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Study of Platelet Functions in Pregnancy, Labour and Puerperium

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Abstract
Normal pregnancy associated with many changes in coagulation profile. These changes are important for intrapartum blood loss and also for thromboembolism during pregnancy, labour and puerperium. From various studies it is well known that quantitative and qualitative changes in platelets play an important part in thrombotic and haemorhagic states. So present study aimed at to find out any quantitative change in platelet functions during pregnancy, labour and puerperium.
This study was carried out in the Department of physiology, AMC, Dibrugarh, Assam. 50 cases of pregnant, 50 in labour, 50 in puerperium. and 50 non-pregnant women of child bearing age group are enroll for my study. For platelet functions we consider two key tests platelet count and bleeding time. In my study mean platelet count decreases in pregnancy and labour than that of non-pregnant but again the count increases in puerperium. But mean bleeding time increases in pregnancy but the count was low during labour and again it increases in puerperium. It is partly due to hemodilution and partly due to increased platelet activation and accelerated clearance (Shehlata et al., 1999 and McCrae, 2010).To conclude thromboembolism and bleeding disorder are two major complications of pregnancy to puerperium . So to prevent the complication proper study of coagulation profile is necessary.
Keywords: *Platelet count, bleeding time, thromboembolism, pregnancy, labour and puerperium,*

Introduction

The platelet is one of the key elements of human blood. Platelets play an essential role in the process of thrombogenesis, as well as an important role in atherogenesis and the progression of atherosclerotic lesions [(1)]. Platelet play these functions by adhesion to the vessel wall, leading to platelet aggregation and then reinforcement of platelet plug by fibrin formation. Two tests could be performed to evaluate platelet function in a routine clinical setting. Bleeding time, which is highly operator-dependent, lacks sensitivity and specificity and has a poor diagnostic value even when platelet function is altered. [(2,3)] platelet aggregation tests cannot be used in usual practice and like the bleeding time, cannot predict the risk of haemorrhage. However, during pregnancy, knowledge of platelet function may be of critical importance before performing epidural anaesthesia. Platelets are lost from circulation by 2 mechanisms: senescence and random loss. Approximately 7.1×10^3

platelets/μL/d are postulated to be randomly used in maintaining vascular integrity. Thus, in clinically stable patients, major bleeding is unusual unless the platelet count is $\leq 5 \times 10^3/\mu L$. Risk factors for bleeding at higher platelet counts are disseminated intravascular coagulation with contributory clotting factor deficiencies, structural lesions with loss of vascular integrity, and refractoriness to platelet transfusions. Several large studies have documented the safety of lowering the prophylactic platelet transfusion trigger from the previously used $20 \times 10^3/\mu L$ to $10 \times 10^3/\mu L$[4]. Duke in 1912 showed that there existed a close correlation between the number of platelets in the blood and duration of bleeding time. He also introduce the present concept of the role and importance of platelets in disorders of haemostssis.

During pregnancy, childbirth and puerperium haemorrhage can occure frequently. Causes may be premature separation of placenta, uterine atony, laceration of cervix or vagina during delivery etc But these causes are not lethal. According to Delee (1901) ''Faulty coagulation of blood can be a cause of haemmorhage''. According to Lanugo et al (1959) and Roy Choudhury (1976) 12 to 22.5% of maternal mortality due to coagulation failure. So, bleeding due to coagulation failure is lethal. According to M.Hellgren and M. Blombac, thromboembolism and bleeding are two major causes of mortality during pregnancy,labour and puerperium. So to protect the women from these fetal causes, some changes like hypercoagulable state takes place. But these hypercoaguble changes may predisposes to thromboembolic phenomenon. However in this part of the country no systematic studies have yet been undertaken regarding the role of platelet functions in pregnancy, labour and puerperium. And to avoid these complications present study has been undertaken to find out quantitative change in platelet functions during pregnancy, labour and puerperium.

