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Original Research Article

Angiographic Profile of Acute Coronary Syndrome in Smokers and Non Smokers: A Comparative Study

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Abstract

Aim: To study the angiographic profile of Acute Coronary Syndrome in smokers versus non-smokers and to analyses with respect to baseline characteristics.

Material & Methods: This study comprised of a total of 200 cases. Study participants were allocated to two groups: Smoker's Group and Non Smoker's Group. Each group comprised of 100 participants. Mean age of the participants was 39:67 years. It was conducted in the Department of Cardiology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India, over a period of one year.

Results: In the smokers group, Acute coronary syndrome was more frequently encountered in males (71% versus 29%, p<0.001) Non-smokers group, Acute coronary syndrome was often encountered in females (69% versus 31%).

Conclusion: (1) Acute coronary syndrome occurred seven years earlier in smokers (2) Smokers presented with more acute infarctions and less Unstable angina (3) Single vessel disease was the most common CAG diagnosis in both smokers and non-smokers.

Keywords: STEMI ST elevation myocardial infarction, unstable angina, myocardial infarction, cardiovascular disease.

Introduction

Cigarette smoking is a well-established risk factor for the development of coronary heart disease [1]. Several studies have shown lower mortality after ST-segment elevation myocardial infarction in smokers compared with non-smokers [2–4]. This is

the dsmokersT paradoxT, where an individual who smokes is not only more likely than a non-smoker to suffer a heart attack but is also more likely to survive it. One explanation for this paradox is that smokers may have a larger thrombus burden, leading to a greater efficacy of intravenous thrombolysis [3–7].

The “Smoker's paradox”, typically described in studies where patients who were smoker and had acute ST-segment elevation MI (STEMI) treated with or without thrombolytic therapy [8] has been carried forward today with the primary percutaneous coronary intervention (PCI) also. [9] Young age and associated lesser co-morbidities in smokers were the proposed explanations for it. With the advent of primary PCI for acute STEMI, higher thrombus burden with less severe underlying coronary artery stenosis along with minimal or diseased free non-infarct related coronary arteries have also been added in the list to explain this “paradox”. [10]

According to World Health Organization (WHO), tobacco use has caused 100 million deaths in the 20th century worldwide, and if the current trend continues this figure will be 1 billion deaths for the 21st century. [11] Hence the aim of this study was to evaluate the angiographic profile of Acute Coronary Syndrome in smokers versus nonsmokers and to analyses with respect to baseline characteristics.

Material & Methods:

This study comprised of a total of 200 cases. Study participants were allocated to two groups: Smoker’s Group and Non Smoker’s Group. Each group comprised of 1oo participants. Mean age of the participants was 39:67 years. It was conducted in the Department of Cardiology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India, over a period of one year.

Inclusion Criteria:

1. Patients with first episode of ACS (Unstable Angina with ECG changes, NSTEMI, STEMI) attending the ICCU, Department of Cardiology, Igims, Patna,Bihar

2. Different types of ACS were diagnosed according to ECG criteria and Troponin T positivity

3. Both Smokers and non Smokers were included in the study group. Smoking history (all forms-tobacco chewing / khaini / beedi / tambaku / cigars).

4. Troponin positivity (qualitative) for NSTEMI differentiating from USA with ECG changes.

5. Coronary angiogram was done after 5 days of Heparin therapy in acute coronary syndrome.

Exclusion Criteria:

1. Age<18yrs/>80yr

2. Patients with recurrent episode of ACS and Cardiogenic shock

3. Patients with Valvular heart diseases/cardiomyopathies/pericardial diseases/conduction diseases other than ischemia

4. Contradictions to CAG (pts with serum creatinine >1.5mg/dl,lack of consent for CAG) and prior coronary angiogram report. 5. Unstable Angina without ECG changes. Disease (TVD), Left main coronary artery (LMCA) involvement, Proximal LAD involvement.

Statistical Analyses:

The observations were recorded in a proforma created for this purpose and entered in the master chart. Statistical Analysis was done using SPSS software. Mean, median, standard deviation and Chi Squares were calculated wherever applicable. A value of $p<0.05$ was considered statistically significant.

Results:

This study comprised of a total of 200 cases. Study participants were allocated to two groups: Smoker's Group and Non Smoker's Group. Each group comprised of 1oo participants. Mean age of the participants was 39:67 years.

In the smokers group, Acute coronary syndrome was more frequently encountered in males (71% versus 29%, p<0.05) Nonsmokers group, Acute coronary syndrome was often encountered in females (69% versus 31%). [Figure 1]

Out of 100 study subjects in the smokers group, Diabetes mellitus was present in 33% subjects and in the smokers group (57%) (P< 0.05). Hypertension was commonly encountered in both study groups (52% versus 59%). Smokers group, Overweight/Obesity was present in 70% subjects. Nonsmokers group,Overweight/Obesity was present in 30% subjects. Acute myocardial infarction(STEMI+NSTEMI) was the most common presentation in both smokers (89%) and nonsmokers (81%) (p<0.05) Unstable angina was often encountered as initial presentation in Nonsmokers (35% versus 15%, p<0.05). Single vessel disease was the most common CAG diagnosis in both the smokers and nonsmokers (45% versus 48%). Double vessel disease, even though not statistically significant, was more commonly encountered in smokers (25% versus 14%, p>0.05, Not significant). The smokers group, LMCA stenosis (>30% diameter stenosis) was present in 9% subjects and in the nonsmoker group, LMCA stenosis was present in 11% subjects. No statistically significance difference. [Table 1]

The mean EF was 54.2±10.2%. The median EF was 56.4%. 50% patients presented with Anterior wall STEMI which was the most common presentation of ACS in Smokers followed by inferior wall MI 39%. Only 3% patients were presented with high lateral / true posterior wall STEMI.

