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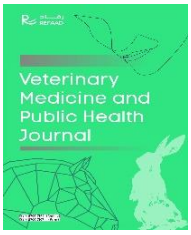

The Relationship of Blood Groups and an Increased Risk of Type 2 Diabetes Mellitus (A Subject Review)

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Abstract:

Objective: Although human blood consists of the same basic parts (red blood cells, white blood cells, platelets, and plasma), there are a large variety of blood groups and types, each with its own different characteristics. The aim of this study to search the correlation between different types of blood groups and increase risk factor for type 2 diabetic mellitus disease.

Methods: Blood is made up of several components, and all of these can be utilized to management a lot of different illness. What makes a blood type different is the combination of protein molecules called antigens and antibodies. A person's blood type is also considered to be inherited from the parents' genes. Diabetic mellitus type 2 is related with a type of a chronic illness that effect the trend of the cells in the body for receive glucose or the amount of insulin which synthesize in the pancreas, thus leads to an abnormal decrease or increase in the scale of glucose in the blood.

Results: Blood type O had a low risk of diabetes for women with type A, and same for women with type A. Group AB, and low persent of type B, compared with blood group O, have poor chances of developing diabetes.

Conclusions: The effect of blood types should be investigated in future clinical and epidemiological studies on diabetes, also there is a need for more research on the pathophysiological mechanism to explain why diabetes has people of group O have a low risk of developing type 2 diabetes.

Keywords: *Blood groups; type 2 diabetes mellitus; antibodies; antigen.*

1 Introduction

The human body as an average contains an amount of blood 5.6 L which has many functions as a result of its diverse composition of blood cells, which includes the following (Anstee, 2011):

Red blood cells: Which plays an important role in the gas exchange process because it contains hemoglobin and thus provides oxygen to cells as well as represents the greatest part of the blood components.

White blood cells: mainly represents the body's defense line against invaders by including them with part of the body's autoimmunity.

Platelets: It has a key role in the formation of blood clot and preventing bleeding during minor and deep wounds.

Plasma: It is a liquid that constitutes the remainder of the blood in proportion 55% and has a role in carrying the plasma proteins which is necessary for various functions in the body.

Blood groups:

The difference in human blood is due to the absence or presence of a certain proteins molecules called antigens and the antibodies (Logdberg, et al., 2005).

The (Ags) are located on the surface of the (R.B.C) and the (Abs) are in the blood plasma. So, we have two main systems according to this classification (Agarwal, et al., 2013):

1. ABO system

The membrane of human red cells contain a variety of (Ags) called (agglutinogens) the most important and best known of these are A and B. The individual are divided into major blood groups A, B, AB and O on the basis of the agglutinogen. (Abs) to agglutinogen are called (agglutinins) they may occur naturally by exposure to the red blood cells from anther individuals (e.g. blood transfusion , labor). (Daniels & Reid, 2010).

2. Rh (D) Antigen

Of next importance is the Rh type. Rh is a blood group system with many antigens, one of which is D. Rh refers to the presence or absence of the D antigen on the red blood cell The most important patient population to consider is females of child-bearing age. If immunized to Rh (D) antigen the antibody can cross the placenta and destroy Rh (D) positive fetal cells resulting in death (Westhoff, 2004).

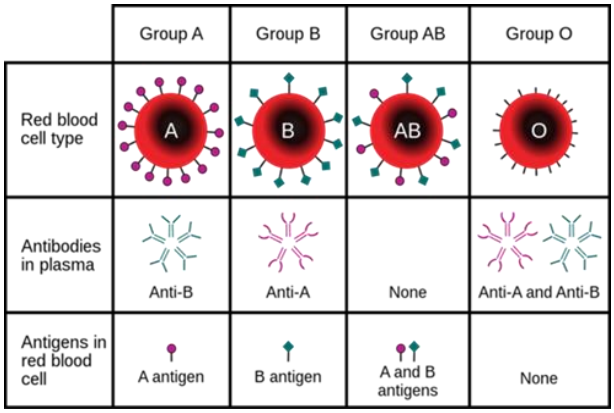

Figure 1: ABO system in human blood

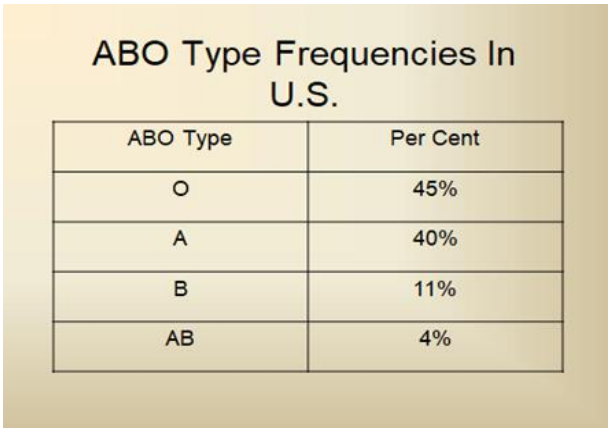

Figure 2: ABO type frequencies

Diabetic mellitus:

Diabetes indicate to a type of illness that explain how the human body use a blood sugar, glucose is basic to your good health; because it is an essential origin of powerful to the cells which help to maintains tissues and muscles, as well considered the energy source to brain (Inzucchi, et al., 2012). The varies cause of diabetes are underlined by what you have a kind type of diabetes, it leading to raises sugar in your blood and if the percent reach more than normal limit in blood person thus means significant health problems (Duckworth, et al., 2009).

The type 1 and type 2 diabetes which is a part of a chronic conditions include, curable diabetes such as gestational diabetes and pre-diabetes, the pre-diabetes happen when the level of sugar in blood is more than normal, but not significance above normal limit it is often a precursor to developing diabetes except if suitable gauge are taken to prohibit its progression, while the gestational diabetes happen through pregnancy, but women who have it may recover after giving birth (Maruthur, 2013). The symptoms of diabetes is different according to how yours blood sugar is high, part of people mostly those with type 2 diabetes or pre-diabetes may didn't have any symptoms, it will be come on quickly and be more severe in type 1 diabetes (Pippitt, et al., 2016).

2 Materials and Methods

How does insulin work?

From a pancreas, a hormone will be secreted is called insulin, this gland occur behind and under the stomach that excrete insulin into the bloodstream and transport in your blood circle to allow the molecule of sugar to enter your building unit cells and decrease the amount of glucose in your body, the secretion of insulin from your pancreas will also be lower when drops happen in level of sugar in your blood (Taneera, et al., 2019).

The role of glucose

A type of sugar is glucose, it is a main origin of powerful from which the cells building tissues and muscles, it is bring from two main sources: liver and food, with the help of insulin, the parts of sugar is absorbed during the bloodstream where it enters inside the cells, while your liver depot and manufacture glucose (Navale and Paranjape 2016). For keep your glucose grade into a normal range the function of liver will be catalyze glycogen into glucose if your glucose levels are low (Poggiogalle, et al., 2018).

3 Results and Discussion

Blood groups and correlation with type 2 diabetes mellitus

A team of researchers linked between type 2 diabetes and blood type, it is known that there are several factors that facilitate the process of diabetes, including obesity, lack of physical activity, food rich in calories, smoking, high blood pressure and cholesterol, however, these factors are not the only ones responsible for the disease, as the researchers added to it the incidence of diabetes, as it is less for those who carry blood type O than those who carry blood groups: A, B, and AB (Alanazi, et al., 2018). The team of researchers led by Guy Vagerazi from the Center for Epidemiology and Population Health Research, who followed 82,104 French women between 1990 and 2008, and found that women without blood type O had a 10% increased risk of diabetes for women with type A, and 17% for women with type A. Group AB, and 21% of type B, compared with blood group O, have poor chances of developing diabetes, which is also consistent with what was observed in men (Zaidi, et al., 2018).

Another study suggested that people with blood types A and B have a 21% higher risk of developing type 2 diabetes than people with type O blood, the scientists have not yet discovered a reason for this, but it is believed that this blood type affects inflammation and glucose metabolism (Kamil, et al., 2010). Other illustrates that relationship between diabetes risk and blood type is still unknown, but there are some possible explanations, a protein in the blood called "non-Wilbrand factor" is higher in people without type O blood and has been linked to higher blood sugar levels (Qureshi & Bhatti 2003). The researchers also said that these blood types are also bound to various molecules known to be associated with type 2 diabetes, other researchers point out that the reason for this association is not yet known, but it could be related to several factors. It has been suggested that the locus of human ABO antigens may influence inflammatory markers and linked to several molecules known to be associated with type II diabetes (Order, et al., 2016).

Another new research paper suggested that the ABO group is a factor that plays a role in determining the total bacterial content in the intestine, which affects the metabolism and thus may be associated with type II diabetes (Waseem et al., 2012).

4 Conclusions

Findings support the relationship between blood type and the risk of diabetes, and show a low probability of type 2 diabetes among group O members. Therefore, the effect of blood types should be investigated in future clinical and epidemiological studies on diabetes, also there is a need for more research on the pathophysiological mechanism to explain why diabetes has people of group O have a low risk of developing type 2 diabetes.

Recommendations:

More studies about the relation between other factors related with diabetic and other disease.

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