Materials and Method

The study was conducted in Department of Physiology Assam Medical College, Dibrugarh, Assam. The 50 nos. of randomly selected third trimester pregnant cases and the same patients were enrolled in labour and puerperium . Cases were collected from the department of obst and gynae, Assam Medical College, Dibrughar, Assam. For control 50 nos of healthy female were enrolled. For both cases and control the age group is 18 to 35 years. The cases were taken from both primipara and multipara women. The cases having high blood pressure, oedema, anaemia, albuminurea, and abnormalities in cardiovascular respiratory and urinary system were excluded. In the study to look for the Platelet functions platelet count and bleeding time were done by Brecher and Cronkite method (1950). Normal platelet count was 1.5 to 3 lacs / cumm of blood. Bleeding time was carried out by Dukes method (1912). Normal Bleeding time was 2.5 to 9.5 minutes.

The data was analyzed by Microsoft excel and statistical package of social sciences (SPSS version 20.0). standard deviation were calculated and reported for quantitative variables. The statistical difference were tested by using one way ANOVA (Analysis of Variance). A P-value of < 0.05 was considered as statistically significant.

Ethical consideration

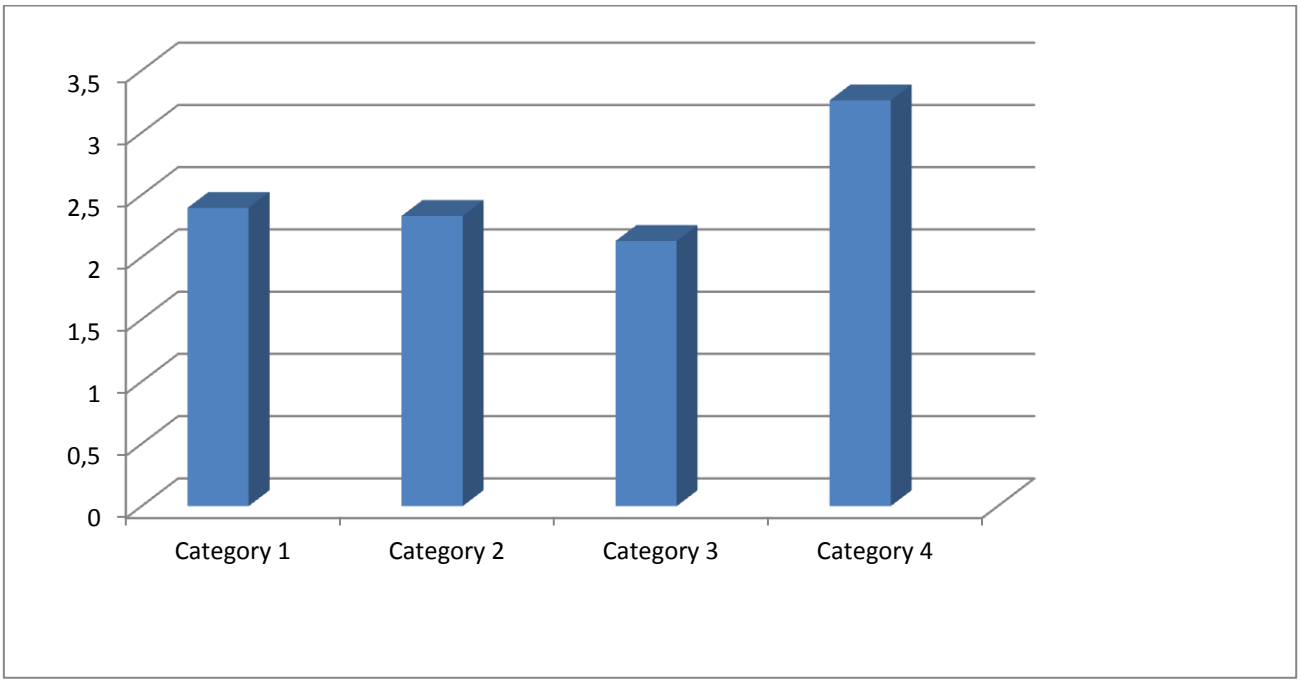
The necessary approval to conduct the study was obtained from ethical committee of Assam Medical College, Dibrugarh, Assam. Consent form obtained from all participants to ensure their voluntary participation.

Results

The distribution of cases and their results in pregnancy, labour and puerperium together with the controls are summarized in Tables and Histogram 1-4.

