慢性的な騒音への曝露は心血管リスクを上昇させる(Abstract PR.APS.02)

慢性的な騒音への曝露と心血管リスク上昇との関連の背景にあるメカニズムが明らかにされた

Scientists identify mechanism behind relationship between chronic noise exposure and elevated cardiovascular risk

環境騒音への曝露は、ストレス反応に関連する脳領域の活動を刺激することにより心筋梗塞(MI)および脳卒中のリスクを上昇させるようである、との予備研究の結果がAmerican Heart Association Scientific Sessions 2018で発表された。慢性的な騒音への曝露レベルが最大(高速道路や空港)の人々は、扁桃体活性が高く動脈内の炎症がより多かった。注目すべきことに、これらの人々は、騒音への曝露レベルが低い人々に比べ、他のリスクファクターに関係なくMIまたは脳卒中および他の重大な心血管イベント発症リスクも3倍以上高かった。

Full Text

Exposure to environmental noise appears to increase the risk of myocardial infarctions (MI) and strokes by fueling the activity of a brain region involved in stress response. This response in turn promotes blood vessel inflammation, according to preliminary research presented at the American Heart Association's Scientific Sessions 2018, a premier global exchange of the latest advances in cardiovascular science for researchers and clinicians.

The findings reveal that people with the highest levels of chronic noise exposure – such as highway and airport noise – had an increased risk of suffering cardiovascular events such as MI and strokes, regardless of other risk factors known to increase cardiovascular risk.

The results of the study offer much-needed insight into the biological mechanisms of the well-known, but poorly understood, interplay between cardiovascular disease and chronic noise exposure, researchers said.

"A growing body of research reveals an association between ambient noise and cardiovascular disease, but the physiological mechanisms behind it have remained unclear," said study author Azar Radfar, M.D., Ph.D., a research fellow at the Massachusetts General Hospital in Boston. "We believe our findings offer an important insight into the biology behind this phenomenon."

Researchers analyzed the association between noise exposure and major cardiovascular events, such as heart attacks and strokes, among 499 people (average age 56 years), who had simultaneous PET and CT scan imaging of their brains and blood vessels. Diagnostic validation was done in a subset of 281 subjects.

All participants were free of cardiovascular illness and cancer at baseline. Using those images, the scientists assessed the activity of the amygdala - an area of the brain involved in stress regulation and emotional responses, among other functions. To capture cardiovascular risk, the researchers examined the participants' medical records following the initial imaging studies. Of the 499 participants, 40 experienced a cardiovascular event (e.g., MI or stroke) in the five years following the initial testing.

To gauge noise exposure, the researchers used participants' home addresses and derived noise level estimates from the Department of Transportation's Aviation and Highway Noise Map.

People with the highest levels of noise exposure had higher levels of amygdalar activity and more inflammation in their arteries. Notably, these people also had a greater than three-fold risk of suffering an MI or a stroke and other major cardiovascular events, compared with people who had lower levels of noise exposure. That risk remained elevated even after the researchers accounted for other cardiovascular and environmental risk factors, including air pollution, high cholesterol, smoking and diabetes.

Additional analysis revealed that high levels of amygdalar activity appears to unleash a pathway that fuels cardiac risk by driving blood vessel inflammation, a well-known risk factor for cardiovascular disease.

The researchers caution that more research is needed to determine whether reduction in noise exposure could meaningfully lower cardiovascular risk and reduce the number of cardiovascular events on a population-wide scale.

In the meantime, however, the new study findings should propel clinicians to consider chronic exposure to high levels of ambient noise as an independent risk factor for cardiovascular disease.

"Patients and their physicians should consider chronic noise exposure when assessing cardiovascular risk and may wish to take steps to minimize or mitigate such chronic exposure," Radfar said.

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