

# PET imaging shows young smokers quick benefit of quitting

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The early stages of coronary artery disease in young smokers can be reversed quickly if they choose to put out their cigarettes for good, according to a positron emission tomography (PET) imaging study in the December Journal of Nuclear Medicine.

"I believe this is the first PET study that shows abnormal coronary function is reversible after only one month of smoking cessation," said Nagara Tamaki, a professor and chair of the nuclear medicine department at Hokkaido University in Sapporo, Japan. "Smoking cessation normalized abnormal coronary artery function, thus supporting its value in preventing heart disease in young adults," he explained. "In addition, this is an important report with PET imaging that shows abnormal coronary artery function can be measured by coronary blood flow and flow response to cold stimulation (also called 15O-water PET) in healthy young smokers," noted the co-author of "Smoking Cessation Normalizes Coronary Endothelial Vasomotor Response Assessed With 15O-Water and PET in Healthy Young Smokers." Researchers from the Japanese university also noted that improvement was "preserved" six months after the study's subjects stopped smoking, "supporting the value of smoking cessation for prevention of coronary artery disease particularly in the young," said Tamaki.

"This study provided a noninvasive look at the early stages of coronary artery disease in smokers and the recovery time of coronary endothelial dysfunction after giving up cigarettes," indicated Tamaki. Coronary endothelial dysfunction occurs when the heart's blood vessels aren't

flexible enough to expand in response to increased blood flow. Smoking can damage the endothelium—the innermost layer of the artery—and over time, plaques can narrow coronary arteries, allowing less blood to flow to the heart muscle. Rupture of these plaques may result in a stroke, heart attack and death.

It's generally known that the risk of death from coronary artery disease is up to six times higher in smokers than in nonsmokers, and about half of all smokers who continue to smoke will end up dying from a smoking-related illness. Cigarette smoking is the leading cause of preventable death in the United States, accounting for 438,000 deaths annually (about one of every five deaths). Since coronary endothelial dysfunction is both "a significant predictor of cardiovascular events"—and reversible—its early detection is important, said Tamaki. PET—a diagnostic imaging test that measures metabolic activity and generates images of organ or tissue function—"will continue to provide insight into coronary risk analysis and risk management (such as smoking cessation and lowering one's cholesterol)," he added.

In the Hokkaido University study, researchers examined the effects of smoking cessation on coronary endothelial dysfunction in 15 young male adults (in their twenties and thirties) with no other heart diseases or cardiovascular risk factors (other than smoking). The young smokers, who smoked an average of 20 cigarettes a day, agreed to stop for at least six months. Myocardial (heart) blood flow was measured both at rest and during stimulation induced by a cold pressor test by using PET with the oxygen tracer called  $^{15}\text{O}$ -water. Additional research is necessary, said Tamaki. "We would like to compare the current information with data from middle-aged smokers to see whether such response after smoking cessation may be seen in an older generation. Also, it would be nice to see the reversibility in young smokers associated with other risk factors, such as diabetes and obesity," he said.

Source: Society of Nuclear Medicine

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