
Bleeding Time in Different Blood Groups and Genders In Hawija Technical Institute Students

Fadheelah S. Azeez¹, Abulhadi M. Jumaa², Hassan Y. Hassan³

¹Pathology analysis Dept., Hawija Technical Institute, Northern Technical University, Kirkuk, Iraq

^{2,3}Department of Physiology, Collage of Medicine, Tikrit University, Tikrit, Iraq

umaimandalaa@gmail.com

ABSTRACT

In medicine, blood groups play an active role. A noticeable relationship is observed linking ABO with the Wilbrand factor and vWF deficiency which results in hemorrhagic disorders, while increased levels are a risk factor for blood clotting. Previous investigations found that individuals in group O have long hemorrhage and blood clotting time. The aim of the current study is to evaluate the bleeding time relationship with the different blood groups and sex also. This cross-sectional study includes 95 students aged between 18 and 20 years. Permission has been taken from the students participated in this study before the bleeding time (the method of filter paper for Duke) was determined. The obtained results showed a longer time of bleeding among the AB group. Moreover, the bleeding time is longer in women than men. For more results, it is necessary to involve a larger research group.

Keywords: Bleeding time, Blood groups, Factor of von Wilbrand.

زمن النزف في مختلف فصائل الدم و كلا الجنسين لدى طلاب معهد الحويجة

التقني

* فضيلة سلمان عزيز¹, عبد الهادي محمد جمعة², حسن يشار حسن³
¹ قسم تقنيات المختبرات الطبية, معهد الحويجة التقني, الجامعة التقنية الشمالية, كركوك, العراق
^{2,3} قسم الفلسفة, كلية الطب, جامعة تكريت, تكريت, العراق

umaimanandalaa@gmail.com

الخلاصة

في مجال الطب, تلعب فصائل الدم دورا حيويا. وجد ان هناك علاقة واضحة ما بين مختلف فصائل الدم و عامل "فون ولبراند", حيث ان نقص هذا العامل يؤدي الى اضطرابات نزفية, بينما تؤدي زيادته عن المعدلات الطبيعية الى ظهور الجلطات الدموية. اثبتت دراسات سابقة ان الافراد ذوات فصيلة الدم "ج" يكون زمني النزف و التخثر لديهم اطول من باقي الفصائل. الهدف من هذه الدراسة هو احتساب العلاقة ما بين زمن النزف و بين مختلف فصائل الدم, و اذا ما كانت هنالك اي علاقة ما بين زمن النزف والجنس. ضمت هذه الدراسة المقطعية 95 طالبا و طالبة ضمن الفئة العمرية (18-20) عاما. تم احتساب زمن النزف لديهم بطريقة "ديوك باستعمال ورق الترشيح" بعد ان تم جمع المعلومات المطلوبة من المتطوعين. اوضحت هذه الدراسة ان زمن النزف كان اطول لدى ذوات فصيلة الدم "أب", كذلك كان زمن النزف اطول لدى الطالبات مقارنة بالطلاب.

الكلمات الدالة: زمن النزف, فصائل الدم, عامل فون ولبراند.

I. Introduction

The people are divided into four major blood groups based on Mendelian Determinants which state that the antigens of blood cell are inherited. Individuals of type A contain antigen A; type B contains antigen B; type AB contains both of antigen A and antigen B, and type O which doesn't contain any of the previously mentioned antigens. A and B antigens are complex Oligosaccharides, which have different covered sugar [1]. On the other hand,

antigens of ABO seem to be important during our development, as the different blood types frequency varies in different population groups [2].

Karl Landsteiner defined the ABO blood group system in 1900 and put the milestone for the beginning of blood transfusion and banking medicine. Complex carbohydrate molecules form ABO. The glycosyl A and B, encoding alleles A and B, convert the H-antigen parameters to A and B. This is the result of the transferase enzyme in the G-group, which remains to express the antigen H [3]. These antigens are carbohydrate fragments located at the end of the carbohydrate chain in the glycoprotein on the surface of red blood cells. The location of the gene that symbolizes these antigens is on the chromosomes 9 and 19 [4].

Latest studies suggested an association of ABO blood groups and various diseases, like periodontal disease, stomach cancer and venous thrombosis [5, 6].

Diabetes, duodenal ulcer, urinary tract infection, incompatibility of the mother-child species, etc. [7, 8, 9].

The time of bleeding is defined as the period between the skin puncture and automatic stop of bleeding [10].

The phenotype and ABO level are clearly correlated. In clotting, there are two important proteins, factor VIII and von Wilbrand vWF. These factors are lower in plasma in the people within group O by about 25% than in other groups, which increases blood clotting time and can cause excessive bleeding [11].

The factor of von Wilbrand is a large glycoprotein produced by the endothelial cells of the blood vessels as well as produced by master cells. The lack of the vWF causes hemorrhagic disorders, and high levels of it are a risk factor for coagulation [12,13,14].

