Measurement of C- reactive Protein and Platelets Indices in Hypertensive Sudanese patient in Khartoum state.

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Abstract: Hypertension ,also known as high blood pressure or arterial hypertension, is a chronic medical condition in which the blood pressure in the arteries is persistently . Elevated C-reactive protein (CRP) , platelet count and mean platelet volume (MPV), have been associated in hypertensive patient.
Objective: To determine C- reactive protein and platelets indices in hypertensive Sudanese patients.
Materials and Methods: This cross sectional study was carried out in international hospital Khartoum state, Sudan during period from Dec 2015 up to Feb 2016. Seventy subjects were enrolled in the study, fifty as case study and twenty as case control. Assessment of C- reactive protein and platelets count and mean platelet volume in hypertensive patients by using hemoanalyzer Sysmex
Results: There was significant value between hypertensive patient and age mean 54.42 and STD ±10.543, duration mean 5.11and STD ±4.263, gender mean 1.46 and STD ±503, platelets mean 355.28 and STD ±112.513, MPV mean 8.93 and STD ±1.901and CRP mean 1.192 and STD ±0.8523.
Conclusions: The study confirms the existence of an association significant between hypertension in age, duration, platelets count, Mean platelet volume and C- reactive protein level and significant of CRP, Platelets count and MPV according to age and sex were reflecting on patient healthy stats.
Keywords: C- reactive protein, Patelets count, Mean platelet volume ,Hypertensive

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I. Introduction

Hypertension (HTN or HT), also known as high blood pressure or arterial hypertension,is a chronic medical condition in which the blood pressure in the arteries is persistently elevated. Blood pressure is expressed by two measurements, the systolic and diastolic pressures, which are the maximum and minimum pressures, respectively, in the arterial system [1]. The systolic pressure occurs when the left ventricle is most contracted; the diastolic pressure occurs when the left ventricle is most relaxed prior to the next contraction. Normal blood pressure at rest is within the range of 100–140 millimeters mercury (mmHg) systolic and 60–90 mmHg diastolic [2]. Hypertension is present if the resting blood pressure is persistently at or above 140/90 mmHg for most adults; different numbers apply to children [3]. High blood pressure develops cholesterol-rich build-ups (plaques) that line the blood vessel; these plaques can rupture and cause the platelets to form a clot. Even though no bleeding is occurring, platelets sense the plaque rupture and are confused, thinking that an injury has taken place that will cause bleeding. Instead of sealing the vessel to prevent bleeding as would occur with a cut, a clot forms in an intact blood vessel, causing a blockage of blood flow [4].

C-reactive protein (CRP), the prototypical acute-phase reactant, is one of the most widely known biomarkers of cardiovascular disease. Circulating levels of CRP are clinically used to predict the occurrence of cardiovascular events and to aide in the selection of therapies based on more accurate risk assessment in individuals who are at intermediate risk. In hypertensive individuals, CRP levels associate with vascular stiffness, atherosclerosis and the development of end-organ damage and cardiovascular events. Data suggest that some anti-hypertensive medications may lower CRP levels in a manner independent of their effect on blood pressure. In individuals who are normotensive at baseline, CRP levels have been shown in multiple cohorts to foretell the development of hypertension on follow-up [5]. Similarly to CRP, the platelet parameters are markers reflecting the systemic inflammatory response and activity/severity of many diseases [6, 7]. Moreover, such cells play an important and active role in the immune inflammatory response [8]. Platelet volume indices, such as mean platelet volume (MPV), an indicator of platelet size, and platelet distribution width (PDW), an index of platelet size heterogeneity, have been shown to be the markers of platelet function and activation [6, 7].Higher MPV was associated with low-grade inflammatory conditions and a variety of risk factors of cardiovascular disorders [6, 9]. The aim of this study is to determine C- reactive protein and platelets indices in hypertensive Sudanese patients.

II. Materials And Methods

This cross sectional case control state study conducted in international hospital Khartoum state, Sudan during period from Dec 2015 up to Feb 2016.Seventy subjects were enrolled in the study, fifty as case study and twenty as case control.Hypertensive patients were included in the study.Exclusion criteria for entry into the study were renal or hepatic dysfunction, diabetes mellitus, thrombocytopenia hematological disease, autoimmune diseases and heart disease. Permission of this study was obtained from local authorities in the area of the study. An informed consent was obtained from each participant in the study.5.5 ml venous blood were collected using sterile disposable plastic syringe after cleaning vein puncture area with 70% ethanol. 2.5 ml was dispensed in EDTA container for platelets indices and the remaining 2.5 ml of blood was allowed to clot in plain tube. It was then centrifuged and was used to measure C-reactive protein (CRP) .CRP concentrations were assayed using Cobas 6000 analyzer with c501 module (Roche, Switzerland). The platelet count, mean platelet volume (MPV), and platelet were analyzed using Sysmex XT-21 automated hematology analyzer (Sysmex, Japan).Statistical analysis was done by using SPSS 16.0 used independent T test.

