Smoking and First Acute Myocardial Infarction: Age, Mortality and Smoking Cessation Rate

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Abstract

Background: Cigarette smoking is a major contributor to the risk of acute myocardial infarction and the subsequent morbidity and mortality. Physicians can play an important role in smoking cessation among patients with AMI because of their frequent contact with the patient during the event

Objectives: To study the prevalence of smoking, age, localization of coronary occlusion, mortality and rate of smoking cessation in consecutive patients who were diagnosed with a first AMI in our center in 1989–93.

Methods: The study included 1,510 consecutive patients with first AMI: 973 men (512 smokers, 52.6%) and 537 women (215 smokers, 40%), whose mean age was 64.1 ± 6.7 and 68.6 ± 5.2 years respectively.

Results: The median age at the first AMI in non-smoking and smoking men differed significantly (70.4 ± 6.8 vs. 56.6 ± 6.1 years, $P<0.001$) while the difference in the women was smaller (70.4 ± 6.9 vs. 66.8 ± 7.2). The proportion of smokers/non-smokers among men was greater at a younger age and decreased proportionally with age. The overall mortality was 11.3% with a significant difference in mortality rate in the younger age groups between smokers and non-smokers (1% vs. 0% in the age group 31–40 years, $P<0.05$, and 6.1% vs. 0.8% in the 41–50 year age group, $P<0.001$). Only 62% of the smokers who survived the AMI declared that they had received anti-smoking advice from a physician during hospitalization. The cessation rate in this group was significantly higher than in smokers who had not been cautioned against smoking (56% vs. 18%).

Conclusions: Current smokers sustained their first AMI more than one decade earlier than non-smokers, and the younger smokers had a higher mortality rate. The majority of the smokers who received anti-smoking advice during their hospitalization for AMI quit smoking in the year following the acute event.

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It is well established that cigarette smoking is a major contributor to the risk of myocardial infarction in both men and women [1–6]. Current cigarette smokers have a 70% increased risk of fatal coronary heart disease, and the overall incidence of non-fatal MI is two to fourfold higher in cigarette smokers [2,3,5,7]. Numerous studies [2,4,8–10] have demonstrated an association between smoking and MI in younger age groups. White [11] found that each of 21 male MI patients below the age of 40 was a smoker. It is also well known that the cessation of smoking is followed by a decline in the risk [4,6,12,13].

Physicians can play an important role in smoking cessation among patients with AMI. However, only about 40% of smokers who had seen a physician in the previous year reported that they had ever been told to quit smoking by their physician [14]. This percentage is somewhat higher among patients who have survived a myocardial infarction or stroke [5,6,15]. The present study was undertaken to determine both the relationship of smoking habits to trends of AMI mortality, and the percentage of patients with a first AMI who during hospitalization in a medical center in Israel in 1989–93 had been advised to quit smoking by a physician.

Patients and Methods

We studied all the patients who were discharged from the hospital alive, or the files of the patients who died during hospitalization, with the diagnosis of first AMI in the years 1989–93 at the Hillel Yaffe Medical Center, which serves a population of about 200,000.

In order to establish a diagnosis of AMI, two of the following three criteria had to be met: a) chest pain lasting at least 15 minutes, b) serum creatinine kinase isoenzyme MB activity above the normal range on admission with elevation of serum aspartate aminotransferase activity in samples from at least 2 consecutive days, and c) the appearance of new Q waves in at least 2 leads on a 12 lead standard ECG.

All the patients included in this study were sent a questionnaire or telephoned during March and April 1995. They were asked about smoking habits, smoking

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AMI = acute myocardial infarction

MI = myocardial infarction

cessation, and support received during this period. We defined smokers as persons who currently smoke or had smoked in the previous year. Those who had last smoked at least one year previously or those who never smoked were defined as non-smokers.

Results

During these years, 1,510 patients were admitted to the hospital with the confirmed diagnosis of a first AMI. Of these, 113 patients who survived the AMI could not be contacted following discharge from the hospital. During the period of the study 973 men (64.4%) and 537 women (35.6%) had their first AMI. The proportion of smokers among men (n=512, 52.6%) was significantly greater than among women (n=215, 40%) ($P<0.01$) [Figure 1].

