



Estimation of Plasma D-Dimer Levels in Sudanese Women with Preeclampsia

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Abstract

Background: The literature suggests that the haemostatic abnormalities have taken a big part in preeclampsia. D-dimer is a biomarker of fibrin formation and degradation. **Objective:** The present study was aimed to estimate and evaluation of the plasma D-dimer levels in Sudanese preeclampsia women. **Material and Methods:** This is an analytical descriptive case control study done during March 2016. A total of 100 participants were enrolled in this study, classified into two groups: the first group consisted of 50 Sudanese women diagnosed by preeclampsia as patients group, while the second group consisted of 50 normotensive women and their age matched to patients, designated as normal control group. 3 milliter of veins blood samples were collected in containers containing 3.2% tri sodium citrate as anticoagulant, then the platelet-poor plasma was prepared immediately by centrifuging for 15 minutes at approx 3000 rpm. The plasma D-dimer levels were done using MISPA-i2 (Switzerland). The data were analyzed by using SPSS (version 20). **Results:** The current study showed that the D-dimer level was statistically significant higher in preeclampsia women compared with normotensive pregnant women (Mean \pm SD: 1.016 ± 0.158 vs 0.168 ± 0.045 with P value 0.000, respectively). **Conclusion:** This study concluded that the plasma D-dimer level was significantly elevated in Sudanese women with preeclampsia.

Subject Areas

Hematology

Keywords

D-Dimer, Hypercoagulable, Preeclampsia, Sudan

1. Introduction

Preeclampsia (PE) or Eclampsia (E) is one of the most common complications

characterized by hypertension (raised blood pressure) [1]. The development of hemolysis (H), elevated liver enzyme (EL), low platelets (LP) is called HELLP syndrome [2] [3]. During normal pregnancy, the placenta vascularizes to allow for the exchange blood [4], water, gases, solute, including nutrient and wastes between the mother and fetal circulation [5]. The poor placental perfusion was occurred in abnormal pregnancy, which can affect of some [6] maternal organs, such as dysfunctional liver (rupture affected by coagulation factor), renal failure [7] or UTI during gestation [8], stroke and one of the signs is the excretion of large amount of protein in the urine appearing after the 20 or 23 weeks of gestation [1]-[5]. Preeclampsia women present with headache, blurred vision, flashing lights, abnormal pain especially in the upper right side, nausea, shortness of breath. Many factors obviously increased the preeclampsia in pregnant women [9] [10], for instance: history Diabetes mellitus, history of hypertension, lupus anticoagulant, rheumatoid arthritis, advanced maternal age more than 35 years, multiple gestation [9], chronic hypertension [11], Thrombotic Thrombocytopenic purpura [12], and history of preeclampsia [13]. The pregnancy is associated to physiological changes for the maintenance of the fetoplacental unit [14]. The haemostatic abnormalities in preeclampsia is hypercoagulable state, this is due to activation of coagulation and increased fibrinolysis, which may elevate the plasma D-dimer [14]. The preeclampsia diseases are also characterized by seizures as a sign of affection of the cerebral vessels (neurologic), or disseminated intravascular coagulation, but pulmonary edema is rare [5].

2. Material and Method

This is a descriptive case control study done at Bahri Teaching Hospital and Al neelain University faculty of medical laboratory science, Khartoum, Sudan. A total of 100 pregnant women were enrolled in this study, 50 were known Sudanese women professionally diagnosed by preeclampsia (high blood pressure and proteinuria before 34 weeks of gestation) their mean age is 28.1 ± 2 years {17 (34%) in first gestational and 33 (66%) in second gestational} admitted to Obstetrics and Gynecology department at Bahri Teaching Hospital, Khartoum, Sudan during March 2016. Other 50 were normotensive women designated as normal healthy control group matched with patients in nationality, age and gestational age. 3 ml of venous blood were collected in a container contains 3.2% trisodium citrate at a ratio of 9:1 as anticoagulant, then platelets poor plasma (PPP) was immediately prepared by centrifuged for 15 minutes at 3000 rpm at room temperature. The plasma D-dimer levels were measured using (MISPA-i2 Reagent-Switzerland). This study was approved by the faculty of medical laboratory sciences Alneelain University ethical committee, the informed consent was taken from every woman enrolled in this study before the sample was collected. A woman has a history of coagulopathy, liver disease or any inflammatory disorders were excluded from this study. The data was analyzed by using Statistical Package for the Social Sciences (SPSS) version 20. The T. test was used to compare the plasma D-dimer level between the two study arms, and the level of p

value less than 0.05 considered significance.