Table 1 and Histogram 1 Platelet count in control and study group in Lacs/cu mm of blood

Sl no	Different stages	No of cases	Range	Mean	SD
1	Non pregnant	50	1.5 to 3.35	2.396	0.408
2	Pregnant	50	1.1 to 3.1	2.331	0.419
3	Labour	50	1.2 to 3.01	2.13	0.379
4	Puerperium	50	2.24 to 3.84	3.26	0.535



Category 1: control, Category 2 : Pregnancy, Category 3: Labour, Category 4: Puerperium

Table 2 and Histogram 2 shows the Bleeding time in min in cases and control

Sl no	Different stages	No of cases	Range	Mean	SD
1	Non pregnant	50	1.5 to 2.66	1.783	0.203
2	Pregnant	50	1.1 to 2.85	1.883	0.049
3	Labour	50	1.2 to 2.55	1.819	0.060
4	Puerperium	50	1.32 to 2.42	1.823	0.034

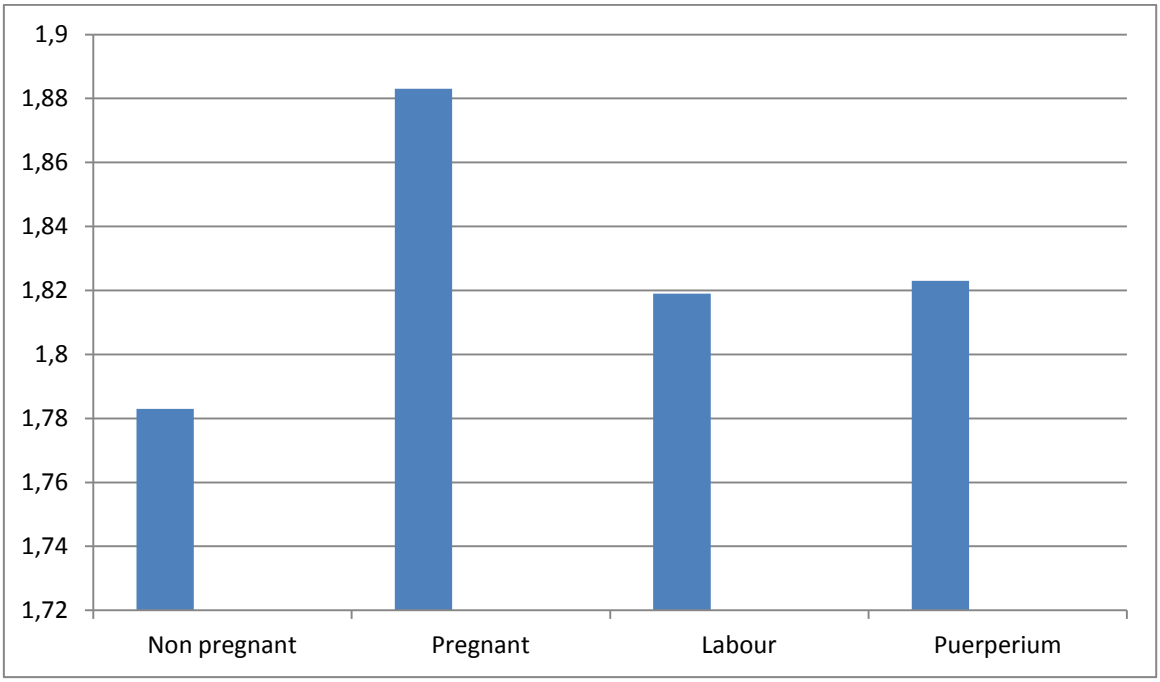


Table 3. A, B, C, D, E, F Shows the results of statistical comparison of platelet functions in non pregnant, Pregnant, labour and Puerperium.

