

The Effect HELLP Syndrome on Neonatal Asphyxia in Margono Soekarjo Hospital Purwokerto

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Abstract—Introduction: hellp syndrome is a dangerous condition that occurs in pregnant women with preeclampsia. HELLP syndrome occurs in 10-20% of cases of pre-eclampsia. The characteristics of the HELLP syndrome include; thrombocytopenia, hemolysis (microangiopathic hemolysis anemia) and abnormal liver enzymes. The main causes of perinatal death associated with the incidence of HELLP syndrome include; prematurity, intrauterine growth restriction (IUGR), asphyxia, placental insufficiency, and placental abruption. The objective was to determine the effect of HELLP syndrome on neonatal asphyxia in pregnant women with preeclampsia. The method used was descriptive analytic with approach cross sectional. The number of samples used was 42 people with purposive sample technique Data analysis used the chi square. Result shows that there is a relationship between HELLP syndrome and neonatal asphyxia in pregnant women with preeclampsia with a value of $p = 0.036$, OR: 5.464, which means that babies born to pregnant women with HELLP syndrome are at 5,464 times more likely to experience asphyxia than pregnant women with preeclampsia without HELLP syndrome. **Conclusion:** There is a relationship between HELLP's syndrome with neonatal asphyxia in pregnant women with preeclampsia

Keywords—HELLP's syndrome, asphyxia neonatorum, preeclampsia.

I. INTRODUCTION

Preeclampsia is a pregnancy-specific syndrome in the form of hypertension accompanied by proteinuria that appears starting at 20 weeks of gestation. The minimum criteria for the diagnosis of preeclampsia are hypertension with a blood pressure greater than equal to 140/90 mmHg and minimal proteinuria, namely the presence of more than 300 mg protein in the urine per 24 hours.

Preeclampsia adversely affects both the mother and the fetus. Complications that can occur in the mother include HELLP syndrome, pulmonary edema, kidney problems, bleeding, placental abruption and even maternal death. Meanwhile, complications in infants are premature birth, fetal distress, low birth weight or intra uterine fetal death (IUFD).

HELLP syndrome is a dangerous condition that occurs in pregnant women with preeclampsia. HELLP syndrome occurs in 10-20% of cases of pre-eclampsia. The term HELLP Syndrome was introduced for the first time by Weinstein [1] which stands for Hemolysis, Elevated Liver Enzymes and Low Platelet Counts. HELLP syndrome is a collection of symptoms that occur multisystem in cases of severe preeclampsia and eclampsia. The characteristics of the HELLP syndrome include; thrombocytopenia, hemolysis (microangiopathic hemolysis anemia) and abnormal liver enzymes (Benedetto et al 2011).

Hanumanthappa [2] states that the possible pathophysiology underlying HELLP syndrome is a deficiency in the vascular repair mechanism and coupled with the

occurrence of vasospasm, the blood vessels will develop into endothelial dysfunction. Endothelial dysfunction will increase platelet aggregation and fibrin activation. Aggregation and activation of fibrin will lead to the appearance of the manifestations/symptoms of HELLP syndrome. Excess aggregation of platelets causes thrombocytopenia, whereas activation of fibrin causes hemolysis of erythrocytes that pass through the dysfunctional endothelium. Elevated liver enzymes result from ischemia liver. The three main manifestations/symptoms of HELLP syndrome are due to endothelial dysfunction.

Perinatal mortality and morbidity are higher in fetuses than in mothers. The effects that occur on babies are directly related to gestational age at birth. If the baby was born <32 weeks' gestation, then the baby was at the highest risk with a 32% mortality, while babies born >32 weeks' gestation had a mortality rate of 8%. The main causes of perinatal death associated with the incidence of HELLP syndrome include; prematurity, intrauterine growth restriction (IUGR), asphyxia, placental insufficiency, and placental abruption. Thrombocytopenia occurs in 15-38% of neonates with HELLP syndrome [3].

Babies born prematurely face a variety of complications, including respiratory distress syndrome, electrolyte imbalance, metabolic problems, infections, necrotizing enterocolitis, patent ductus arteriosus (PDA), apnea, bradycardia, anemia, and Intraventricular hemorrhage (IVH). In addition, long-term complications include chronic lung disease, retinopathy of prematurity, vision problems, hearing loss, developmental delays, and learning difficulties [4].

