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Research Article

Association between ABO Blood Group and Pregnancy Induced Hypertension

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Abstract: Pregnancy induced hypertension (PIH) is a multifactorial pregnancy- specific syndrome affecting 5-15% of pregnant women. The exact cause is not known, thought to be multifactorial. ABO blood groups are known to be associated with many disorders in this study we try to find out its association with PIH. A cross-sectional study was conducted in 50 pregnant women with PIH and 50 women with normal pregnancy, matched for age and parity. Rh negative females or women with any other medical and surgical complication were excluded from the study. Using blood group O as the reference group, the association between blood group and PIH was estimated using odds ratios and 95% confidence intervals from logistic regression models. When compared with blood group O, women of blood group AB have an increased risk of PIH. The result of present study indicates that AB blood group have the highest risk of developing PIH. AB blood group is associated with an increased risk of thrombotic events this may be the cause of increased incidence of PIH in this group. Thus attention should be given to the AB blood group pregnant women in order to prevent the PIH and improve prognosis.
Keywords: Pregnancy induced hypertension (PIH)

INTRODUCTION

Everyday around 800 women die from preventable causes related to pregnancy and childbirth. Maternal deaths occur as a result of complications during and following pregnancy and childbirth, most develop during pregnancy. Other complications prior to pregnancy are worsened during it. Major complications (around 75%) of maternal deaths include severe bleeding (mostly bleeding after childbirth), infections (usually after childbirth), high blood pressure during pregnancy, and complications from delivery unsafe abortion [1].

In India, more women die due to pregnancy-related complications than anywhere else in the world. Roughly one maternal death occurs every five minutes in India [2]. These deaths account for 15% of all deaths of women of reproductive age [3].

PIH is defined as hypertension (blood pressure ≥ 140/90 mmHg) with or without proteinuria (≥ 300 mg/24 hours) that emerges after 20 weeks gestation, but resolves up to 12 weeks postpartum. It is also defined as new onset proteinuria (≥ 300 mg/24 hours) in hypertensive women exhibiting no proteinuria before 20 weeks gestation [4]. Risk factors with PIH development include previous history of PIH, preexisting diabetes, multiple pregnancy, nulliparity, previous raised blood pressure and raised body mass index before pregnancy [5].

The antigens of ABO blood-group are oligosaccharides that are attached to the cell-surface glycoconjugates and are expressed by epithelia, endothelia and erythrocytes (RBCs) in primates. Susceptibility to diseases such as infections, cancer, cardiovascular diseases and hematologic disorders are found to be been associated with ABO blood groups. It is a key determinant of coagulation factor VIII and von Willebrand factor plasma concentrations [6].

In view of the blood group is a risk factor for PIH, the suggested mechanism is that the inherited thrombophilias may increase risk for PIH. Increased plasma concentrations of coagulation factors may result in prothrombotic effect, triggering or exacerbating the pathophysiologic events that results to preeclampsia [6]. As there are few studies done to know about the association of blood group with PIH, we have undertaken this study.

MATERIALS AND METHODS

The study was undertaken in Hassan Institute of Medical Sciences Hassan. It is a cross sectional study.

The subjects for the study were selected from the out-patient and in –patient department of obstetrics and gynaecology and also from the labour room. The pregnant women who were fulfilling the criteria for PIH were considered as cases and women with normal pregnancy without any complications were selected as controls. In both groups 50 subjects were selected. Rh negative blood group subject were excluded from the study. Even subjects having any other medical and surgical complication and women having history of any drug use, multi-fetal pregnancy, smoking, erythroblastosis fetalis, were excluded from the study. For this study ethical committee clearance was taken and informed consent was taken from all the subjects. After taking relevant past and personal history from the subjects, a drop of blood was taken from their finger tip using lancet, under aspetic precaution. 1 drop of blood was mixed with 1 ml of normal saline in a test tube. This provided the red cell suspension. Blood group was determined by haemagglutination technique. A drop of monoclonal Anti A, Anti B, Anti D was added separately on a clean glass slide and to each of this a drop of red cell suspension was added. With separate applicator, the serum was well mixed back and forth and observed for agglutination and it was confirmed under low power objective Results of agglutination were recorded immediately for ABO blood group and after 2 minutes for Rh. The protenuria was measured by urine dipsticks. The data were analyzed by using Microsoft Excel and Statistical Package of Social Sciences (SPSS version 20.0). The association of blood group with PIH was estimated by calculating odds ratio from logistic regression models using blood group O as a reference group. A p-value of < 0.05 was considered as statistically significant.

