



Study of Serum Triglycerides Level and Fasting Blood Glucose Level Among The Essential Hypertensive Patients Visiting Jorhat Medical College & Hospital- A Crosssectional Hospital Based Study

KEYWORDS

Hypertension, dysglycaemia, triglycerides.

* Dr. Chiranjib bania

Dr. Saurabh Borkotoki

Anuradha paul

Post Graduate Trainee, Department of Biochemistry, Jorhat Medical College, Jorhat-785001, Assam, India
* Corresponding Author

Professor & Head, Department of Biochemistry, Jorhat Medical College, Jorhat-785001, Assam, India

Msc statistics, Lecturer, Guwahati college, bamunimaidan-781021

ABSTRACT Essential hypertension leads to altered lipid profile especially Triglycerides level in blood. There are reports showing hypertension and diabetes are the leading co-morbidities in general population as there is substantial overlap between hypertension and diabetes in both aetiology and diseases mechanism. There are only few reports worldwide showing dysglycaemia during high blood pressure, which has recently got interest Triglycerides are a type of fat the body uses to store energy and give energy to muscles. The study has been carried out among clinically diagnosed essential hypertension patients in Jorhat Medical College and Hospital, Jorhat. A Cross-Sectional hospital based Study of 680 patients with Essential hypertension who have been examined for serum triglycerides and fasting blood glucose level. During the study period, the quality control has been maintained according to prescribed norms and standards. Considering that the Essential hypertension to be more common in young adults, the study group was restricted to 20 years to 40 years. In our study, it was seen that serum Serum triglycerides increases with increase of fasting blood glucose level. & The Pearson correlation coefficient which was found to be positive between these parameters ($r=0.49$).

Introduction:

Hypertension is a common and major health problem in India and worldwide. It is the most common factor of cardiovascular diseases (CVD) which increases the risk of stroke, myocardial infarction and renal failure. According to world health report of 2003, CVDs will be the largest cause of death and disability by 2020 in India (1). The changes in serum lipid profile levels should be actively investigated & a few studies have established relation between hypertension and hyperlipidemia. In 2020, 2.6 million people in India are predicted to die due to coronary artery disease which constitutes 54.1% of all CVD deaths. Dyslipidemia and hypertension are one of the commonest risk factors for coronary artery disease. Hypertensive patient have higher lipid profile than normotensive patient (1-5). There are reports showing hypertension and diabetes are the leading co-morbidities in general population as there is a substantial overlapping between hypertension and diabetes in both aetiology and diseases mechanism. There are only few reports worldwide showing dysglycaemia during high blood pressure, which recently got interest (6-9). Hypertension is grossly divided into essential hypertension or primary hypertension or idiopathic hypertension and secondary hypertension. Essential Hypertension, by definition, has no identifiable cause. It is the most common type of hypertension, affecting 95% of hypertensive patients. Essential hypertension is likely to be consequences of an interaction between environmental factors and genetic factors. Prevalence of essential hypertension increases with age and with relatively high blood pressure at younger ages is at increased risk for the subsequent development of hypertension (10-12). Some modifiable risk factors are high salt intake, saturated fat, less dietary fibre, alcohol intake, less physical activity etc (4). Abnormalities in serum lipid and lipoprotein levels are recognized major modifiable cardiovascular disease and essential hypertension risk factors. (13-15). In north east, prevalence of essential hypertension is 33.3% (16). The body uses cholesterol to help build cells and produce hormones. Too much cholesterol in

the blood can build up inside arteries, forming what is known as plaque. Large amounts of plaque increase your chances of having a heart attack or stroke. (17-18) The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) defined and classified hypertension in adults. The diagnosis of hypertension is made when the average of 2 or more diastolic BP measurements on at least 2 subsequent visits is ≥ 90 mm Hg or when the average of multiple systolic BP readings on 2 or more subsequent visits is consistently ≥ 140 mm Hg. Isolated systolic hypertension is defined as systolic BP ≥ 140 mm Hg and diastolic BP < 90 mm Hg. Individuals with high normal BP tend to maintain pressures that are above average for the general population and are at greater risk for development of definite hypertension and cardiovascular events than the general population (19). Triglycerides are a type of fat the body uses to store energy and give energy to muscles. Only small amounts are found in the blood. Having a high triglyceride level along with a high LDL cholesterol may increase your chances of having heart disease more than having only a high LDL cholesterol level.

MATERIALS AND METHODS:

SAMPLE SIZE- 680 PATIENTS

STUDY PERIOD- ONE YEAR (1.6.2015 – 31.5.2016)

Aims and objective:

To measure the changes of serum triglycerides and fasting blood glucose level in clinically diagnosed patients with essential hypertension between 20 years to 40 years visiting JMCH

Design of the study:

Study design: cross sectional hospital based study.

Subjects: The study has been carried out among clinically

diagnosed essential hypertension patients in Jorhat Medical College and Hospital, Jorhat. The consent form was provided to the patients to obtain prior approval before their inclusion in the study.

