HEARTBEAT

Cardiovascular Health Study

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CHS researchers use MRI to identify risk factors of stroke

Norm Beauchamp, MD

Stroke is one of the most common causes of illness in the older population. Patients are usually treated after a stroke occurs, but preventive medicine is the best way to lessen the impact of strokes. In order to help prevent strokes, we need to understand clearly which factors indicate that a stroke may happen. Identifying such risk factors is a primary goal of CHS.

Identifying risk factors associated with stroke in CHS participants has been particularly challenging. It is fair to say that if even one stroke occurs, that is too many. In the elderly population, the incidence of stroke is approximately 5 out of 100. This number is alarmingly high, representing the third most common cause of mortality. Surprisingly, even numbers this high are relatively small when it comes to clearly defining the risk factors for a disease.

Obtaining enough examples of people who have had strokes would require performing a costly study involving an extremely large population. Instead, CHS investigators decided to find a physical indication of stroke that occurs more often than stroke itself. This approach is possible using Magnetic Resonance Imaging (MRI).

MRI is a painless method of viewing inside the body using magnetic fields and radio frequency waves. MRIs of the brain are very useful because they show small abnormalities which may or may not be symptomatic, depending on their location. In CHS participants, the vast majority of abnormalities were in parts of the brain that were asymptomatic. Thus, using the MRI, CHS investigators are able to visualize regions where the blood flow to some small portions of the brain had been interruped, even though there may be no obvious physical signs of a stroke.

MRIs obtained from CHS participants showed a sizable number of these small abnormalities in individuals with no evidence of neurologic disease. These same abnormalities have been found in other studies. With your participation, CHS investigators are learning about the meaning of these abnormalities and determining whether or not they indicate other problems.

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CHS winds down over the next five years

CHS will continue to be funded by the National Institutes of Health (NIH) through 2004, but we will collect less data after June 1999. The staff at your local CHS clinic will telephone you every six months to find out about any hospitalizations and cardiovascular illnesses you may have had. Although we still want to track your health, we won't be asking you to visit the clinic every year for an exam after 1999. You may, however, have opportunities in the future to be involved in smaller studies in which a clinic visit is requested.

Did you forget to remember? CHS investigates memory

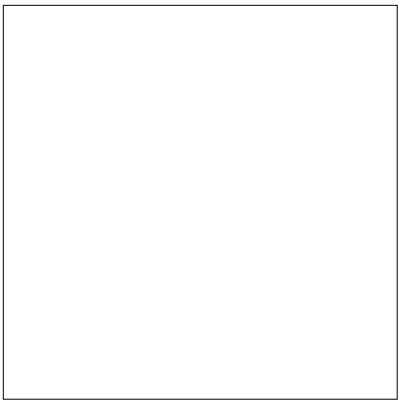
Lewis H. Kuller, MD, DrPH and Peg Meyer, RN, MEd

Those of you who have participated in CHS since early on, and had a Magnetic Resonance Imaging (MRI) for the study between 1992 and 1994, may have an unusual opportunity to contribute to yet another field of research; that is, the research into memory and changes in memory over time.

Certain CHS participants who had an initial MRI in 1992-94 (and, for many, a second MRI in 1997-99) form an ideal group for further study. You have already contributed much of the data we need to answer research questions in the study of memory. Our researchers are investigating whether changes seen on the MRI can be used, along with other information, to predict changes in memory and cognition over the years.

Some of these changes seen on the MRI are related to vascular disease. It is important now to determine whether the same vascular changes and the factors related to those changes are also related to memory changes. If this is true, it may provide a major opportunity for prevention of at least some types of memory changes.

In order to understand these important associations, we need your participation in the next phase of CHS, which will include tests for memory and concentration. These tests are used in many studies of memory changes in older individuals. Because of the tremendous amount of information that you have allowed us to collect, CHS can provide very important information that can not be obtained very well from other studies.



Magnetic Resonance Imaging (MRI) is a painless method of viewing inside the body using magnetic fields and radio frequency waves. This is a sample MRI image of the brain

With additional detailed testing, such as memory and concentration testing, the foundations of information from one study can form a basis for a different, but related, research inquiry. The new relationships between the information from different studies should be strong enough to allow better methods for early identification of those at risk of certain types of memory change.

