

ORIGINAL RESEARCH

Carotid Intima Media Thickness in HTN smokers and Non HTN Smokers

Dr. Ramesh Kumar Goenka

Associate Professor, Department of Internal Medicine, KIMS, Bhubaneswar, Odisha, India

Corresponding Author

Dr. Ramesh Kumar Goenka

Associate Professor, Department of Internal Medicine, KIMS, Bhubaneswar, Odisha, India

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Abstract

Introduction – Cardiovascular diseases are the leading cause of death globally. Carotid artery intimal thickening is a marker of early atherosclerosis that can be assessed non invasively. The present study is done to compare carotid intima media thickness in hypertensive and non hypertensive smokers.

Material & methods- case control study was conducted among 100 patients with habit of smoking both hypertensive and non-hypertensive who visited the department during the time period one year. Each patient underwent ultra-sonographic scanning of carotid arteries. Data was analyzed using SPSS version 23.0.

Results –In this study maximum subjects were in the age group of 51-60 years (36%). The number of male and female were equal in case and control group. Mean value of cIMT was found to be significant higher in cases (0.870 ± 0.20) as compared to control (0.725 ± 0.17) group. The difference in mean values of cIMT for females was found to be significant ($P < 0.05$) for cases in comparison to controls

Conclusion – The present study and its observations makes it imminent that Hypertension affects every cIMT measurement of the study subjects.cIMT is an effective marker in finding out the risk of arthersclerosis.

Keywords – cIMT, cardiovascular disease,hypertension, risk, smoking

Introduction

In the world, cardiovascular diseases are the leading cause of death. These ailments are listed as the number one cause of death in various countries.[1] One of the most common cardiac risk factors and the main reason assessed by doctors, hypertension (HTN), can be treated well to avoid catastrophic side effectsas such ischemic heart disease, heart failure, stroke, and renal failure.[2]

India is currently experiencing a CVD epidemic on a worldwide scale. Early childhood is when atherosclerosis begins to develop, and it continues for decades. Only when there is a hemodynamically substantial constriction of the vasculature or when a sudden thrombus forms over a ruptured plaque does the atherosclerotic disease start to manifest symptoms. Atherosclerosis progresses slowly and subtly, giving doctors a chance to catch it in its subclinical stage and take the necessary corrective action to stop it. [3,4]

Carotid artery intimal thickening is a non-invasive testable indicator of early atherosclerosis. The atherosclerotic process is most frequently to blame for arterial remodellingthat results in changes in arterial wall thickness, which suggest structural arterial alterations. One of the often employed techniques for assessing subclinical atherosclerosis is carotid ultrasound for the evaluation of carotid intima media thickness (cIMT) and plaque assessment. A well-researched tool that has been applied in clinical practise is cIMT. [5,6]

On the other hand smoking has been well documented as a risk factor for ischemic heart disease (IHD) in general. It is also reported that, smoking degrades carotid IMT, a well known marker for atherosclerosis.[7] Therefore, early prevention of cardiac disease has become focus for current research in utilising CIMT as a simple non-invasive method in the assessment of sub-clinical atherosclerosis which has been shown to be an independent predictor of CVD. Hence the present study was conducted to assess Carotid Intima Media Thickness in HTN smokers and Non HTN Smokers.

Material & methods

The present case control study was conducted among 100 patients with habit of smoking both hypertensive and non-hypertensive who visited the department during the time period one year. Permission was taken from ethical review board before the commencement of study and a written informed consent was taken all the participant of study.

Inclusion criteria

Cases were defined as smokers with hypertension above 18 years or equal. The subjects were poorly controlled hypertensive patients who defaulted or not compliant with medications. Controls were age and sex matched individuals who are smokers and non-hypertensive.

Exclusion criteria

All patients below 18 years and who failed to give consent, having associated respiratory illness like Chronic obstructive pulmonary disease, asthma, pulmonary tuberculosis etc and are known cases of diabetics, dyslipidemia, coronary artery disease, stroke, valvular heart disease and cardiomyopathies.

Each patient underwent ultra-sonographic scanning of carotid arteries using WIPRO-Ge logic 400 MD scanner with a linear transducer (mid frequency range 7.5 – 10 MHz). CIMT value of more than 0.8 mm was suggestive of significant atherosclerosis. Blood examination to assess lipid profile and BMI was also measured. Each patient was also evaluated with complete echocardiography. Blood pressure was measured by standard mercury sphygmomanometer. HTN was classified using JNC 8 guidelines measured at least two consecutive measurements.

