



Clinicopathological Characteristics of Placenta Samples of Preeclampsia

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Abstract

Preeclampsia is a systemic syndrome in pregnancy that is characterized by decreased organ perfusion due to endothelial dysfunction and systemic inflammation. It caused by many proposed etiologies and multifactorial factors behind it, thus preeclampsia is known as the disease of theory. Preeclampsia can be divided into 2 categories based on the clinical presentation, which are: preeclampsia and severe preeclampsia. The aim of this study is to determine the clinicopathological characteristics of preeclampsia patients. A descriptive study using 56 samples of placenta from preeclampsia patients was conducted, and the following clinical characteristics were presented: age, gestational age, gravida, and hypertension history. Preeclampsia was found in 51.8% of the samples (29) and severe preeclampsia was found in 48.2% of the samples (27). Most samples (69.6%) had an age range of 20-35 years, 73.2% (41 samples) had 2-5 times of pregnancy (gravida), 76.8% (43 samples) had 37-42 weeks of pregnancy, and most samples (73.2%) had no hypertension history. The histopathological found calcification and syncytial knots in villi chorialis.

Keywords: Placenta; Preeclampsia; Clinicopathological characteristics.

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1. Introduction

Preeclampsia is a complex disorder in pregnancy characterized by hypertension and proteinuria, and has become one of the major causes of morbidity in maternal and neonatal [1]. Hypertensive disorders are generally one of the most common disorders in pregnancy. In Indonesia, hypertensive disorder was the second leading cause of maternal death, with the maternal mortality rate still relatively high [2]. According to WHO, the number of cases of preeclampsia is seven times higher in developing countries such as Indonesia, with a prevalence of cases of around 1,8-18% compared to developed countries, with a prevalence of cases of around 1,3-6%. There was no significant decrease in preeclampsia incidence in the last two decades, in contrast to incidence of infection cases, which decreased with the development of antibiotic findings [2,3].

Preeclampsia is a serious and complex health problem and continues to be a complication in approximately 15% of women [4,5]. Preeclampsia causes abnormalities during pregnancy and also problems after delivery due to endothelial dysfunction in various organs [2]. Women with preeclampsia have a 2 to 5-fold greater risk of developing cardiovascular diseases such as hypertension, stroke, and heart disease 5-15 years after pregnancy, compared with normotensive women in their pregnancy [5,6].

The pathogenesis of preeclampsia was still unclear until now, influenced by various factors and theories such as maternal, genetic, immunological, and environmental factors [5]. There are some risk factors for developing preeclampsia, such as old maternal age, chronic hypertension, diabetes mellitus, obesity, history of previous pregnancies with preeclampsia, history of preeclampsia in siblings, new paternity, and also conditions associated with increased placental mass such as multiple pregnancy and hydatidiform mole [1]. In addition, there are studies that report an association of preeclampsia with fetal growth retardation in a certain population [1,7].

Preeclampsia is characterized by the presence of new-onset hypertension and proteinuria, which occur at more than 20 weeks of gestational age. There are two categories of preeclampsia based on the clinical presentation of patients, which are preeclampsia and severe preeclampsia. The diagnosis of preeclampsia is made by the presence of hypertension in more than 20 weeks of pregnancy with more than 140 mmHg systolic pressure or more than 90 mmHg diastolic pressure and proteinuria. In conditions in which hypertension is not accompanied by proteinuria, the diagnosis of severe preeclampsia can be made by several signs: systolic blood pressure of more than 160 mmHg or diastolic blood pressure of more than 110 mmHg, or one of the following signs: thrombocytopenia, renal insufficiency, liver function impairment, pulmonary edema, and cerebral or visual symptoms [2], Roberts 2013. The degree of proteinuria varies from minimal to nephrotic, but proteinuria levels have no effect on either maternal or fetal outcomes. Serious maternal complications can occur, including acute renal failure, abruptio placenta, seizures, pulmonary edema, acute liver failure, hemolysis, and/or thrombocytopenia [1,8].

2. Materials and Methods

This study was a descriptive study with a sample population that included pregnancy with preeclampsia. Fifty-

six (56) samples of placenta tissues were collected from April 2018 to July 2018 in Hasanuddin University Hospital and consisted of 29 samples of PE and 27 samples of SP through data on medical records. Another data of clinical characteristics (patients' age, number of gravids, gestational age, and history of hypertension) were also collected.

3. Result

We collected 56 tissue samples from preeclampsia patients, consisting of 29 cases of PE (51,8%) and 27 cases of SP (48,2%). The clinical characteristics of samples are shown in Table 1. The samples in this study have an age range of 16 to 42 years. The samples were dominantly from the 20-35 year category, which has 39 samples (69.6%), and dominantly from the G2-G5 pregnancy category, with 41 samples (73.2%). The majority of samples had a 37-42 week pregnancy range, which is 43 samples (76.8%), and dominant samples had no hypertension history, as many as 41 samples (73.2%).

