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Predictive Value of Platelet Count as a Prognostic Marker of PIH – A Retrospective Study

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Abstract: ***Background: Pregnancy induced hypertension (PIH) includes gestational hypertension, pre eclampsia and eclampsia. It occurs in approximately 11-29% pregnancies in indian population. Amongst all the parameters platelet count is the most simple and cost effective. Objective: The study soughts the importance of platelet count as the most consistent and reliable method in early detection of PIH cases. Material& Methods: A retrospective hospital based study was carried out in the Department of Obstetrics&gynecology of Yenepoya Medical College; a tertiary health care referral centre in Mangalore, Karnataka over a period of 2 years from December 2014 to February 2016.Statistical analysis was used since it is a descriptive study. Results: Out of the 139 patients subjected to this study, majority of the patients were multigravidas belonging to the age group 26- 30 years. There was a Marked thrombocytopenia in severe PIH which indicates severity of disease. Conclusion: The conclusion from this study is that Thrombocytopenia is directly proportional to severity of a disease.platelet count less than 1 lakh increases the risk of DIC and HELLP syndrome significantly.***

Keywords:

1. Introduction

Preeclampsia is defined as a multisystem disorder occuring in pregnancy and the puerperium which is characterized by development of hypertension of 140/90 mmHg and above after the 20th week in a previously normotensive patient. Approximately 70% of hypertensive disorders are due to gestational hypertension, preeclampsia and eclampsia whereas other 30% are due to preexisting or undiagnosed hypertension.

Out of all the haematological abnormalities that occur in PIH, thrombocytopenia is the most common seen to occur in 11% to 29% of patients .These pregnancies also are associated with qualitative changes suggesting increased platelet production and
destruction. There is a shortened platelet life span, increased numbers of megakaryocytes in the bone marrow, and an increased number of immature platelets seen in the peripheral blood smear . The frequency and intensity of maternal thrombocytopenia varies and is dependent on the intensity of the disease process and duration of PIH syndrome [6,7]. Overt thrombocytopenia, defined by a platelet count less than 100,000/L, indicates severe disease. [8] In general, the lower the platelet counts, the higher the maternal and fetal morbidity and mortality. In most cases, delivery is indicated because the platelet count continues to decrease.

2. Material & Methods

A retrospective hospital based study was carried out in the Department of Obstetrics & gynecology of Yenepoya Medical College; a tertiary health care referral centre in Mangalore, Karnataka over a period of 2 years from December 2014 to February 2016.

Inclusion criteria for the study group consists of two groups of patients:

The first group included 70 Normotensive women and 69 women with pre eclampsia with singleton pregnancies. Healthy normotensive pregnant females in the third trimester of pregnancy, without any signs and symptoms of pregnancy induced hypertension were considered as controls. Pregnant females in the third trimester with symptoms and signs of pregnancy induced hypertension, admitted in Antenatal care ward were selected and grouped as per the criteria described in classification of hypertensive disorders of pregnancy according to the American College of Obstreticians and Gynaecologists.[11] 2.3 The study groups were divided as follows

1) Healthy normotensive pregnant controls-80
2) Patients with mild preeclampsia-106
3) Patients with severe preeclampsia-58
4) Patients with eclampsia-36

Detail history, important clinical findings and relevant investigations were noted as per the case proforma. Whole blood sample was obtained by venepuncture of the Anterior cubital vein. The blood sample was obtained without a pressure cuff, allowing blood to enter the syringe by continuous free flow by the negative pressure from an evacuated tube. The 22 Gauge size needle and good quality 10 ml disposable plastic syringe was used for the collection of blood.

3. Results

139 pregnancies which met all the parameters in the inclusion criteria were taken into consideration in this study

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Age * Group

			GROUP				Total
			NORMAL	GESTATIONAL HTN	MILD PIH	SEVERE PIH	
AGE	<=20	Count	5	1	0	0	6
		% within GROUP	7.4%	2.6%	0.0%	0.0%	4.3%
	21-25	Count	24	11	7	2	44
		% within GROUP	35.3%	28.9%	33.3%	16.7%	31.7%
	26-30	Count	29	18	4	3	54
		% within GROUP	42.6%	47.4%	19.0%	25.0%	38.8%
	31-35	Count	9	7	8	4	28
		% within GROUP	13.2%	18.4%	38.1%	33.3%	20.1%
	>35	Count	1	1	2	3	7
		% within GROUP	1.5%	2.6%	9.5%	25.0%	5.0%
Total		Count	68	38	21	12	139

Parity * Group

			GROUP				Total
			NORMAL	GESTATIONAL HTN	MILD PIH	SEVERE PIH	
PARITY	MULTI	Count	43	23	16	7	89
		% within GROUP	63.2%	60.5%	76.2%	58.3%	64.0%
	PRIMI	Count	25	15	5	5	50
		% within GROUP	36.8%	39.5%	23.8%	41.7%	36.0%
Total		Count	68	38	21	12	139
		% within GROUP	100.0%	100.0%	100.0%	100.0%	100.0%

