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A study of association between ABO blood group and pregnancy induced hypertension

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Abstract
Background & Objectives: Pregnancy induced hypertension (PIH) is a multifactorial pregnancy- specific syndrome affecting 5-15% of pregnant women. ABO blood groups are known to be associated with many disorders in this study we try to find out its association with PIH**.**
Material and Methods: 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.
Results & Conclusion: 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.

Keywords: Pregnancy induced hypertension (PIH), Blood Group.

1. Introduction

- 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].
- 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].
- Susceptibility to diseases such as infections, cancer, cardiovascular diseases and hematologic disorders are found to be been associated with ABO blood groups. 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.

2. Materials and Methods

The study was undertaken in Civil Hospital Ahmedabad. It is a cross sectional study. The subjects for the study were selected from the outpatient 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. After taking relevant past and personal history from the subjects, a drop of blood was taken from their finger tip using lancet, under aseptic 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 proteinuria was measured by urine dipsticks. The data were analyzed by using Microsoft Excel.

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.

3. 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
Case	3 (6)	8 (16)	21 (42)	18 (36)	50
Control	10 (20)	10 (20)	7 (14)	23 (46)	50

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

Blood group	Odd ratio	95% confidence limit		Significance (p value)	
		Lower bound	Upper bound		
A	0.38	0.092	1.602	0.309	NS
B	1.022	0.34	3.12	0.97	NS
AB	3.83	1.33	11.01	0.01	HS

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

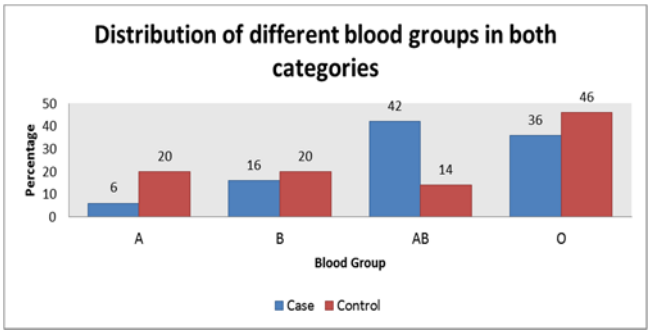

Fig 1: Distribution of different blood groups in both categories

4. 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 Nacetyl- 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].

5. 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.

6. References

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