Sudden cardiac death higher in men with slower electrical impulses through heart

May 21 2012

Men whose electrical impulses take a few milliseconds longer to travel through the lower chambers of the heart have an increased risk for sudden cardiac death (SCD), according to research reported in *Circulation*, an American Heart Association journal.

An electrocardiogram (ECG) measures electrical impulses, or waves, that travel through the heart and cause it to pump blood through its four chambers. The waves have distinct patterns and are labeled on the ECG printout alphabetically from P to T. The electrical waves traveling through the lower chambers (ventricles) are shown on the ECG as the "QRS complex."

"Our results suggest that prolonged QRS duration is a potentially important predictor of sudden cardiac death," said Sudhir Kurl, M.D., lead author of the study and a research physician at the University of Eastern Finland in Kuopio. "It will be clinically important to find even more specific risk markers for sudden cardiac death in the general population."

In this study, researchers defined sudden cardiac death as death within an hour after symptoms start or change abruptly, or within 24 hours if there's no other non-cardiac cause of sudden death. However, they say there isn't an easy, inexpensive way to screen a lot of people for risk factors that could predict SCD.

"An essential part of our study is to bring the results to healthcare

professionals — including those in preventive medicine — to make them aware that the simple, cheap and widely available ECG may have practical use in SCD risk stratification," Kurl said.

In the prospective study, researchers recruited 2,049 Finnish men, ages 42 to 60, between March 1984 and December 1989 and tracked them for 19 years. They evaluated their ECG records, heart risk factors, heart disease they developed during the study, whether they died, and the cause of death. They then divided the men into five groups according to their QRS durations. Among the men, 156 died from SCD.

The study's significant results included:

- The risk of SCD rose 27 percent for every 10 milliseconds (ms) increase in the QRS duration.
- The larger the QRS increase, the greater the SCD risk.
- Men with QRS duration longer than 110 ms had 150 percent (or 2.5-fold) higher SCD risk than those with QRS of less than 96 ms, after researchers accounted for such factors as age, a previous heart attack, blood pressure, type 2 diabetes and fitness level.
- Total deaths from any cause numbered 557. The 156 SCDs were compared with 185 non-sudden deaths from coronary heart disease, a narrowing of the arteries that supply blood to the heart.
- QRS duration posed a higher risk of SCD than cigarette smoking, poor physical fitness, high systolic blood pressure, body mass index and C-reactive protein.
- Only a prior heart attack and type 2 diabetes increased risk of SCD more than QRS duration.

"Our study shows that QRS duration is one of the strongest risk factors for sudden cardiac death, although left ventricular function was taken

into account," Kurl said. "We believe resting ECG should be used to help assess the risk of sudden cardiac death in particular patients."

People most likely to benefit from such testing include those with known cardiovascular disease, cardiovascular risk factors and symptoms, and those who are inactive and plan to begin exercising, researchers said.

The study findings apply to women and men, other nationalities, and ethnic and racial groups throughout the world, Kurl said. "There might be small differences between the different groups. Further studies are needed to confirm this."

For example, additional studies in women would be particularly important, because there are no similar findings among women. Sorting out differences among the groups may also help researchers know how reliable the risk factors are, Kurl said.

Provided by American Heart Association