According to a study conducted by Gill J. C. et al. [15], lowest plasma vWF levels found in individuals in group O, while, elevated plasma vWF levels found in the other groups (A, B and AB). Claim that there is a potential risk of stroke among people outside the group O. This indicates an increase in the time of bleeding and the time of a blood clotting between the

group O individuals compared to members of non O group. On the other hand, Daniel M. and others were unable to find any relationship in their studies between ABO Group and the factor of von Wilbrand [16].

The aim of the current investigation is to evaluate the bleeding time relationship with the different blood groups among students of the Technical Institute of Hawija.

II. Materials and methods

This study was conducted on students of the first and second stages of the Department of Medical Laboratories Techniques at Hawija Technical Institute in Kirkuk city. The study included 95 students aged 18 to 20 years. The study excludes students with any history of bleeding disorders and non-use of (NSAIDs). Data collection was age-related after getting informed consent.

Procedures: Collection of blood was performed by adding antisera A and B to the blood sample and was confirmed by the clumping appearance between the erythrocytes. Bleeding time estimation was conducted using the filter paper method for Duke [17].

III. Results

In the current study, data collected from a homogeneous study group of 95 students aged between 18 to 20 years old. Of the 95 students, 47 were women, and 48 were men. The bleeding time was found between 1-4 minutes in group AB (88.23%) compared to group A (84.61%), group B (75%) and group O (63.88%) as presented in [Table 1](#). There was a clear difference between ABO groups with bleeding time less than 1 min and between 1-4 min but not statistically significant ($p > 0.05$).

Table 1 Students distribution according to Bleeding time (BT) and Blood groups

| Blood group | Bleeding time (BT) | |
|-------------|--------------------|------------|
| | <1 | 1-4 |
| A (n=26) | 4(15.38%) | 22(84.61%) |
| B (n=16) | 4(25%) | 12(75%) |
| AB (n=17) | 2(11.76%) | 15(88.23%) |
| O (n=36) | 13(36.11%) | 23(63.88%) |
| Total | 23 | 72 |

Furthermore, insignificant difference observed among blood groups in bleeding time ($p > 0.5$) as listed in Table 2.

Table 2 BT Comparison in between blood groups

| Comparison | Bleeding time (BT) | | |
|------------|--------------------|---------|--------------|
| | X2-value | p-value | Significance |
| A and B | 0.594 | 0.441 | NS |
| A and AB | 0.112 | 0.738 | NS |
| A and O | 3.26 | 0.071 | NS |
| B and AB | 0.971 | 0.325 | NS |
| B and O | 0.621 | 0.43 | NS |
| AB and O | 3037 | 0.066 | NS |

The difference in genders regarding bleeding time showed that 8.51% of women had bleeding time longer than 4 minutes compared to 6.25% for men. The t-test of student's bleeding time reveals insignificant statistical difference between men and women ($p > 0.5$) as presented in Table 3.

Table 3 Comparison of bleeding time between males & females

| GENDER | < 4 mins (%) | > 4 mins (%) |
|--------|----------------|----------------|
| FEMALE | 43(91.48%) | 4(8.51%) |
| MALE | 45(93.75%) | 3(6.25%) |

IV. Discussion

So far, much research has been done to establish a relationship between blood groups and bleeding time and blood clotting time. Massimo et al. surveyed the relevant literature and reported that, compared to O group; members of group O may not have a potential risk of coagulation due to the vWF low levels [18]. In addition, the ABO group variation can influence the vWF undermining, which indicates that the levels of plasma for the vWF may depend on the human blood type. Another study by Jenkins et al. [19], stated that, compared to O group, vWF is largest 25% in the other non O groups of individuals, means that the time of hemorrhage and blood coagulation time will increase between O group compared to other groups. Although according to a study conducted by Mahptraet al. [20], bleeding time in group AB increased compared with other groups. This result was consistent with our results.

Furthermore, no significant difference in the bleeding time and the time of coagulation observed between men and women in the Mahapatra study [20] and other studies, which were also consistent with the results of our study. Another study found that 44.4% of women had more than 4 minutes bleeding time compared to 13 % of men, this result agreed with a study conducted by Roy et al. [21], who noted that bleeding time was longer in women compared to men. The fact that the females have longer bleeding and coagulation time is related with the presence of estrogen hormone and a decrease in fibrinogen in plasma as reported by Ercan et al. [22].

V. Conclusions

O group was the most common type, and B was the less common group among the study students. Bleeding time was longer 1-4 minutes in AB individuals, followed by A members, B and O. As well as, there was no statistical association between the blood groups in regard bleeding time. Also in regard bleeding time and sex, we found longer bleeding time in females than males, although the difference is statistically insignificant. Values were statistically unimportant; this may be because of the small size sample. Further studies with large size samples of study are needed to confirm the findings and correlate it with the level of von wilbrand factor and factor VIII to take prophylaxes before any troubles.

