

The Bleeding Profile [PT- APTT- PLATELETS COUNT] in Apparently Normal Sudanese Pregnant Women during the Second and the Third Trimesters (2016)

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Abstract:

Background: *Haemostasis in normal pregnancy involves a complex network of interactions with positive and negative feedback loops, integrating blood vessels, platelets coagulation factors, coagulation inhibitors and fibrinolysis and has evolved to maintain the integrity of the vasculature. Normal pregnancy is associated with substantial changes in the wider haemostatic system. Traditionally, it is proposed that these changes are in the preparation for the haemostatic challenge of delivery, with the haemostatic system returning to that of the non-pregnant state of approximately 4 weeks of post delivery.*

Methodology: *Sixty (60) apparently healthy pregnant women (30 from second trimester) and (30 from third trimester) and 30 healthy non-pregnant age-matched controls were recruited. Each participant had Prothrombin time (PT), activated partial thromboplastin time (APTT) and platelet count done. Multiple comparisons were made between control values and coagulation profile at different stages of pregnancy using SPSS computer program. Results were expressed as means and standard deviations. The mean difference is significant at the 0.05 level. This study was approved by Omdurman military hospital and faculty of medical laboratory sciences, Alneelain University as well as consent was taken from patients.*

Results: *The means of the PT and APTT were significantly higher in the third trimester (15.62 ± 1.31) / (38.46 ± 3.8) Compared with*

controls (13.09± 1.81)/(33.7± 5.2) and second trimester(14.53± 1.84)/(35.61±6.18) respectively. The mean of PLTs count was significantly higher in control group (278± 76.7) compared with second trimester (254.7± 82.18) and third trimester (265± 86.4)

Conclusion: *PT and APTT shows normal results with higher significance in third trimester. PLTs count shows normal result without statistical significance.*

Key words: Pregnancy, coagulation, prothrombin, activated partial thromboplastin, platelets

INTRODUCTION:

Pregnancy, also known as gravidity or gestation, is the condition between conception and birth, during which the fertilized egg develops in the uterus. In humans, pregnancy lasts about 288 days.(1)

There is activation of blood coagulation and a simultaneous increase in fibrinolysis without signs of organ dysfunction during normal pregnancy. These changes increase as pregnancy progresses.

During delivery, there is consumption of platelets and blood coagulation factors, including fibrinogen. Fibrinolysis improves and increases fast following childbirth (2)

Pregnancy is associated with changes in hemostasis, including an increase in the majority of clotting factors, decrease in the quantity of natural anticoagulants and a reduction in fibrinolytic activity, These changes result in a state of hypercoagulability. (3), these changes are likely due to hormonal changes. (4) And essential to help the woman adapt to the pregnancy state and to aid fetal growth and survival.

The increase in clotting activity is greatest at the time of delivery with placental expulsion, releasing thromboplastic substances. (5) These substances stimulate clot formation to stop maternal blood loss. As placental blood flow is up to 700 ml/min, considerable hemorrhage can occur if clotting fails.

Coagulation and fibrinolysis generally return to pre-pregnant levels 3-4 weeks postpartum. (6)

As pregnancy is a prothrombotic state ,Activated partial thromboplastin time is usually shortened in pregnancy by up to 4s in

third trimester, largely due to the hormonally influenced increase in factor VIII. However no marked changes in prothrombin time occur(7) The platelet count does not change during pregnancy but rises during the first week of puerperium before returning to non-pregnant values 6 weeks after delivery. (8)

Thrombocytopenia is the most common hemostatic abnormality observed in pregnancy.

The aim of this work is to determine the level of (Prothrombin time (PT), Activated partial thromboplastic time (APTT) and Platelets count (PLTs) in apparently normal Sudanese pregnant women during the second and the third trimesters

MATERIAL AND METHODS:

This was a case control hospital based study conducted on 90 Sudanese women 30 apparently normal pregnant women in second trimester,30 apparently normal pregnant women in third trimester and 30 non pregnant women (age matched control) to estimate the influence of normal pregnancy on coagulation profile (PT,APTT,PLTs).

The study was undertaken in Omdurman maternity hospital, known cases of diabetes, hypertension, Prenatal bleeding, recent history of blood transfusion were rejected.

Data was collected using questionnaire including age, gestational period and medical history.

Ethical approval was taken from Research Esthetical Committee (REC) in the federal ministry of health. Verbal consent was taken from all patients explaining the objectives of the study.

METHODS:

Two and half ml of whole blood with 1:9 ratio of tri sodium citrate were collected from all participants, then centrifuged to take plasma to perform PT and APTT

Coagulometer was used for measurement of PT and APTT, automated method as same as manual method but cuvettes of one ml and magnetic stirrers used and time of clot formation were record digitally.

Normal value of PT: (12-16 second)

Normal value of APTT: (20-40 second)

Two and half ml of whole blood with EDTA anticoagulant collected to perform platelets count using automated hematological analyzer. **(Sysmex K 21).**

Normal value of PLTs count: is (150,000 to 450,000) per cubic millimeter.

