Seasonal Variation Effect on the Diagnosis of Immune Thrombocytopenic Purpura in Children

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ABSTRACT

Background: Immune thrombocytopenic purpura is caused by a dysregulation of the immune system. Diagnosis of immune thrombocytopenic purpura requires isolated thrombocytopenia and platelet count <100 x 10^9/L. Bone marrow examination is not required for diagnosis and it typically reveals normal or increased number of megakaryocytes. Since immune thrombocytopenic purpura in children often occurs after a viral infection, a seasonal incidence has been reported.

Objective: To assess the effect of seasonal variation on number of cases diagnosed as immune thrombocytopenic purpura in children.

Methods: During a period of 3 months (from August 2020-November 2020), a retrospective descriptive study was done on 471 pediatric patients (under age of 14 years) who were diagnosed with immune thrombocytopenic purpura. Data was collected for a period of 5 years (2015-2019) at Medical City, Children Welfare Teaching Hospital, laboratory of hematology and bone marrow examination.

Results: Of the 471 patients who were included in the study, 256 of them were males (54.4%) and 215 of them were females (45.6%). The age of those patients ranges from 2 months-14 years and the mean was 4.96±3.34 years.

There was no significant effect of seasonal variation on number of immune thrombocytopenic purpura cases where 128 cases were diagnosed in Spring, 127 cases were diagnosed in Autumn, 118 cases were diagnosed in Winter and 98 cases were diagnosed in Summer (P value=0.849).

Conclusion: The number of cases of immune thrombocytopenic purpura in children was not significantly affected by seasonal variation in this study.

Keywords: Immune thrombocytopenic purpura, Children, Seasonal variation.

Iraqi Medical Journal Vol. 67, No. 2, July-December 2021; p. 98-101.

The acronym ITP stands for 'Immune Thrombocytopenic Purpura' and has, by international agreement, replaced the term 'idiopathic thrombocytopenic purpura'. This is because ITP is no longer idiopathic. The Greek term 'ídios pathos' designates a disease without a tangible cause, but today it is well known that ITP is caused by a dysregulation of the immune system[(1)]. Platelet autoantibody, usually IgG is directed against glycoprotein (GP) IIb/IIIa or Ib complex, resulting in premature removal of platelets from the circulation by macrophages of reticuloendothelial system especially the spleen[(2)].

Diagnosis of ITP requires isolated thrombocytopenia and platelet count <100x 10^9/L[(3)].

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A normal platelet count is between 150,000 and 400,000 per microliter of blood[(4)]. Bone marrow investigation: not required for typical presentation and typically reveals normal or increased number of megakaryocytes[(5)].

Most children present with mild bruising and petechiae, but approximately 3% present with more serious bleeding from the nose, mucosa or gastrointestinal tract[(6)].

Approximately two-thirds of children with primary ITP have a history of a viral infection during the previous month[(7)] and since ITP in children often occurs after a viral infection, a seasonal incidence has been reported[(8)].

Evidence suggests that ITP risk after vaccination increases through the same mechanism as that by which microbial

infections induce antiplatelet auto-antibodies since vaccines are designed to induce protective immunity by mimicking infections in the human body[9].

The aim of this study is to assess the effect of seasonal variation on number of cases of ITP in children.

Methods

During a period of 3 months (from August 2020 - November 2020), a retrospective descriptive study was done on 471 pediatric patients (under age of 14 years) who were diagnosed with ITP. Data was collected for a period of 5 consecutive years (2015, 2016, 2017, 2018 and 2019) for patients who were diagnosed with ITP at Medical City, Children Welfare Teaching Hospital, laboratory of hematology and bone marrow examination.

The diagnosis of ITP was done as a diagnosis of exclusion, which was based on clinical manifestation, CBC findings and bone marrow aspirate examination.

Other patients with other findings like dicytopenia or pancytopenia, diluted or inconclusive bone marrow aspirate examination were excluded from the study.

Statistical analysis of data was carried out using the available statistical package of SPSS-27 (Statistical Packages for Social Sciences- version 27). Data were presented in simple measures of frequency and percentage. The significance of difference of different percentages (qualitative data) were tested using Pearson Chi-square test with application of Yate's correction or Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05.

Results

Of the 471 patients who were included in the study, 256 of them were males (54.4 %) and 215 of them were females (45.6 %). The age of those patients ranges from 2 months-14 years and the mean was 4.96±3.34 years.

The number of ITP cases per season during the period of 2015-2019 were shown in table 1. No significant effect of seasonal variation on number of ITP cases as P value=0.849 (>0.05).

Number of ITP cases per month during the period of 2015-2019 were shown in table 2. No significant effect of monthly variation on number of ITP cases as P value=0.253 (>0.05).

Table 1: The total patients diagnosed with ITP (n=471) during the period of 2015-2019 distributed by season of onset and gender.

	Male		Female		Total	
	No.	%	No.	%	No.	%
Spring	71	55.5	57	44.5	128	27.2
Autumn	70	55.1	57	44.9	127	36.9
Winter	60	50.9	58	49.1	118	25.1
Summer	55	56.1	43	43.9	98	20.8
Total	**256**	**54.4**	**215**	**45.6**	**471**	**100**

P=0.849 (Not significant using 2x2 χ^2-test) for association between season and gender.

Table 2: The total patients diagnosed with ITP (n=471) during the period of 2015-2019 distributed by months of onset.

	No.	%
January	52	11.1
February	43	9.1
March	31	6.6
April	42	8.9
May	55	11.7
June	30	6.4
July	35	7.4
August	33	7.0
September	51	10.8
October	40	8.5
November	36	7.6
December	23	4.9
Total	**471**	**100**

P=0.253 (Not significant using χ^2-test for heterogeneity test) for months

Discussion

Since ITP in children often occurs after a viral infection, seasonal incidence has been reported[8].

In this study, there was no significant effect of seasonal variation on number of cases of ITP in children. Cases were reported throughout the year.

This finding agrees with the finding of S Abbas who had a retrospective study that was done in the AL-Kadhimiyia Teaching Hospital in Baghdad in 2006 on cases diagnosed as ITP where the total number of cases was 65 with age ranging from 1-16 years in which there was no seasonal variation in relation to the onset of the disease[10] .

The finding in this study also agrees with another study that was done by N Al-Mulla et al in a retrospective, descriptive study that was carried out at Hamad General Hospital, Hamad Medical Corporation in Qatar in 2009 where a total of 50 children below 14 years of age who were diagnosed with ITP were included in that study where no significant seasonal occurrence was observed[11].

However it disagrees with the findings of A Hamad who carried out a retrospective study at the medical department and hematology clinic at Benghazi Children Hospital in Libya in 2012 where 182 children diagnosed as ITP were included in the study with age ranges from 5 months - 14 years, most of the cases, 91 patients (59%) where in Spring and Summer[12]. Also, it disagrees with Golam Hafiz et al who had prospectively studied 110 children with ITP with age ranging from 1 to 15 years at Bangladesh in 2008 where a peak incidence of children with ITP was observed during the month of June, July and lowest in the month of October to December[13].

Seasonal variation effect on number of children with ITP was not proved in this study probably because thrombocytopenia was “true” idiopathic thrombocytopenia in which no precipitating factor or associated illness could be found[13].

In conclusion; the number of cases of ITP in children was not significantly affected by seasonal variation in this study.

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IMJ 2021; 67(2): 98-101.