Effect of smoking on angiographic findings in Iraqi patients with coronary artery disease

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تأثير التدخين على نتائج الفحص القسطاري في المرضى العراقيين المصابين بقصور الشرايين التاجية

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الخلاصة: الهدف من هذا البحث هو دراسة تأثير التدخين على نتائج قسطرة الشرايين التاجية للمرضى العراقيين المصابين بقصور الشرايين التاجية حيث تم اختيار عينة متكونة من ٣٩٣ مريض مصابين بقصور الشرايين التاجية ممن خضعوا للفحص القسطاري في مركز القسطرة في مستشفى الصدر التعليمي للفترة من ٢٠٠٨ ولغاية نهاية عام ٢٠١٠ حيث تم تقسيمهم الى مجموعتين ،المجموعة الاولى هم المرضى المدخنين وعددهم١٩٨ والمجموعة الثانية هم المرضى غير المدخنين وعددهم ١٩٥
نتائج البحث اظهرت ان المدخنين لديهم نسبة الاصابة في الشريان التاجي الايمن وكذلك نسبة حدوث الاصابة في شريانيين تاجين مجتمعين والى حد اقل ٣ شرايين مجتمعة هي اكثر من غير المدخنين في حين لايوجد اختلاف احصائي مهم بين المدخنين وغير المدخنين في قوة او شدة الاصابة للشرايين التاجية في الفحص القسطاري.

Abstract:

Background: There were conflicting results regarding clinical studies of effect of smoking on the coronary angiographic findings, our aim was to study the effect of smoking on angiographic results in Iraqi patients with history of coronary artery disease submitted to routine coronary angiography.

Methods: 393 consecutive patients with history of coronary disease submitted to coronary angiography in cardiology center divided into two major groups: smokers group (198 patients) and non smokers group (195 patients) and comparison had been done between two groups in the number of diseased coronary arteries, distribution of obstructive lesion and morphological severity

Results: RCA and LMS (58% &57%) were more likely to diseased in smoking group rather than non smoker and the prevalence of two vessel disease(63% Vs 37%)*(P*= 0.02) and to lesser extent the three vessel disease pattern(53% Vs 47%) was more common in smoking group compared to non smoking group.
On the other hand, no significant association was found between smoking and morphological severity of coronary artery disease regarding multiple or total cut lesions (P value > 0.588).
Abbreviations:
RCA: right coronary artery
LCx: left circumflex artery
LMS: left main stem artery

LADA: left anterior descending artery
CAD: Coronary artery disease
STEMI: ST elevation myocardial infarction
NSTEMI: non ST elevation myocardial infarction
CRP: C reactive protein

Introduction

Smoking is the single most important risk factor for coronary artery disease and the smoking has a particularly large impact in the developing world and annually accounts for 1.17 million deaths worldwide. Even among nonsmokers, inhaled smoke, whether from passive exposure or from cigar or pipe consumption, increases coronary risk.
Smoking affects atherothrombosis by several mechanisms:
1-unfavorable effects on blood pressure and sympathetic tone with a reduction in myocardial oxygen supply
2- Long-term smoking may enhance oxidation of low-density lipoprotein (LDL) cholesterol
3- Impair endothelium-dependent coronary artery vasodilation.
4- Smoking has adverse haemostatic and inflammatory effects, including increased levels of CRP, soluble intercellular adhesion molecule-1 (ICAM-1), fibrinogen, and homocysteine.
5- Smoking is associated with spontaneous platelet aggregation, increased monocyte adhesion to endothelial cells, and adverse alterations in endothelial derived fibrinolytic and antithrombotic factors, including tissue-type plasminogen activator and tissue pathway factor inhibitor.[1]
Cigarette smoking impacts all phases of atherosclerosis from endothelial dysfunction to acute clinical events, the latter being largely thrombotic and beside that, smoking was found to be associated with CAD progression both on coronary Angiography and CT angiography [2,3]
Furthermore, the magnitude of coronary endothelial dysfunction in Smokers appears to be greater than that in nonsmokers with marked worsening of endothelial function occurs in smokers over a 6-month period .[4]
There were conflicting results regarding clinical studies of effect of smoking on the coronary angiographic findings, some studies showed no significant association between smoking habits and coronary artery disease in patients undergoing routine coronary angiography [5]while other studies in favor of significant association between cigarette smoking and coronary artery disease pattern. [6]
Observational studies have demonstrated clear benefits of smoking cessation. Smokers who quit reduce their excess risk of a coronary event by 50 percent in the first year or two after cessation. This period is followed by a more gradual decline, with the risk of former smokers approaching that of never-smokers after 3 to 5 years.[1]
Recently, implementation of regulations banning smoking in public buildings was shown to lead to a significant and rapid decline in the total number of hospital admissions for acute coronary syndromes in several countries. [7]
The aim of this study was to study the effect of smoking on angiographic results in Iraqi patients with history of coronary artery disease submitted to routine coronary angiography.