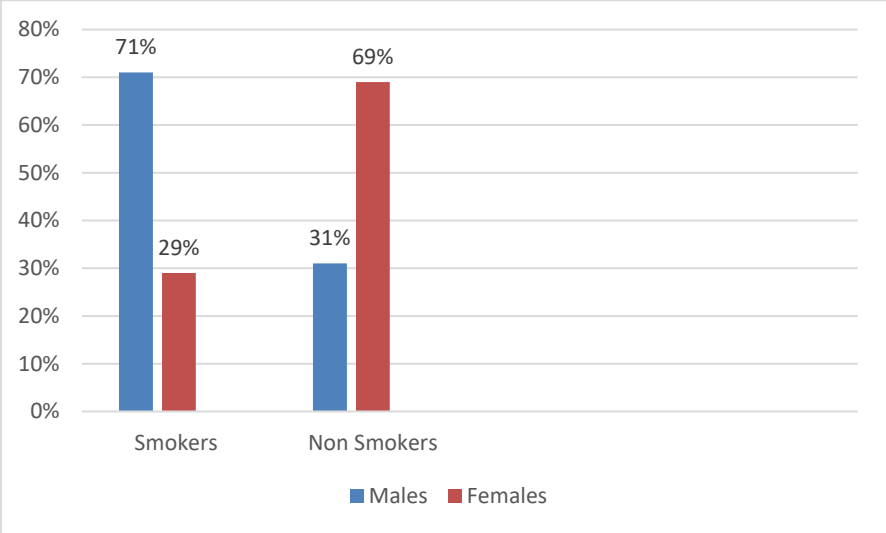

Figure 1: distribution of acute coronary syndrome among study participants

Table 1: Comparison of smoker's and nonsmoker's group with various variables

Variables	Smoker's Group	Non Smoker's Group	P value
Diabetes Mellitus	33	57	0.05*
Hypertension	52	59	0.271
Obesity	70	30	0.233

Acute myocardial infarction	89	81	0.05*
Unstable Angina	15	35	0.05*
Single Vessel Disease	45	48	0.738
Double Vessel Disease	25	14	0.374
LMCA Stenosis	9	11	0.111

Discussion:

Significantly less prevalence of hypertension and DM in our study among smokers was in accordance with most of the studies and this can be because of younger mean age of the smokers. Anterior wall MI with Left anterior descending (LAD) coronary artery as culprit vessel was the most frequent presentation in both the groups. However, in few studies inferior wall MI was the more frequent presentation in smokers. [12]

LAD coronary artery was also the most common culprit vessel in the previous data from EUROTRANSFER Registry. [13] Another important aspect regarding the finding of a higher incidence of thrombosis rather than atherosclerosis in smokers, was also evaluated in our study. Both the groups were profiled with coronary angiography at the time of STEMI. It was seen that the smokers group had higher thrombotic burden which, however, was not statistically significant. Besides this, thrombo suction, which is an indirect marker of higher thrombus burden was used more frequently in our study in smokers group. Higher use of thrombo- suction in smokers in our study is in contrast to previous data from EUROTRANSFER Registry. [14]

A consistent finding in the GRACE population is the lower risk profile of current smokers compared with former smokers and non-smokers. This was also observed in most previous large-scale studies [15], in which the lower risk profile accounted for much of the seemingly improved outcome of smokers compared with former smokers and non-smokers. However, the clinical profile of former smokers does not appear to be simply intermediate between those of current smokers and non-smokers. As already noted in the Platelet glycoprotein IIb/IIIa in unstable angina: Receptor Suppression Using Integrilin Therapy (PURSUIT) trial [16], former smokers were more likely to have had prior cardiac events than current smokers and non-smokers. This difference may be related to the encouragement of smokers to quit smoking after a first cardiac event.

In coronary angiogram, single vessel disease was seen in 42% of patients and multi vessel disease in 37% of patients. Recanalised coronary arteries with no significant flow limiting disease were seen in 21% of patients. Multi vessel disease was seen in patients with diabetes or newly detected diabetics. Multi vessel disease was higher in patients with LV dysfunction (68%) whereas recenalised coronaries after thrombolytic therapy was 9 %.

Overall around 94% of patients were prescribed aspirin during hospitalization, which is high in comparison with previous studies involving patients with myocardial infarction [17-18]. However, a lower percentage of former smokers and non-smokers were given aspirin compared with current smokers. Statin therapy was prescribed in around half of the patients. [19] Again, former smokers and nonsmokers were less likely to receive statin therapy than current smokers. The age and the potentially high prevalence of comorbidities encountered in former smokers and non-smokers may explain why these patients were less likely to receive evidence-based therapies than current smokers.

Conclusion:

Acute coronary syndrome occurred seven years earlier in smokers. Smokers presented with more acute infarctions and less unstable angina. Single vessel disease was the most common CAG diagnosis in both smokers and nonsmokers.

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