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ROLE OF GLYCATED ALBUMIN DURING PREGNANCY 21-36 WEEKS WITH NORMAL GLYCEMIC STATUS

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ABSTRACT

Introduction: Hyperglycemia during pregnancy is found in 25% of pregnancy in Southeast Asia, and when uncontrolled may cause serious complications. Glycated albumin, a new glycemic status indicator which is not affected by gestational age, may be an alternative for pregnancy. **Purpose:** To examine the usefulness of glycated albumin during pregnancy with normal glycemic status. **Method:** 60 pregnant women between 21-36 weeks of pregnancy. Tests were done for glycated albumin, blood glucose, and albumin. These parameters were compared among four groups of age of pregnancy (I:21-24 weeks, II:25-28 weeks, III:29-32 weeks, and IV:33-36 weeks) using ANOVA or Kruskal-Wallis test with post-hoc tests. **Results:** Glycated albumin was not statistically different among the groups. Albumin level of group IV(3.59±0.22g/dL) was lower than group I(3.82±0.19g/dL).

Conclusion: Glycated albumin level was not affected by pregnancy age. Therefore glycated albumin may be used as glycemic status indicator during pregnancy age of 21-36 weeks.

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INTRODUCTION

International Diabetes Federation (IDF) estimated that 21.4 million women in the world suffered from hyperglycemia in pregnancy in 2013. It is estimated that 16% of them suffer from gestational diabetes mellitus (GDM), thus requiring close monitoring during pregnancy and after childbirth. Southeast Asia has the highest prevalence of hyperglycemia in pregnancy at 25 % (Table 1).[1]

Table 1.Prevalence of hyperglycemia in pregnancy (20-49 years) in 2013

Region	Number of Cases per live births (Million)	Prevalence (%)
Africa	4.6	14.4
Europe	1.7	12.6
Middle East and North Africa	3.4	17.5
North America and the Caribbean	0.9	10.4
Central and South America	0.9	11.4
Southeast Asia	6.3	25
Western Pacific	3.7	11.9

Hyperglycemia in pregnancy if untreated properly can lead to complications in the mother and the baby, such as impaired invasion of cytotrophoblast that causes placental hypoxia releasing antiangiogenic factors such as soluble fms-like tyrosine kinase-1 (*s*Flt-1) resulting in preeclampsia, premature birth, hyperinsulinemia fetus that causes diabetic fetopathy include macrosomia, birth by cesarean section, perinatal trauma, neonatal hypoglycemia, and fetal death.International Association of Diabetes and Pregnancy Study Groups (IADPSG) recommends screening for diagnosis of gestational diabetes using oral glucose tolerance test (OGTT) after 75 g glucose load in all pregnant women at gestational age of 24-28 weeks.[1-5]

An indicator is needed that can be used not only as a tool for monitoring the glycemic status during pregnancy, but also important to make predictions about possible complications for mother and baby.

Glycated albumin is a new indicator for monitoring glycemic status which is not affected by the condition of anemia. Glycated albumin is formed through a process of non-enzymatic glycation, in which glucose is covalently bonded to the amino acid residues lysine, arginine, cysteine of albumin, which further through Amadori reaction form ketoaminein stable form. Glycated albumin can indicate glycemic status for the previous 2 weeks because albumin half-life is only 15-20 days, so that glycated albumin can be used to monitor short-term glycemic status. Research by Hashimoto, et al on 47 pregnant women with gestational age 21-36 weeks found glycated albumin levels were not affected by gestational age.[6-9] This study investigates whether glycated albumin can be used in pregnancy 21 – 36 weeks with normal glycemic status.

METHODS

This is a cross-sectional study with 60 pregnant women 21 to 36 weeks gestation recruited consecutively from April 2016 - May 2016 and was approved by the ethics committee of the Cipto Mangunkusumo Hospital / Faculty of Medicine, University of Indonesia, approval number 260 / UN2.F1 / ETHICS / 2016.

Sixty pregnant women atgestational age 21-36 weeks were divided into four groups: 17 subjects in group I (21-24 weeks), 11 subjects in Group II (25-28 weeks), 16 subjects in group III (29-32 weeks), and 16 subjectsin group IV (33-36 weeks). Inclusion criteria on were pregnant women with blood glucose levels < 200 mg / dL and exclusion criteria were thyroid disease, cirrhosis, diabetes, proteinuria, and corticosteroid therapy. The research material werein the form of 4 mL serum for examination glycated albumin, albumin, blood glucose.

Glycated albumin levels were measured using the reagent Lucica®GA-L(Asahi Kasei Pharma). Blood glucose weremeasured using a Cobas C 501 (Roche Holding AG).