CRITERIA FOR SELECTION OF CASES:

Cases has been selected among the Essential hypertension patients attending the OPD and in patients WARD of MEDICINE department of Jorhat Medical College, Jorhat fulfilling the below mentioned inclusion and exclusion criteria. A brief history of the patient has been taken including demographic profile.

INCLUSION CRITERIA:

Patients of age group 20 to 40 years.

Newly and already diagnosed cases of essential hypertension with or without medications.

EXCLUSION CRITERIA:

Patients with other associated major disorders and in which hypertension diagnosed later

Patients with systemic illness like diabetes, hypertension, hypothyroidism, renal disease, liver disease, obesity and cancer.

Already diagnosed case of Secondary hypertension

Patients on contraceptive pills (OCP) for longer duration around 10 years.

COLLECTION OF BLOOD SAMPLE:

All samples were collected under aseptic and antiseptic measure in CCL collection center JMCH..The samples was collected after overnight fasting of around 8 hours to 12 hours. The samples were collected in fluoride vial for Fasting glucose and clot vial for serum triglycerides. Fasting glucose and serum cholesterol was tested in vitrous 250 auto analyser based on principle of reflectance spectroscopy. Samples were made to stand for 20 minutes at room temperature and centrifuged at 3200rpm.for 5-10 minutes. Serum was separated into secondary cup and then analysed. During the study period, the quality control was maintained according to prescribed norms and standards. The PV1 & PV2 of reference range of every parameter was run daily. The external & internal quality control was properly maintained during the study period

Statistical method;

The data were analysed using Microsoft Excel. Statistical significance of the study was tested online calculator.

Results:

In the present study, total of 680 patients were selected for estimation of serum cholesterol and fasting blood glucose of having essential hypertension. there was equal distribution of male and female in each group. Normally, desired serum triglycerides level is upto 101-150mg/dl & fasting blood glucose is 70-110mg/dl. Total number of patients in each group was equal. The comparison of serum triglycerides(164.21±32.17) and fasting blood glucose(116.57 ± 27.40). It was seen from the table 3 that serum triglycerides level showed a positive correlation with fasting blood glucose levels, that was statistically significant (p<0.05). The Pearson Correlation Coefficient "r" which was found to be 0.498867 established a strong positive correlation between the two parameters.

TABLE 1:SHOWING NUMBER OF PATIENTS IN EACH GROUPS:

AGE(years)	CASE	MALE:FEMALE PERCENTAGE
20-40	680	50

TABLE 2: COMPARISON OF SERUM TRIGLYCERIDES AND FASTING BLOOD GLUCOSE:

	SERUM TRIGLYCERIDES MEAN ±SD	FASTING BLOOD GLUCOSE MEAN±SD
CASES	164.21±32.17	116.57 ± 27.40

TABLE 3: CORRELATION BETWEEN FASTING BLOOD GLUCOSE AND SERUM TRIGLYCERIDE LEVEL IN CASES:

Fasting blood glucose (F.B.G)	Serum triglyceride (S.T.)	
	r-value	p- value
	0.498867	<0.05

It was seen from the above table 3 that Serum triglyceride level showed a positive correlation with fasting blood glucose levels, that was statistically significant (p<0.05). The Pearson Correlation Coefficient "r" which was found to be 0.498867 established a strong positive correlation between the two parameters.

Discussion:

In a study of Two hundred and fifty newly diagnosed adult hypertensive patients and an equal number of age- and sex-matched controls without hypertension were consecutively recruited from the Medical and General Outpatient Clinics of Nnamdi Azikiwe University Teaching Hospital, Nnewi. Result. 126 males and 124 females were in each of the two groups. Mean age was comparable in both groups. Hypertensives had significantly higher mean systolic blood pressure, diastolic blood pressure and fasting blood sugar than the controls. The mean of triglycerides, was significantly higher among the hypertensives. This study showed that lipid abnormalities are highly prevalent among newly diagnosed hypertensives in South-East Nigeria.

In a study from General Medicine department of Government hospital, Rishikesh from May 2009 to May 2010. Hypertension was defined as per the recommendations of JNC7th Report. A total of 120 volunteers were recruited for this study. Out of them 70 were hypertensive subjects (38 males and 32 females) and 50 were normotensive subjects (27 males and 23 females). The results concluded that triglycerides was higher and statistically significant in hypertensive subjects than normotensive subjects (p<0.05).

In another attempt was made by N Lakshmana kumar, J.Deepti, YN rao, M Kiran deedi, department of biochemistry, GSL medical college, Andhra Pradesh, india .to study the role of lipid profile serum blood glucose in hypertension individuals. Moreover, all the parameters are analyzed biochemically. In about 80 samples (50cases and 30 controls) and it is observed that dyslipidemia is seen in Hypertensive individuals with no change in HDL concentration.. . Fasting blood glucose of hypertensive cases (101.62mg/dl ±33.78) is higher than that of Controls (82.46 mg/dl±10.8). This increase is statistically significant (p<0.001).

