



REVIEW ARTICLE

EVALUATION OF COAGULATION PROFILE AMONG SUDANESE PREGNANT LADIES AT CONSULT CENTER

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ABSTRACT

This Normal pregnancy is considered as hypercoagulable state; a physiological safety aimed at preventing excessive maternal blood loss at delivery. The study aimed to evaluate the influence of normal pregnancy on coagulation profile (PT, APTT and TT) Platelet count and to explore changes in activity from the first through the third trimester. This case control study was performed in consult center in Sudan. A total of forty five (45) apparently healthy pregnant women (15 from each trimester) and 30 healthy non-pregnant age-matched controls were recruited. Each participant had Prothrombin time (PT). Activated partial thromboplastin time (APTT), Thrombin time and platelet count were done. Multiple comparisons were made between control values and coagulation profile at different stages of pregnancy by using the statistical package for social sciences (SPSS) version 11.5, Results were expressed as means and standard deviations, $p < 0.05$ was significant at 95 % CI. The study revealed that a significant differences in mean and P value of two groups, Platelet count were significantly decrease in pregnant women as the P value was (0.02), PT, APTT also showed lower value than in non pregnant women as the P value was (0.003 and 0.001), while Thrombin time remain at non-pregnant levels as the P value was (0.18). APTT and Platelet count were affected by gestation stage but PT was not. The means of the APTT was lower in the first, second and third trimesters compared with controls (34.1 seconds, 31.6 seconds and 29.1 seconds, respectively, vs. 39.4 seconds for control) Correspondingly, the platelet count was reduce in the first, second and third trimesters compared with controls ($257 \times 10^9/L$, $207 \times 10^9/L$, $193 \times 10^9/L$ respectively, vs. $289 \times 10^9/L$ for control group .

Conclusion: The APTT and platelet counts are significantly lower in the 3 trimester of normal pregnancy.

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INTRODUCTION

Pregnancy is a term used to describe the period in which a woman carries a fetus inside her body and it is period from conception to birth. pregnancy usually lasts 40 weeks, beginning from the first day of women's last menstrual period , and is divided into three trimesters, each lasting three month(Spong, 2013). Pregnancy is associated with changes in homeostasis, including an increase in the majority of clotting factor and decrease in quantity of natural anticoagulants and reduction in fibrinolytic activity, these changes result in state

of hyper coagulability (Bremme, 2010 and O'Riordan and Higgins, 2003) are likely due to hormonal changes and increase the risk of thromboembolism. The increase in clotting activity is greatest at the time with placental expulsion; releasing thromboplastic substances stimulate clot formation to stop maternal blood loss. As placental blood flow is up to 700ml/min, considerable haemorrhage can occur if clotting fails .coagulation and fibrinolysis generally return to pre-pregnant 3-4 weeks postpartum (Dahlman, 1985). The platelet count decrease in normal pregnancy possibly due to increased destruction and haemodalution with a maximal decrease in third trimester (Boehlen *et al.*, 2000). As most coagulation factors increase in normal pregnancy, the prothrombin time (PT)and activated partial thromoplastin time (APTT) are shortened. The PT and it derived measure international normalization ratio (INR) test for factors such as FII, FV,

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FVII, FX, and fibrinogen. Some nutritional deficiencies and or liver disease will decrease these factors and prolonged PT. Furthermore PT and APTT may artificially prolonged due to the presence of an antiphospholipid antibody such as lupus anticoagulant in fact patients with APLA are prothrombotic. Factor VIII (FVIII) Von willebrand factor (vWf). torescen cofactor (RCoA) and factor X (FX) and XII (FXII) increase during pregnancy (2-4) levels of factor VII (FVII) increase during pregnancy and reach very high level (up to 1000%) by term. Fibrinogen also increases during pregnancy with levels at term 200% above pre-pregnant levels (Dalaker and Prydz, 1984). Fibrinolysis is reduced in pregnancy due to decrease in t-PA activity which remains low until 1 h postpartum when activity returns to normal. This reduction is due to the gradual eventually threefold increase in plasminogen activator inhibitor-1 (PAI-1) and the increasing levels of plasminogen activator inhibitor -2 (PAI-2) (Bremme, 2010 and Lee *et al.*, 2006). The placental produces (PAI-1 and is the primary source of PAI-2. PAI-2 levels at term are 25 times that of normal plasma (Bremme, 2010 and Persson *et al.*, 1980). Postpartum t-PA levels return to normal as PA-1 levels decrease, however PA-2 levels remain elevated for few days (Bouma and Meijers, 2004).

