

Effect of Smoking on Long-Term Clinical Outcomes and Lung Cancer in Patients with Acute MI

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Background/Aims: Smoking has been known as a well-established risk factor of coronary artery disease. However, recent studies demonstrated favorable results including reduced mortality among groups with current smokers which are referred as a “smoking paradox”. This study examined the impact of current smoking on 5-year outcomes of patients after acute myocardial infarction(AMI) who underwent percutaneous coronary intervention(PCI).

Methods: Patients with AMI who underwent PCI between 2004-2014 were enrolled and stratified by smoking status at the time of enrollment. Cox-proportional hazards model was constructed to assess the relationship between smoking status and 5-year outcomes including major adverse cardiovascular event (MACE), all-cause death, cardiac death, MI, TVR, any cancer and specifically, lung cancer.

Results: Among the 10,250 patients, 5,573 (54.3%) were current smokers. Smokers were 8.7 years younger and less likely to have comorbidities such as hypertension, diabetes, chronic kidney disease, prior stroke, prior PCI, or cancer. Smokers had less MACE (HR: 0.653; 95% CI: 0.596-0.714; $p<0.001$), all-cause death (HR: 0.509; 95% CI: 0.458-0.566; $p<0.001$), and cardiac death (HR: 0.495; 95% CI: 0.439-0.588; $p<0.001$) compared with nonsmokers after 5-year period in unadjusted model. However, after adjusted with age and other comorbidities, smokers showed higher risk of MACE (HR: 1.157; 95% CI: 1.005-1.332; $p=0.043$), all-cause death (HR: 1.369; 95% CI: 1.151-1.629; $p<0.001$), and cardiac death (HR: 1.308; 95% CI: 1.066-1.606; $p=0.010$). The incidence of lung cancer was also higher in smoking group (HR: 3.878; 95% CI: 1.803-8.338; $p=0.001$) when compared with nonsmokers.

Conclusions: In contrast to unadjusted model, smoking is associated with worse cardiovascular outcome and higher incidence of lung cancer after adjustment of various confounding factors, in discordance with smoking paradox. Our research illustrated that “smoking paradox” can be explained by the characteristics of the smoking group which were young age and less comorbidities.

Outcome	Smoking		Unadjusted		Multivariate Adjusted*	
	Non-smokers (n = 5772)	Smokers (n = 3997)	HR (95% CI)	P value	HR (95% CI)	P value
MACE	1463 (25.3%)	696 (17.5%)	0.653 (0.596-0.714)	<0.001	1.157 (1.005-1.332)	0.043
All-cause death	1279 (22.2%)	473 (11.9%)	0.509 (0.458-0.566)	<0.001	1.369 (1.151-1.629)	<0.001
Cardiac death	1015 (17.6%)	364 (9.2%)	0.495 (0.439-0.588)	<0.001	1.308 (1.066-1.606)	0.010
MI	258 (4.5%)	135 (3.4%)	0.714 (0.580-0.879)	0.002	0.917 (0.685-1.228)	0.562
TVR	399 (6.9%)	302 (7.6%)	1.035 (0.892-1.202)	0.649	1.138 (0.924-1.403)	0.224
Any cancer	163 (2.8%)	97 (2.4%)	0.808 (0.628-1.039)	0.096	1.127 (0.805-1.577)	0.487
Lung cancer	18 (0.3%)	35 (0.9%)	2.632 (1.491-4.647)	0.001	3.878 (1.803-8.338)	0.001

* adjusted for age, sex, body mass index, hypertension, diabetes, dyslipidemia, chronic kidney disease, end-stage renal disease, stroke, family history of coronary artery disease, prior MI, prior PCI, prior CABG, COPD, prior malignancy, clinical diagnosis (STEMI vs. NSTEMI), left ventricular ejection fraction, hemoglobin, total cholesterol, triglyceride, HDL cholesterol, LDL cholesterol, eGFR, stent generation, culprit lesion, multivessel disease, CTO lesion, number of total stents, mean diameter of total stents, length of total stents, aspirin, clopidogrel, potent P2Y12 inhibitors, statins, beta-blockers, ACEi/ARB