

Evaluation of Platelet and Prothrombin Time in Hypertensive Patients Attending Clinic in Federal Teaching Hospital Abakaliki



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Abstract

The aim of this research work is to evaluate the platelet and prothrombin time test in hypertensive patient attending clinic in Federal Teaching Hospital, Abakaliki. A total of 80 subjects comprising of 40 males and 40 females between the ages of 30-70 years were selected for the study. Sixty (60) of the subjects (30 males and 30 females) were hypertensive patients while 20 of the subjects were apparently healthy non-hypertensive patients and were the control (10 males and 10 females). The method used for platelet count is the standard manual method using improved Neubauer ruled counting chamber and prothrombin time method is plasmascann (ISI 1.4-1.6) with water bath at 37°C. The results for platelet count was $P > 0.05$, $r = +0.06$, $P = 0.1290$ and that of prothrombin time $P > 0.05$, $r = +0.006$, $P = 0.0130$. The mean age of the patients and control is 36.33 ± 11.992 and 36.533 ± 11.420 (years) respectively. In conclusion the result obtained indicates that there is no statistical significant difference ($P > 0.05$) of prothrombin time and platelet count. It serves as indices for evaluating haemostatic abnormalities in hypertensive patients.

Keywords: Platelet; Prothrombin time; Hypertensive patients; Federal teaching hospital abakaliki

Introduction

A hypertensive patient is defined as patient with disorder in his/her blood pressure which occurs when the mean arterial pressure is greater than the upper range of accepted normality [1]. Hypertensive patients are at high risk for the development of cardiovascular diseases. High blood pressure is said to be present if it is often at or above 140/90mmHg [2].

A prothrombin time (PT) test, measures the amount of time it takes for your blood plasma to clot and in order to help diagnose unexplained bleeding and it helps to evaluate the extrinsic and common pathways of the coagulation cascade. Prothrombin, also known as factor II, is just one of many plasma proteins involved in the clotting process [3].

Platelets play a central role in maintaining hemostasis and must be present in adequate number and have normal function. Platelets undergo a complex series of morphological and biochemical changes when activated. Platelets have the ability to bind to non-endothelial surfaces (adhesion), bind to other platelets (aggregation) and secrete substances that are stored in internal granules (secretion) [4].

The normal haemostatic response to vascular damage depends on a closely linked interaction between the blood vessel wall, circulating platelets and blood coagulation factors.

Pulmonary thrombosis often appears to complicate the course of patients with hypertension.

Thrombosis could be the consequence of a prothrombotic condition occurring in these patients with vascular and alveolar lesions or because of platelet dysfunction leading to pulmonary hypertension and pulmonary thrombolism [5].

Aim

The aim of this study is to evaluate the platelet and prothrombin time profile in hypertensive patients.

Materials and Methods

Study area

The study was carried out in Federal Teaching Hospital, Abakaliki, Ebonyi State, Nigeria. This research work was done in federal teaching hospital Abakaliki mainly in their major outpatient clinic (MOPC) and was carried out at federal teaching hospital Abakaliki (FETHA 2).

Study subjects

A total of 80 subjects comprise of 40 males and 40 females between the ages of 30-70 years were selected for this study. Out of which 60 (30 males and 30 females) were hypertensive

patients while 20 (10 males and 10 females) were apparently healthy non-hypertensive patients.

Sample collection

7ml of blood was collected from each subject using the standard procedure. Out of which 4.5ml and 2.5ml was dispensed into a plain sterile container containing tri-sodium citrate fluid and EDTA containers respectively.

Prothrombin time

Method: Prothrombin time estimation by plasmascann using calcium thromboplastin (ISI 1.4-1.6).

Procedure

- o The plasmascann was rehydrated and mixed gently with 2ml of distilled water and allowed for 10 minutes for homogenization of the reagent
- o The reagent was incubated in a water bath at 37°C for 10 minutes
- o The various blood collected was centrifuged at 3000g for 10 minutes to obtain platelet poor plasma.
- o 0.1ml (100ml of the plasma was) dispensed into a pre-warmed glass tube and incubated in a water bath at 37 °C for 3 minute.
- o 0.2ml (200ml) of the pre-warmed rehydrated plasmascann reagent was the dispensed into the glass tube containing the pre-warmed plasma 37 °C.
- o The stop watch was started immediately and the time it takes the plasma to form clot (quick's time) was noted.

