

CARDIAC RESUSCITATION

The 'smoker's paradox' after in-hospital cardiac arrest

A retrospective, observational analysis of data from a large US hospital database has shown that smokers have higher rates of survival and lower rates of poor neurological status after in-hospital cardiac arrest (IHCA) than do nonsmokers. This 'smoker's paradox' of improved outcomes has been recognized in patients with acute myocardial infarction for 25 years, but whether the phenomenon is present after cardiopulmonary resuscitation (CPR) was unknown.

Tanush Gupta and colleagues utilized information from the Nationwide Inpatient Sample Database, which contains discharge-level data from ~1,000 hospitals in the USA. All patients aged ≥ 18 years who underwent CPR for IHCA during 2003–2011 ($n = 838,464$) were included in the analysis. Of these individuals, 116,569 (13.9%) were smokers. An initial diagnosis of acute myocardial infarction, or ventricular tachycardia or fibrillation, was more common among smokers, who were also more likely than nonsmokers to be young, male, and white.

The rate of survival to hospital discharge was significantly higher in smokers than nonsmokers (28.2% vs 24.1%; OR 1.24, 95% CI 1.22–1.26, $P < 0.001$), even after adjustment for confounding factors (OR 1.06, 95% CI 1.05–1.08, $P < 0.001$). The poor neurological status after CPR was less prevalent among smokers than nonsmokers (3.5% vs 3.9%; OR 0.88, 95% CI 0.85–0.91, $P < 0.001$), a difference that remained significant in the adjusted analysis (OR 0.92, 95% CI 0.89–0.95, $P < 0.001$).

The investigators postulate that the improved outcomes in smokers "can potentially be explained by the phenomenon of ischaemic preconditioning," whereby the hypoxic effects of tobacco smoke induce periodic episodes of minor ischaemia and reperfusion that can blunt the effects of sustained and dramatic reperfusion injury, such as that occurring after CPR. Commenting on the study, in which he was not involved, Dr Jasmeet Soar from Southmead Hospital, Bristol, UK explained that "the concept of ischaemic



preconditioning is of considerable interest to resuscitation researchers. Studies suggest that an ischaemic conditioning intervention could be effective during cardiopulmonary resuscitation, and after successful resuscitation." He cautions that "the quality of data [in the study] is too crude regarding neurological outcome ... so we don't really know how smoking impacts on this. Cardiac arrest survivors can have subtle neurological deficits or new disabilities that effect their quality of life."

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Original article Gupta, T. *et al.* Relation of smoking status to outcomes after cardiopulmonary resuscitation for in-hospital cardiac arrest. *Am. J. Cardiol.* doi:10.1016/j.amjcard.2014.04.021