Platelets * Group

Crosstab							
			GROUP				Total
			NORMAL	GESTATIONAL HTN	MILD PIH	SEVERE PIH	
PLATELETS	<1 LAKH	Count	4	2	2	9	17
		% within GROUP	5.9%	5.3%	9.5%	75.0%	12.2%
	1-1.5 LAKH	Count	7	7	10	3	27
		% within GROUP	10.3%	18.4%	47.6%	25.0%	19.4%
	1.5-2 LAKH	Count	12	15	8	0	35
		% within GROUP	17.6%	39.5%	38.1%	0.0%	25.2%
	2-2.5 LAKH	Count	17	9	1	0	27
		% within GROUP	25.0%	23.7%	4.8%	0.0%	19.4%
	2.5-3 LAKH	Count	5	4	0	0	9
		% within GROUP	7.4%	10.5%	0.0%	0.0%	6.5%
	>3 LAKH	Count	23	1	0	0	24
		% within GROUP	33.8%	2.6%	0.0%	0.0%	17.3%
Total		Count	68	38	21	12	139
		% within GROUP	100.0%	100.0%	100.0%	100.0%	100.0%

One way ANOVA

		N	*Mean*	*Std. Deviation*	*Statistics/ mean squares*	*df2(welch) / F(Anova)*	*p value*
age	NORMAL	68	26.43	3.88	113.394	6.947	<0.001
	GESTATIONAL HTN	38	27.39	3.492			
	MILD PIH	21	29.52	4.915			
	SEVERE PIH	12	31.33	4.868			
	Total	139	27.58	4.293			

		N	*Mean*	*Std. Deviation*	*Statistics/ mean squares*	*df2(welch) / F(Anova)*	*p value*
platelets	NORMAL	68	2.405882	0.890058	64.294	57.71	<0.001
	GESTATIONAL HTN	38	1.821053	0.616949			
	MILD PIH	21	1.390476	0.473186			
	SEVERE PIH	12	0.8075	0.210934			
	Total	139	1.954604	0.889258			

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The study group of 71 women with PIH was distributed into gestational hypertension mild PIH, and severe preeclampsia. For comparing the platelet count and to determine its increasing or decreasing trend, the mean value of each group was determined. There was a significant difference between platelet count of severe PIH(0.8075), mild PIH(1.390476) and gestational hypertension(1.821053) when compared to control group(2.405882). Comparison of age using one way ANOVA test shows that the mean value of Severe PIH (31.33) is highest followed by MILD PIH(29.52), GESTATIONAL HTN(27.39) least in NORMAL(26.43). This difference is statistically Significant with a test value of 6.947 and p value of <0.001. Comparison of platelets using one way ANOVA test shows that the mean value of NORMAL (2.405882) is highest followed by Gestational HTN(1.821053),MILD PIH(1.390476) least in SEVERE PIH(0.8075). This difference is statistically Significant with a test value of 57.71 and p value Of<0.001.

To specify the relationship, a comparsion was made between number of cases in control group and study group ,with normal, low and, very low counts. Minimum counts are seen in patients with severe PIH of study group. Of the study group 3 patients died,1 with eclampsia and 2 with severe pre eclampsia.of eclampsia patient died of cebrovascular accident and while of severe pre eclmpsia one died of DIC and other died of acute renal failure 5. Comparison of platelet count in present study with other studies in controls and cases.

Authors	Control (lac/cmm)	GHTN (lac/cmm)	MILD PIH (lac/cmm)	SEVERE PIH (lac/cmm)
Srivastava (1995)	1.94	1.79	1.64↓*	1.52↓*
Jambhulkar et al (2001)	2.38	2.30	1.70↓*	1.51↓**
Joshi et al (2004)	2.2	2.0	1.40↓*	1.30↓**
J. Davies et al (2007)	2.57	2.30	1.77↓*	--
Ellora Devi et at (2012)	2.44	1.82	1.42↓**	--
Present study (2016)	>3.00	2.00	1.50↓**	1.00↓**

4. Discussion

- Out of the 139 patients subjected to this study, majority of the patients were multigravidas belonging to the age group 26- 30 years.
- The incidence of reduced platelet count is more severe PIH and mild PIH were comparable to those reported by authors.
- All these studies confirm a marked thrombocytopenia in patients with severe PIH, which indicates severity of disease

Hypertensive disorders which cause chronic placental insufficiency is a major factor. In the present study 75% of severe PIH and 47% of mild PIH patients with platelet count below one lac per cc which is comparable to study of joshi et al who, reported platelet count of less than one lac per cc .

5. Conclusion

Thrombocytopenia is directly proportional to severity of PIH .counts less than one lac per cc is associated with increase risk of DIC and HELLP syndrome. The early detection of compromised status combined with the institution of prompt treatment has been proven to have a crucial and definite role in reducing the morbidity and mortality of both mother and fetus.

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