早期段階の脳疾患と心疾患とに関連が認められた(ST09-01)

潜在性心機能低下はMRI上の潜在的な脳疾患の画像マーカーと関連がある

Subclinical cardiac dysfunction correlates to imaging markers of subclinical brain disease on MRI

数千人の健常成人を調査している研究者らが、非常に早期の脳疾患と心疾患との関連性を発見した。このスタディは2015年Radiological Society of North America年次集会で発表された。研究者らは、Rotterdamの高齢者における、慢性疾患を調査する地域住民を対象とした前向き研究であるRotterdam Studyの参加者2,432人（女性57.4%、平均年齢56.6歳）のデータを解析した。明らかな心疾患、認知症および脳梗塞を有する人々は解析から除外された。参加者は、拡散テンソル画像（DTI）と呼ばれる先進的技術を用いた脳MRI検査、およびN末端プロB型ナトリウム利尿ペプチド（NT-proBNP）の血中レベル計測を施行された。研究者らは脳容積の減少、微細構造変化および白質病変など、細胞領域が外傷や疾病により障害されていることを示すMRIの結果を早期脳疾患のマーカーとして評価した。DTIの結果から、NT-proBNPが高値の者は白質の微細構造組織が不良であることが示された。NT-proBNP高値は脳の容積が小さいこと、および白質病変容積が大きいことと関連があった。脳容積の減少は灰白質で優位であった。

Full Text

Researchers in the Netherlands studying thousands of healthy adults have found a connection between very early stages of brain and heart disease. Results of their study were presented at the 2015 annual meeting of the Radiological Society of North America (RSNA).

"Heart and brain diseases are big problems in aging individuals and are expected to grow even more," said Hazel Zonneveld, M.D., M.Sc., from the Department of Epidemiology and Radiology at Erasmus University Medical Center in Rotterdam, Netherlands. "We know that myocardial infarction, heart failure and atrial fibrillation are associated with an increased risk of stroke and dementia. Our study investigates whether the heart-brain link is present at an earlier stage of disease."

Dr. Zonneveld and colleagues analyzed data from 2,432 participants in the Rotterdam Study (57.4 percent women, mean age 56.6 years), a prospective, population-based study designed to investigate chronic diseases in Rotterdam's aging population. Participants with overt heart disease, dementia and brain infarcts were excluded from the analysis.

Participants in the study underwent brain MRI, which included the use of an advanced technique called diffusion tensor imaging (DTI), and blood testing to measure levels of N-terminal pro b-type natriuretic peptide (NT-proBNP), which is primarily used to help detect, diagnose and evaluate the severity of heart failure.

"NT-proBNP is released into the bloodstream in response to myocardial wall stress," Dr. Zonneveld said. "Studies have demonstrated that NT-proBNP provides information on cardiac dysfunction even in the absence of overt heart disease."

The researchers evaluated the brain MRI results for markers of early brain disease, including a loss of brain volume, microstructural changes and white matter lesions, which indicate areas of cells that have been damaged by injury or disease.

"Diffusion tensor imaging gives us information on the microstructural organization of the brain's white matter," Dr. Zonneveld said. "It is thought that microstructural brain changes precede brain changes, such as white matter lesions."

The results of DTI showed that participants with higher NT-proBNP levels had worse microstructural organization within the white matter. A statistical analysis revealed that higher NT-proBNP levels were also associated with smaller total brain volume and larger white matter lesion volume.

"The brain volume loss was predominantly in the gray matter," Dr. Zonneveld said.
According to Dr. Zonneveld, this study is the first to demonstrate an association between NT-proBNP and the microstructure of the brain.

"This implies that the heart and brain are intimately linked, even in presumably healthy individuals, and informs us importantly about development of disease as we age," she said.

Co-authors on the study are Wiro Niessen, Ph.D., Aad Van Der Lugt, M.D., Ph.D., Gabriel P. Krestin, M.D., Ph.D., Oscar H. Franco, M.D. Ph.D., M. Arfan Ikram, M.D, Ph.D., and Meike W. Vernooij, M.D, Ph.D.

RSNA2015特集

Cardiology
3D MRIは糖尿病患者における脳卒中リスクの早期徴候を示す

早期段階の脳疾患と心疾患とに関連が認められた

MRIにより一流ダイバーの無呼吸中の心血管系変化が示された

Oncology
Subsolidの肺結節は男性よりも女性におけるがんリスクを増大させる

乳腺密度のみではがんのリスクファクターにならない

Psychiatry
小児において親がいないことは脳の発達を遅延させる可能性がある

肥満小児において食物のにおいは脳の衝動性領域を活性化させる

患者の気分は医療処置の結果に影響を及ぼし得る