RESULTS

The study population consist of 50 cases and 50 controls. Using blood group O as the reference group, the association between blood group and PIH was estimated using odds ratios and 95% confidence intervals from logistic regression models. The results as shown in table 2 indicated that AB has the highest, and O has lowest risk for PIH among the ABO blood groups.

Table 1: Showing the distribution of different blood groups in both categories

Category	Blood group (%)				
	A	B	AB	O	Total
Cases	5 (10)	6 (12)	25 (50)	14 (28)	50
Control	8 (16)	12 (24)	3 (6)	27 (54)	50

Table 2: Showing the association between ABO blood group and PIH

Blood groups	Odds ratio	95% confidence limit		Significance (p value)	
		Lower bound	Upper bound		
A	1.205	0.332	4.38	0.77	NS
B	0.964	0.298	3.118	0.952	NS
AB	16.07	4.123	62.645	<0.0001	HS

The reference category is: blood group O, p value > 0.05 was non-significant (NS);p value < 0.05 was significant(S)

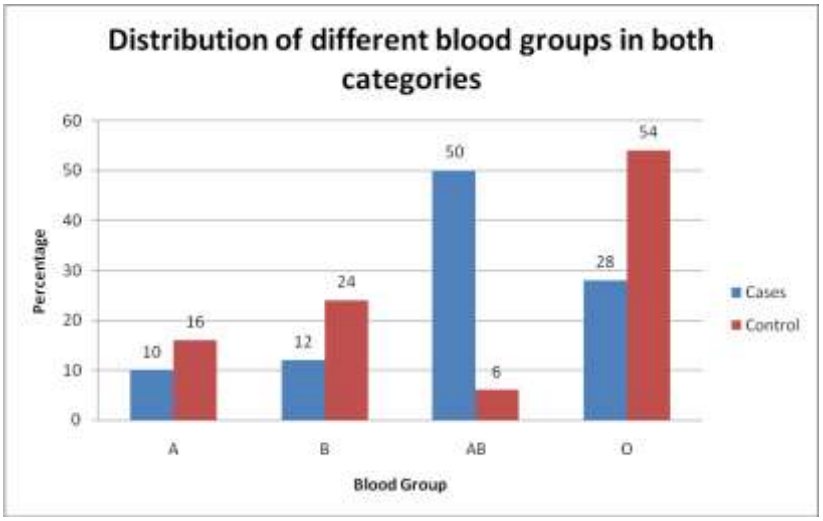

Fig. 1: Distribution of different blood groups in both categories

DISCUSSION

The results of our study indicate that women with blood group AB have the highest risk for PIH compared to other blood group. The results of our study are consistent with findings of Lee BK *et al*. [7], Bharali R

et al. [8], Spinillo *et al*. A [9], Phaloprakram C *et al*. [10].

Preeclampsia, a syndrome unique to human pregnancy and one of the leading causes of maternal and foetal morbidity and mortality, is also associated with maternal blood group. AB blood group patients have increased risk of severe, early-onset or intrauterine growth restriction (IUGR) associated forms of preeclampsia [6].

One suggested mechanism of the influence of the blood group on the risk of gestational hypertensive disorders is through the maternal immune response. Placental Protein 13 (PP13) is considered to be an early marker for preeclampsia. It is a galectin (galectin-13) primarily produced by the placenta in anthropoid primates that binds to beta-galactosides, such as N-acetyl-galactosamine, galactose, fucose, located at terminal positions on ABO blood-group antigens having strongest affinity to blood group AB [6]. In AB group women, the close proximity of A and B antigens can explain the stronger binding of PP13 to blood group AB erythrocytes that leads to its sequestration. Low levels of PP13 plasma levels in pregnant women on the first trimester of gestation could predispose pregnancy complications, including PIH [5].

