

Fibrinogen Levels in Hypertensive and Normotensive: A Cross-Sectional Study from El-Obied City, Sudan

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Abstract

Hypertension (HTN) has been defined as a blood pressure level at which an otherwise healthy person would have an increased risk of cardiovascular disease that could be mitigated through blood pressure-lowering treatment. Worldwide, hypertension is one of the most common causes of death. The prevalence of hypertension and cardiovascular disease increases with age, and has been found to be higher in those of South Asian and African ancestry, and in Aboriginal populations. Hypertension is not only one of the most important risk factors for cardiovascular disease, but also the number one modifiable risk factor for stroke. Alterations in blood coagulation system have been reported in patients of hypertension. Fibrinogen has been identified as a major independent risk factor for cardiovascular diseases. This was a descriptive cross-sectional study, conducted in Elobied teaching hospital during period from March to June 2014. The aim of this study is to determine the level of fibrinogen among hypertensive patients. Seventy percent of the patients (about 35 patients) had high fibrinogen level above 400 mg/dl compared with the control and about 30% (15 patients) were within the normal range of 200 mg - 400 mg/dl. This study has concluded that there was a significant increase in fibrinogen level in hypertensive patients compared to control, while the gender has no effect on the level of fibrinogen.

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Keywords

Hypertensive, Normotensive, Fibrinogen Level, El-Obied City, Sudan

1. Introduction

Hypertension (HTN) or high blood pressure is a cardiac chronic medical condition in which the arterial blood pressure is increased. Hypertension is a powerful risk factor for fatal and nonfatal cardiovascular disease events. Also it is the most common cardiovascular disease and is a major public health issue in developed as well as developing countries [1]. Randomized controlled trials have convincingly shown that treatment of hypertension reduces the risk of stroke, coronary heart disease, congestive heart failure, and mortality [1]-[3]. Patients with hypertension should be evaluated for other cardiovascular risk factors including smoking, dyslipidemia, diabetes mellitus, age older than 55 years for men and 65 years for women, body mass, physical inactivity, micro albuminuria, an estimated glomerular filtration rate and for a family history of premature cardiovascular disease (younger than 55 years in fathers or brothers and younger than 65 years in mothers or sisters) [4]. Thrombosis is one of the most complicated courses of patients with hypertension and could be developed to many of organ damages. Circulatory homeostasis depends on the equilibrium between vasoconstricting and vasodilating forces regulating blood pressure, as well as the equilibrium between procoagulant and fibrinolytic factors regulating blood rheology [5]. Arterial disease is the major underlying factor leading to most clinically relevant cardiovascular events and these events are usually due to formation of a thrombus at the site of an atherosclerotic plaque; research has concentrated on the state of the coagulation pathways. Fibrinogen is both a coagulation factor and an acute-phase reactant that has been identified as a major independent risk factor for coronary artery [6]. There were many previous studies conducted in Sudan about the association of fibrinogen levels, D-dimer and other coagulation factors with hypertension and other heart disease. A fibrinogen level has been identified as a major independent risk factor for cardiovascular disease and measurement of fibrinogen level may be beneficial to avoid the complication of hypertension [7]-[9].

2. Materials and Methods

This was descriptive cross sectional study, conducted in Elobied teaching hospital during period from March to June 2014. Fifty known hypertensive patients (case) treated with anti hypertensive drugs, their age ranged (30 - 79) and divided according to their sex into (25 males and 25 females). Twenty five healthy people were assigned to the healthy control group their age ranged (30 - 79) and divided according to their sex into (13 males and 12 females). Excluding all patients with diabetes mellitus, smoking, cardiovascular diseases, liver disease and any patient under anticoagulant therapy, after consent was obtained by patients then data collected using structure questionnaire and direct interview to collect information. Then venous blood has been collected, from each subject, in 3.8% trisodium citrate (9:1 vol/vol). The samples were centrifuged at 2000 g for 15 minutes to obtain platelet-poor plasma (PPP). Plasma was separated from cells into plane container. PPP will be stored and refrigerated on (2 - 8 c) and tested within 4 hours. Fibrinogen has been measured using ready kits principle depend In the presence of excess thrombin the clotting time of the plasma is direct proportional with the level of fibrinogen in the plasma sample lie within the normal range 200 - 400 mg/dl. Data analysis was performed using statistical package for social science (SPSS) software version (22). Evaluation of patient's data was performed using the t-test and Pearson correlation test. Results with p value < 0.05 were considered as statistically significant.

