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Serum Concentrations of PIGF (Placental Growth Factor) Severe Preeclampsia Patients in Dr. Mohammad Hoesin Palembang General Hospital

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Abstract

Objective: To analyze the relationship between maternal serum concentration of PIGF with Severe Preeclampsia

Methods: A case study on the control of Severe Preeclampsia group as a group of cases and normal pregnancies as a control group. Data obtained dientry using SPSS version 21.0 software Windows. Analysis conducted in the form of univariate, bivariate analysis, ROC analysis and multivariate analysis

Results: Based on the results of ROC analysis showed that the cut-off point of PIGF in preeclampsia is predictive 123.35 pg / ml (sensitivity 93.3%, specificity 70.0%). The percentage of Severe Preeclampsia majority occur in low PIGF level group (38.3% of the 60 samples). The existence of a significant relationship with the occurrence of low levels of PIGF in Severe Preeclampsia (p= <0.001).

Conclusion: There is a significant correlation with the incidence of low levels of PIGF in Severe Preeclampsia

Keywords: Placental Growth Factor, Pregnancy, Severe Preeclampsia

Abstrak

Tujuan: Untuk menganalis hubungan antara konsentrasi serum PIGF maternal dengan kejadian preeklampsia berat

Metode: Studi kasus kontrol pada kelompok preeklampsia berat sebagai kelompok kasus dan kehamilan normal sebagai kelompok kontrol. Data yang diperoleh dientry menggunakan software program SPSS versi 21.0 Windows. Dilakukan analisis berupa analisis univariat, analisis bivariat, analisis ROC dan analisis multivariat

Hasil: Berdasarkan hasil analisis ROC didapatkan bahwa cut off point PIGF dalam prediksi preeklampsia adalah 123,35 pg/ml (sensitifitas 93,3%; spesifitas 70,0%). Persentase kejadian PEB mayoritas terjadi pada kelompok kadar PIGF rendah (38,3% dari 60 sampel). Adanya hubungan bermakna kadar PIGF rendah dengan kejadian PEB (p= <0.001).

Kesimpulan: Terdapat hubungan yang bermakna kadar PIGF rendah dengan kejadian PEB

Kata Kunci: Placental Growth Factor, Kehamilan, Preeklampsia Berat

INTRODUCTION

PlGF (Placental Growth Factor) and VEGF (Vascular Endothelial Growth Factor) is a factor proangiogenic best and most potent who work directly which increases vascular permeability. PlGF is a member of the group other than VEGF VEGF-B, VEGF-C, VEGF-D and VEGF-E. These molecules are secreted dimeric glycoproteins.[1,2]

In normal pregnancy PlGF worth 40-50 pg / ml at 7-15 weeks gestation. At the age of 28-30 weeks gestation increased dramatically PlGF worth 180-200 pg / ml, whereas the term gestational age between 39-41 weeks gestation serum concentrations of PlGF worth 55-65 pg / ml. Serum PlGF at the end of the second trimester increased up to four times from the end of the first trimester. Whereas, if an interruption occurs in the placenta of pregnancy with preeclampsia, the concentration of PlGF would decreased.[3-5]

In some hospitals in Indonesia the incidence of preeclampsia was not much different. RSCM (Cipto Mangunkusumo Hospital), Jakarta reported that in 2002 there were the incidence of preeclampsia by 9.17%. The incidence of preeclampsia in RSHS (RS Hasan Sadikin) in 1998 amounted to 13.05, while in RSHAM (H. Adam Malik Hospital) in 2002 amounted to 7.0%. Medical records at the Dr. Mohamad Hoesin Palembang General Hospital, the incidence of preeclampsia in 2012 found 12%.[6]

Etiology of preeclampsia is still unknown. There are several hypotheses to explain the pathogenesis of preeclampsia include placental ischemia theory, theory maladaptation immune, genetic theory and the theory of change in NOS and activities antitoxin.[6,7] It is considered important in the development of preeclampsia there is incomplete trophoblast invasion or can also terms be regarded as abnormal endovascular invasion of the maternal spiral arteries, which cause bad perfusion trophoblast. Furthermore, it has spread toxins that cause dysfunction of endothelial cells and vascular endothelial function imbalance maternal circulation.[8,9]