Differences between groups I-IV were obtained by first tested for normality in the data of each group. If distribution of the data of each group was normal and its variance homogeneous, ANOVA test was used. If the ANOVA showed significant differences, the differences between groups were tested by analysis of Bonferroni or Tukey multiple comparisons. If data distribution was not normal and/or its variance are not homogeneous, the Kruskal-Wallis test followed by Mann Whitney U post-hoc analysis between groups. Statistical test was done using SPSS version 20.

RESULTS

Glycated albumin levels did not differ significantly between the four groups (p = 0061). Level of albumin in group IV (3.59 ± 0.22g/dL) was significantly lower than group I (3.82 ± 0.19 g/dL, p =

0.006). Characteristics of research subjects in each gestational age group is shown in Table 2.

Table 2. Characteristics of the study subjects in each gestational age group

Parameter	Gestational age			
	21-24 weeks	25-28 weeks	29-32 weeks	33-36 weeks
N	17	11	16	16
Mother age (years)	27.35 ± 5.43	27.82 ± 6.06	30.69 ± 5.56	27.44 ± 4.68
Glycated albumin (%)	11.52 ±0.85	11.58 ±1.02	11.45 (10.8 – 14.6)	10.8 ±1.17
Blood glucose (mg/dL)	80.7 (67 – 149.4)	81.16 ± 16.16	82.55 (67.1 – 137.2)	78.85 (67.9 – 123.6)
Albumin (g/dL)	3.82 ± 0.19	3.68 ± 0.18	3.72 ± 0.15	3.59 ± 0.22

DISCUSSION

In this study there was no significant difference in glycated albumin level between gestation groups. These results are the same as found by Hashimoto, et al. This may bebecause of the similar use of Asian subjects. This study found levels of albumin group IV significantly lower than the levels of albumin in group I, this may be due to hemodilution due to the increase in plasma volume that occurs during pregnancy.[10] Glycated albumin levels are not affected by hemodilution because the results in the form of glycatedalbumin level isa ratio of glycated albumin to albumin.[11-12]

CONCLUSION

Glycated albumin levels were not affected by gestational age. Glycated albumin can be used to assess glycemic status in gestation age 21-36 weeks.

REFERENCES

1. Guariguata L, Noolan T, Beagley J, Linnenkamp U, Jacqmain O, editors. IDF Diabetes Atlas. 6th edition: International Diabetes Federation; 2013:44-5.
2. Lowe L, Metzger B, Dyer A, Coustan D, Hadden D, Hod M, et al. Hyperglycemia and adverse pregnancy outcome (HAPO) study: an overview. In: Kim C, Ferrara A, editors. Gestational diabetes during and after pregnancy: Springer-Verlag London Limited; 2010:p. 17-34.
3. Uddin MN, Beeram MR, Kuehl TJ. Diabetes mellitus and preeclampsia. Med J Obstet Gynecol. 2013;1(3):1016-20.
4. American Diabetes Association. Standard of medical care in diabetes 2013. Diabetes Care. 2013;36(Suppl.1):S11-66.
5. Metzger BE, Gabbe SG, Persson B, Buchanan TA, Catalano PA, Damm P, et al. International association of diabetes and pregnancy study groups recommendations on the diagnosis and classification of hyperglycemia in pregnancy. Diabetes Care. 2010;33(3):676-82.
6. Hashimoto K, Osugi T, Noguchi S, Morimoto Y, Wasada K, Imai S, et al. A1C but not serum glycated albumin is elevated because of iron deficiency in late pregnancy in diabetic women. Diabetes Care. 2010;33(3):509-11.
7. Hashimoto K, Noguchi S, Morimoto Y, Hamada S, Wasada K, Imai S, et al. A1C but not serum glycated albumin is elevated in late pregnancy owing to iron deficiency. Diabetes Care. 2008;31(10):1945-8.
8. Bai X, Wang Z, Huang C, Chi L. Investigation of non-enzymatic glycosylation of human serum albumin using ion trap-time of flight mass spectrometry. Molecules. 2012;17(8):8782-94.
9. Rondeau P, Bourdon E. The glycation of albumin: structural and functional impacts. Biochimie. 2011;93(4):645-58.
10. Cunningham F, Leveno K, Bloom S, Spong C, Dashe J, Hoffman B, et al. Maternal physiology. Williams Obstetrics. 24th ed. New York: McGraw-Hill Education; 2014. p. 55-6.
11. Kohzuma T, Yamamoto T, Uematsu Y, Shihabi ZK, Freedman BI. Basic performance of an enzymatic method for glycated albumin and reference range determination. J Diabetes Sci Technol. 2011;5(6):1455-62.
12. GA-L [package insert]: Tokyo: Asahi Kasei Diagnostic; 2013.p. 1-2.

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