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Research article

Correlation of bleeding time and clotting time with blood pressure, pulse rate and respiratory rate: a pilot study

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Key words: Bleeding time, Clotting time, Blood pressure, Pulse rate, Respiratory rate.

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Abstract

The present study is to correlate bleeding time and clotting time with blood pressure, pulse rate and respiratory rate. A total of 30 apparently healthy, male and female students aged 18-25 years, were included in the study. Bleeding time, clotting time, blood pressure, pulse rate, respiratory rate was recorded by standard methods. Significant positive correlation was present between DBP and Pulse rate with bleeding time ($P<0.05$). Significant negative correlation was observed between respiratory rate with bleeding time ($P<0.05$). Significant negative correlation was present between clotting time and systolic and diastolic blood pressure ($P<0.05$). Significant positive correlation was observed between pulse rate and respiratory rate with clotting time ($P<0.01$). Our study observes correlations between bleeding time and clotting time and blood pressure, pulse rate and respiratory rate. We recommend further detailed studies in this area to understand in detail about the associations, to support diagnostic importance of bleeding time and clotting time.

Introduction

When an injury caused by puncture of a sharp needle, blood oozes from the blood vessels and bleeding ordinarily lasts for 2 to 5 minutes. Bleeding time is the time elapsed from the onset of bleeding till the stoppage of bleeding. It indicates the efficiency of vasoconstriction and platelet plug formation [1]. It is a common and popular test to explore primary hemostasis [2]. Clotting time is defined as the time elapsed from the onset of bleeding till the formation of fibrin threads or clot. Capillary tube method is commonly used one, normal value ranges from 5 to 8 minutes [1]. Blood pressure is the lateral pressure exerted by the blood on the walls of the blood vessels while flowing through them. When volume of blood decreases, blood pressure also decreases. Normal value is 120/80 mm of Hg. When volume of blood decreases, blood pressure also decreases [3]. Pulse is the expansion and elongation of the arterial walls passively produced by pressure changes during systole and diastole. Normal value is 72-80 beats/minute. Pulse rate and blood pressure are inversely proportional [4]. Respiratory rate is the number of breaths per minute or, more formally, the number of movements indicative of inspiration and expiration per unit time, normally ranges from 16-20 breaths/minute. There is an argument exist regarding association of autonomic arousal due to presence or absence of hypercoagulability and, if it occurs, whether it is due to changes intrinsic to clotting mechanism or to other process [5]. The present study is to correlate bleeding time and clotting time with blood pressure, pulse rate and respiratory rate.

Materials and Methods

Participants

The current study was conducted at Little Flower College of allied health sciences, Angamaly, Kerala. The study protocol was approved by institution ethics committee. Informed consent was obtained from all the participants after providing details of the study. A total of 30 apparently healthy, male and female students aged 18-25 years, were included in the study.

Recording of Blood pressure and pulse rate

Measurement of blood pressure was performed by using diamond digital blood pressure monitor-fully automatic M60, manufactured by Industrial Electronic and allied products. Pulse rate was recorded by using pulse oximeter [6].

Recording of respiratory rate

Respiratory rate (breaths that a patient takes each minute) was recorded manually by counting the number of times the chest rises in one minute [7].

Recording bleeding time and clotting time

Bleeding Time and clotting time was estimated by Duke Method and Capillary Tube Methods respectively [8-10].
All the parameters were recorded between 9-10 am to avoid diurnal variations.

Data analysis

Data was analyzed by SPSS 20.0. Pearson correlation coefficient followed by significance test was performed to analyze the results. $P<0.05$ was considered as significant.

Results

Results are presented in table no 1. Significant positive correlation was present between DBP and Pulse rate with bleeding time ($P<0.05$). Significant negative correlation was observed between respiratory rate with bleeding time ($P<0.05$). Significant negative correlation was present between clotting time and systolic and diastolic blood pressure ($P<0.05$). Significant positive correlation was observed between pulse rate and respiratory rate with clotting time ($P<0.01$).