There is another theory says preeclampsia associated with an imbalance of circulating angiogenic factors. The imbalance between antiangiogenic form of soluble fms-like tyrosine kinase 1 (sFlt-1) and soluble soluble endoglin high with proangiogenic the form of a low PlGF and VEGF. This condition triggers vascular endothelial cell injury in the liver, kidney, brain and placenta. Endothelial dysfunction and injury causes a state of hypertension, proteinuria and other systemic manifestations syndrome.[7,11]

The pathogenesis of preeclampsia is still being studied further, but allegedly associated with angiogenesis and vasculogenesis process that occurs in fetomaternal circulation. Both of these processes is necessary to anticipate the threat of hypoxia on fetomaternal circulation along with the growth of the fetus. The process of angiogenesis and vasculogenesis require several growth factor. The main growth factor in this process are VEGF and PlGF.[11,12]

Many research shows that in pregnant women with preeclampsia, trophoblast implantation less than perfect so that blood flow is reduced, and placental hypoxia and an increase in the production of sFlt1 that will bind VEGF angiogenic factors are independent and free P1GF so that the amount in circulation is reduced. This will cause the endothelial dysfunction that would disrupt the blood brain barrier and cause intracranial hypertension, causing edema, liver injuries and affect the function of capillary glomerulus. When VEGF on renal prodocyte decreased by 50%, glomerular endothelial cells will swell, capillaries collapse and cause proteinuria.[13-17]

Petrozella et al found increased levels of sFlt-1 and PlGF levels decrease compared to both normal mRNA concentrations in placenta and serum levels in preeclampsia.[7] Grill et al observing the relationship between placental protein in patients with preeclampsia and protein-protein sFlt proangiogenic such as VEGF and PlGF concentrations.[9] Grill described in Severe Preeclampsia will decrease from the first trimester of pregnancy until delivery. Thus the level of sFlt-1 increased maternal preeclampsia and vice versa levels of VEGF and free PlGF decreased.[9,18]

Chaiworapongsa et al continued evaluation of this antiangiogenic protein. They showed concentrations of angiogenic and antiangiogenic

factors from serum of pregnant women with preeclampsia at 34-36 weeks of gestation. They showed that the combination of soluble endoglin levels and the ratio of sFlt-1 by PlGF increases the predictive value of preeclampsia, both of which occur earlier or slower, and also the prediction of severe impact of this disease (fetal growth restriction and the HELLP syndrome) 10 weeks before emerging clinical manifestations.[5,16,19]

Mutter et al makes the size of the angiogenic protein as a potential test tool in predicting preeclampsia, which is when the increase in the level of sFlt-1 and lower levels of free VEGF, PlGF is free, and urinary PlGF about 5 weeks prior to the manifestation of preeclampsia. They conclude that VEGF and PlGF decreased, soluble endoglin increased, each with a different mechanism causes endothelial dysfunction and mediate the manifestation of preeclampsia. Research in Indonesia on PlGF in preeclampsia is still has inadequate data as reported by Ekapatria et al. They compared the levels of PlGF between early-onset preeclampsia group and late-onset in Dr Hasan Sadikin, Bandung. This makes the interest of researchers to examine further why PlGF decreased in patients with Severe Preeclampsia in Dr. M. Hoesin Palembang General Hospital.[9-11]

Some researchers at the above also show that low serum levels of PlGF can be a useful marker in predicting and diagnosing Severe Preeclampsia. Therefore, this research needs to be done in the clinical management of Severe Preeclampsia in Department Obstetrics and Gynecology Dr. M. Hoesin Palembang General Hospital.

METHODS

Case-control study in Severe Preeclampsia group as a group of cases and normal pregnancies as a control group. Data obtained entered using SPSS version 21.0 software Windows.