MATERIALS AND METHODS

A case control study carried out at of Medical Laboratory science, AL-Neelain University with sample comprised of 45 Sudanese normal pregnant ladies from consult Center and 30 non pregnant their ages range was 17-42. centrifuged at 4000rpm for 15 min to preparation PPP and the plasma transferred to new plain containers, samples were analyzed by using Biomed reagents and Semi- automated and EDTA container (3ml in each), then blood samples in citrate were coagulometer Used to measure the (PT, APTT, TT) and Age matched between two group, pregnant ladies with disease and complication that affected the coagulation profile were excluded. Blood specimens were taken from normal pregnant ladies, 6 ml of venous blood was collected in tri sodium citrate platelets counted by using automated hematology analyzer. The mean \pm SD was determined and then compared between the case group and control group by calculating the p.value; the data were analyzed using SPSS.

RESULTS

The results of present study showed that the mean of APTT during pregnancy (31.6 seconds) which was lower compare with control group mean (39.4 seconds) *p-value* (0.001), as show table 2. and difference between trimesters first (34.1 seconds) (31.6 seconds) *third* (29.1 seconds) respectively table3 however the platelet count was lowered in pregnant

Table 1. Descriptive Statistics

Status		Mean	Std. Deviation
Case	PT	10.831	0.9556
	APTT	31.604	2.7673
	TT	16.927	1.7286
	Platelets	219.33	47.189
	Age	28.24	5.666
Control	PT	15.890	.8066
	APTT	39.473	3.2301
	TT	13.683	1.1231
	Platelets	289.37	62.446
	Age	30.63	6.995

Table 2. T test for mean difference in coagulation parameters between cases and control

	Status	N	Mean	P value
PT	Case	45	10.831	0.003
	Control	30	15.890	
APTT	Case	45	31.604	0.001
	Control	30	39.473	
TT	Case	45	16.927	0.180
	Control	30	13.683	
Platelets	Case	45	219.33	0.02
	Control	30	289.37	

ladies mean (219 10^9 /cumm with p value of 0.02) and decrease in each trimester (257x 10^9 /cumm), 207x 10^9 /cumm), 193 x 10^9 /cumm) as show table3. While PT in pregnant ladies which was significantly lowered (10.8) compared to control (15.8) (*p-value*0.003) but was no significantly different between trimesters first (11.1) second, (10.5) second, third (10.8) second. TT was no statistically difference in pregnant ladies mean 16.9 *p-value* 0.18) and have no significant difference between trimester mean (15.7 second, 16.9 second, 16.1 second) as shown in table 3.

Table 3. The mean of coagulation parameters during gestational stages

	First trimester	Second trimester	Third trimester
PT (second)	11.147	10.793	10.553
APTT (second)	34.193	31.673	29.147
TT (second)	15.700	16.907	16.173
Platelets (10^9 /cumm)	257.53	207.07	193.40

DISCUSSION

Thrombophilia predisposes a woman for an increased risk of developing both early and late complications in pregnancy. These include recurrent miscarriages, PROM and late placental vascular-mediated problems (fetal loss, preeclampsia, placental abruption and intra-uterine growth restriction (Simcox *et al.*, 2015). The concentrations of coagulation factors V, VII, VIII, IX, X, XII and von Willibrand factor rise significantly during pregnancy, accompanied by a pronounced increase in the concentration of plasma fibrinogen (Bremme, 2003). Oestradiol induced alteration of triglyceride is probably responsible for these changes in coagulation and fibrinolysis (Sattar *et al.*, 1999). In this cross sectional case control study, the authors looked into the PT, APTT and TT levels and Platelet count of 45 pregnant women during different trimesters of pregnancy and 30 non pregnant ladies.

The present study revealed that a significant differences in mean and P value of two groups, Platelet count were significantly decrease during pregnancy, as the P value was (0.02), this is termed as gestational thrombocytopenia, it's partly due to hem dilution and partly due to increased platelet activation and accelerated clearance, PT, APTT also showed lower value than in non pregnant women as the P value was (0.003 and 0.001), while Thrombin time remain at non-pregnant levels as the P value was (0.18). APTT and Platelet count were affected by gestation stage but PT was not. Increased levels of coagulation factors are due to increased protein synthesis mediated by the rising estrogen levels. In in vitro experiments, pregnant plasma has been demonstrated to be capable of increased thrombin generation. This study was in agreement with Ibeh N and his college, they reported that

show significant difference in mean and p-value of two groups in APTT and platelet count and are significantly lower value in each trimester (Ibeh *et al.*, 2015).

Conclusion

The present study shows a shortened APTT and platelet count during pregnancy and. Further studies with larger cohorts and other coagulation parameters are required to predict clinical outcomes in pregnant women with shortened coagulation profile.

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