3. Results

Fifty known hypertensive patients (case) treated with anti hypertensive drugs, The maximum duration of the hypertension was 10 years and the minimum duration about 5 years, their age ranged (30 - 79) and divided according to their sex in to (25 males and 25 females). Twenty five healthy people were assigned to the healthy control group their age ranged (30 - 79) and divided according to their sex in to (13 males and 12 females) (Table 1 & Table 2). 70% of the patients (about 35 patients) have high fibrinogen level above 400 mg/dl compare with the control and about 30% (15 patients) within the normal range 200 - 400 mg/dl (Table 3 & Table 4).

Table 1. Shows the distribution of study population by age.

	Age distribution among case and control					Total
	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	
Patient	11	18	12	7	2	50
Control	2	9	10	4	0	25
Total	13	27	22	11	2	75

Table 2. Shows the distribution study population by the gender.

	Gender distribution		
	Sex		Total
	Male	Female	
Patient	25	25	50
Control	13	12	25
Total	38	37	75

Table 3. Shows the percent of normal and high level of FIB on patients.

	Frequency	Percent	Valid Percent	Cumulative Percent
Normal	15	30.0	30.0	30.0
High	35	70.0	70.0	100.0
Total	50	100.0	100.0	

Table 4. Shows the comparison of FIB level between the patient and control depend up on the age.

p	N	Mean	Std. Deviation	t	df	p value
Patient	50	432.7200	65.33119	12.691	73	0.000
control	25	241.8000	52.52380	13.647	58.382	0.000

4. Discussion

Hypertension is recognized as one of the principal risk factors for cardiovascular disease. Impaired fibrinolysis may be associated with hypertension [10]. Fibrinogen is a major determinant of blood viscosity, and it is involved in haemostasis and thrombosis pathway. Elevated plasma fibrinogen is implicated in cardiovascular disease. However, it is not clear whether fibrinogen levels predict the development of hypertension. Our finding demonstrated that, the plasma fibrinogen level was significantly higher in the hypertensive patients than in control group. This result was in agreement with several studies conducted among hypertensive patients [8] [11] [12]. Also this finding is contrary to the findings reported by other workers [13] [14]. Although Sechi *et al.* did not observe differences in fibrinogen between hypertensive patients and normotensive controls, their study demonstrated a strong and independent association between fibrinogen and the presence and severity of hypertension related damage in different target organs [15]. Also our study show that the genders of the patient have no effect on the fibrinogen level both sex has same level of fibrinogen. This finding is agreement with study done by Anoop *et al.* found that elevated plasma fibrinogen level was positively associated with prevalent hypertension both among men and women [16]. Also study conducted by Folsom *et al.*, and concluded that despite a moderately strong positive association between fibrinogen levels and prevalent hypertension in both sexes, there was only a weak positive association between fibrinogen levels and incident hypertension in men and

no association in women. Whether an elevated fibrinogen level is a risk factor for, or a consequence of, hypertension remains unclear [17]. Our study is limited by the low number of subjects and other fibrinolytic markers like (D-dimer, PT, PTT and PLTs) must be included in study.

5. Conclusion

In conclusion, our study indicates that they significantly increased in fibrinogen level in hypertensive patients compared to control, while the gender showed no effect on the level of fibrinogen.

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