

Brain emotional activity linked to blood vessel inflammation in recent heart attack patients

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People with recent heart attacks have significantly higher activity in the amygdala, the brain area involved in stress perception and emotional response, along with greater inflammation in arteries resulting from increased bone marrow activity, a hallmark of plaque build-up—and these are all capable of returning to near-normal, according to preliminary research presented at the American Heart Association's Vascular Discovery: From Genes to Medicine Scientific Sessions 2020. The meeting is a virtual event in 2020, to be held May 5-7.

"The results of this study advance our understanding of the interconnections among the brain, bone marrow and blood vessels, with activity of the brain emotional center closely linked to [heart](#) disease activity and inflammation of [blood vessels](#) which are spurred by inflammatory immune cells produced by the bone marrow," said Dong Oh Kang, M.D., lead study author and clinical instructor in the cardiovascular center of Korea University Guro Hospital in Seoul, Korea.

The researchers obtained simultaneous PET and CT scans to create 3-D images of the brain, major arteries and bone marrow of 62 study participants. The study included 45 people (84% male, average age 60 years) who had a heart attack within the previous 45 days and 17 people with no heart attack history (76% male, average age 59.6 years), the control group. All participants completed widely accepted standard screening questionnaires for depression and perceived stress.

Researchers found:

- Those who had a recent heart attack had significantly higher activity in the amygdala region of the brain, which is responsible for stress perception and [emotional response](#).
- The participants who had a recent heart attack also had increased inflammation in the aorta and carotid artery (neck), which supplies blood to the brain, and increased [bone marrow](#) activity, indicating active production of inflammatory cells.
- In both groups, those who reported feeling more depressed or stressed on psychological questionnaires showed higher activity in the amygdala.

Brain emotional activity and inflammation can change over time. After six months, the 10 heart attack patients who underwent follow-up imaging had near-normal PET and CT scans.

"Amygdala activity has previously been reported to be stable over time, however, the changes seen in our study suggest the possibility that stress reduction techniques may lower brain emotional activity and potentially reduce inflammation in arteries and the production of inflammatory cells, thus, potentially modifying the course of heart disease. This could become an additional strategy

to prevent a second [heart attack](#)," Kang said.

Although the study found significant links between amygdala activity and artery inflammation, intervention studies are needed to investigate the possible benefits of modifying brain emotional activity on atherosclerosis. Kang also noted more research is needed to identify the most effective stress relief treatments.

Provided by American Heart Association

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