3. Result

A total of 100 women were enrolled in this study, 50 of them known Sudanese female diagnosed with preeclampsia wear attended to Bahri Teaching Hospital as test group and others 50 of normotensive pregnant women matched with patient in age and in gestational age as control group.

The current study showed that the D-dimer levels was statistically significant higher in Sudanese woman with preeclampsia in compares on with those normotensive pregnant women Mean \pm SD (1.016 \pm 0.158 vs 0.168 \pm 0.045 with P value 0.000) (**Table 1**).

4. Discussion

The hypercoagulability in pregnancy, this can in turn lead to complication like early onset hypertensive disorder of pregnancy [2] [15], that lead to decrease in natural anticoagulant and activation and increase in coagulation in early stage of fibrin clot formation, activated thrombin cleaves fibrinogen, soluble plasma protein convert immediately fibrin clot lead to micro vascular thrombi [15] [16]. The criteria that define pre-eclampsia have not changed over the past decade [17] [18]. Pre-eclampsia is a multisystem disorder that complicates 3% - 8% of pregnancies in western countries and constitutes a major source of morbidity and mortality worldwide [19] [20]. While in Sudan the complication with pre-eclampsia/eclampsia is 4.2% [21]. The current study aimed to estimate and evaluation of the plasma D-dimer level in Sudanese preeclampsia women. The analysis of the present study revealed that the D-dimer level was statistically significant elevated in the woman with preeclampsia in compares on with those normotensive pregnant women (Mean \pm SD 1.016 \pm 0.158 vs 0.168 \pm 0.045 with P value 0.000) respectively. This finding was in concordance with eight previous studies, the first study done in 2012 by Pinheiro Mde B. *et al.* in meta-analysis who was indicates that increased plasma D-dimer is associated with preeclampsia vs normotensive pregnant subjects [22]. Second study by Bozkurt M *et al.* (2015) who reported that D-dimer level was increased in preeclampsia and eclampsia patients [23]. Third study showed that the plasma D-Dimer concentration level were significant higher in patient with preeclampsia women compared with normotensive pregnant women (Means 1.016 \pm 0.158) versus (Mean \pm SD 0.168 \pm 0.045 with p value < 0.000) respectively [24]. Fourth and fifth studies done in Japan (1991) and Norway (1997) by Terao *et al.* and Schjetlein *et al.* respectively, who concluded that the D-Dimer level was increased in preeclampsia and eclampsia patients [25] [26]. Six, Seven and Eight studies were cited by Bellart *et al.* in Spain (1998) He *et al.* in Sweden (1997) and Heilmann *et al.* in Germany (2007) who reported that the D-dimer levels were significant higher in patient with preeclampsia compared with normotensive pregnant women [27] [28] [29]. The interesting finding of this study was in contrast with Dusse *et al.* (2003) in Brazil [30], and with study done in Portugal (2008) by Catarino *et al.*

Table 1. Association of plasma D-dimer levels in preeclampsia woman and normotensive pregnant.

Parameter	Subject	Number	Mean \pm SD	p value
D-dimer Ng/mg	Patient	50	1.016 \pm 0.158	0.000
	Control	50	0.168 \pm 0.045	

T-test was used for comparison. p value < 0.05 was considered significant.

[31] who showed that there is no any significant different in D-dimer level between preeclampsia woman and normotensive woman this might be due to small samples size in our study our may attributed to different ethnic background of population.

5. Conclusion

This study concluded that the hypercoagulable state was present in Sudanese women with preeclampsia.

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