IUGR is a prenatal diagnosis caused by reduced blood flow to the placenta, which results in a reduced intake of essential nutrients needed for growth in the fetus. Each year, 30 million prenatal babies are diagnosed with IUGR; of these infants, 15% were associated with the incidence of preeclampsia or HELLP syndrome [5].

Infants with IUGR are at high risk of complications such as perinatal asphyxia, cold stress, polycythemia, cholestasis associated with parenteral nutrition and hypoglycemia, persistent pulmonary hypertension of newborns (PPHN), respiratory disorders, and PDA can also be seen in IUGR infants who were asphyxiated at birth. Babies who are asphyxiated can experience varying degrees of stress at birth. These infants are at risk for hypoxic-ischemic encephalopathy (HIE) [4]. According to Sibai MD, Ramadhan MK, Usta I, et al, [6] Almost 90% of the causes of death are due to syndrome of respiratory failure. Infant morbidity and mortality depends on gestational age at birth versus presence or absence of HELLP syndrome.

The results of a study reported by Chappell [7] where only 56% of babies born to weight preeclampsia patients weighed over 2500 grams. From the birth weight of the babies, it was

also found that the incidence of stunted fetal growth was 17 cases (7%). The incidence of stunted fetal growth in this study was taken from the diagnosis in the medical records. In this study most (72.8%) babies were born at more than 37 weeks of gestation. There was an increase in the incidence of preterm birth by 1.7% when compared to research conducted by Indrianto A [8] where there was a preterm birth rate of 25.5%. However, different results were reported by Tuffnell [9] where out of 1078 patients with severe preeclampsia, most (65.3%) were born at gestational age less than 37 weeks.

In the condition of pregnant women with HELLP syndrome, there is an increase in the levels of lactate dehydrogenase (LDH). LDH levels have an effect on the infant's Apgar score. In normal pregnant women, LDH levels range from 340 -670 IU / L. In HELLP syndrome this level increases, namely >600 IU / L [10]. The Research of Dian S [10] results that lactic dehydrogenase (LDH) levels have an effect on infant Apgar scores ($p > 0.05$). At LDH levels >600 IU / L, there were infants who were not asphyxiated at 64.7%, moderate asphyxia was 5.9% and severe asphyxia was 29.4%. Meanwhile, LDH levels <600 IU / L were only 4.5% associated with severe asphyxia. Higher than may indicate a lack of blood flow (ischemia). Normal levels in pregnant women, the platelet count is > 150,000 / mm³. In HELLP syndrome this level decreases to <100,000 / mm³ [6]. The condition of thrombocytopenia or platelet levels <100,000 / mm³ was found in cases of severe asphyxia by 60%, moderate asphyxia by 20% and no asphyxia by 20%. Whereas at platelet levels >100,000 / mm³, it was associated with complications in the mother by 7.4 % and not related to maternal mortality in infants only 11% were associated with severe asphyxia [11].

Research from Sofoewan [12] shows that in the severe preeclampsia group, 1.1% delayed fetal development, 7.4% intra-uterine fetal mortality and 5.6% fetal distress. Whereas in the study of Morikawa et al [13] showed that in the severe preeclampsia group, the fetal development was stunted by 23.8%, poor infant outcomes (fetal death and severe fetal distress) was 2.4%.

In the Erkilinc & Eyi [14] study that observed neonatal outcomes in HELLP syndrome, it was found that 19% of neonates born with birth weight <1.500 grams and 41.8% with infant body weight 1.500 - <2.500 grams and 39.2% with baby weight >2.500 grams. In Angesti PW, Ernawati, Susanti D's study [17] stated that neonates born from HELLP Syndrome had an average birth weight of 1.994.4 grams, while those in the non-HELLP Syndrome group had a baby weight of 2.656.3 grams. This is because the neonates with HELLP Syndrome, born at <34 weeks' gestation, causes low birth weight. Neonatal outcomes are associated with placental abruption, intrauterine asphyxia, and prematurity.

In the study of Khumsat et al [15], the first minute Apgar score ≥ 7 occurred 50% in the HELLP Syndrome group. Meanwhile, in the research by Angesti PW, Ernawati, Susanti D (2015), the first-minute Apgar score ≥ 7 was 33.3% in the HELLP Syndrome group, while in the non-HELLP Syndrome group it was 70.4%. Prematurity once again explains this, because at gestational age <34 weeks, lung maturity is not yet complete, so the Apgar score is low.

The research of Rahmayantia S and Nurdiati DS [16] states that women with HELLP syndrome have a higher risk of giving birth to a baby with asphyxia OR: 2.11 (95% CI: 1.5–4.83) which means that women with HELLP Syndrome have a 2.11 times higher risk of having a baby by asphyxia

compared with mothers who did not experience the HELLP syndrome.

