Microplastics found in blood vessels linked to greater risk of heart problems, study finds

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Micro and nanoplastics, tiny pieces of plastic scattered throughout the environment, have been increasingly found to be able to enter the body, raising questions about where they end up and how they affect people's health. In a new study, researchers say they have for the first time detected these plastic pieces inside fatty plaques that accumulate in blood vessels and linked them to an increased rate of heart problems.

Researchers found that people who had these plastic pieces in their plaques experienced a 4.5-fold greater risk of major complications including heart attacks, strokes, or death compared to those with plastic-free plaques, according to the study, published Wednesday in the New England Journal of Medicine.

Specifically, over about a three-year period, 30 out of 150 — or 20% — of patients who had plastic detected in their plaques experienced a complication, compared with eight out of 107 — or 7.5% — of patients who didn't have plastic identified.

The types of plastic they found are commonly used in everyday life: polyethylene, which is used in plastic bags and bottles, and polyvinyl chloride, which is used in pipes, insulation, and medical devices.

The authors cautioned that the study doesn't prove the plastic pieces definitively caused a greater risk of problems, but it does find an important link between microplastics and cardiovascular complications that should be probed in future studies, they said.

The paper comes amid a greater research focus on microplastics, which have been found all across the environment, from food and water sources to the atmosphere. The issue is expected to worsen with climate change, as rising temperatures accelerate the breakdown of plastic products. Studies so far have found microplastics to be harmful in mice and have also detected them in different parts of the human body — like the placenta, liver, and lungs — but there has been less research showing how much microplastics actually affect people's health.

"There's already a big awareness that microplastics are everywhere, in every geographic locale," said Sanjay Rajagopalan, an author on the study and chief of cardiovascular medicine at University Hospitals Cleveland Medical Center. What "we don't know is do they have significant health effects and should we really worry about them? What are the long-term effects?"

The study included about 300 people in Italy who underwent carotid endarterectomies, a type of surgery to remove the buildup of fatty plaques in blood vessels. The accumulation of these plaques over time can block vessels and lead to heart attacks or strokes.

The plaques collected from the surgeries were frozen and then analyzed by the researchers. They used microscopic techniques and chemical analyses to find jagged pieces of plastic embedded in the plaques.

Since previous research has suggested microplastics may increase inflammation, the researchers looked at markers of inflammation — including interleukin-18, interleukin-1β, interleukin-6, and TNF-α — and found that the amount of plastic pieces in plaques correlated with levels of these inflammatory markers.

Changcheng Zhou, a professor at the University of California, Riverside, who wasn't involved in the study, said a next step of this research could be to understand the mechanisms that could explain how the microplastics might increase inflammation and lead to heart problems. One avenue to investigate is whether chemicals from the plastics leached into the plaques, said Zhou, who studies the chemicals inside plastic products.

Though the study is far from proving that microplastics cause heart problems, "this is a much-needed analysis," said Tim O'Toole, an associate professor of medicine at the University of Louisville who also wasn't involved in the study.

"The problem of microplastics contamination is going to continue or get worse because of global climate change," said O'Toole, who has been researching the effects of pollutants on heart outcomes. "The increased temperature will increase the breakdown of these contaminants, and they'll be even more and more a problem in our water supplies, in the food chain."

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