III. Results

Seventy samples from Hypertensive and Healthy patients from International hospital were participate to perform of platelets count, indices and CRP.Of the 50 patients were case study , 27 patients (54%) were males and 23 (46%) were females. twenty as casecontrol,13 were males (65%) and 7 (35%) were females (table 1)The study revealed there was significant values between hypertensive patient and age: mean 54.42 and STD ±10.543, duration of the disease: mean 5.11and STD ±4.263, MPV: mean 8.93 and STD ±1.901 and insignificant differences between hypertensive patient and gender: mean 1.46 and STD ±503.We found significant differences between hypertensive patient and in platelets count,mean CRP levels and MPV and mean of control group (table 2)

Table 1: frequency among genders

group			Frequency	Percent
case	Valid	male	27	54.0
		female	23	46.0
		Total	50	100.0
control	Valid	male	13	65.0
		female	7	35.0
		Total	20	100.0

Table 2: Descriptive statistics of age, duration of the disease, gender platelets count, MPV and CRP.

parameter	group	Mean	Std. Deviation ±	P.value ≤ 0.05
Age	case	54.42	10.543	.001
	control	37.65	6.268	
Duration of the disease	case	5.11	4.263	.001
	control	0.00	0.000	
Gender	case	1.46	0.503	.408
	control	1.35	0.489	
Platelets	case	355.28	112.513	.011
	control	279.10	105.696	
MPV	case	8.93	1.901	.045
	control	8.07	0.723	
CRP	case	1.192	0.8523	.001
	control	2.310	1.6380	

IV. Discussion

Blood pressure tends to rise with age. About 65 percent of age 60 or older has high blood pressure. However, the risk for prehypertension and high blood pressure is increasing for children and teens, possibly due to the rise in the number of overweight children and teens. In the present study there were different number of age participate as shown in table [1], with observed clinical significant with age and these explained in table [3] this result was agree with another study performed by Lakoski [10], while disagree with another study which was done by Bath and Butterworth to determine mean values for platelet indices [11]. Before age 55, men are more likely than women to develop high blood pressure. After age 55, women are more likely than men to develop high blood pressurein this research we were targeting a number of different gender male and female as show in table [2]In relation to gender, significant differences were observed on hypertensive as show in table [3] and there were agreement with previous study. In our study we determine C- reactive protein and platelets indices in hypertensive Sudanese patients.

We found significant association between hypertension and CRP as shown in table [2] similar to study conducted in china by Lakoski [10]. An association between elevated blood pressure and increased CRP has also been reported by Shafi Dar *et al* [12] , other study noted that elevated CRP levels didn't lead to the development of hypertension Davey Smith *et al*) [13].In this study the CRP levels in non-hypertensive patients (2.310mg/L) were elevated as compared to hypertensive study subjects (1.192mg/L). This could be explained on the basis of the fact that the study sample was small and only 70 patients were included in the study.MPV is well-established marker of platelet activation. It has been determined that elevated MPV levelswereassociated with poor prognosis in diseases with increased thrombogenesis including myocardial infarction, ischemic stroke and pulmonary embolism (Pizzulli, *et al*) [14] .Although several studies have previously shown the association between MPV and hypertension [15, 16,17,1 8] its relationship in subjects without hypertension is unknownThere is an inverse relation between the hypertensive and the MPV value as in table [3] which corroborates the results described in other study conducted by Bath PM and Butterworth RJaimed.11Gang *et al* [19]. found that causal relationship of MPV with the development of hypertension and may provide insight to enhance our comprehension of the pathophysiology of hypertension. However, our results differ from those in the report by Wasilewska.15.the differences due to small sample size of our study.In the present study there was significant difference in platelet count between hypertensive patients and the controls. However, the platelet count was elevated in hypertensive patients , as compared to the control subjects. Nadar *et al*, confirmed that hypertensive patients had higher MPV and mean platelet mass (MPM) [20].In hypertensive patients increased MPV with normal or lowered platelet count was reported byNadar et al and Pathansali *et al* [20, 21].Hypertension is chronic disease that may affect other organ within long time duration and can cause complication in this study observed that was significant between duration and hypertensive as in table [3]

V. Conclusion

The study confirms the existence of an association significant between hypertension in age, duration, platelets count, Mean platelet volume and C- reactive protein level and significant of CRP, Platelets count and MPV according to age and sex were reflecting on patient healthy stats. Further studies with larger sample size are needed to determine the CRP ,platelets count and MPV in individuals with hypertension and to evaluate these indicators can improve care for hypertensive patient.

Acknowledgments

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