Age

The mean age at the first AMI was 64.1±6.7 years (mean±SEM) in men and 68.6±5.2 in women. The median age at the first AMI in non-smoking and smoking men differed significantly (70.4±6.8 vs. 56.6±6.1 years, $P<0.001$) and the difference was greater than for non-smoking and smoking women (66.8±7.2 vs. 70.4±6.9 years respectively, not significant). The proportion of smokers versus non-smokers among men was higher in the younger age group and decreased proportionally with age, while among women the proportion was almost unchanged for all ages [Figure 2].

Localization of myocardial infarction

There was no difference between women and men regarding the localization of the MI. About 50% had anterior wall MI and about 40% inferior wall MI, with no change in prevalence when comparing non-smokers with smokers. However, a tendency was noticed for increased prevalence of anterior wall MI in the elderly group and inferior wall MI among younger patients who smoked [Figure 3].

Mortality rate

The overall mortality rate for their first AMI was 11.3%, with no significant difference between smokers and non-smokers. However, as shown in Figure 4, there was a significant difference in mortality rate between smokers and non-smokers in the younger age groups (1 patient, 1% vs. 0% in the age group 31–40 years and 6 patients vs. 1 patient, 6.1% vs. 0.8%, in the 41–50 year age group).

Smoking cessation rate

Of the 727 smokers diagnosed with their first AMI, 640 (88%) survived and were released from the hospital. For 568 of them, information on smoking habits 1 year later was available. At this time point the smoking cessation rate was 41.4% (235 of 568 smokers). Only 352 patients (62%) claimed that they had received anti-smoking advice from a physician during hospitalization. The cessation rate (62%) was significantly higher in this group than in smokers who had not been cautioned against smoking (56% vs. 18%, $P<0.01$). Of the 235 patients who quit smoking, 187 (80%) did so alone, while 48 (20%) used aids to reinforce
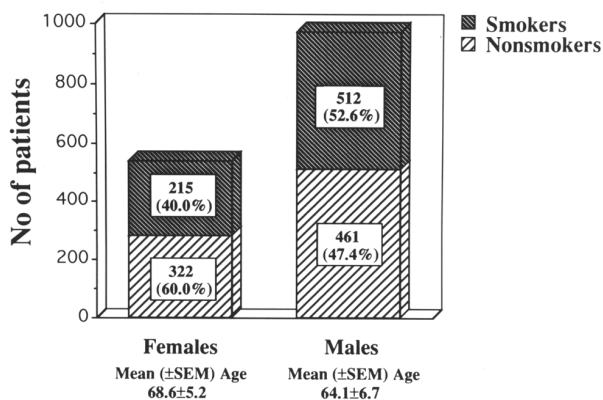

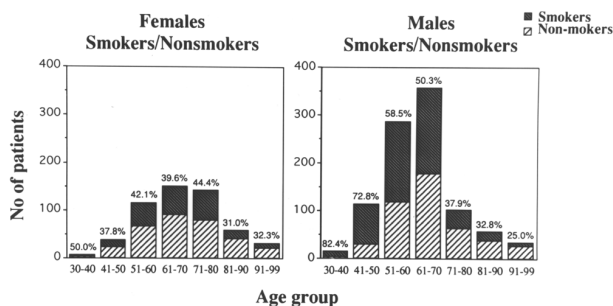Figure 1. Prevalence of female and male smokers in patients with first acute myocardial infarction.

Figure 2. Age at time of first acute myocardial infarction of female and male smokers and non-smokers.
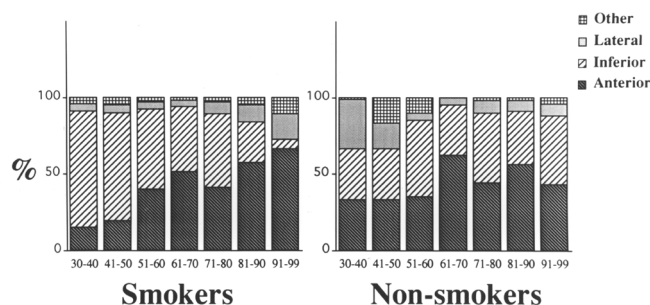