Patients and methods

This retrospective study was carried out in coronary cath lab in cardiology center in AL-Sader teaching hospital in AL-Najaf city.

393 consecutive Iraqi patients with history of coronary artery disease {angina pectoris=202, NSTEMI =105, STEMI=86} matched to sex and age submitted to routine coronary angiography in our center were collected (female=105, male=288, mean age 55±8) from January 2008 to December 2010.

The patients were divided into two groups, smoking group with history of cigarette smoking of one packet and more and non smoking group including patients who had never smoked cigarettes or abandoned smoking more than 5 years.

Excluding criteria for this study including patients with diabetes mellitus (194 patients), patients with unclear or missing data of smoking(46), patients with congenital or valvular heart disease(234).

Detailed history from the patient regarding clinical risk factors for ischemic heart disease was taken at the time of admition including positive family history of premature atherosclerosis (occurring in men before the age of 55 and before the age of 65 in women), hypertension (defined as systolic blood pressure greater than 140 mm Hg or a diastolic blood pressure greater than 90 mm Hg), and BMI(≥30) for obesity while most of the patients enrolled in this study was on lipid lowering therapy, so the lipid status not included in the analysis (patients characteristics in table 1).

Coronary angiography was performed by a femoral approach using the modified Seldinger technique. Standardized angiographic projections (LMS, LAD and left circumflex arteries were assessed in the right anterior oblique projection with caudal angulations, and for the right coronary artery in the left anterior oblique projection with cranial angulations) were chosen for the assessment of each arterial segment.

Coronary angiograms were visually assessed by two independent observers blinded to the identity and clinical characteristics of the patients.

CAD (Coronary artery disease) defined as significant when there is >50% stenosis in the Left main artery and >70% stenosis in luminal diameter of left anterior descending, left circumflex and right coronary arteries and Total coronary occlusion is identified as an abrupt termination of the pericardial vessel. Multiple lesions when 3 and more segments had significant lesion in the same vessel.

Obstructive CAD was classified as a one-, two-, or three-vessel disease.

Chi-square had been applied for categorized variables at level of significance $\alpha=0.05$ (p value <0.05) by using SPSS program version 17

RESULTS

Table 2 illustrate the distribution of occlusive lesion in the 4 major coronary arteries between smoker and non smoker groups and reported that the RCA (right coronary artery) and LMS(left main stem)(58% &57%) were more likely to be diseased in smoking group rather than non smoker.

Table 3 demonstrate that the prevalence of two vessel disease(63% Vs 37%)*(P*< 0.02) and to lesser extent the three vessel disease pattern(53% Vs 47%) was more common in smoking group compared to non smoking group with normal coronary arteries more in non smokers group(35% Vs 65%)(p value<0.003).

On the other hand, table 4 illustrates no significant association between smoking and morphological severity of coronary artery disease regarding multiple or total cut lesions (P value > 0.588).

Table (1) patients characteristics

variables	smokers	Non smokers	Total number
male	150	138	288
female	48	57	105
hypertension	60	118	178
Family history of premature CAD	6	15	21
obesity	85	76	161

Table (2) comparison between smokers & non smokers groups in the distribution of individual coronary arteries involved by occlusive lesion

