Predictors of dying suddenly versus surviving heart attack identified

July 25 2011

Is it possible to predict whether someone is likely to survive or die suddenly from a heart attack?

A new study by researchers at Wake Forest Baptist Medical Center has answered just that.

"For some people, the first heart attack is more likely to be their last," said Elsayed Z. Soliman, M.D., M.Sc., M.S., director of the Epidemiological Cardiology Research Center (EPICARE) at Wake Forest Baptist and lead author of the study. "For these people especially, it is important that we find ways to prevent that first heart attack from ever happening because their chances of living through it are not as good."

While there are many traits that are common among heart attack patients – both those who survive the event and those who die suddenly – researchers found that some traits, such as hypertension, race/ethnicity, body mass index (BMI), heart rate, and additional markers that can be identified by an electrocardiogram (ECG) can differentiate between dying suddenly versus living through a heart attack, Soliman said.

The study, published by the journal *Heart*, is now available online.

Somewhere between 230,000 and 325,000 people in the U.S. succumb to sudden cardiac death every year, Soliman said. Most of these sudden deaths are caused by coronary heart disease.

"Since sudden cardiac death usually occurs before patients ever make it to the hospital, there is very little that can be done to save them," Soliman said. "Identifying specific predictors that separate the risk of sudden cardiac death from that of non-fatal or not immediately fatal heart attacks would be the first step to address this problem, which was the basis for our study."

Researchers analyzed data from two of the largest U.S. cardiovascular studies – the ARIC (Atherosclerosis Risk in Communities) and the CHS (Cardiovascular Health Study) – containing records for more than 18,000 participants. After taking into account common risk factors for coronary heart disease and the competing risk of sudden cardiac death with coronary heart disease, they found that:

- Black race/ethnicity (compared to non-black) was predictive of high sudden cardiac death risk, but less risk of coronary heart disease.

- Hypertension and increased heart rate were stronger predictors of high risk of sudden cardiac death compared to coronary heart disease.

- Extreme high or low body mass index was predictive of increased risk of sudden cardiac death but not of coronary heart disease.

- Additional, more technical traits that a doctor evaluating an ECG report could use to evaluate risk of sudden cardiac death in their patients. (Prolongation of QTc and abnormally inverted T wave were stronger predictors of high risk of sudden cardiac death. On the other hand, elevated electrocardiographic ST height in V2 was not predictive of sudden cardiac death but predictive of

coronary heart disease.)

If the results are validated and confirmed in other studies, Soliman predicts that doctors will have a way to identify patients who are at greater risk of dying suddenly if they experience a heart attack and, therefore, a group of patients for whom early intervention, including risk factor modification, may be a life-saving option.

"Our next step in this path of research is to see if we can come up with a risk stratification score that can be applied to the general population, as well as to look at interventions that reverse the effect that these traits are having on susceptibility to sudden cardiac death," Soliman said. "We need to know if lowering hypertension, BMI or resting heart rate would reduce the risk of dying suddenly."

Provided by Wake Forest Baptist Medical Center