From May 2009 to May 2010. After 12 hours fast the blood samples were collected from all individuals with-

out anticoagulant and centrifuged at 3000 rpm for 5 minutes. The serum was collected in fresh vial and standard methods were followed for biochemical studies. A total of 120 volunteers were recruited for this study. Out of them 70 were hypertensive subjects (38 males and 32 females) and 50 were normotensive subjects (27 males and 23 females). The results concluded that hypertensive patients had fasting blood glucose level higher than normal healthy controls. Mean fasting blood glucose level among hypertensive patients was 98.57 ± 14.23 mg/dl and that of among normal healthy controls was 82.98 ± 9.16 mg/dl. The difference between the two groups was statistically significant ($p=0.000$). This study was planned to compare the fasting blood glucose level in hypertensive patients and normal healthy controls. This prospective study was carried out in general medicine and pathology departments of Govt. Hospital in Rishikesh. In the present study, the volunteers were selected from General Medicine department of Government hospital Rishikesh

Another cross-sectional study was done by Singla R, Goyal A, Bedi GK, Rao HK. In north Indian population in 2013 which shows Hypertensive subjects were characterized by increased fasting insulin levels (16.77 ± 7.62 vs. 8.84 ± 2.04 μ IU/ml, $p < 0.01$), increased dyslipidemia, i.e. high serum triglycerides, with $p < 0.01$. There was a positive correlation of fasting insulin levels with BMI, total cholesterol and LDL-C ($p < 0.01$) and a negative correlation with HDL-C ($p < 0.05$).

Conclusion: From the present study, It was observed that Serum triglycerides increases with increase in blood glucose level in Essential hypertensive patients & The Pearson correlation coefficient which was found to be strongly positive between these parameters & it was highly significant. The serum triglycerides level showed a positive correlation with fasting blood glucose levels, that was statistically significant ($p < 0.05$). The Pearson Correlation Coefficient "r" which was found to be 0.498867 established a strong positive correlation between the two parameters.

References:

- (1) Pooja M ,mittal Y,mathur,(2013) A.Asian journal of lipid profile of north Indian hypertensive subjects. asian journal of biomedical sciences.2013;18(3):38-41 .
- (2) Pooja M ,Mittal Y;Fasting(2014) blood glucose level in patients suffering from hypertension.Asian journal of biomedical sciences and pharmaceutical sciences. ; 04(29);19-22.
- (4) Park.K. text book of preventive and social medicine.M/s banarsidas bhanot publishers;22;2013;hypertension;344-348.
- (5) Charles U. Osuji 1, Emeka G.(2012) Serum Lipid Profile of Newly Diagnosed Hypertensive Patients in Nnewi, South-East Nigeria. International Journal of Hypertension.Volume. 12, 7-8.
- (6) Gupta S, Agarwal K Bimal,S, Prabodh K,Goel K R.(2011) Prevalence And Predictors Of Essential Hypertension In The Ruralpopulation Of Haryana, India. An Hospital Based Study. Jrraltrroppublichealth 2011 .Volume 10. 29 – 34
- (7) Esunge PM . (1991)From blood pressure to hypertension: the history of research. J R Soc Med..84 (10): 621.
- (8) Kotchen TA. (2011),Historical trends and milestones in hypertension research. a model of the process of translational research..Hypertension 58 (4): 522–38.
- (9) Swales JD. (1995)Manual of hypertension. Oxford: Blackwell Science. 1995.861.
- (10) Postel-VN. (1996)A century of arterial hypertension.Chichester. Wiley. 1996; 1896-1996.
- (11) Paul I. (2007)Essential Hypertension and Its Causes : Neural and Non-Neural Mechanisms. Oxford University Press, USA.
- (12) Keith NM, Wagener HP, Kernohan JW .(1928) The syndrome of malignant hypertension. Arch. Intern. Med.. 41 (2): 141–188.
- (13) Bruenn HG . (1970)Clinical notes on the illness and death of president Franklin D. Roosevelt. Annals of Internal Medicine.. 72 (4): 579–591.
- (14) Hay JH. (1931)A British Medical Association Lecture on THE SIGNIFICANCE OF A RAISED BLOOD PRESSURE. Br. Med.J.. 2 (3679): 43–47.
- (15) Moser M. (2006)Historical perspectives on the management of hypertension. J. Clin. Hypertens. . 8 (2): 15–20.
- (16) White PD . (1937)Heart Disease (2nd ed.). New York. NY. MacMillan Co. .p. 326.
- (17) Friedberg CK ,(1949) Diseases of the Heart. Philadelphia, PA: WB Saunders Co..
- (18) Pickering GW.(1952)The natural history of hypertension. Br. Med. Bull. .8 (4): 305–9.
- (19) Dustan HP, Roccella EJ, Garrison HH . (1996)Controlling hypertension. A research success story. Arch. Intern. Med. 156 (17): 1926–35.