



Heart Attacks: Genetic Link Weaker Than Thought



Results of a new study debunk the long-standing belief linking heart attacks to family history and genetics. These new findings may help those with a family history of coronary disease and those diagnosed with narrow coronaries realise that heart attacks are not inevitable and that their lifestyle choices and environment, not just their genetics, also play a role in whether or not they have a heart attack, said researchers from the Intermountain Medical Center Heart Institute in Salt Lake City, Utah.

The research team found that while severe coronary artery disease can be inherited regardless of whether someone has a heart attack, the presence of heart attacks in people with less severe coronary disease was not clustered in families. Their findings were presented at the 2014 conference of the American Society of Human Genetics in San Diego on 20 October.

In the study, the team examined patients with different severities of coronary disease who had or had not suffered a heart attack. The patients were identified by linking 700,000 patients in Intermountain Healthcare's clinical data warehouse with the Intermountain Genealogy Registry, which contains 23 million individuals within extended family pedigrees. "This link between the registry and the medical records allowed us to look at information about both heart attacks and the degree of coronary disease," said lead author Benjamin D. Horne, PhD, MPH, director of cardiovascular and genetic epidemiology at the Intermountain Medical Center Heart Institute. "That means we can compare heart attack patients to people with coronary disease who were free from heart attacks."

The finding has medical implications:

- It can help guide physicians and researchers to look for triggers or risk factors for heart attacks that result from behaviours or environmental factors rather than genetic ones.
- It can help researchers better design genetic studies focused on heart attacks so they can best utilise the resources they have to find the limited set of genetic mutations that are actually involved in predisposing people to heart attack.

Since coronary disease and heart attacks are so closely related, Dr. Horne said, researchers in the past have assumed they are the same thing. "They thought that if someone had coronary disease, they would eventually have a heart attack. This finding may help people realise that, through their choices, they have greater control over whether they ultimately have a heart attack," the doctor continued.

Dr. Horne and his team began studying the connection between heart attacks and family history in 2008 when researchers found that genetic factors related to chromosome 9 were strongly connected to coronary artery disease but those same mutations had no connection to heart attacks. This supported the belief that a heart attack is different from coronary disease where heart attack results when the atherosclerosis causing coronary disease is unstable. Some atherosclerosis is stable and will not result in a heart attack.

"Although in almost all situations someone needs to have some level of coronary disease in order to have a heart attack, some people will have a heart attack when they only have mild coronary disease where there's only a small amount of narrowing of the artery, while others will have a heart attack with severe coronary narrowing," Dr. Horne explained.

In 2011, Dr. Horne's team was part of an international genome-wide association study run by the University of Pennsylvania that validated that the chromosome 9 mutation — and the 10 other genetic mutations also known at the time to be predictors of coronary disease — did not predict heart attacks.

"The 2011 study was only able to find one genetic mutation associated with heart attack among people with coronary disease," Dr. Horne noted. "As researchers continued to find more connections to coronary disease but not specifically to heart attacks, we started wondering if we'd find the same within family pedigrees."

Three years later, researchers have found 35 more genetic mutations — for a total of 46 — believed to be associated with coronary disease. The studies that have discovered these connections have evaluated unrelated people in large populations, according to Dr Horne.

The new study has shown how Intermountain Healthcare "is able to leverage the strengths of the local community in Utah, including genealogical resources, databases via medical informatics technology, and the involvement of community members to perform valuable, unique research that few others can do," said Dr. Horne.

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