

COMPARATIVE STUDY OF CAROTID ARTERY INTIMA MEDIA THICKNESS IN HYPERTENSIVE SMOKERS AND NON-HYPERTENSIVE SMOKERS IN YOUNG ADULT MALES IN SOUTH KARNATAKA POPULATION

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ABSTRACT

Background: Carotid artery intima media thickening is a marker of early atherosclerosis that can be assessed non-invasively and predicts severity of cardio-vascular diseases and cerebro-vascular diseases. **Materials and Methods:** 30 adult smokers with HTN were compared with non-hypertensive smokers (a controlled group). USG of both carotid arteries was measured using a GE Versana Balance scanner with a linear transducer, and the lipid profile was also compared in both groups. **Result:** Comparison of lipid profile BMI had a significant p value ($p < 0.001$). Similarly, the mean values of CIMT in both groups had a significant p value ($p < 0.001$). **Conclusion:** It is concluded that the present significant value will be useful for clinicians and cardiologists to efficiently prevent morbidity and mortality in cardio-vascular disease patients.

INTRODUCTION

Cardio-vascular disease (CVD) is a non-communicable disease due to atherosclerosis in the majority of patients. Atherosclerosis disease becomes symptomatic when there is hemodynamically significant narrowing of the lumen of blood vessels or when sudden thrombus formation occurs over a ruptured plaque.^[1]

The major etiology of atherosclerosis is smoking, alcoholism, and sedentary life. The carotid artery intimal thickening is a marker of early atherosclerosis and can be assessed non-invasively.^[2] Changes in the arterial wall thickness indicate structural changes resulting from arterial remodeling, most often due to the atherosclerosis process. Carotid ultrasound for the measurement of carotid intima media thickness and plaque assessment is one of the tools for the assessment of carotid wall thickness related to coronary risk factors such as stroke and sudden death.^[3] The thickness of the carotid arterial wall also predicts cerebrovascular diseases.^[4] Hence, an attempt was made to evaluate the thickness of carotid arteries and compare them with those of non-smokers and hypertensive adult males.

MATERIALS AND METHODS

30 (thirty) adult male patients, age between 25 to 60 years visited the medicine department of Dr. BR Ambedkar Medical College, Bangalore-560045, South Karnataka were studied.

Inclusion Criteria

Heavy or chain smokers with hypertension and not taking any antihypertensive drugs. The patients who gave their consent in writing to the study were selected.

Exclusion Criteria

Patients below 20 years and above 60 years of age, patients with COPD, pulmonary tuberculosis (PT), type II DM, cardiomyopathies, cardio-vascular disease, patients on antidepressive treatment, and immune compromised patients were excluded from the study.

Method: 30 smokers with hypertension were compared with the same number 30 healthy controlled group.

Each patient was made to undergo ultra-sonographic scanning (USG) of carotid arteries using a GE Versana Balance scanner with a linear transducer (Mid frequently ranges from 7.5 to 10 MHZ). A CIMT value of more than 0.8 mm is suggestive of significant intima thickness. Blood examination to rule out lipid profile, renal profile routine blood test, and BMI were measured. Blood pressure was

measured by a standard mercury sphygmomanometer. HTN was classified using JNC 8 guidelines, which required at least two consecutive measurements.

Each patient was also evaluated with echocardiography. Two-dimensional pulsed Doppler. M. Mode and color flow Doppler echocardiography by the GE Healthcare CareVision 5 machine with a multi-frequency probe.

The duration of the study was from September 2023 to March 2024.

Statistical Analysis: Comparison of CIMT (Carotid Intima Media Thickness Test) and lipid profile was studied in both groups by t test, and significant values were noted. Statistical analysis was carried out in SPSS software.

RESULTS

[Table 1] Comparative study of lipid profile in HTN smokers and controlled group: -

- Cholesterol: 164.5 (± 18.2) in HTN smokers and 153.5 (± 3.5) in controlled group, t test value 3.21 and $p < 0.003$
- Triglycerides (mg/dl): 120.4 (± 33.3) in HTN smokers and 115.2 (± 15.2) in the controlled group, t test value 2.27 and $p < 0.002$
- HDL: 58.4 (± 12.60) in HTN smokers and 48.8 (± 8.8) in the controlled group, t test value 3.42 and $p < 0.001$
- LDL: 119.8 (± 23.3) in HTN smokers and 109 (± 13.2) in the controlled group, t test value 2.20 and $p < 0.003$
- BMI: 29.3 (± 3.2) in HTN smokers and 25.2 (± 2.2) in the controlled group, t test value 5.78 and $p < 0.001$

[Table 2] Comparative study of CIMT tests in HTN smokers and a controlled group

- CIMT (mm): 0.974 (± 0.10) in HTN smokers and 0.732 (± 0.3) in the controlled group, t test value 4.19 and $p < 0.002$
- CIMT right side (mm): 0.945 (± 0.8) in HTN smokers and 0.722 (± 0.2) in the controlled group, t test value 1.34 and $p < 0.001$
- CIMT left side (mm): 0.998 (± 0.52) in HTN smokers and 0.744 (± 0.18) in the controlled group, t test value 5.52 and $p < 0.001$.