The Chappell study also reported that 75% of babies born at gestation less than 37 weeks. Most (83.3%) babies were born with an APGAR score of more than seven, so that there were 16.7% or 38 cases born with an APGAR score of less than seven. Of the 38 cases, eleven babies had severe asphyxia and three of them did not survive. Of the 244 babies born, it was found that the perinatal mortality rate was 7.8% or 19 perinatal deaths either in the womb or shortly after delivery. Most of the incidence of perinatal mortality died in the womb or intra uterine fetal death (IUFD) as much as 84.2%. The rest died due to severe asphyxia (15.8%).

II. METHOD

This study used a descriptive analytical approach cross sectional. The total population was 103 pregnant women with severe preeclampsia, then the sampling technique was done purposively samples that meet the inclusion and exclusion criteria are 42 people. Bivariate data analysis using chi square with degree of confidence $p = 0.05$.

III. RESULT

A. Research Results

1. Description of Hellp syndrome in pregnant women with preeclampsia at Margono Soekarjo Hospital, Purwokerto

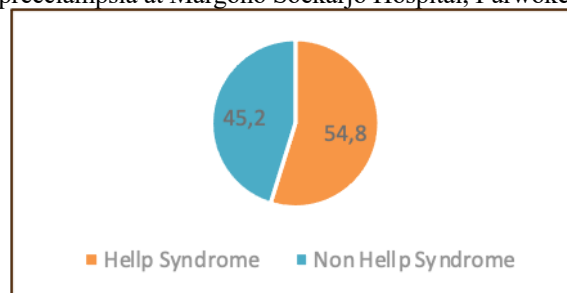


Figure 1. Description of Hellp syndrome in pregnant women with preeclampsia at Margono Soekarjo Hospital, Purwokerto

In Figure 1. It shows that pregnant women with preeclampsia at Margono Soekarjo Hospital mostly experience Hellp syndrome by 54.8%. Meanwhile, 45.2% did not experience Hellp syndrome.

2. Description of neonatal asphyxia in infants of pregnant women with preeclampsia at Margono Soekarjo Hospital, Purwokerto

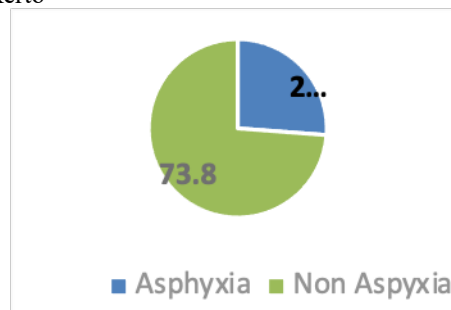


Figure 2. Description of neonatal asphyxia in infants of pregnant women with preeclampsia at Margono Soekarjo Hospital, Purwokerto

Figure 2. It shows that the majority of babies born to mothers with preeclampsia do not experience neonatal asphyxia, which is 73.8%. Meanwhile babies born to mothers with preeclampsia, 26.2% of experienced asphyxia.

3. Relationship between neonatal asphyxia and Hellp syndrome in pregnant women with preeclampsia severe at Margono Soekarjo Hospital, Purwokerto

Table 1. Relationship between neonatal asphyxia and Hellp syndrome in pregnant women with severe pre-eclampsia

Neonatal Asphyxia	Syndrome_Hellp				Total	p	OR
	Yes		No				
	f	%	f	%	f	%	
Yes	9	69,2	2	30,8	13	26,1	0,036 5,464
No	14	45,2	17	54,8	31	73,8	
Total	23	54.8	19	45.2	42	100	

Based on the results of the study in Table 1 above, it shows that the majority of babies born to pregnant women with Hellp's syndrome experience asphyxia neonatorum as much as 69.2%.

The result of the Chi square test value shows the value of $p = 0.036 < 0.05$, this indicates that there is a relationship between neonatal asphyxia and the incidence of Hellp syndrome in pregnant women with preeclampsia. Based on the results of this study, babies born to pregnant women with Hellp syndrome are more at risk of experiencing asphyxia, this is in accordance with the results of the OR 5,464 analysis, which means that babies born to pregnant women with Hellp syndrome are at 5,464 times more likely to experience asphyxia compared to pregnant women with preeclampsia without Hellp syndrome.

