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Original Research Article

A Prospective Observational Assessment of the Role of Dyslipidemia and Other Unidentified Risk Factors in Ischaemic Stroke

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Abstract

Aim: Evaluate the role of Dyslipidemia and other unidentified risk factors in Ischaemic stroke in our population.

Methods: It was a prospective observational study in 80 angiographically proven CAD patients at Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India. Anthropometry and cardiovascular risk variables were assessed in all patients, and blood samples were taken to test biochemical and inflammatory markers. This study included a total of 80 individuals who were admitted to the Medicine Department for examination of chest discomfort and confirmed to be angiography positive.

Results: A total of 80 individuals with known CVD (Male: 50; Female: 30, age: 58.22 ±4.21 years, range: 27-77 years). indicates the individuals' baseline characteristics. Males and females were not separated by age (Male: 60.45±12.21; Female: 54.21±11.11; P = 0.7 4). Males had higher levels of dyslipidemia than females. Males had a larger percentage of T2DM, Dyslipidemia and HTN than females. Total cholesterol level (169.41±18.26 vs. 199.24±11.45, *P* = 0.88) and LDL cholesterol (104.21±8.21 vs. 99.41±9.45, *P* = 0.64) were comparable in patients with and without atherogenic dyslipidemia. There was no statistically significant difference in percentage of patients with hypercholesterolemia among patients with or without atherogenic dyslipidemia. Cardiovascular risk factors found significantly higher in patients with atherogenic dyslipidemia present in cases and there was statistically significant difference in both groups.

Conclusion: In individuals with CAD, hypertriglyceridemia and low HDL cholesterol are more prevalent than hypercholesterolemia. This shows that among Indian individuals with CAD, a new preventative approach is necessary.

Keywords: Dyslipidemia, Ischaemic Stroke, Unidentified Risk Factors.

Introduction

Asians have a higher prevalence of cardiovascular risk factors, type-2 diabetes mellitus (T2DM) and earlier onset of cardiovascular disease (CVD) despite a normal body mass index (BMI) by international standards [1,2]. It is expected that individuals of Indian Asian ethnicity will account for 40-60% of global CVD burden within the next 10-15 years [3]. It has been hypothesized that higher risk observed in this ethnic group can be due to underlying genetic susceptibility [4] unmasked by environmental factors and excess accumulation of visceral body fat in adult life [5]. The metabolic abnormalities associated with increased visceral fat; raised triglycerides (TG) and low high-density lipoprotein (HDL) cholesterol are more prevalent in individuals of South Asian origin [6,8]. Dyslipidemia is a primary, widely established as an independent major risk factor for coronary artery disease (CAD) and may even be a prerequisite for CAD, occurring before other major risk factors come into play [9]. Studies have reported higher prevalence of lipid abnormalities among Asians compared with non-Asians [10,11]. Low HDL cholesterol and high TG concentrations have been implicated as possible independent predictors of CVD [11] and the combination of these two conditions are called as atherogenic dyslipidemia. Asian Indian have a higher prevalence of low HDL cholesterol and lower prevalence of high cholesterol than non-Asian Indians, which suggests impaired reverse cholesterol transport. These findings suggest the importance of high TG and low HDL cholesterol in Asian Indians compared with high cholesterol, which is more prevalent in western countries, which may have therapeutic implications. The impact of dyslipidemia on the burden of CVD has been understudied in native Asians, despite its large contribution to CVD in the other world populations. Asian Indians have low prevalence of hypercholesterolemia and high prevalence of atherogenic dyslipidemia, which may have therapeutic implications.

Materials and methods:

It was a prospective observational study that looked at the relationship between dyslipidemia and cardiovascular risk variables in 80 angiographically proven CAD patients at Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India,

Methodology

Anthropometry and cardiovascular risk variables were assessed in all patients and blood samples were taken to test biochemical and inflammatory markers. This study included a total of 80 individuals who were admitted to the Medicine Department for examination of chest discomfort and confirmed to be angiography positive. Chronic renal illness, hepatic dysfunction, recognized endocrine. The following measurements were taken height, weight, waist circumference, and hip circumference. BMI was computed by multiplying a person's weight in kilograms by the square of their height in meters. BMI 25 kg/m2, central obesity defined as waist >90 cm in males and >80 cm in females, T2DM defined as history and criteria provided by the American Diabetes Association-2012, and hypertension (HTN) defined as systolic and diastolic blood pressures of 140 and 90 mmHg, respectively. Regardless of the patient's gender, atherogenic dyslipidemia was defined as TG levels of 150 mg/dl and HDL cholesterol levels of 40 mg/dl [12]. Individual lipid abnormalities were also evaluated in this study, and groups were formed based on the presence or absence of lipid abnormalities. After 14 hours of fasting, blood samples were taken. Lipids were tested using cholesterol oxidase, an enzymatic reaction, and the Freidwald method was used to compute LDL cholesterol and very low-density

lipoprotein cholesterol. For all biochemical parameters, the inter assay precision was 3.84 percent and the intra precision was 2%. HPLC was used to determine hemoglobin A1c. extremely sensitive C-reactive protein (hsCRP). Statistical analysis was carried out using SPSS Version 19. Data were presented as mean ± SD, median or number (%) unless specified. All non-parametric data such as HTN, dyslipidemia, smoking and number of vessels involved were analyzed by Chi-square test. All non-parametric data were analyzed by Chi-square test. A $P < 0.05$ was considered as statistically significant.

