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Original Research Article

Comparative study of C-F PWV and CIMT in smokers and non-smokers

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Abstract: The objective is to comparative study of C-F PWV and CIMT in smokers and non-smokers. Study comprised of 200 subjects, out of these, 100 were smokers and 100 were non-smokers. Both C-F PWV and CIMT increased in smokers with advancing age as compared with non-smokers. Increase in carotid-femoral pulse wave velocity (C-F PWV) and carotid intima-media thickness (CIMT) indicate the risk of atherosclerosis in smokers as compared with non-smokers and was statistically significant.
Keywords: Carotid-femoral pulse wave velocity (C-F PWV), carotid intima-media thickness (CIMT), atherosclerosis, smokers, non-smokers

INTRODUCTION

Atherosclerosis is a multi-stage process that progresses through a series of structural and functional changes taking place in vessel wall culminating into manifest cardiovascular disease. Lesions of atherosclerosis occurs principally within the innermost layer of arterial wall, the intima. Lesions include fatty streaks, fibrous plaque and the complicated lesion [1]. Atherosclerosis is a condition in which fatty material is deposited along the wall of arteries. This fatty material thickens, hardens and may eventually block the arteries.

Tobacco use (both cigarettes and beedi) is strongly related to Coronary Artery Disease (CAD). Current smoking of >35 cigarettes or beedi a day is associated with a 6.9 fold increase in the risk of MI [**2] .** Patients who smoke more than 25 cigarettes/day have a four-fold increased risk of MI compared to non-smokers; those smoking less than 15 cigarettes/day have a two-fold increase in risk [3]. Compared With non-smokers, heavy smokers (>25/ day) have low level of HDL and higher level of LDL and TG. In Framingham study it was found that smokers have high level of fibrinogen. Serum fibrinogen is an independent and newer risk factor for CAD. Fibrinogen increases the blood viscosity and plays a key-role in thrombosis. Both factors promote coronary atherosclerosis. Inhalation of nicotine increases fibrinogen uptake by arterial wall, which may be one mechanism of atherosclerosis. Smoking increase platelet aggregation and bleeding time. Smoking also decreases endothelial release of prostacyclin. Smoking increases coronary tone and increases coronary vessels constriction. As per Framingham study, person who stops smoking decrease their risk of CVA in two years while other study showed that smokers are at increased risk even after 20 year of cessation of smoking [4].

Pulse wave velocity [PWV] is now recognized as a standard method for the measurement of arterial stiffness [AS]. Determination of PWV is most reliable and reproducible method among the various indices of arterial stiffness. [AS] [5-7]. An early sign of atherosclerosis is hypertrophy of the arterial wall. Increased intima-media thickness (IMT) is a non-invasive marker of arterial wall alteration, which can easily be assessed in the carotid arteries by high-resolution B-mode ultrasound.

MATERIAL AND METHOD

The present study comprised of 200 subjects residing nearby in the city.100 smokers and 100 non-smokers.

NUMBER OF CASES STUDIED:- 200.

INCLUSION CRITERIA:-
1.Healthy individuals with no atherosclerotic risk factors like high BP, diabetes, hyperlipidemia etc.
2.Male subjects of age greater than or equal to 40 years are included in study.

DATA EVALUATION:- This is an observational cohort study and the data was analyzed using student's t test.

EVALUATION ON A PREFORMED PROFORMA HISTORY

Complete clinical examination, routine biochemical analysis, and Pulse wave velocity and Intima-media thickness are measured.

METHOD*:*

Pulse wave velocity was determined by Periscope (M/S Genesis Medical Systems, Hyderabad, India) in an 8-channel real-time PC-based simultaneous acquisition and analysis system. Intima-media thickness (CIMT), a measurement of the thickness of artery walls, by external ultrasound, to track the progression of atherosclerotic disease in humans.

OBSERVATION:

Table-1 shows average C-F PWV and average CIMT according to advancing age in smokers and non-smokers. As age increases, there was increase in C-F PWV & CIMT in smokers more than non-smokers and was statistically significant (p=<.0.001).

Table-1: Distribution of C-F PWV and CIMT in smokers and non-smokers

Age group	Smokers	Non-smokers	Av C-F PWV Smokers	Av C-F PWV Non-smokers	Av CIMT Smokers	Av CIMT Non-smokers
40 - 49	25	25	1238.2± 44.8	992± 96.0	0.83± 0.1	0.68 ± 0.05
50 - 59	30	30	1245.8± 56.7	1013±101	0.88 ± 0.3	0.70± 0.06
60 - 79	25	25	1255.0±62.1	1025± 108	0.89 ± 0.2	0.71± 0.08
>70	20	20	1268.8± 63.2	1036±104.2	0.92 ± 0.1	0.75 ±0.03
	100	100	1251.9±226.8	1016.5±409.2	0.88± 0.7	0.74 ± 0.22

DISCUSSION

In present study, both C-F PWV and CIMT were found elevated in smokers than non-smokers and it was favoured byYamada MD et al who studied the effect of smoking cessation on improving PWV. After smoking cessation baPWV was significantly decreased (P<0.05) [8]. Zhao guiqin, Buaijiaer, Hasimu et al, studied 1038 males and 621 females in research, 478 were smokers, and the total smoking rate is 28.8%, while the percentage of smoking was 44.2% in all male, 3.1% in all female. The smoking rate in male was significantly more than that in female, almost smoking time was 10 years. Compared with non-smokers, the pulse wave velocity of smokers speeded up at different levels, the carotid artery intima-media thickness was in increasing trend, the detection rate of ankle-brachial index was 13.0%, while 0.08% in non-smokers [9].

Ricky Camplain *et al.;* the cross-sectional relationship between smoking behavior with carotid-femoral (cfPWV) and femoral-ankle pulse wave velocity (faPWV) was examined in 5,002 men and women, separately, of the Atherosclerosis Risk in Communities (ARIC) cohort study. In women, faPWV was lower in current smokers compared to never smokers (−66.0cm/s; 95% confidence interval (95% CI): −94.6, −37.4), and was 1.0cm/s lower (95% CI: −1.8, −0.2) for every additional year a woman smoked, after adjustment for confounders. Among women, cfPWV was not associated with smoking status or cigarette pack-years. Additionally, no associations of smoking status and cigarette pack-years with PWV were observed among men. Years since smoking cessation was not associated with PWV in either gender [10].

SUMMARY AND CONCLUSION

Increase in carotid-femoral pulse wave velocity (C-F PWV) and carotid intima-media thickness (CIMT) indicate the risk of atherosclerosis in smokers as compared with non-smokers and was statistically significant.

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