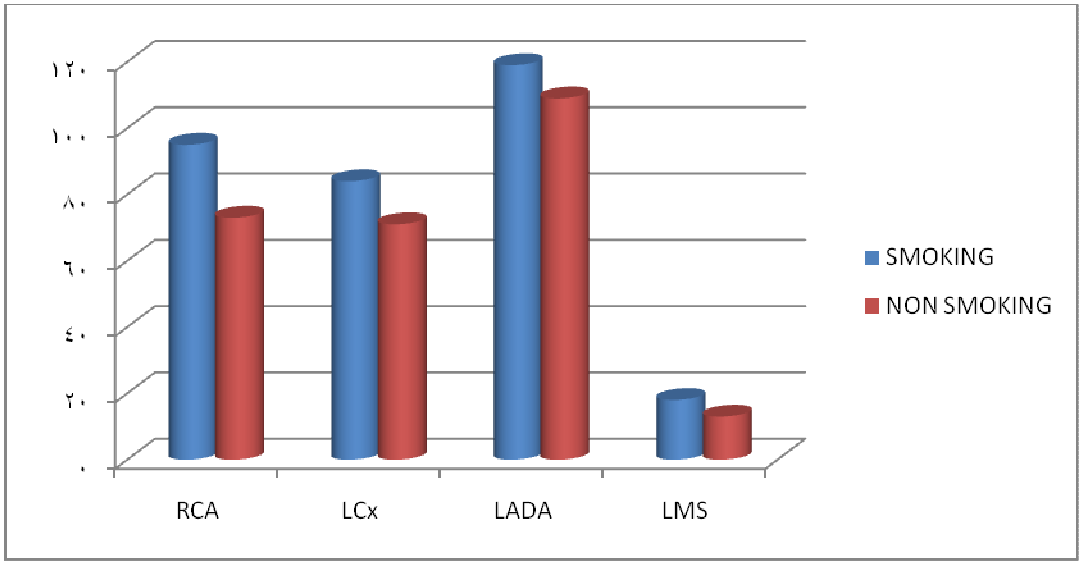

Table 3 number of diseased coronary arteries in smokers and non smokers groups

CORONARY ARTERY	SMOKER	NON SMOKER	TOTAL NO.
Normal coronary	44 (35%)	82 (65%)	126
Single vessel disease	38 (49%)	40(51%)	78
two vessel disease	47 (63%)	28 (37%)	75
3 vessel disease	60 (53%)	54 (47%)	114

Table (4) morphological severity of coronary artery lesions between smoker and non-smoker groups

Morphological lesion	smoker	Non smoker	Total number
Single lesion	114 (44, 7%)	141 (55, 3%)	255
Multiple lesion	108 (45%)	132 (55%)	240
Total cut	132 (46%)	154 (54%)	286

P value > 0.588

Discussion

This study is not a randomized but a retrospective study and suffers from the limitations of all nonrandomized, data-based analyses as we select the patient who had coronary artery disease prior to submitting to routine coronary angiography.

The results of this study reported that the smoking had a significant association with tow vessel disease and to lesser extent 3 vessel disease and also Patients who smoked had a strong tendency to have right coronary artery and left main stem obstruction than non smokers.

Our results support the pervious evidence in favor of an association between cigarette smoking and coronary artery disease [6]

Rahel Alemu et al found that cigarette smoking is associated more strongly with inferior than anterior AMI and coronary atherogenesis and/or endothelial dysfunction may be more pronounced in the right than the left coronary arterial circulation.[8]

Mechanisms for association between the smoking and the right coronary artery are that the right coronary artery is at great jeopardy because of its path over the right ventricle. This chamber is more commonly affected by pulmonary hypertension resulting from cigarette smoking. Increased stretch on the overlying artery may thus ensue.[9]

Moreover, venous drainage of the right ventricular portion of the right coronary circulation directly into that chamber may also place it at great jeopardy from hemodynamic changes in the pulmonary arterial circuit. Finally, the right coronary artery may be more susceptible to vasomotor stimuli, such as that produced by smoking that may have an impact on disease progression. This is suggested by studies documenting higher vascular resistances and reduced autoregulatory capacity in the right than that in the left coronary artery system. [10]

Other findings of our study showed no significant association between smoking and morphological severity of coronary artery disease.

The complex interrelation between cigarette smoking and other cardiovascular risk factors makes assessing the importance of smoking habit as an independent risk factor for coronary disease difficult.

Coronary obstruction in smoker may be more thrombogenic and less atherosclerotic than non smokers. Furthermore, angiographically recorded coronary artery disease was less extensive in smokers and such thrombogensis occlusion may tend to be reperfused spontaneously or therapeutically.[11]

Multiple reports have described the effects of smoking on the formation of atherosclerosis both at autopsy, as well as in clinical studies using coronary angiography and influence of smoking on the formation and progression of atherosclerosis through its negative effects on vasomotor dysfunction, inflammation and lipid modification [3].

Furthermore, Gehani AA et al found that Smoking is a major risk factor for acute myocardial infarction (even with normal coronary angiography), whereas diabetes is a major risk factor for more severe but more stable coronary artery disease.[12]

Conclusion: Smoking is important risk factor for coronary artery disease and associated with more tow vessel disease and with involvement of right coronary artery than non smoking patients but without significant statistical association with coronary artery lesion morphological severity

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