You may be one of our "ideal candidates." If you are, we will be contacting you and inviting you to participate. Not only will you be helping the medical research effort for the common good, but you'll also be a pioneer in a brand new study.

This issue of *Heartbeat* focuses on CHS's investigation of the brain and memory. MRI is one of the best ways for researchers to understand certain diseases. If you have already received an MRI over the past year or so, thank you! If you have not received an MRI recently, please consider having one this year. Staff from your local CHS clinic will be calling you soon, if they have not already done so.

Study of memory and aging provides valuable results

Judy Saxton, PhD

CHS participants are helping researchers study the effects of age and cardiovascular disease upon cognition and memory. Nearly 1000 participants at CHS clinics in Pennsylvania and Maryland took cognitive tests at their annual clinic visit. The tests measured a range of cognitive skills including memory, language, speed of performance, attention, concentration and visiospatial ability.

The results showed that age had a significant effect on performance on every test. When participants were grouped into five-year age bands (ages 65-69, 70-74, 75-79, 80+), test scores dropped significantly with each increase in age.

As might be expected, CHS participants with more years of education tended to score higher on cognitive tests. More importantly, the group as a whole tended to achieve significantly higher scores on most tests compared with national norms, possibly because of the slightly higher education level of CHS participants. Women performed better than men on most tests, especially memory tests, but men outscored women on a measure of visiospatial ability and on one of the language tests.

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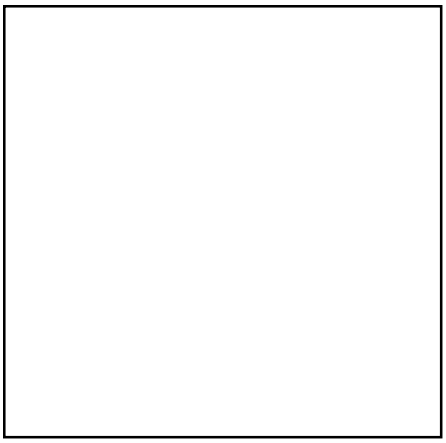
Cardiovascular disease also affected test performance. After adjusting for the effects of age, education, and gender, researchers noted that participants with cardiovascular disease tended to perform more poorly on cognitive tests in which speed is a crucial component, than did those with no disease.



Nearly 1000 CHS participants took cognitive tests during their clinic visit.

CHS researchers divided individuals into groups based on whether their cognitive test scores seemed normal for their age, taking into account educational background and gender. Most participants fell into a normal range but two subgroups appeared to have more difficulty with cognitive tests than expected.

One group (about 7 percent) performed poorly on memory tests, without any other evidence of cognitive impairment. The other group (about 5 percent) achieved generally low scores on all tests, suggesting generalized cognitive decline. The question of whether these subgroups represented individuals with early, subclinical dementia remains to be answered.

This study differs from the study on changes in memory and cognition described in the article on page 2 of this newsletter. We now have the results of the MRIs to see physical changes in the brain. We will thus be able to examine the relationships between those physical changes in the brain and the cognitive memory changes that may take place.

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Through the efforts of the participants and investigators, 3658 CHS participants received MRI examinations between 1992 and 1994. The MRI scans detected signs of cerebrovascular disease in 36 of 100 participants. This exceeds the occurrence of stroke by approximately sevenfold.

As a result, CHS investigators have been better able to define the risk factors for stroke. Investigators found numerous factors (including hypertension, gender, age and previous stroke) to be related to an increased risk of stroke.

In addition to detecting signs of cardiovascular disease, CHS investigators also use the MRI to study other changes in the brain that occur with aging. For example, investigators are studying the change in the appearance of white matter in the brain. This change is associated with impairment in thinking, such as memory loss, as well as foot and leg problems. Some white matter change is likely normal with aging, but the goal is to stop it from becoming too advanced.

The MRI examination has been recognized as a truly unique component of CHS. Incorporating the MRI examination into CHS has greatly strengthened our ability to detect risk factors and correlates of cerebrovascular disease. Participants should take great pride in their involvement in this achievement.

Due in part to the promise of the initial results obtained, CHS received additional funding to repeat the MRI examination this year. If you have not had an MRI in the past year or so, and you qualify for one, please consider saying "yes" when you are asked to have another one.

CHS investigators will continue to explore the information gained by the MRI scans to learn more about strokes and how to prevent them. With your help, we continue to work to improve the health of the older population.

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