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To Compare Platelet Distribution Width and Red Cell Distribution Width between Pregnant Women with History of Recurrent Pregnancy Loss and Pregnant Women without H/O Pregnancy Loss

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Abstract

Background: The aim was to compare platelet distribution width and red cell distribution width between pregnant women with a history of recurrent pregnancy loss and pregnant women without a history of pregnancy loss.

Methods: This was a prospective study to the evaluation of 70 pregnant women with a history of recurrent pregnancy loss and 70 pregnant women without a history of pregnancy loss in the first trimester.

Results: There is a positive correlation between RDW –SD and PDW. This correlation is statistically significant i.e. $p<0.05$. There were no significant and negative correlation between RDW-SD and Plateletcrit ($r= 0.001$ and $P= >0.05$) PDW and Plateletcrit ($r = -0.110$, $P = >0.05$). There were no significant and negative correlation between PCT and MCH ($r=0.104$, $P = >0.05$) and PCT and MCHC ($r =0.113$, $P > 0.05$).

Conclusions: Complete blood count is a simple test and can be performed easily at primary health centre level and early identification of high risk cases is possible so that patient can be timely referred to higher centres and early pregnancy loss can be prevented.

Keywords: Platelet distribution width, Red cell distribution width, Recurrent pregnancy loss

Introduction

Recurrent pregnancy loss is defined as three or more consecutive pregnancy losses at or less than 20 weeks of gestation or with a fetal weight less than 500 gms.[1]

The American Society for Reproductive medicine (2008) proposed that recurrent pregnancy loss is defined as two or more failed clinical pregnancies confirmed by either sonographic or histopathological examination.[1] Recurrent pregnancy loss affects between 1 in 300 and 1 in 100 couples.[2]

Large platelets are metabolically and enzymatically more active than small platelets. That is, large platelets are capable of producing larger amounts of thromboxane A2 and β-thromboglobulin, which is associated with an increase in platelet size, which is further related to increased platelet aggregation and enhanced expression of adhesion molecules.[3-5] Anisocytosis may occur as erythrocytes and thrombocytes undergo consumption due to underlying inflammation and thromboembolism. PDW and RDW might be regarded as biological markers that would reflect moderate hypercoagulability. Thrombophilias

are inherited or acquired conditions which predispose an individual to thromboembolism.

Red cell distribution width is a red cell parameter that measures the variability of red cell volume/size (anisocytosis). Red cell distribution width can be reported statistically as RDW-CV (coefficient of variation) or RDW-SD (standard deviation). RDW-SD is an actual measurement of the width of the erythrocyte distribution curve (measured at a relative height of 20% above the baseline). Reference range: 39-46 fL.[6] RDW-CV is calculated from standard deviation and MCV. RDW-CV :1SD/MCV x 100, reference range :11.6-14.6%.

Materials and Methods

Study Area

The study will be conducted in the antenatal out patient clinic at the Department of Obstetrics and Gynaecology, Apollo BGS Hospitals, Mysore during the study period.

Study Population

The study will be conducted on pregnant women attending the antenatal clinic at the Department of Obstetrics and Gynaecology, Apollo BGS Hospitals and those women meeting inclusion criteria of the study and willing to participate in the study.

Study Design: Hospital based comparative study.

Study Duration: May 2017 to May 2018

Inclusion Criteria

Pregnant women with h/o recurrent pregnancy loss (case) and without h/o pregnancy loss (control).

Exclusion criteria

- Uterine anomalies
- Diabetes mellitus
- Thyroid disease
- Immunological factors
- Infectious causes
- Cardiac diseases
- Other Haemoglobinopathies

Sample Size with Justification

The sample size is calculated at 80% study power and an alpha error of 0.05 assuming SD of 3.8fl in PDW as found in reference article (Recurrent pregnancy loss by Ozgur Dundar, Mine kanat Pektas, Serkan Bodur, Lale Vuslat Bakir and Ahmet Cetin). For a minimum detectable difference of 2fl in PDW, 58 participants in each group are required as sample size. It was further enhanced and rounded off to 70 cases in each group as final sample size assuming 20% drop outs/ attrition.

Methodology

Ethical clearance was taken from the Ethical Clearance Committee. All pregnant women attending the antenatal clinic at the Department of Obstetrics and Gynaecology, Apollo BGS Hospital will be included in the study. Pregnant women with h/o recurrent pregnancy loss and meeting the inclusion criteria will be in the study group (cases) and pregnant women with no h/o recurrent pregnancy loss will be in the control group (controls).Convenience sampling method is used.

- After taking their informed written consent, detailed history, general and systemic examination will be done.
- Patient's samples will be collected for routine laboratory examination along with sample for RDW and PDW in an EDTA vial from antecubital vein puncture.
- Red cell distribution width and platelet distribution width will be measured using full automated 5/6 parts hematology analyser –ADVIA 2120.
- RDW and PDW are measured by the technique of hydrodynamic focusing method, flow cytometry method using semiconductor laser.

- Collected samples will be sent to a designated laboratory of our hospital and reports will be procured personally.
- All information and reports will be recorded on a predesigned performa and will be entered in Microsoft excel sheet to prepare master chart.

