

Case Report**Anemia in Pregnancy as a Predisposing Factor of Severe Preeclampsia****Anemia dalam Kehamilan sebagai Salah Satu Faktor Predisposisi Preeklamsia Berat****Gagah B. A. Nugraha¹, Prakosa J. Prasetyo², Daliman³**¹Ajibarang General Hospital, Banyumas²Harapan Anda General Islamic Hospital, Tegal³Division of FetomaternalLaboratory Obstetrics and Gynecology Universitas Jendral Sudirman
Margono Soekarjo General Hospital, Purwokerto**Abstract**

Objective: This case may partly explain that anaemia can be a predisposing factor for the development of many women with preeclampsia who have a low level of haemoglobin during their pregnancy.

Methods: A case report

Case: We present a case 23-year-old pregnant woman who has had moderate anemia with severe preeclampsia at 38-week pregnant. As the evidence, there were elevated blood pressure, decreasing haemoglobin obtained by routine blood analysis, and presence of urine protein by urinalysis examination.

Conclusions: In terms of anemia as one of a predisposing factor of preeclampsia it is important to care provider, pregnant women, and families to prevent anemia in pregnancy through routine ANC.

Keywords: anemia, pregnancy, severe preeclampsia.

Abstrak

Tujuan: Kasus ini sebagian dapat menjelaskan bahwa anemia dapat menjadi faktor predisposisi bagi perkembangan banyak perempuan dengan preeklamsia yang memiliki kadar hemoglobin yang rendah selama masa kehamilan mereka.

Metode: Laporan kasus.

Kasus: Kami melaporkan kasus ibu hamil berusia 23 tahun yang mengalami anemia sedang dengan preeklamsia berat di usia 38 minggu, dibuktikan dari peningkatan tekanan darah, penurunan hemoglobin, serta protein uria pada pemeriksaan urinalisis.

Kesimpulan: Berkaitan antara anemia sebagai predisposisi preeklamsia, penting bagi petugas kesehatan dan ibu hamil serta keluarga untuk mencegah anemia dalam kehamilan melalui ANC yang rutin.

Kata kunci: anemia, kehamilan, preeklamsia berat.

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INTRODUCTION

Anemia in pregnancy is a common problem that can occur in developed and developing countries. In 2015 the World Health Organization (WHO) published that 83.2% of pregnant women globally are anemic, while in Indonesia alone is estimated anemia can occur in 30% of pregnant women.¹

The deficiency of micronutrients such as folic acid and iron is the most common aetiology of anaemia in pregnant women. Increased nutrients transfer from maternal to fetal causes maternal depleted in micronutrient reserves which serve as primary substances for erythropoiesis.² Based on scientific studies, anemia is associated with

maternal mortality and morbidity due to broadly 20% of maternal deaths caused by anemia,³ except that in the process of pregnancy, anemia can lead to other problems indicated one of them is preeclampsia. Preeclampsia is one of the problems of maternal and perinatal, especially in developing countries. Although it has the distinction of variation between countries, the incidence rates of preeclampsia are estimated to reach 1.8% - 16.7% of all pregnant women in The world.^{4,5} Indonesian Demographic Health Survey in 2013, approved that preeclampsia is at the second position (27.1%) of the five causes of maternal deaths in Indonesia aside from haemorrhage, infection, and other abortions.⁶

In matters relating to preeclampsia, there is still much research done to further assess the relationship between both of them. The effect of anaemia on preeclampsia is still being debated by experts to be approved.⁴ Therefore, on this occasion the researchers present the case of suspected anaemia predisposes to severe preeclampsia.

METHODS

Descriptive research of case reports. Primary data obtained by history and physical examination. Secondary data were obtained based on the results of laboratory and medical records. The study was conducted in the month of October 2017.

CASE

A 23-year-old woman who was 38+2 weeks pregnant (Gravid 1, Para 0) came to the emergency department at City Hospital. The patient had her routine antenatal care (ANC) at a community health clinic in her district as her first tier health facility. In her 38 weeks of pregnancy, the patient discovered that she had high blood pressure as per told by the midwife. She had never high blood pressure during prior ANC. The patient denied complaints of headache, blurred vision, heartburn, and convulsions. Patients also have no history of hypertension or heart disease. At her routine ANC, Iron and folic acid supplements were given by the midwife which the patient had never consumed. There were no prior kidney injury on this patient.

On a physical examination, the patient presented with blood pressure of 160/110 mmHg, pulse rate of 84 beat per minute respiration rate at 22 breaths per minute, and temperature at 36,7 °C. The patient fundal height is at 34 cm with fetal back in the left maternal side, fetal heartbeat is at 140 beat per minute, and there was no contraction occurred. Laboratory findings were normal except haemoglobin which at the level of 7,3 g/dl and a qualitative test of proteinuria which showed at +4. Morphological examination of red blood cells showed normocytic and normochromic erythrocyte. The patient was diagnosed as anemic with severe preeclampsia at a 38-week pregnancy. Further management included has observation of vital signs and labour progress, stabilization with parenteral fluid and MgSO₄ administration 4 gr loading

dose and 5 gr intramuscular of maintenance at each right and left gluteus, urinary catheter, oral nifedipine 10 mg every 8 hours, cardiotocography examination for monitor fetal wellbeing and induction of labour with misoprostol 1/8 tablet every 4 hours. Stage two labour decided to be assisted with extraction vacuum management. Communications, information and education were provided to the patients and families about the potential complications. The prognosis of this patient was dubia.

