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Maternal mortality as a cause of Von Willebrand disease and postpartum hemorrhage: A statistical study

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Background: Early postpartum hemorrhage is the leading cause of maternal mortality. The most common cause of early postpartum hemorrhage is uterine atony, but coagulation disorders can also lead to heavy bleeding. Von Willebrand disease, for example, is a common inherited condition that arises from a deficiency in the quality or quantity of Von Willebrand factor (VWF). Many studies have reported that ABO blood type system has an important effect on hemostasis, mainly by determining the level of VWF and indirectly determining the level of factor VIII in the blood. A, B and AB blood group individuals have VWF levels approximately 25-30% higher than O subjects. While a number of studies have analyzed the relationship between ABO blood groups and vascular thrombosis, only a few studies have been published on the association between ABO blood groups and hemorrhagic disorders. The aim of this study was to explore whether blood type O is associated with an increased risk for early postpartum hemorrhage compared to the other blood groups.

Methods: Data were collected for women who gave birth at Carmel Medical Center in Haifa between December 1, 2014 and March 3, 2016. Women were categorized according to blood type as O and non-O blood groups. The study included women at the age of 20-45 who gave birth at 34-42 weeks of gestation. Women with known coagulation disorders, unknown blood type and intrauterine fetal death were all excluded. The primary outcomes were defined as early postpartum hemorrhage and blood transfusion. The comparison of categorical variables was done using the χ^2 or Fischer exact test, whereas the comparison of the continuous variables was done using student's t-test or ANOVA. The relevant data were further processed using a stepwise logistic regression model. $P < 0.05$ values were considered statistically significant.

Results: 4,516 women were included in the study, of which 1,594 (35.3%) were found to have blood type O. After multivariate analysis, blood type of the parturient was not associated with an increased risk for early postpartum hemorrhage and/or with packed red cells transfusion (OR 1.25, 95% CI 0.847-1.84, $P=0.26$). There was also no association between the Rh blood group (positive/ negative) and the risk for developing postpartum hemorrhage (OR 0.97, 95% CI 0.44-1.4, $P=0.422$).

Conclusions: Blood type O is not associated with an increased risk for early postpartum hemorrhage or for blood transfusion.

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