Table A

Parameter	Non Pregnant : total no of cases : 50 Mean±SD	Pregnant: total no of cases: 50 Mean±SD	Significance P-value
Platelet count	2.396±0.408	2.331±0.419	>0.05
Bleeding time	1.783±0.203	1.883±0.350	>0.05

Table B

Parameter	Non Pregnant : total no of cases : 50 Mean±SD	Labour total no of cases: 50 Mean±SD	Significance P-value
Platelet count	2.396±0.408	2.13±0.379	<0.001
Bleeding time	1.783±0.203	1.819±0.428	>0.05

Table C

Parameter	Non Pregnant : total no of cases : 50 Mean±SD	Puerperium: total no of cases: 50 Mean±SD	Significance P-value
Platelet count	2.396±0.408	3.26±0.535	<0.001
Bleeding time	1.783±0.203	1.823±0.241	>0.05

Table D

Parameter	Pregnant: total no of cases: 50 Mean±SD	Labour total no of cases: 50 Mean±SD	Significance P-value
Platelet count	2.331±0.419	2.13±0.379	<0.01
Bleeding time	1.883±0.350	1.819±0.428	>0.05

Table E

Parameter	Pregnant: total no of cases: 50 Mean±SD	Puerperium: total no of cases: 50 Mean±SD	Significance
Platelet count	2.331±0.419	3.26±0.535	<0.001
Bleeding time	1.883±0.350	1.823±0.241	>0.05

Table F

Parameter	Labour total no of cases: 50 Mean±SD	Puerperium: total no of cases: 50 Mean±SD	Significance
Platelet count	2.13±0.379	3.26±0.535	<0.01
Bleeding time	1.819±0.428	1.823±0.241	>0.05

In Table 1 and 2 and Histogram 1 and 2 shows the mean ±SD of platelet count and bleeding time in non pregnant, pregnant, labour and in purperium. In table 1 and histogram 1 shows the mean platelet count as a whole in pregnancy is decreases than the non pregnant. Similarly in puerperium the count is increased than the non pregnant and pregnant state .But the Platelet count of labour is the least among all the four groups. In Table 2 and Histogram 2 shows the mean bleeding time as a whole in pregnancy is increases than the non pregnant state. Similarly in puerperium the value is increases than the non pregnant but decreases than the pregnant state .But mean bleeding time of labour is increases than the non pregnant and decreases than the pregnant and puerperium. In Table 3-A, B, C, D, E,F shows the comparison of platelet functions in control and study group. In table 3 A, comparison of platelet functions between non pregnant and pregnant are statistically not significant P-value >0.05.But in rest of the tables (B,C,D,E,F) comparison of platelet count in between non pregnant and labour, non pregnant and puerperium ,pregnancy and labour , pregnancy and puerperium and labour and puerperium are statistically highly significant (P-value< 0.001). In bleeding time mean ±SD comparison in all the above groups are statistically not significant (Table 3 A,B, D, E , F).

Discussion

Quantitative changes in platelets that occur in various thrombotic and haemorrhagic states are very common now a days. In recent years considerable amount of works have been done regarding the behavior of platelet in pregnancy, labour and puerperium. Regarding this work many workers gave different opinion. This lack of uniformity of findings may be due to various socio-economic and nutritional status of the women and also due to racial and environmental conditions. There are some other factors that may modify the behavior of platelet are antenatal, intranatal and postnatal care, puerperal sepsis abortion etc. In the present study mean platelet count decreases in pregnancy and labour than the non pregnant. It may be due to increased consumption of platelets in the utero-placental unit resulting in decreasing platelet counts (Aster, 1990; Burrows and Kelton,(1990). Present study results are similar to that of Ward *et al.* (1948) and Shaper *et al.* (1968). The mean bleeding time increases in pregnancy and labour than that of nonpregnant. It correlates with the platelet count. Mean values of platelet count of puerperium increases than that of nonpregnant .Our study correlates with Kennan et al 1955 and Shaper et al 1968 study. But the mean bleeding time also increases in puerperium than that of nonpregnant.It does not correlates with platelet count. Again comparison between pregnancy and labour, pregnancy and puerprium, labour and

puerperium are highly significant. The value of mean platelet count decreases in labour than the pregnant. This may be due to the changes in production or utilization of body's protective mechanism during labour. There is increase platelet count in puerperium than the labour, so this may be due to increase destruction of tissuses and release of blood factors. But there are no relevant data found regarding these changes. Regarding bleeding time it is not correlated with variation of platelet count.

Conclusion

So, from the present study it has seen that consistant change in platelet number or functions occurred during pregnancy, labour and puerperium. So, establishment of accurate etiological diagnosis and individualized management are required to obtain optimum outcome in these clinical condition.

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