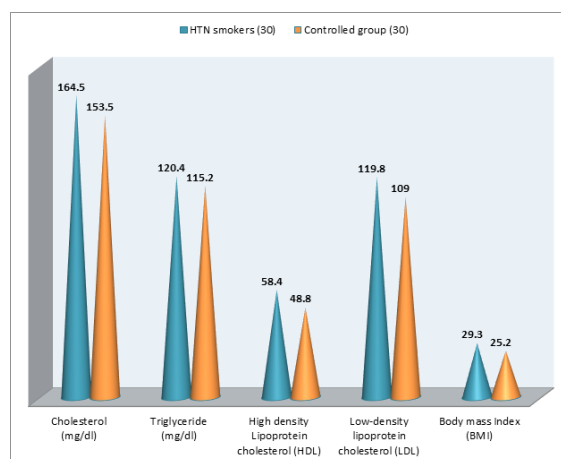


Figure 1: Comparative study of lipid profile in HTN smokers and controlled groups

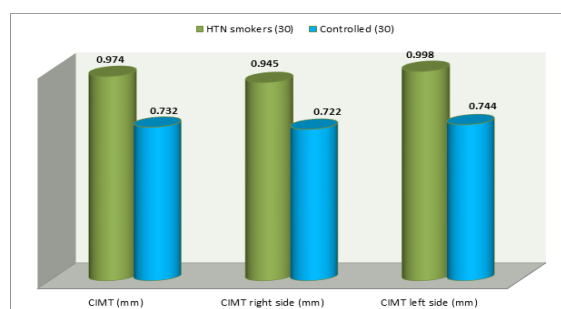


Figure 2: Comparative study CIMT (carotid Intima Media thickness) test in HTN smokers and controlled group

Table 1: Comparative study of lipid profile in HTN smokers and controlled groups

Sl. No	Lipid profile	HTN smokers (30)	Controlled group (30)	t test	p value
1	Cholesterol (mg/dl)	164.5 (± 18.2)	153.5 (± 3.5)	3.21	$P < 0.003$
2	Triglyceride (mg/dl)	120.4 (± 33.3)	115.2 (± 15.2)	2.27	$P < 0.002$
3	High density Lipoprotein cholesterol (HDL)	58.4 (± 12.60)	48.8 (± 8.8)	3.47	$P < 0.001$
4	Low-density lipoprotein cholesterol (LDL)	119.8 (± 23.3)	109 (± 13.2)	2.20	$P < 0.003$
5	Body mass Index (BMI)	29.3 (± 3.2)	25.2 (± 2.2)	5.78	$P < 0.001$

Table 2: Comparative study CIMT (Carotid Intima Media Thickness) test in HTN smokers and controlled group.

Sl. No	CINT	HTN smokers (30)	Controlled (30)	t test	p value
1	CIMT (mm)	0.974 (± 0.10)	0.732 (± 0.3)	4.19	$P < 0.002$
2	CIMT right side (mm)	0.945 (± 0.8)	0.722 (± 0.2)	1.34	$P < 0.002$
3	CIMT left side (mm)	0.998 (± 0.521)	0.744 (± 0.18)	2.52	$P < 0.001$

DISCUSSION

Present a comparative study of carotid artery intima media thickness in hypertensive smokers and non-hypertensive smokers in young adult males in the

South Karnataka population. The lipid profile parameters in hypertensive smokers and the control group had a significant p value [Table 1]. A comparative study of the CIMT test in hypertensive smokers and the control group had a significant p

value ($p < 0.001$) [Table 2]. These findings are more or less in agreement with previous studies.^[5-7]

The arterial capacity of a resistant artery is a decisive factor in arterial function. In HTN patients, functional, mechanical, and structural changes cause a decrease in the diameter of the arteries. These changes increase systolic pressure, pulse rates, and stiffness of the arteries.^[8] Since racial, geographical, cultural, or environmental differences are decisive factors for HTN and the thickness of carotid arteries.^[9]

It is reported that vascular remodeling is the cause of carotid arterial wall thickness.^[10] In the early atherosclerosis stages, a compensatory mechanism prevents narrowing coincident with carotid arterial wall thickening, which occurs during the early phase.^[11] It is also noted that low socio-economic status, low education, low income, or being employed are associated with carotid artery media intima thickness hypertensive patients because they don't have awareness about cardio-vascular disease.^[12]

CONCLUSION

The present comparative study of the thickness of tunica media intima in hypertensive smokers with a controlled group has been significantly proven. adverse effects like CVD and strokes. The present study demands that such clinical trials be conducted in a large number of patients in higher cardiac centers to confirm these significant results because the exact pathophysiology of the thickening of carotid walls is still unclear.

Limitation of study: Owing to the tertiary location of the research center, the small number of patients, and the lack of the latest techniques, we have limited findings and results.

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