B. Discussion

Description of hellp syndrome in pregnan women with preeclampitic at Margono Soekarjo Hospital, Purwokerto

Based on the results of the analysis showed that pregnant women with preeclampsia at Margono Soekarjo Hospital mostly experienced Hellp syndrome of 54.8%. Meanwhile, 45.2% did not experience Hellp syndrome.

Hellp syndrome is a dangerous condition that occurs in pregnant women with pre-eclampsia. Hellp syndrome occurs in 10-20% of cases of pre-eclampsia. Hellp syndrome is a collection of symptoms that occur multisystem in cases of severe preeclampsia and eclampsia. Hanumanthappa [2] states that the possible pathophysiology underlying HELLP syndrome is a deficiency in the vascular repair mechanism and coupled with the occurrence of vasospasm, the blood vessels will develop into endothelial dysfunction. Endothelial dysfunction will increase platelet aggregation and fibrin activation. Aggregation and activation of fibrin will lead to the appearance of the manifestations / symptoms of HELLP syndrome. The characteristics of the HELLP syndrome include; thrombocytopenia, hemolysis (microangiopathic hemolysis anemia) and abnormal liver enzymes (Benedetto et al 2011).

The main causes of perinatal death associated with the incidence of HELLP syndrome include; prematurity,

intrauterine growth restriction (IUGR), asphyxia, placental insufficiency, and placental abruption. Thrombocytopenia occurs in 15-38% of neonates with HELLP syndrome [3].

Description of neonatal asphyxia for pregnant women with preeclampsia at Margono Soekarjo Hospital, Purwokerto.

Based on the results of the study, the majority of babies born to mothers with preeclampsia did not experience neonatal asphyxia, which was 73.8%. Meanwhile babies born to mothers with preeclampsia, 26.2% of experienced asphyxia.

The results of this study are in line with research from Sofowean [11] showing that in the severe preeclampsia group, 1.1% stunted fetal development was found, intra uterine fetal mortality was 7.4% and fetal distress was 5.6%. Whereas in the study of Morikawa et al [13] showed that in the severe preeclampsia group, the fetal development was stunted by 23.8%, poor infant outcomes (fetal death and severe fetal distress) was 2.4%.

According to Sibai BM [6], in normal pregnant women, platelet levels are $>150,000 / \text{mm}^3$. In HELLP syndrome this level decreases to $<100,000 / \text{mm}^3$. Thrombocytopenia or platelet levels $<100,000 / \text{mm}^3$ were found in cases of severe asphyxia by 60%, moderate asphyxia by 20% and not asphyxia in 20%. Meanwhile, a platelet level $> 100,000 / \text{mm}^3$ was associated with complications in the mother by 7.4% and was not related to maternal mortality. Out of infants only 11% were associated with severe asphyxia [10].

Relationship between neonatal asphyxia and hellp syndrome in pregnant women with severe preeclampsia at Margono Soekarjo Hospital, Purwokerto.

Based on the results of the analysis, it is stated that there is a relationship between neonatal asphyxia and the incidence of Hellp syndrome in pregnant women with preeclampsia. Based on the results of this study, babies born to pregnant women with Hellp syndrome are more at risk of experiencing asphyxia, this is in accordance with the results of the OR 5,464 analysis, which means that babies born to pregnant women with Hellp syndrome are at 5,464 times more likely to experience asphyxia compared to pregnant women with preeclampsia without Hellp syndrome.

This study is in line with Erkilinc & Eyi's [13] study which observed that outcomes neonatal in HELLP syndrome showed 19% of neonates born with birth weight <1.500 grams and 41.8% with infant weight $1.500 - <2.500$ grams and 39, 2% with babies >2.500 grams. In Angesti PW, Ernawati, Susanti D's study [17] stated that neonates born from HELLP Syndrome had an average birth weight of 1,994.4 grams, while those in the non HELLP Syndrome group had a baby weight of 2,656.3 grams. This is because the neonates with HELLP Syndrome, born at <34 weeks' gestation, causes low birth weight. Neonatal outcomes are associated with placental abruption, intrauterine asphyxia, and prematurity.

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1.5–4.83) which means that women with HELLP Syndrome have a 2.11 times higher risk of having a baby by asphyxia compared with mothers who did not experience the HELLP syndrome.

IV. CONCLUSION

The results showed that the majority of pregnant women with preeclampsia at Margono Soekarjo Hospital had Hellp syndrome by 54.8% and most of the babies born to mothers with preeclampsia did not experience neonatal asphyxia, namely 73.8%. The analysis showed that there was a relationship between Asphyxia Neonatorum with Hellp syndrome in pregnant women with preeclampsia at Margono Soekarjo Hospital, Purwokerto.

