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Carotid Plaques in Saudi Smokers

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Abstract

Background: Smoking has been found to be associated with carotid atherosclerotic disease. Since smoking is an important public health problem, because it may be an essential risk factor for carotid artery plaques. Therefore the researchers tried to explore the powerful of this association, the researchers investigated smokers as unique suspected risk factor for carotid plaques beside the age. **Methods:** In observational cross-sectional study, 31 smokers with mean age of 56, were studied by B- mode ultrasound. Carotid arteries for all participants were examined by using 7MHrz linear transducer. Both saggital and transverse views were applied to evaluate the right and left common carotid arteries. **Results:** The frequency of carotid plaque was 35.5%. 54.5 % of these occurred in population group that smoke > 20 cigarettes per day. All plaques were presented in population of age above 53 years old. There was association between smoking frequency and age with the increases of plaque size. **Conclusion and recommendations:** The study suggested that there is a significant association between carotid plaques and smoking in Saudi smokers. In addition it showed that

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carotid plaque may present at age of 54 years old in smokers. The researchers recommended that further studies were needed. Moreover intensive health promotion against smoking in the KSA. represents an essential issue.

Keywords: Carotid artery, Plaques, Ultrasound, smoking, Saudi

1 Introduction

There are so many fatal diseases attack human body, one of these is a stroke which is considered to be the second top leading causes of deaths worldwide [1]. Stroke may result from blockage or rupture of the arteries that supply the brain. Since carotid arteries are the main source of brain supply, this clarifies the importance of studying their abnormality specially the atherosclerosis. The relationship between extracranial carotid disease and stroke was emphasized since 1914, [2]. Atherosclerosis is a degenerative disease of the arteries resulting in plaques consisting of necrotic cells, lipids, and cholesterol crystals. These plaques can result in symptoms by causing a stenosis, emboli, and thrombosis [3]. Carotid artery atherosclerosis is a common feature, which is developmentally and anatomically is indistinguishable from atherosclerosis in the other arteries. In population, the main risk factors of carotid artery atherosclerosis are the same as those of other atherosclerotic diseases [4].

Smoking represents one of the crucial risk factors for carotid atherosclerosis. The prevalence rate of carotid atherosclerosis increased with age and smoking [5, 6]. Current smoking in KSA considered to be of high rate in Saudi males which is about 26.5 % and the tobacco- related health problems cost 176 billion dollars per year in KSA [7]. This indicates the significance of studies that have relation with this problem, like carotid atherosclerotic changes, smoking may be a crucial risk factor for carotid artery plaques, so it considered as

an important public health problem. In the current study, the researchers aimed to study the occurring of carotid plaque in male Saudi smokers using B- mode ultrasound. Moreover to see the possible effect of age on carotid plaque beside smoking.

2 Preliminary Notes

2.1 Definition

KSA= Kingdom of Saudi Arabia

CCA= Common carotid artery

ICA= Internal carotid artery

3 Material and Methods

3.1 Study Design and Population

This is an observational analytical cross-sectional study, 31 participants was included in the study. Inclusion criteria is male Saudi smokers. Exclusion criteria includes patients with coronary artery disease, high blood cholesterol level, obesity and hypertensive patients. The sampling technique used was systemic simple random sampling to select all participants.

3.2 Ultrasound Technique

ACUSONX300 ultrasound machine with 7MHrz linear transducer was used. B- mode ultrasound modality selected to examine all participants. Carotid arteries for all participants were examined according to carotid ultrasound protocol which described by Sandra [8].

3.3 Collection of Smoking Data

A questionnaire was used to obtain the data of smoking, either the duration or the frequency of smoking per day. The participants were classified according to the number of cigarettes smoked per day either ≤ 20 or >20 cigarettes.

3.4 Statistical Analysis

SPSS 16.0 For Windows Evaluation Version statistical system was used in analyzing the processes of the findings. Chi-Square Tests was applied to achieve the statistical values of relation between smoking and the presence of carotid plaque.