RESULT

Data taken in this study of primary data is to perform sampling of maternal blood were diagnosed with Severe Preeclampsia from June 2013 to February 20[illegible] routine urine and [illegible] been done before in the [illegible] Preeclampsia. Researchers [illegible] PlGF in maternal blood [illegible] suffer from Severe Preeclampsia [illegible] pregnant women in the [illegible] The characteristics of the [illegible] described as follows.

CHARACTERISTICS OF [illegible]

This study is a case-control [illegible] the aim to determine the [illegible] levels in the two groups and [illegible] a connection with a reduction in the [illegible] of Severe Preeclampsia serum PlGF [illegible] subjects were normotensive pregnant [illegible] and Severe Preeclampsia. Data [illegible] is done in IRD (Emergency Room), [illegible] room and outpatient clinic Obstetrics [illegible] Palembang. Subject recruitment carried [illegible] accordance reference with full respect for the freedom of the subject.

The following table below describes the characteristics of the study subjects which [illegible] risk factors for preeclampsia.

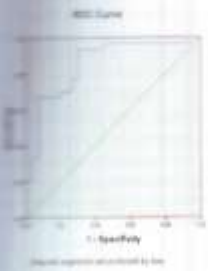
Table 1. Characteristics of Research Subjects

Characteristic	Severe Preeclampsia		Normal		Total	
	n	%	n	%	n	%
Age (Years)						
< 20	0	0	2	3,3	2	3,3
20 – 35	20	33,3	23	38,3	43	71,7
> 35	10	16,7	5	8,3	15	25
Parity						
1	8	13,3	14	23,3	22	36,7
2	4	6,7	5	8,3	9	15
> 2	18	30	11	18,3	29	48,3
History of hypertension						
Hypertension (+)	11	18,3	0	0	11	18,3
Hypertension (-)	19	31,7	30	50	49	81,7
Gestational Age						
13 - 28 weeks	1	1,7	5	8,3	6	10
≥ 29 weeks	29	48,3	25	41,7	54	90

Area Under the Curve

Asymptotic Sig.[b]	.000

WITH SEVERE



Area Under the Curve

	Asymptotic 95% Confidence Interval	
Asymptotic Sig.[b]	Lower Bound	Upper Bound
.000	.754	.952

From the calculation of ROC and AUC (Area Under the Curve) PIGF levels, it can be concluded that:

a. PIGF degree of sensitivity and specificity in determining the incidence of preeclampsia was significantly (P <0.05) was excellent / good (AUC = 0.853, 95% CI 0.754 to 0.952)

b. PIGF cut-off point in the determination preeklampisa with the best sensitivity and specificity were in the value of PIGF 123.35 pg / ml (sensitivity = 93.3%; specificity = 70.0%)

2. PIGF Relationship with Severe Preeclampsia

Table 2. Distribution Category PIGF levels with Severe Preeclampsia (SP)

PIGF	SP (+)		SP ( )		Total	
Category	N	%	N	%	N	%
<123,35	21	35	2	3,3	23	38,3
≥123,35	9	15	28	46,7	37	61,7
	30	50	30	50	60	100

Descriptively shown that the percentage of Severe Preeclampsia majority occur in low PIGF level group (38.3% of the 60 samples). This finding is consistent with the theory that low levels of PIGF is closely related to the high incidence of Severe Preeclampsia. It is also strengthened by the statistical analysis showed a significant association PIGF levels (cut off point = 123.35 pg / ml) with Severe Preeclampsia events with OR = 21, which showed that patients with low levels of PIGF (PIGF <123.35 pg / ml) 21 times greater risk of experiencing Severe Preeclampsia than patients with higher levels of PIGF.

Conclusion

Researcher can infer that PIGF concentrations in normal pregnancy >123.35 pg / ml with sensitivity 93.3% and specificity of 70% and in pregnancy with Severe Preeclampsia <123.35 pg / ml with 93.3% sensitivity and 70%

specificity. There is a significant relationship between low levels of PIGF with incidence of Severe Preeclampsia.

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