 patients. Clin Pediatr 1994; 33: 340- 343.
3. Denton A, Davis P. Extreme thrombocytosis in admissions to paediatric intensive care: no requirement for treatment. Arch Dis Child 2007; 92: 515-516.
4. N. N. Syed, M. Usman, and M. Khurshid, "Thrombocytosis: age dependent aetiology and analysis of platelet indices for differential diagnosis," Indian Journal of Pathology and Microbiology, vol. 50, no. 3, pp. 628–633, 2007.
5. C. N. Harrison, D. Bareford, N. Butt *et al.*, "Guideline for investigation and management of adults and children presenting with a thrombocytosis," British Journal of Haematology, vol. 149, no. 3, pp. 352–375, 2010.
6. Dame C, Sutor AH. Primary and secondary thrombocytosis in childhood. Br J Haematol 2005; 129: 165-177.
7. Ishiguro A, Ishikita T, Shimbo T, Matsubara K, Baba K, Hayashi Y, *et al.* Elevation of serum thrombopoietin precedes thrombocytosis in Kawasaki disease. ThrombHemost 1998; 79: 1096-1100.
8. Frye JL, Thompson DF. Drug-induced thrombocytosis. J Clin Pharm Ther 1993; 18: 45-48.
9. Nako Y, Tachibana A, Fujiu T, Tomomasa T, Morikawa A. Neonatal thrombocytosis resulting from the maternal use of non-narcotic antischizophrenic drugs during pregnancy. Arch Dis Child Fetal Neonatal Ed 2001; 84: F198-200.
10. Ishiguro A, Ishikita T, Shimbo T, Matsubara K, Baba K, Hayashi Y, *et al.* Elevation of serum thrombopoietin precedes thrombocytosis in Kawasaki disease. ThrombHemost 1998; 79: 1096-110
11. Ishiguro A, Suzuki Y, Mito M, Shimbo T, Matsubara K, Kato T, *et al.* Elevation of serum thrombopoietin precedes thrombocytosis in acute infections. Br J Haematol 2002; 116: 612- 618.
12. Folman CC, Ooms M, Kuenen B B, de Jong SM, Vet RJ, de Haas M, *et al.* The role of thrombopoietin in post-operative thrombocytosis. Br J Haematol 2001; 114: 126-133.
13. Dodig S, Raos M, Kovac K, Nogalo B, Benko B, Glojnaric I, *et al.* Thrombopoietin and interleukin6 in children with pneumonia-associated thrombocytosis. Arch Med Res 2005; 36: 124-128.
14. Du X, Williams DA. Interleukin-11: review of molecular, cell biology, and clinical use. Blood 1997; 89: 3897-3908.
15. Felle P, McMahon C, Rooney S, Donnelly P, Ni Chonchubhair F. Platelets in the paediatric population: the influence of age and the limitations of automation. Clin Lab Haematol 2005; 27: 250- 257.
16. E Mantadakis, A Tsalkidis , A Chatzimichael. Thrombocytosis in Childhood. Indian Pediatrics 2008;45: 669-677.
17. Sarangi R, pradhan S, Dhanawat A, patanayak R, Benia G. thrombocytosis in children: clinic-hematological profile from a single centre in estern india. J Lab Physicians 20185;10:34-7.

Source of Support: None Declared
Conflict of Interest: None Declared