4 Main Results

31 smokers with mean age of 56.19 ±16.17, were studied .No carotid plaque was found in 64.5%. 22.6% showed solitary plaques and 12.9% showed multiple plaques. Chi – square test was applied to see the relation between the frequency of smoking and the occurring of carotid plaque. The results indicated that there is no statistically significant relationship between the frequency of smoking and the occurring of carotid plaques (chi- square with two degree of freedom = 5.103a, P = 0.078). All plaques in this study were seen in age group > 53 years old. 54.5 % of plaques occurred in population group that smoke ≥ 20 cigarettes per day. No statistical significant relationship between the frequency of smoking and the size of plaque, (chi- square with two degree of freedom = 4.136a, P = 0.126). 63.6% of plaques > 5mm in size, were seen in age above 60 years old. The common site of plaque was carotid bifurcation.

Table 1: Site and Presence of Plaques

Site of plaque	Single	Multiple
CCA	2	0
Bifurcation	3	1
ICA	2	1
Bifurcation & CCA	0	1
Bifurcation & ICA	0	1
Total	**7**	**4**

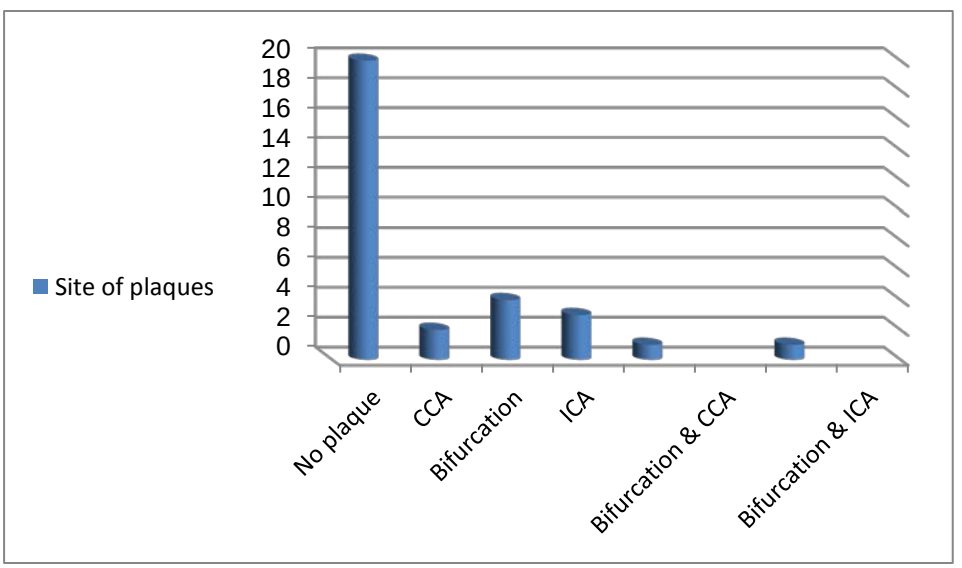

Figure 1: The Site of Plaques

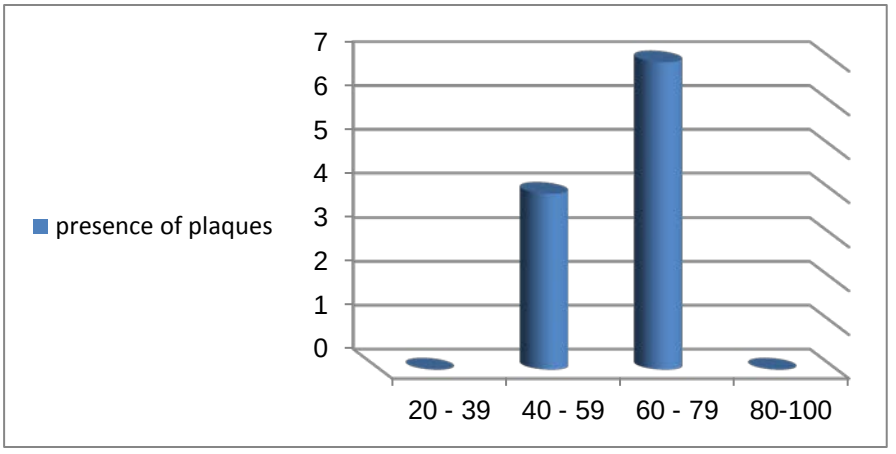

Figure 2: The relation between participants' age and the presence of plaques

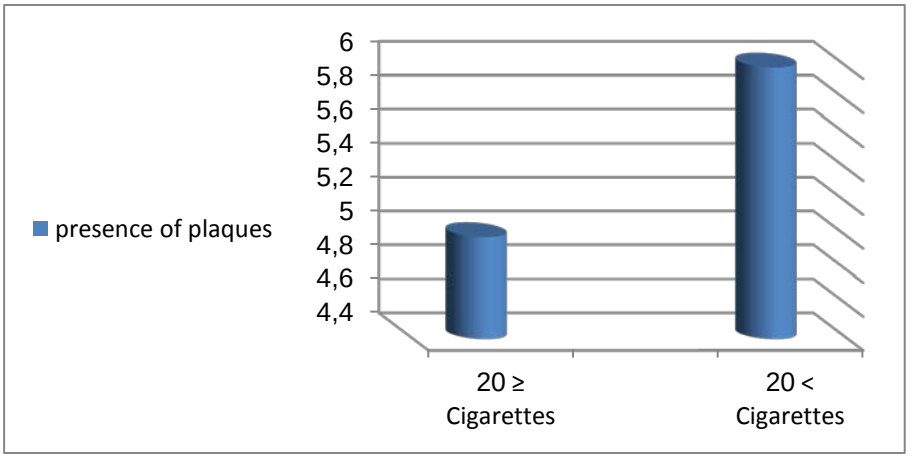

Figure 3: The relation between the frequency of smoking per day and the presence of Plaques

5 Discussion

Carotid plaques may have association with systemic hypertension and ischemic arterial diseases. This is beside other risk factors such as; age, gender, hyperlipidemia, obesity and smoking [9]. This study tried to evaluate the association of carotid plaque with smoking and age in Saudi smokers. There is no