Statistical Methods

Continuous variables will be summarized as mean and SD while Nominal/ Categorical variables as percentages. Unpaired T test will be used for analysis of continuous variables whereas Chi square test will be used for Nominal/Categorical variables. P value <0.05 will be taken as significant. SPSS Statistics 20 will be used for all statistical calculation.

Observations and Results

Table 1: Age distribution of case and control group subjects

Age group (in years)	Case		Control	
	No.	%	No.	%
18-25	29	41.4	43	61.4
26-33	35	50.0	23	32.9
34+	6	8.6	4	5.7
Total	70	100.00	70	100.00

The above table shows the age wise distribution of case and control group subjects. In case group out of 70 study subjects, maximum i.e. 35 (50%) subjects were lying in the age group 26-33 years followed by 29 (41.4%) were lying in the age group 18- 25 years and 6 (8.6%) in the age group ≥ 34 yrs. The mean age of this group subjects was 27.37± 4.54 years. In control group out of 70 study subjects, maximum i.e. 43 (61.4%) subjects were lying in the age group 18- 25 years followed by 23 (32.9%) were lying in the age group 26-33 years and 4 (5.7%) were lying in ≥34 years respectively. The mean age of this group subjects was 24.92 ±4.99 years.

Table 2: Mean ± SD of PLT of case and Control group subjects

Parameter	Mean ± SD		P-value	Significance
	Case (n=70)	Control (n=70)		
PLT	2.29 ± 0.43	2.56 ± 0.42	<.01	Sig

The above table shows the mean PLT values of cases and controls. It was observed that the mean PLT of controls is higher i.e. 2.56 ± 0.42 than cases i.e. 2.29±0.43.

We reject the null hypothesis and mean difference of cases and controls group statistically differ significantly i.e. p<0.01.

Table 3: Mean ± SD of RDW-SD of case and Control group subjects

Parameter	Mean ± SD		P-value	Significance
	Case (n=70)	Control (n=70)		
RDW-SD	48.94 ± 5.78	42.87 ± 4.49	<.001	HS

The above table shows the mean RDW-SD values of cases and controls. It was observed that the mean RDW-SD of cases is higher i.e. 48.94 ± 5.78 than controls i.e. 42.87 ± 4.49.

We reject the null hypothesis and mean difference of cases and controls group statistically differ highly significantly i.e. p<0.001.

Table 4: Mean ± SD of RDW-CV of case and Control group subjects

Parameter	Mean ± SD		P-value	Significance
	Case (n=70)	Control (n=70)		
RDW-CV	16.90 ± 1.86	14.93 ± 1.02	<.001	Sig

The above table shows the mean RDW-CV values of cases and controls. It was observed that the mean RDW-CV of cases is higher i.e. 16.90 ± 1.86 than controls i.e. 14.93 ± 1.02.

We reject the null hypothesis and mean difference of cases and controls group statistically differ highly significantly i.e. p<0.001.

Table 5: Correlation between PDW and RDW-SD

Correlation	r-value	p-value	Significance
PDW v/s RDW-SD	+ 0.365	<.05	S

There is a positive correlation between RDW –SD and PDW. This correlation is statistically significant i.e. p<0.05.

Table 6: Correlation between PDW and RDW-CV

Correlation	r-value	p-value	Significance
PDW v/s RDW-CV (%)	0.5	<.05	S

There is a positive correlation between RDW–CV and PDW. This correlation is statistically significant i.e. p<0.05.

Table 7: Correlation between PCT and RDW-SD

Correlation	r-value	p-value	Significance
PCT v/s RDW-SD	0.001	>.05	NS

There is a poor degree of negative correlation between RDW–SD and PCT. This correlation is statistically not significant i.e. p>0.05.

Discussion

Our study was a hospital based comparative analysis study done between pregnant women with h/o recurrent pregnancy loss(case) and without h/o of pregnancy loss (control) attending department of Obstetrics and Gynaecology, Apollo BGS Hospitals, Mysore. The sample size is calculated at 80% study power and an alpha error of 0.05 assuming SD of 3.8fl in PDW. For a minimum detectable difference of 2fl in PDW, 58 participants in each group are required as sample size. It was further enhanced and rounded off to 70 cases in each group as final sample size assuming 20% drop outs/attrition. Seventy pregnant women having h/o recurrent pregnancy loss as cases and 70 pregnant women without h/o of recurrent pregnancy loss as controls would be included on first cum first basis after beginning the study assuming 20% drop outs. Complete blood count including RDW and PDW were done in these patients and the data collected and analyzed.

Study variable		Our Study(70)	Sumerya et al[7]
Plateletcrit(%)	Cases	0.26 ± 0.06	0.21 ± 0.04
	Controls	0.26 ± 0.04	0.23 ± 0.52
	P value	>.05	>0.05

In our study no statistically significant difference was noticed in plateletcrit between 2 groups. Sumerya et al (2014) studied the association between platelet indices and clinical parameters in recurrent pregnancy loss. Plateletcrit was not statistically significantly different between the two groups (p> 0.05).

Conclusion

We conclude from our study that thrombophilia has a significant role in the pathophysiology of recurrent pregnancy loss. Complete blood count is a simple test and can be performed easily at primary health centre level and early identification of high risk cases is possible so that patient can be timely referred to higher centres and early pregnancy loss can be prevented.

Our study concludes that simple determination of RDW and PDW values help in both early identification and management of these high-risk patients.

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