Figure 3. Localization of first acute myocardial infarction in smokers and non-smokers according to the age group.
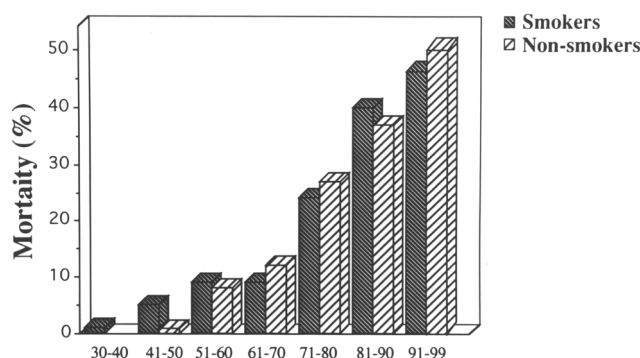

Figure 4. Mortality rate at first acute myocardial infarction in smokers and non-smokers according to the age group.

motivation. Of the 568 smokers, only 79 (14%) participated in an adequate long-term rehabilitation or secondary prevention program after the AMI event.

Discussion

In the present study, the smoking habits, characteristics of the acute coronary event, mortality, and rate of smoking cessation following myocardial infarction were investigated only in those who survived the coronary occlusion and reached the hospital. This might have considerably influenced the results [2,4,16]. In addition, several patients could not be located following the AMI and were also excluded from the study.

We found a high proportion of smokers and a higher mortality rate in younger MI patients. Current smokers had the first AMI earlier than non-smokers. This was especially true for men.

Only 62% of the smokers who survived the AMI were advised by a physician during hospitalization to quit smoking. However, the rate of smoking cessation among those who received anti-smoking advice was significantly higher than among those not so advised.

There is consistent evidence supporting the causal role of smoking in the development of atherosclerosis and cardiovascular disease [2,6,17,18] Other potentially adverse effects of smoking on the cardiovascular system are mediated through the effect of nicotine on thrombosis and platelet function [2,6,19] and the raised levels of carboxyhemoglobin [5,6,19,20]. As also found in our study, when cigarette smokers are compared with non-smokers the risk ratio for MI is much more extreme in early adult life than in old age [4,21].

Smoking did not appear to be an independent predictor for mortality in one study [2,4,19,22], but other studies found it to be a predictor for a more favorable [23] or less favorable prognosis [3,4,24]. These discrepancies may be explained by the fact that smokers present with MI at a younger age and hence have lower levels of other risk factors; secondly, most of them quit smoking during their AMI hospitalization, which might have favorable effects within a very short time [5,6].

The overall mortality in our study was equal among smokers and non-smokers. However, a significantly higher mortality rate was observed in the younger age groups, although the numbers of patients in these age groups were small.

Several investigators have reported a more favorable prognosis if smokers who suffer an AMI quit smoking as compared to those who continue to smoke [6]. Wilhelmsson and colleagues [16], in a study of 564 male patients who survived a first myocardial infarction and whose smoking habits were assessed 3 months after entry, reported a halving in cardiovascular mortality and in subsequent non-fatal MI over a 2 year period among those who stopped smoking.

Previous studies have shown that the most important contributor to cessation of smoking is the anti-smoking advice of a doctor. Moreover, physicians themselves consider the elimination of smoking to be the most important health promotion activity [25]. It is therefore surprising that of the smokers who had seen a physician in the previous year only a third had been advised by the physician to stop smoking [3,4,14]. Conversely, smokers who had survived a myocardial infarction were more likely (73%) to have been told to quit smoking [2,5,15]. In our study only 62% of the patients who had experienced a MI had been told to quit. In other words, 38% of smokers who survived AMI had not been advised to quit by a physician during their hospitalization. Since the efficacy of a physician's advice to quit is greatest among smokers who have developed a smoking-related disease, physicians need to become more involved in the prevention of smoking-related illnesses. This may be achieved by including instructions for anti-smoking counseling in medical school curricula, residency training programs, and continuing medical education. It is likely that this will increase the physicians' confidence in their ability to influence smokers and augment their involvement in advising smokers to quit.

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