The data were managed on Microsoft excel spreadsheet and analyzed using SPSS for Windows (release 23.0, SPSS Inc., Chicago, IL, USA). Standard descriptive analysis was performed to analyze the baseline characteristics of the study population. Student's independent samples t-test was used for dichotomous risk factors and Pearson's correlation coefficient for continuous variables. A P value < 0.05 was considered statistically significant for all the analysis performed.

Results

The demographic profile of patients is shown in table 1. The maximum subjects were in the age group of 50 to 60 years (36) and least was in the age group of above 70 years (13). The number of male and female subjects was equal in both groups.

Table 1 showing demographic profile of patients

Variable		Case N (%)	Control N (%)
Age (in years)	30-40	6 (12)	9 (18)
	41-50	9 (18)	15 (30)
	51-60	25 (50)	11 (22)
	61-70	2 (4)	10 (20)
	>70	8 (16)	5 (10)
Gender	Male	30	30
	Female	20	20

The difference in mean value of cIMT was found to be significant (P < 0.05) as mean of Case group (0.870) is significantly higher than that of Control group (0.725). The difference in mean value of Left cIMT was found to be significant (P < 0.05) as mean of Case group (0.988) is significantly higher than that of Control group (0.736). The difference in mean value of Right cIMT was found to be significant (P < 0.05) as mean of Case group (0.983) is significantly higher than that of Control group (0.713) as shown in table 2.

Table 2 Comparison of Mean Value of cIMT in both groups

cIMT (mm)	Case Mean \pm SD	Control Mean \pm SD	P value
cIMT	0.870 \pm 0.20	0.725 \pm 0.17	0.037
Left cIMT	0.988 \pm 0.51	0.736 \pm 0.87	0.002
Right cIMT	0.983 \pm 0.21	0.713 \pm 0.18	0.013

Comparison of cIMT values was done on the basis of gender and it was found that the difference in mean values of cIMT for females was found to be significant (P < 0.05) for cases in comparison to controls. Similar results were seen in males. But cIMT values for males and females were statistically non significant as shown in table 3.

Gender	Case cIMT (Mean \pm SD)	Control cIMT (Mean \pm SD)	P value
Male	0.958 \pm 0.21	0.871 \pm 0.18	0.015
Female	0.977 \pm 0.23	0.873 \pm 0.151	0.020

Discussion

The present study was conducted among 100 patients who visited the hospital during the time period of study. The subjects were divided to cases and controls on the basis of presence and absence of hypertension.

The mean age of Case group (52.12) was higher than that of Control Group (51.05). Patients in the Case group had higher percentage 50% for 51-60 years of age group while, show the lowest percentage 4% for 60-70 years of age group. Similarly, in Control group, patients show the higher percentage 30% for 41-50 years of age group while, show the lowest percentage 10% for above 70 years of age group. This was a small study where only 100 patients were screened as compared to the other studies where the sample size was more as in The British Regional Heart Study by Shah Ebrahim et al [6]

In the present study the mean value of cIMT was higher for case group. This association was found similar to studies done by J Ahmad et al[8], Hamma S et al[9], RatnakarSahoo et al[10] which also showed that CIMT increases with age. Henceforth, increasing age was statistically significant and comparable with previous studies.

In our study, there were 60males and 40 females. When compared to controls, both the male and female case groups' cIMT values were considerably greater. Although the mean cIMT in our study was statistically considerably higher in males than in females, the result is not statistically significant. In contrast to earlier studies by Oboz-Rudnicka M et al[11] and Mohamed M et al[12], gender was not identified in our investigation as an independent risk factor for cIMT.

cIMT was significantly more in the case group which signifies that hypertensives are more prone to increased atherogenesis and subsequently increased cIMT. This result was comparable with the other previous study done by Costan G. Magnussen[13].cIMT can be used as a surrogate marker for cardio-vascular and cerebralvascular disease as it is an independent predictor atherosclerosis which leads to CVD [14] . Smoking significantly exacerbates the adverse effects of age and metabolic syndrome. Smokers had significant increased atherosclerosis risk.

Conclusion

It is inevitable given the results of the current investigation and its findings that hypertension will have an impact on each of the study subjects' cIMT measurements. Even after taking into consideration the known predictors of carotid IMT, such as sex, age, and smoking, the link between higher cIMT and the hypertensive state persisted.cIMT is a reliable indicator of developing atherosclerosis.

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