

# Patients who quit smoking after percutaneous coronary intervention do as well as non-smokers, unless they smoked heavily

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Patients who quit smoking after undergoing percutaneous coronary intervention (PCI) for narrowed arteries have similar outcomes as non-smokers during four years of follow-up after the procedure, according to a large study published in the *European Heart Journal* today. However, if they had been heavy, long-term smokers, no improvement was seen.

The study of 74,471 patients who had a PCI between 2009 and 2016 is the first, large population-based study to examine the impact of [smoking](#) on cardiovascular outcomes, such as death, heart attacks, and strokes, since [drug-eluting stents](#) (DES) were first approved for use in PCIs in Europe in 2002 and in the U.S. in 2003.

A DES is a short wire mesh tube that is inserted into the narrowed artery during PCI and is left in place permanently to allow blood to flow freely. It blocks cell proliferation by releasing a drug over a period of time. This prevents scarring which could narrow the stented artery. PCIs are often performed as an [emergency treatment](#) after a [heart attack](#), or when there is a need to enhance blood flow in the coronary arteries, such as when chest pains (angina) can no longer be controlled with medication.

The researchers, led by Professor Jung-Kyu Han, from Seoul National University Hospital, South Korea, analyzed data from the Korean National Health Insurance System nationwide database to investigate patient outcomes over four years following PCI. They looked at the rates of heart attacks, strokes, repeated procedures to widen arteries, and deaths from any cause. These are commonly called MACCE (major adverse cardiovascular and cerebrovascular events).

As well as collecting information on factors that could affect the results, such as age, sex, diabetes, blood pressure, alcohol drinking, exercise, body mass index (BMI), medications and [socioeconomic status](#), they also gathered information on whether or not the patients were current smokers, never-smokers, or ex-smokers.

During four years of follow-up, current smokers had a 19.8% higher rate of MACCE than people who had never smoked, and ex-smokers had a comparable rate as never-smokers.

Additionally, they also analyzed data from 31,887 patients with information on their smoking habits before and after PCI to further assess the impact of quitting smoking after PCI. They assessed how much patients smoked by placing them in four groups: less than 10 pack years, between 10 and 19 pack years, between 20 and 29 pack years, and over 30 pack years. 'Pack years' indicates a person's accumulated exposure to tobacco; this was reached by multiplying the number of cigarettes smoked a day by the number of years the person had smoked.

Quitters who stopped smoking after PCI and who had smoked less than 20 pack years had a comparable rate of MACCE as people who had never smoked. However, those who had smoked more than 20 pack years before quitting had a 20% higher rate of MACCE, similar to the rate for persistent smokers.

Prof. Han said, "Patients who quit smoking after undergoing [percutaneous coronary intervention](#), with a cumulative smoking exposure of 20 pack years, had cardiovascular risks similar to those of non-smokers. Notably, this finding was observed within a relatively short interval after smoking cessation—a median of 628 days between pre- and post-PCI-health check-ups."

One of the reasons Prof. Han and his colleagues conducted the study was because most previous research did not consider changes in smoking habits before and after PCI, leaving the effects of quitting smoking after PCI largely unexplored.

He said, "From the beginning of this study, my colleagues and I, as clinical researchers, suspected that there could be a threshold for

irreversible harm resulting from smoking. Yet, the revelation that this threshold lies around 20 pack years—not like just five or 10 pack years—was an encouraging discovery. It suggests that smokers undergoing percutaneous coronary intervention, who have not reached a cumulative smoking exposure of 20 pack years, may still have an opportunity to evade the lasting detrimental effects on their cardiovascular outcomes caused by smoking.

"Patients undergoing percutaneous coronary intervention should be encouraged to quit smoking as soon as possible, and smoking cessation may improve their cardiovascular outcomes even within a relatively short period of time. This emphasizes the paramount importance of clinicians' attention to their patients' smoking status, along with the combined efforts of clinicians, patients, and policymakers in promoting smoking cessation."

The study also contributes to de-bunking what is known as the "smokers' paradox"; some previous studies seemed to suggest that smokers who had a heart attack had a better prognosis after PCI.

"A subgroup analysis of our study, which included 28,266 patients with [myocardial infarction](#), refuted this paradox by demonstrating that current smokers had a significantly higher rate of adverse cardiovascular events compared to non-smokers. Notably, the positive impact of smoking cessation in patients with myocardial infarction was not as pronounced as in the overall study population."

"This may be due to insufficient numbers of patients and events in the subgroup analyzes, or because the synergistic effects of heart attack and smoking resulted in more irreversible damage to the myocardium," said Prof. Han.

A strength of the study is that it's based on the Korean National Health

Insurance System, which covers 97% of the Korean population, and is one of the most comprehensive sources of data on people's health.

Limitations include: whether or not a person smoked and how much was self-reported in a questionnaire and may not reflect the true status; other, unknown factors might affect the findings; the findings cannot be generalized to all races; and pack years cannot differentiate between the impact of long-term smoking at low doses from short-term smoking at high doses.

**More information:** Jung Kyu Han et al, Smoking and cardiovascular outcomes after percutaneous coronary intervention: a Korean study, *European Heart Journal* (2023). [DOI: 10.1093/eurheartj/ehad616](https://doi.org/10.1093/eurheartj/ehad616)

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