All data obtained with questionnaire and biochemical analysis were analyzed using Statistical Package for the Social Science (**SPSS**), Statistical significance was accepted when **P value is < 0.05**

RESULTS:

The study included 90 Sudanese women 30 apparently normal pregnant women in second trimester, 30 apparently normal pregnant women in third trimester and 30 non pregnant women (age matched control), The mean of prothrombin time was (14.53±1.84) , (15.62±1.31), (13.09±1.81) respectively (P value =0.001) _table(1), while the mean of APTT was (35.61±6.18), (38.46±3.8) , (33.7±5.2) respectively (P value =0.003)_table(1), in addition the mean of PLTs was (254.7±82.18), (265±86.4) , (278±76.7) respectively (p value =0.547)_table(1).

Table (1): Comparison of means of PT, PTT, PLT among the cases, and control group

Variable	Case N=60	Control group N=30	P value
PT	15.08± 1.679 (11.8 – 18.2)	13.93± 1.81 (11 – 18)	< 0.004
PTT	37.03± 5.29 (27 – 54)	33.73± 5.21 (27 – 45)	< 0.007
PLTs	259.87± 83.8 (102 – 434)	277.9± 76.7 (150 – 425)	= 0.311

The table shows the mean ± SD (mini - max) and probability (P)

T-test was used for comparison.

P value ≤ 0.05 was considered significant.

Table (2): Comparison of means of PT, APTT, PLT among the second and third trimesters

Variable	Second N=30	Third N=30	P value
PT	14.53± 1.84 (11.8 – 18)	15.62± 1.31 (13 – 18)	< 0.011
PTT	35.61±6.18 (27 – 54)	38.46± 3.8 (31 – 45)	< 0.036
PLT	254.7± 82.18 (144 – 425)	265± 86.4 (102 – 434)	=0.635

- The table shows the mean ± SD (mini - max) and probability (P)
- T-test was used for comparison.
- P value ≤ 0.05 was considered significant.

There were 30 pregnant women in second trimester 2 of them showed short prothrombin time (7%) while 22 of them showed normal prothrombin time (73%) then 6 of them showed prolonged prothrombin time (20%)_table(3)

No cases showed short APTT (10%) while 25 cases showed normal APTT (83%) and 5 cases showed prolonged APTT (7%)_table(3) moreover 2 cases showed thrombocytopenia (7%) while 28 cases showed normal PLTs count (93%) and no cases showed thrombocytosis_table(3)

Table (3) Distribution OF PT, PTT, PLTs among the second trimester pregnant women

	PT		PTT		PLTs	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Less than Normal	2	7%	0	10%	2	7%
Normal Range	22	73%	25	83%	28	93%
More than Normal	6	20%	5	7% _s	0	0%
Total	30	100%	30	100%	30	100%

There were 30 cases in the third trimester no case showed short PT , while 21 cases showed normal PT (70%) and 9 cases showed prolong PT (30%)_table(4)

There were no cases showed short APTT, while 22 cases showed normal APTT (73%) and 8 cases showed prolong APTT(27%) _table(4) Moreover 2 cases showed thrombocytopenia (7%) while 28 cases showed normal PLTs count (93%) then no cases showed thrombocytosis. Table(4)

Table (4): Distribution of PT, PTT, PLTs among the Third trimester pregnant women

	PT		PTT		PLTs	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Less than Normal	0	0%	0	0%	2	7%
Normal Range	21	70%	22	73%	28	93%
More than Normal	9	30%	8	27%	0	0%
Total	30	100%	30	100%	30	100%

DISCUSSION:

The physiology of the normal pregnancy involves major changes in the coagulation system, these changes appear to be related to the development of the uteroplacental circulation and provide a protective mechanism during delivery, in this study we focus on bleeding profile (PT, APTT, PLTs count) among Sudanese apparently normal pregnant women during second and third trimesters.

Prothrombin time showed significant difference, and appear to be slightly higher in third trimester than second and controls, this result disagrees with study done with Huda I.Babiker F et al reveals that PT and APTT statistically insignificant and this indicates that pregnancy is not likely to have any adverse effect on these parameters, p value (plts=0.813/pt=0.000/APTT=0.963). (9)

Activated partial thromboplastin time showed significant difference, and appear higher among third trimester. This finding contrast with study done with Sanka et al reported shortening of PT and APTT during third trimester of pregnancy (10).

PLTs count showed insignificant result among second and third and control groups and appear higher in controls, vast majority of the women during second and third trimesters appear with normal plts count, this finding contradictory with another study by Bohlen F et al which report that platelet count decreases in normal pregnancy possibly due to increased destruction and haemodilution with maximal decrease in the third trimester (11)

CONCLUSION:

We concluded that normal pregnancy state results in significant increase in prothrombin time and activated partial thromboplastin time mainly in the third trimester while the results showed insignificant change in platelets count among pregnant women.

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