Although debated, when compared with O group, A, B, and AB groups are associated with an increased risk of thrombotic events. ABO blood groups may differ in the occurrence of known vascular risk factors for preeclampsia, such as endothelial dysfunction [11], insulin resistance [12], and hypercholesterolemia [13].

ABO blood group is an important determinant of coagulation factor VIII and von Willebrand factor plasma levels. Low plasma concentrations of these factors in blood-group O individuals may lead to excess bleeding, while elevated plasma concentrations in non-O blood-group individuals may increase risk of thromboembolic and ischemic heart diseases [6].

CONCLUSION

Our study shows an association between ABO blood group and occurrence of PIH, with AB blood group women having highest risk. Thus special attention should be given to pregnant women carrying the AB blood group in order to prevent the development of PIH and improve prognosis.

REFERENCES

1. World Health Organization; Maternal mortality. Fact sheet N°348, May 2014. Available from http://www.who.int/mediacentre/factsheets/fs348/en/
2. Bakshi R; UNICEF unveils new tool to combat maternal mortality in India, UNICEF, 2006. Available from htpp://www.unicef.org/infobycountry/india_33208.htm
3. U.N. Committee on the Elimination of All Forms of Discrimination Against Women (CEDAW Committee), Consideration of Reports Submitted by States PartiesUnder Article 18 of the Convention on the Eliminationof All Forms of Discrimination Against Women, Initial Report of States Parties: India, para. 221, UN Doc.CEDAW/C/IND/1 (1999)
4. Watanabe K, Naruse K, Tanaka K, Metoki H et al.; Outline of definition and classification of "pregnancy induced hypertension (PIH). Hypertens Res Pregnancy, 2013; 1: 3–4
5. Alpoim PN1, de Barros Pinheiro M, Junqueira DR, Freitas LG, das Graças Carvalho M, Fernandes AP *et al*.; Preeclampsia and ABO blood groups: a systematic review and meta-analysis. Mol Biol Rep., 2013; 40(3): 2253–2261.
6. Than NG, Romero R, Meiri H, Erez O, Xu Y, Tarquini F *et al*.; PP13, Maternal ABO blood groups and the risk assessment of pregnancy complications. PLoS ONE, 2011; 6(7): e21564.
7. Lee BK, Zhang Z, Wikman A, Lindqvist PG, Reilly M; ABO and RhD blood groups and gestational hypertensive disorders: a population-based cohort study. BJOG, 2012; 119(10): 1232-1237.
8. Bharali R; ABO blood group - a risk factor for pregnancy induced hypertension. Int J Biol Med Res., 2014; 5(1): 3797-3801.
9. Spinillo A, Capuzzo E, Baltaro F, Piazzi G, Iasci A; Case-control study of maternal blood group an severe pre-eclampsia. J Hum Hypertens., 1995; 9(8): 623-625.
10. Phaloprakarn C, Tangjitgamol S; Maternal ABO blood group and adverse pregnancy outcomes. Journal of Perinatology. 2013; 33(2): 107-111.
11. Huppertz B, Sammar M, Chefetz I, Neumaier-Wagner P, Bartz C, Meiri H; Longitudinal determination of serum placental protein 13 during development of preeclampsia. Fetal Diagn Ther., 2008; 24(3): 230–236.
12. Gonen R, Shahar R, Grimpel YI, Chefetz I, Sammar M, Meiri H *et al*.; Placental protein 13 as an early marker for pre-eclampsia: a prospective longitudinal study. BJOG, 2008; 115(12): 1465–1472.
13. Khalil A, Cowans NJ, Spencer K, Goichman S, Meiri H, Harrington K.; First trimester maternal serum placental protein 13 for the prediction of pre-eclampsia in women with a priori high risk. Prenat Diagn., 2009; 29(8): 781–789.