DISCUSSION

The patients were diagnosed through steps anamnesis, physical examination and laboratories investigations. The patient was a women with obstetric status Gravid 1, Para 0 expected full-term pregnancy, according to calculations First Day of Last Menstrual (DLM). Williams 24th edition states of gestation between 37^{1/7} to 41^{6/7} weeks is included in the full-term pregnancy, Further anamnesis obtained information that the patient's routine did the ANC, but didn't consume folic acid and iron tablets from the midwife. As additional information in the end of full-term pregnancy, the patient had increased blood pressure.⁷

On Physical examination, the patient had 160/110 mmHg blood pressure with a pulse, respiratory rate and temperature within normal limits. Based on recent guidelines, diagnosis of severe preeclampsia can be made by at least one of six criteria which are systolic blood pressure \geq 160 mmHg, hepatic failure, progressive renal insufficiency, cerebral dysfunction, pulmonary oedema, and trombocytopenia.⁸ In this case, the patient blood pressure was at 160/110 mmHg with other parameters of vital sign within normal limits. Qualitative test of proteinuria resulted at +4 level of proteinuria. Two criteria were already fulfilled by the patient. Thus, the patient was diagnosed as severe preeclampsia. To be precise this case is a late-onset preeclampsia because it occurs at gestational age at more than 34 weeks.⁹ This is proven by the documentation in the patients ANC record. The patient blood pressure was normal until the gestational age of 38 weeks.

The diagnosis of anemia is made by a laboratory finding of haemoglobin at the level of 7.3 g/dl. The patient also admitted that she did not consume any of the antenatal supplements such as folic acid and iron. Within this haemoglobin level patient was pronounced

to have moderate anemia (Hb 7-9.9 g / dl) which is belong to anemia with normochromic normocytic erythrocyte morphology.²

Preeclampsia can induced anemia by mechanism of the red blood cells become fragmented as it passes through the blood vessels with damaged endothelium cells and fibrin, it causes hemolytic anemia. Damage to the blood vessels will lead to the use of platelets so that the number of platelets in the blood decreases. If the mechanism continues, are likely to be an increase in lactate dehydrogenase (LDH), followed by apoptosis and necrosis of hepatocytes cells, characterized by elevated liver enzymes (HELLP Syndrome).¹⁰ In this case we found that LDH in the normal range for pregnancy with there were no either elevated liver enzyme or renal insufficiency, so that hemolytic anemia caused by preeclampsia can be ignored.

During pregnancy, there is a disproportionated increase in plasma volume, red blood cell volume,

and haemoglobin mass. The plasma volume is higher than the level of red blood cells which leads to hemodilution.¹¹ This makes adequate iron intake is required during pregnancy from both additional supplements or food daily.¹² Micronutrient deficiency anaemia results in an increase in serum norepinephrine concentration, thus inducing the synthesis of corticotropin-releasing hormone (CRH) produced by the placenta, this condition enhances CRH stimulation resulting in increased inflammatory cytokines, glucocorticoids, oxidative stress.⁹ Increased oxidative stress stimulates angiotensin receptor 1-autoantibodies (AT1-AAs). The formation of AT1-AA will induce sFlt-1 and sEng that bind to the vascular endothelial growth factor (VEGF) and placental growth factor (PlGF).¹³ This condition leads to systemic vascular dysfunction resulting in an increase in blood pressure characterized by decreased Nitric Oxide (NO) and elevated endothelin. Hence, the finding of proteinuria.¹⁴

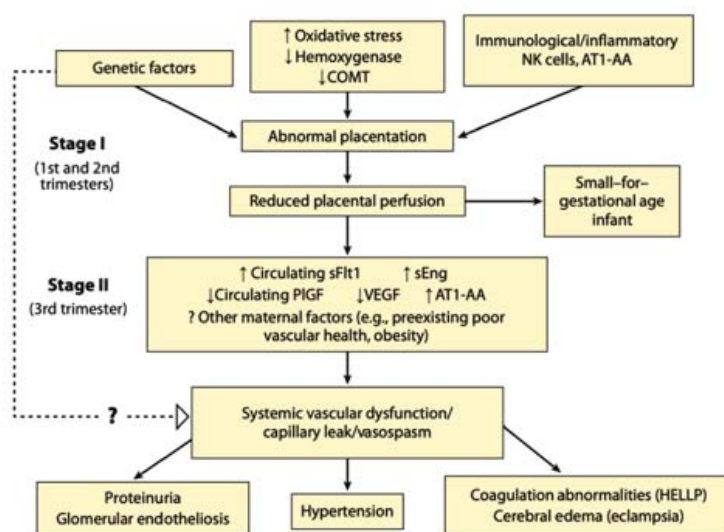


Figure 1. Summary of the pathogenesis of preeclampsia¹¹
Micronutrient deficiency anaemia is included in the normocytic erythrocyte anaemia

CONCLUSION

type. A study conducted by Karaoglu et al (2010) stated that anemia due to micronutrient deficiency of folic acid can cause macrocytic anemia and iron deficiency causes microcytic anemia. But when folic acid deficiency occurs simultaneously with iron deficiency this results in normocytic erythrocyte. This type of micronutrient deficiency anemia basically causes the number of MCV exceeds normal level which explained why the morphological examination showed normal size of the erythrocyte.^{3,15}

Anemia in pregnancy often occurs because of a deficiency of folic acid and iron micronutrients. Thus deficiency can lead synthesis of CRH as a basic mechanism of elevated blood pressure. A routine ANC visit could be a scheme to prevent the occurrence of micronutrient deficiency. In terms of its association with preeclampsia, anemia is thought to have a role as the cause of the emergence of preeclampsia, therefore it is important to care provider, pregnant women, and families to prevent anaemia in pregnancy.

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