References

- [1] Ganong WF, "*Review of Medical Physiology*", 22nd edition. Mc Graw-Hill Education (2005).
- [2] Dean L. , "*Blood Groups and Red Cell Antigens*", Bethesda(MD): National Centre for Biotechnology Information U.S (2005).
- [3] Watkins WM ,"*Biochemistry and genetics of ABO*", Lewis and P blood group systems. Adv Hum Genet;10:1-36 (1980).
- [4] Michael Schleef, Erwin Strobel, Andrea Dick, Josef Frank, Wolfgang Schramm and Michael Spannagl, "*Relationship between ABO and secretor genotype with plasma levels of factor VIII and von Willebrand factor in thrombosis patients and control individuals*", British journal of haematology; 128: 100-107 (2004) .
- [5] Hanrui Zhang, Ciaran J. Mooney and Muredach P. Reilly, "*ABO blood groups and cardiovascular Diseases*", International Journal of Vascular Medicine ; Article ID 641917: 1-11 (2012).
- [6] Wiggins KL, Smith NL, Glaeer N L, Rosendal FR, Heckbert SR, Psaty BM , Rice KM, Lumley T," *ABO genotype and risk of thrombotic events and hemorrhagic stroke*", Journal of thrombosis and haemostasis ; 7: 263-269 (2008).
- [7] Akhtar MN, Tayyib A, Tasneem T, Butt AR, "*ABO blood group in patients with peptic ulcer disease: Association with secretor status*", Ann King Edward Med Coll ; 9: 238-40 (2003).
- [8] Qureshi MA, Bhatti R, "*Frequency of ABO blood groups among the diabetes mellitus type 2 patients*", J Coll Physicians Surg Pak ; 13: 453-5 (2003).
- [9] Ziegler T, Jacobsohn N, Fünfstück R, "*Correlation between blood group phenotype and virulence properties of Escherichia coli in patients with chronic urinary tract infection* Int J Antimicrob Agents", 24 Suppl 1:S70-5 (2004).

- [10] Ghai CL, "*A Textbook of practical Physiology*", 5th edition; JayPee Brothers , NewDelhi, pp 84-101 (1999).
- [11] O'Donnell J, Laffan M, "*The relationship between ABO histoblood group, factor VIII and von Willebrand factor*", *Transfus Med.* 11: 343_51 (2001).
- [12] Ruggeri ZM, Zimmerman TS , "*The complex multimeric composition of factor VIII/vWF*", *Blood* , 57:1140-1143 (1981).
- [13] Sadler JE, "*von Willebrand factor*, *Ann Rev Biochem* ,67:395-424 (1998).
- [14] Ruggeri ZM, "*Structure of von Willebrand factor and its function in platelet adhesion and thrombus formation*", *Best Prac sss Res Clinical Haematol*, 14:257-259 (2001).
- [15] Gill JC, Endres-Brooks J, Bauer PJ, Marks WJ Jr, Montgomery RR, "*The effect of ABO blood group on the diagnosis of von Willebrand disease*", *Blood*; 69(6):1691-5 (1987).
- [16] Daniel, M., M.C. Jaberoo, R.E. Stead, V.M. Reddy and A.A. Moir, "*Is admission for epistaxismore common in Caucasian than in Asian people? Preliminary study*", *Clin. Otolaryngol.*, 31: 386-389 (2006).
- [17] Ghai, C.L., "*A Textbook of Practical Physiology*", 5th Edn., Jaypee Brothers, New Delhi, Haematology (1999).
- [18] Massimo Franchini, Franco Capra, Giovanni Targher, Martina Montagnana, Giuseppe Lippi, "*Relationship between ABO blood group and von Willebrand factor levels: from biology to clinical implications*" , *Thrombosis journal*, 5:14 (2007).
- [19] Jenkins PV, O'Donnell JS, "*ABO blood group determines plasma von Willebrand factor levels: a biologic function after all?*", *Transfusion*, 46 (10):1836-1844,(2006).
- [20] Mahapatra B, Mishra N, "*Comparison of Bleeding Time and Clotting Time in Different Blood Groups*", *American Journal of Infectious Diseases*; 5 (2): 113-115 (2009).

-
- [21] Roy B, Banerjee I, Sathian B, Mondal M, Saha CG, " *Blood Group Distribution and Its Relationship with Bleeding Time and Clotting Time: A Medical School Based Observational Study*", Nepal Journal of Epidemiology; 1(4): 135-140 (2011).
- [22] Ercan M, Yegin E, Akdeniz H, Irmak H, Bayiroglu F, Tuncer I, " *Effect of Estrogen on Fibrinogen Clotting Time in Rabbits*", Tr. J. of Veterinary and Animal Sciences; 22:137-40 (1998).