



EDITORIAL COMMENT

The smoker's paradox: Not an argument against quitting smoking after acute coronary syndrome



Paradoxo do tabagismo na síndrome coronária aguda - não se trata de um argumento contra deixar de fumar após a síndrome coronariana aguda!

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This editorial refers to the article ‘‘The smoker’s paradox in acute coronary syndromes – is it real?’’ by Madalena Coutinho Cruz and co-workers, published in this issue of the *Journal*.¹

In order to assess the possible protection provided by smoking during the in-hospital period and in the first year after acute coronary syndrome (ACS), the so-called ‘smoker’s paradox’, the authors collected data from all consecutive patients (n=3298) hospitalized due to ACS in their center between 2005 and 2014.

After excluding former smokers (n=368) and patients treated by fibrinolysis (n=203), and taking into consideration potential confounding factors related to smokers’ prothrombotic status, the authors performed a retrospective analysis of the remaining 2727 patients, comparing two groups: current smokers (n=1138, 41.7% of the population) and non-smokers (n=1589, 58.3%). Two endpoints were defined: in-hospital mortality and a composite endpoint including all-cause mortality, rehospitalization for cardiovascular causes, angiography, percutaneous coronary intervention and coronary artery bypass graft surgery at one year after ACS.

They found that current smokers, on average 15 years younger at presentation, showed a higher rate of STEMI than

non-smokers (69.8% vs. 56.3%, $p<0.001$), in whom NSTEMI predominated. Current smokers also had a more benign clinical, hemodynamic and angiographic profile at hospital admission and a better in-hospital course. They also appeared to have a more favorable prognosis at one year, although they were more likely to be revascularized, mainly by PCI (84.1% vs. 67.0% in non-smokers, $p<0.001$), during hospital stay and in follow-up.

The raw data assessed by univariate statistics suggested that the smoker’s paradox would be found in this population, but after multivariate analysis with full adjustment for age, gender, heart rate, systolic blood pressure, Killip class, creatinine at admission and ACS type, all the differences disappeared, supporting the authors’ conclusions that the smoker’s paradox was not observed in the study population and that the initial apparent differences in outcome could be explained simply by smokers’ lower baseline risk.

The study’s data and conclusions, coming from a tertiary center with a large ACS population, managed by current state-of-the-art drug regimes and interventions, are significant. To the best of our knowledge, this is the first paper published in Portugal to study the smoker’s paradox with a sufficiently large population and with sufficient statistical power to support its conclusions.

The topic addressed by the authors is important, since several articles have been published in high-ranking medical journals (although contradicted by many others^{2,3}) that suggest the existence of a paradoxical protection afforded

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by smoking in patients with coronary artery disease (CAD), heart failure and stroke.⁴⁻⁶

This is cited by many patients as an argument for not quitting smoking, losing weight or strictly controlling their other risk factors, since they believe that they would benefit from the lower residual cardiovascular risk due to the protection conferred by tobacco smoking.

Arguments are also made in favor of electronic cigarettes. There is the perception that e-cigarettes are neutral for cardiovascular health, but this is not supported by epidemiological studies, since none have yet been performed to elucidate the impact of new forms of tobacco smoking on cardiovascular health.⁷⁻⁹

This misperception is clearly contradicted by other trials. The Organization to Assess Strategies in Acute Ischemic Syndromes (OASIS) 5 trial, which included 18 809 ACS patients, showed that smoking cessation reduced the risk of a new ACS by 43% at six months.¹⁰

The study has some limitations, most of them acknowledged by the authors: its retrospective nature, and the lack of data regarding smoking burden and on compliance with drug regimes and cardiovascular mortality after discharge. None of these should be considered a major challenge to the study's conclusions.

It would also have been interesting to assess the patients' global cardiovascular risk previous to ACS, by the EuroSCORE or another tool validated for the Portuguese population, to ascertain whether the overall risk of smokers, who also had higher rates of dyslipidemia and family history of CAD, would have been predicted to be similar to the non-smokers group, who were 15 years older and had higher rates of hypertension and diabetes.

Another interesting exercise would be to study the consequences of differences in smoking burden in terms of cardiovascular risk, considering that greater numbers of pack/years are associated with increased risk. With this information it would be possible to quantify the risk of smoking in a different way, demonstrating, according to Bradford Hill's causal criteria, a risk that increases proportionally to the smoking burden.¹¹

If the study had included only patients in whom the index ACS was the first manifestation of CAD, its findings and conclusions would probably be even stronger. The study population would decrease by excluding patients with previously known CAD (35.8%), stroke/transient ischemic attack (5.9%) and peripheral arterial disease (3.1%), but this would probably would strengthen the study's conclusions.

Conflicts of interest

The author has no conflicts of interest to declare.

References

1. Coutinho Cruz M, Ilhão Moreira R, Sá Carvalho R, et al. The smoker's paradox in acute coronary syndrome: is it real? *Rev Port Cardiol.* 2018, <http://dx.doi.org/10.1016/j.repc.2017.12.005>.
2. Andrikopoulos GK, Richter DJ, Dilaveris PE, et al. In-hospital mortality of habitual cigarette smokers after acute myocardial infarction: the "smoker's paradox" in a nationwide study. *Eur Heart J.* 2001;22:776-84.
3. Symons R, Masci PG, Francone M, et al. Impact of active smoking on myocardial infarction severity in reper-fused ST-segment elevation myocardial infarction patients: the smoker's paradox revisited. *Eur Heart J.* 2016;37:2756-64.
4. Ali SF, Smith EE, Reeves MJ, et al. Smoking paradox in patients hospitalized with coronary artery disease or acute ischemic stroke: findings from get with the guidelines. *Circ Cardiovasc Qual Outcomes.* 2015;8 Suppl. 3:S73-80.
5. Fonarow GC, Abraham WT, Albert NM, et al. A smoker's paradox in patients hospitalized for heart failure: findings from OPTIMIZE-HF. *Eur Heart J.* 2008;29:1983-91.
6. Kurmann R, Engelter ST, Michel P, et al. Impact of smoking on clinical outcome and recanalization after intravenous thrombolysis for stroke: multicenter cohort study. *Stroke.* 2018;49:1170-5.
7. Bhatnagar A, Whitsel LP, Ribisl KM, et al. Electronic cigarettes: a policy statement from the American Heart Association. *Circulation.* 2014;130:1418-36.
8. Løchen ML. The electronic cigarette do we need to worry? *Eur Heart J.* 2017;38:1870.
9. Qasim H, Karim ZA, Rivera JO, et al. Impact of electronic cigarettes on the cardiovascular system. *J Am Heart Assoc.* 2017;6.
10. Chow CK, Jolly S, Rao-Melacini P, et al. Association of diet, exercise, and smoking modification with risk of early cardiovascular events after acute coronary syndromes. *Circulation.* 2010;121:750-8.
11. Höfler M. The Bradford Hill considerations on causality: a counterfactual perspective. *Emerg Themes Epidemiol.* 2005;2:1-9.