statistical significant relationship between the frequency of smoking and the occurring of carotid plaques, the frequency of plaque in participants smoke > 20 cigarettes per day was higher (54.5 % of 11) (Figure 3). Also there was strong association between age and the presence of carotid plaques, All plaques in this study were seen in age group > 53 years old (Figure 2). These findings partially confirmed the results of Freitas et al [10]; who showed that there was an association between atherosclerosis types and age (> 64 years), stroke, obesity and smoking. While this study recorded occurring of carotid plaque in 54 years old. Moreover these findings totally agree with Lassila et al [11]; who showed that smoking had the strongest association with the presence of plaque.

Regarding the size of plaque this study suggested that there was association between the frequency of smoking and age with increases in plaque thickness. These finding agree with the results of Dempsey et al [12]; who reported that increase in age is associated with smaller increases in plaque thickness.

Regarding the site of plaques the study findings indicated that carotid bifurcation is a common site (Figure 1), this confirmed by Rubba et al [13]; who revealed that early atherosclerotic plaques were detected in 37 women within the common carotid arteries, in the carotid bifurcations in 77 women, and in both sites in 91 women.

6 Conclusion and recommendations

This study suggested that there is a significant association between carotid plaques and smoking in Saudi smokers. In addition it showed that carotid plaque may presence in age of 54 years old in smokers. The researchers recommended that further studies were needed. Moreover intensive health promotion against smoking in the KSA. represents a crucial issue.

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