REFERENCES

- [1] Weinstein L. Syndrome of Hemolysis, Elevated Liver Enzymes and Low Trombosit counts : A Severe Consequence of Hypertension in Pregnancy. *AmJ Obstet Gynecol* 1982 ; 142 : 159 –67.
- [2] Hanumanthappa M (2011). Clinical study of HELLP syndrome in preeclampsia and eclampsia. Dissertation. Mysore Medical College and study Institute, Mysore. Available from <http://119.82.96.198:8080/jspui/bitstream/123456789/4943/1/Hanumanthappa%20M.pdf>. ccessed June 28, 2013.
- [3] Haram K, Svendsen E, Abildgaard U. The HELLP syndrome: clinical issues and management. A review. *BMC Pregnancy Childbirth*. 2009;9:8. <http://www.biomedcentral.com/1471-2393/9/8>. Accessed January 24, 2014.
- [4] Gomella TL, Cunningham MD, Eyal FG. *Neonatology: Management, Procedures, On-Call Problems, Diseases, and Drugs*. 7th ed. New York, NY: McGraw Hill Education; 2013.
- [5] Preeclampsia Foundation <http://www.preeclampsia.org/>. Accessed January 24, 2014
- [6] Sibai BM. The HELLP Syndrome (hemolysis, elevated liver enzymes and low trombosit counts) : Much ado About Nothing ?. *AmJ Obstet Gynecol* 1990 ; 162 : 311 – 6.
- [7] Chappell LC, nye S, Seed P, Briley AL, Poston L, Shennan AH. Adverse perinatal outcomes and risk factors for preeclampsia in women with chronic hypertension a prospective study. *Hypertension* [internet]. 2008 [cited 2011 Jan 30] 51: 1002-09. Available from: <http://hyper.ahajournals.org/cgi/reprint/51/4/1002.pdf>
- [8] Indrianto A, Hadisaputro H. preeklamsia berat di rs dr kariadi periode 1 januari 2004 – 31 desember 2004. Semarang: Bagian Obstetri Ginekologi Fakultas Kedokteran Universitas Diponegoro; 2009.
- [9] Tuffnell DJ, Jankowicz D, Lindow SW, Lyons G, Mason GC, Russell IF, et al. Outcomes of severe pre-eclampsia / eclampsia in Yorkshire 1999/2003. *Br J Obstet Gynecol*. 2005;112: 875-80.
- [10] Sibai MD, Ramadhan MK, Usta I, etal. Maternal Morbidity and Mortality in 442 Pregnancies with Hemolysis, Elevated Liver enzymes and Low Platelet counts (HELLP Syndrome). *AmJ Obstet Gynecol* 1993 ; 169 : 1000 – 6
- [11] Dian S. Luanan ibu dan bayi pada penderita preeklampsia berat dan eklampsia dengan atau tanpa sindroma hellp . 2003 Digitized by USU digital library
- [12] Sofowean S. Pregnancy Outcome of Women with Severe Preeclampsia With and Without HELLP Syndrome. Dalam : AUFOG Accredited Ultrasound and Workshop. Bandung. 2001.
- [13] Morikawa H, Umikage H, Yamasaki M. Clinical Difference Between HELLP Syndrome and Partial HELLP Syndrome. Dalam : AUFOG Accredited Ultrasound and Workshop. Bandung. 2001.
- [14] Erkilinc & Eyi (2013). Adolescent pregnancies complicated by HELLP syndrome: clinical experience of 26 cases. *The Journal of Gynecology Obstetrics and Neonatology* 10, 1643-1646
- [15] Khumsat R, Wongwananurak T, Boriboonhirunsarn D (2008). Incidence and Risk Factors of HELLP Syndrome in Thai Pregnant Women with Severe Pre-eclampsia. *Thai Journal of Obstetrics and Gynaecology* 16, 192-198
- [16] Rahmayantia S dan Nurdianti DS (2017) HELLP syndrome in severe preeclampsia: The perinatal outcomes Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health. Volume 7, January 2017, Page 61
- [17] Angesti PW, Ernawati, Susanti D(2015). Characteristics of hellp syndrome in severe preeclampsia patients in Dr. Soetomo hospital Surabaya. *Folia Medica Indonesiana* Vol. 51 No. 4 October - December 2015 : 272-276