Table 1: Clinical Characteristics of Samples (n=56)

Variable	N (%)
Degree of Preeclampsia	
PE	29 (51,8)
SP	27 (48,2)
Age	
< 20 years	5 (8,9)
20-35 years	39 (69,6)
> 35 years	12 (21,4)
Gravida	
G1	13 (23,2)
G2 – G5	41 (73,2)
> G5	2 (3,6)
Gestational Age	
< 37 weeks	13 (23,2)
37-42 weeks	43 (76,8)
> 42 weeks	0 (0)
Hypertension History	
No	41 (73,2)
Yes	15 (26,8)
Total	56 (100)

Figure 1 shows the histopathology or microscopic findings of the placenta tissue from preeclampsia patients, which are calcification and syncytial knots, occurred in the villi choralis.

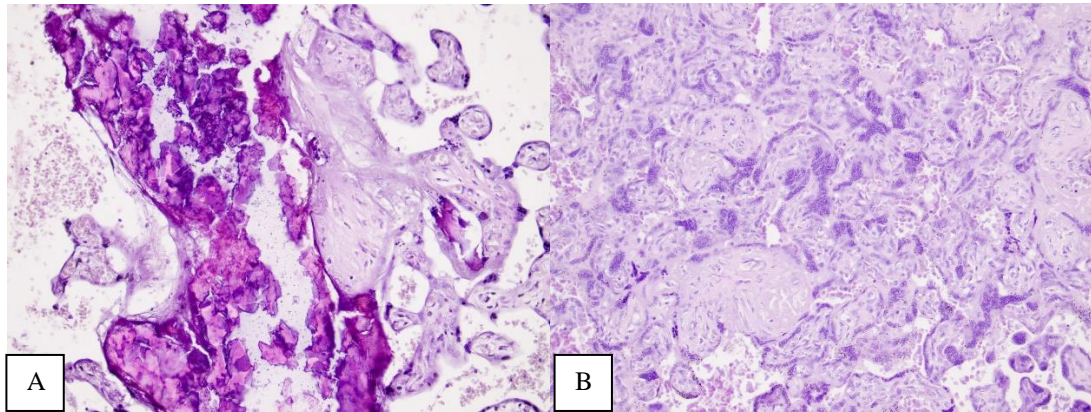


Figure 1: Calcification (A) and Syncytial knots (B) in the villi choralis of placenta tissue in preeclampsia (HE, 200x)

4. Discussion

Our samples were predominantly from the 20–35-year category, which has 39 samples (69.6%). According to Tessema [9], one of the risk factors for preeclampsia is pregnant women older than 35 years of age, as those women who are at this age have 4,5 times the risk of developing preeclampsia in their pregnancy compared with women aged 25-29 years. Our study's samples were also predominantly multigravida, with as many as 41 samples (73,2%) having 2 to 5 pregnancies. In a study by Vincent [10] stated that cases of preeclampsia and eclampsia were mostly found in primigravida aged 20-35 years of age. Meanwhile, another epidemiological study by Anant & Basso [11] stated that there is a significant risk of neonatal death associated with hypertension in pregnancy, especially in multipara or multigravida women. The gestational age factor has been variedly reported in many studies. A study by Lamminpaa [12] stated that preeclampsia is more common in pregnant women with advanced gestational age. Advanced gestational age was an independent risk factor for an unfavorable outcome in primigravida accompanied by preeclampsia and can cause complications of preterm labor and impaired fetal development. An epidemiological study also conducted by Vincent [10] at a hospital in Indonesia found that cases of preeclampsia were more common in pregnant women with a gestational age of more than 37 weeks. In our study, the dominant samples were women with a 37-42 gestational age range. But another study by Mostello [13] stated that the risk of preeclampsia is inversely proportional to increasing gestational age. That study found that the younger the gestational age, the higher the risk for preeclampsia. Forty-one (41) samples in our study (73.2%) had no hypertension history before pregnancy, while the other 15 samples (26.8%) had a hypertension history. Tessema [9] stated that a personal hypertension history or a family history of hypertension, old age, and a history of diabetes are risk factors associated with preeclampsia. Catov [14,15] also stated that hypertension and other pre-existing maternal conditions as well as gestational hypertension were associated with a 22.3% increase in cases of preeclampsia among other nulliparous women. In addition, Bezerra [16] in his study found that pregnant women who had mothers with a history of hypertension, preeclampsia, and eclampsia in the past had a significant relationship in statistical tests to develop

preeclampsia with more severe conditions in the present pregnancy. This risk is also present in pregnant women with siblings with a history of hypertension. The abnormalities characteristic of preeclampsia can also be seen in the placenta, both macroscopically and microscopically. Macroscopic examination reveals placental infarction and calcification. On microscopic examination, the findings that can be found from preeclampsia placental tissue are: an increase in the trophoblast cell syncytial knots in the chorionic villi as a result of uteroplacental malperfusion; fibrinoid necrosis, which is replacement of villus by fibrin; hyalinized villi due to hypovascularization; atherosclerosis; stromal fibrosis; calcification; and endothelial damage [1,4,17]. The limitation of this study is that there aren't enough samples to adequately describe the characteristics of preeclampsia in a population. Further investigation is also required into the theories behind these clinicopathological variables.

5. Conclusion

Patients with preeclampsia are typically between the ages of 20 and 35 years, with gravida 2-gravida 5, and at 37-42 weeks of gestation. Most patients had no history of hypertension. The patients were almost equal in degree of preeclampsia, where preeclampsia had a slightly higher number than severe preeclampsia. The histopathology findings revealed calcification and syncytial knots in the villi chorialis.

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