Platelet count

Method: manual method using improved Neubauer ruled counting chamber

Procedure: The diluents consist of 1% aqueous ammonium oxalate in which the red cells are lysed.

- o Measure 0.38ml of filtered ammonium oxidation diluting fluid and dispense it into a small container or tube
- o Add 20uL (0.02ml, 20cm) of well-mixed anti-coagulated venous blood and mix it together
- o Assemble the counting chamber and fill it with well-mixed sample.
- o Leave the chamber undisturbed for 20 minutes
- o Dry the underside of the chamber and place it on the microscope stage, using 40X objective to focus the ruling of the grid and the central square. Change to the 40X objective and focus platelets
- o Count the platelet in the small squares marked,
- o Report your result [6].

Results (Table 1-3)

Table 1: Mean value of the prothrombin time and platelet count of the patient and control group.

Parameter	Test	Control	P-Value
Age(years)	36.33±11.99	36.53±11.42	0.958
Platelet(x10 ⁹ /L)	286.33±101.09	238.20±92.19	0.1290
PT(Seconds)	15.53±3.35	13.60±1.64	0.013

PT: Prothrombin time

Table 2: Correlation analysis of the prothrombin time and platelet count of the patient and control group

PT _{patient}	Platelet Count _{patient}
0.976	+0.006

Parameters P-value r-value

PT: Prothrombin Time; P-value: Probability value at 0.05 level of significance; r-value: Correlation Coefficient

Table 3: The mean values of the coagulation of the patient group with respect to gender.

Parameter	Male	Female
	Mean	Mean
Age (years)	36.33	36.33
Platelet count (X 10 ⁹ /L)	292.39	277.25
PT/seconds	15.26	15.95

Discussion

There has been considerable alarm at the recent increase in the incidence of hypertension all over the world [7]. Cytokines (e.g. interleukin-6 (IL-6) has been known to play a role in platelet production [8]. This study was therefore carried out to determine the impact of hypertension on some coagulation factors and also to determine the effects of hypertension on some coagulation factors (Prothrombin Time and Platelet Count).

The platelet count results was P>0.05, r = +0.06, P=0.1290 and that of prothrombin time result was P>0.05, r =+0.006, P=0.0130. The mean value of the age of the patient and control group was 36.33±11.99 and 36.53±11.42 respectively. There was an increase in the platelet count and prothrombin time of the patient compared to that of the control group. Analysis of the mean values of the patients PT and platelet count with respect to gender showed that the PT and platelet count of the male patient were higher than that of the female patients and in age also. The result of correlation of the coagulation factors showed a weak but non-significant positive correlation between PT and platelet count of the patient (p>0.05). Increased prothrombin time reported in this study has been reported elsewhere among patients with hypertension according to Kartaloglu et al. [9]. Prolonged prothrombin time and platelet count were common with patients with the age of 65 years and above, one could say that the phenomenon is due to diminished prostacyclin synthesis and/or release by the endothelial cells during old age. They also stated that cytokines and mediators emerging

from a hypertensive patient are considered to prolong the PT. There is increased platelet production amongst the patient when compared with the control group. Reports elsewhere has shown that cytokines are increased in inflammatory reactions and also, these cytokines (mainly IL-6) increases platelet production [7,8].

Conclusion

In conclusion, the research on prothrombin time and platelet count was carried out on hypertensive patients. Due to the fact that there was significant increase in prothrombin time and platelet count of hypertensive patients when compared with non-hypertensive patients (control), the assessment of this parameters may serve as prognostic indices for evaluating hypertensive patients in whom there was clinical evidence of hemostatic abnormality and guide for antihypertensive therapy. This analysis, in conjunction with clinical findings, will shed light to the subject. It is recommended to conduct D-dimer, Activated partial thromboplastin time (APTT) and Protein assays.

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