Discussion

The current study was undertaken to observe the correlation between Bleeding time and clotting time with blood pressure, pulse rate and respiratory rate. Earlier studies reported that Blood platelet count was associated with DBP and suggested platelet indices for early detection of hypertension [11]. Another study reported that platelet count was positively correlated with plasma glucose (FPG), total cholesterol, low-density lipoprotein-cholesterol (LDL-C), triglyceride (TG), and Log-triglyceride (Log-TG) [12]. In our study we have observed positive correlation between DBP, PR with bleeding time. It was reported that higher respiratory rate was observed in patients taking platelets [13]. In our study, we have observed negative correlation between respiratory rate and platelets. It was reported that coagulation factor VII and fibrinogen are predictors of cardio vascular diseases [14]. In our study, we have observed negative correlation between systolic and diastolic blood pressure with clotting time and positive correlation between clotting time and pulse rate and respiratory rate.

Table No 1. Correlation of Bleeding time (BT) and Clotting time (CT) with Systolic Blood pressure (SBP), Diastolic Blood Pressure (DBP), Pulse rate (PR) and Respiratory rate (RR).

Parameter	Correlation of BT (r) with	P value	Correlation of CT (r) with	P value
SBP (mmHg)	0.2288	0.0523	-0.1572	0.0247*
DBP (mmHg)	0.1888	0.0356*	-0.1309	0.0171*
PR (beats/min)	0.1243	0.0155*	0.0493	0.0024**
RR (cycles/min)	-0.1209	0.0146*	0.0399	0.0016**

(Pearson correlation coefficient (r), *P<0.05, **P<0.01, ***P<0.001)

Conclusion

Our study observes correlations between bleeding time and clotting time and blood pressure, pulse rate and respiratory rate. We recommend further detailed studies in this area to understand in detail about the associations, to support diagnostic importance of bleeding time and clotting time.

Conflicts of interest: Nil

References

1. Krishna AP: A Textbook of Medical Physiology. Suman Publications. 2009; 1: 51.
2. White GI, Marder V, Colman R, Hirsh J Salzman E: Hemosta-sis and Thrombosis. Basic Principles and Clinical Practice. Philadel-phia, PA, Lippincott, 1987, 1048.
3. Krishna AP: A Textbook of Medical Physiology. Suman Publications. 2009; 1: 106.
4. Krishna AP: A Textbook of Medical Physiology. Suman Publications. 2009; 1: 114.

5. Jacques, L.B.: Blood clotting and hemostasis in: Blood Clotting and Allied Problems. Transact. of First Conf. Josiah Macy Jr. Foundation 1948; 3:16–17.
6. Archana R, Kumar Sai Sailesh, Mukkadan JK. Effect of vestibular stimulation on stress and cardiovascular parameters in healthy college students. Biomedical Research 2016; 27(3): 985-990.
7. Measuring respiratory rate. Available at http://healthcaresciencesocw.wayne.edu/vs/5_1.html. Accessed on 30/12/2016 at 11.52 pm.
8. Ghai, C.L.: A Textbook of Practical Physiology., Jaypee Brothers, New Delhi, Haematology 5th Edition. 1999: 84-101.
9. Bain B, Forster T. A sex difference in the bleeding time. Thromb Haemost. 1980; 43(2): 131-2.
10. Kumar SS, VK JM, George J, Mukkadan JK. Bleeding time and Clotting Time in Healthy Male and Female College Students of Karukutty Village, Kerala. JH Prospect 2013; 12 (I): 7-9.
11. Yang K1, Tao L, Mahara G, Yan Y, Cao K, Liu X, Chen S, Xu Q, Liu L, Wang C, Huang F, Zhang J, Yan A, Ping Z, Guo X. An association of platelet indices with blood pressure in Beijing adults: Applying quadratic inference function for a longitudinal study. Medicine (Baltimore). 2016; 95(39):e4964.
12. Yen-Ling Chang, Chun Pei, Dee Pei, Sai-Hung Tang, Chun-Hsien Hsu, Yen-Lin Chen, Te-Lin Hsia, Jiunn-Diann Lin, Chung-Ze Wu, Jin-Biou ChangAssociation Between Platelet Count and Components of Metabolic Syndrome in Geriatric Taiwanese Male. International journal of gerontology 2012; 6(3):215-219.
13. Study of possible correlation between respiratory rate increased and platelets. Available at http://factmed.com/study-PLATELETS-causing-RESPIRATORY%20RATE%20INCREASED.php. Accessed on 31/12/2016 at 12:08 pm.
14. Freedman DS1, Byers T, Barboriak JJ, Flanders WD, Duncan A, Yip R, Meilahn EN. The relation of prothrombin times to coronary heart disease risk factors among men aged 31-45 years. Am J Epidemiol. 1992; 136(5):513-24.