Results:

Table 1: Baseline Characteristics of study population

Parameters	Male(n=50)	Female(n-30)	P Value
Age	60.45±12.21	54.21±11.11	0.74
Smoking	35(70%)	2(6.67%)	0.0001
BMI	28.98±1.24	30.44±2.22	0.09
WHR	0.90±0.02	0.92±0.06	0.24
T2DM	37(74%)	20(66.67%)	0.11
HTN	27(54%)	10(33.33%)	0.04
Dyslipidemia	28(56%)	14(46.67%)	0.16

A total of 80 individuals with known CVD (Male: 50; Female: 30, age: 58.22 ±4.21 years, range: 27-77 years). Mean age in male: 60.45±12.21; female: 54.21±11.11 (P = 0.74). Males had higher levels of dyslipidemia than females. Males had a larger percentage of T2DM, Dyslipidemia and HTN than females.

Table 2: Baseline Characteristics of Lipid profile and hs CRP

Parameters	Male(n=65)	Female(n-35)	P Value
T. Cholesterol	169.41±18.26	199.24±11.45	0.88
Triglyceride	296.22±90.21	208.41±44.62	0.04
HDL	39.41±10.42	38.42±9.23	0.74
LDL	104.21±8.21	99.41±9.45	0.64
Hs CRP	12.51±1.41	11.72±1.66	0.28
HbA1C	6.82±1.22	6.54±1.48	0.71

Total cholesterol level (169.41±18.26 vs. 199.24±11.45, $P = 0.88$) and LDL cholesterol (104.21±8.21 vs. 99.41±9.45, $P = 0.64$) were comparable in patients with and without atherogenic dyslipidemia. There was no statistically significant difference in percentage of patients with hypercholesterolemia among patients with or without atherogenic dyslipidemia

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Table 3: Cardiovascular risk factors with atherogenic dyslipidemia

Parameters	Present(n=42)	Absent (n-38)	P Value
T. Cholesterol	246.22±32.14	175.25±11.25	<0.001
Triglyceride	298.32±124.24	175.23±7.45	<0.001
HDL	28.41±3.22	46.21±12.44	0.002
LDL	146.42±8.12	79.45±3.45	<0.001
Hs CRP	15.84±2.45	9.95±2.22	<0.001
HbA1C	8.21±1.22	5.34±1.02	<0.001

In table no 3. Cardiovascular risk factors found significantly higher in patients with atherogenic dyslipidemia present in cases and there was statistically significant difference in both groups.

Discussion:

To assess the effects of dyslipidemia on CVD, several population-based prospective studies have been done. Several studies from different parts of India have found various frequency and types of dyslipidemia. From the north, west, and southern parts of India, high TG (28-72.2%), high LDL cholesterol (23.3-44.5 %), low HDL (27- percent), and high total cholesterol (19-38.7%) were found [13]. These disparities can be explained by changes in the research population in terms of age and sex distribution, the inclusion of patients with CVD, and whether the study was conducted in a community or hospital setting. Only a few studies have looked at the distinct relationships between various dyslipidemias and CVD risk factors in patients with angiographically confirmed CAD [13]. A significant incidence of increased TG was found in research conducted in India (Delhi) among young (below 40 years) CAD patients. Atherogenic dyslipidemia was found in 52.5 % of the participants in our research. Subjects with atherogenic dyslipidemia had comparable total cholesterol levels compared to those without atherogenic dyslipidemia in Italian research, which is similar to ours [14]. Most western studies [15] and NHANES data [16] emphasized the importance of elevated LDL and TC in the development of CAD compared to atherogens. This emphasizes the importance of low HDL and high TG in the Indian population as cardiovascular risk factors, as compared to the western population, as previously stated [17]. Age, gender, BMI, and central obesity are all linked to atherogenic dyslipidemia [18]. However, there was no difference in age, gender, BMI, or WHR between individuals with and without dyslipidemia in this investigation. Similar findings were found in an Italian investigation, which found no change in BMI between participants with and without dyslipidemia and CAD [14]. All of the participants in our study had known CAD, which would have obscured the link between dyslipidemia and BMI and WHR. The majority of our patients had a mean WHR >0.9 and a mean BMI >25, which were already higher than the normal population according to International and Indian guidelines [19], which could explain the lack of a link in this study. Patients with atherogenic dyslipidemia had a considerably greater frequency of participants with T2DM and/or HTN than those without. In contrast, the frequency of HTN did not differ between individuals with and without atherogenic dyslipidemia in other studies [13]. In univariate analysis, serum TG was favorably connected with the presence of T2DM and HTN, whereas HDL cholesterol was inversely connected with the presence of T2DM and HTN. Similarly, the Genetic Epidemiology of Metabolic Syndrome Project, a family-based study, found a weaker link between blood pressure and atherogenic dyslipidemia [20].

Conclusion:

In individuals with CAD, hypertriglyceridemia and low HDL cholesterol are more prevalent than hypercholesterolemia. This shows that among Indian individuals with CAD, a new preventative approach is necessary.

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