# Small rise in heart attack protein linked to increased risk of early death in all age groups

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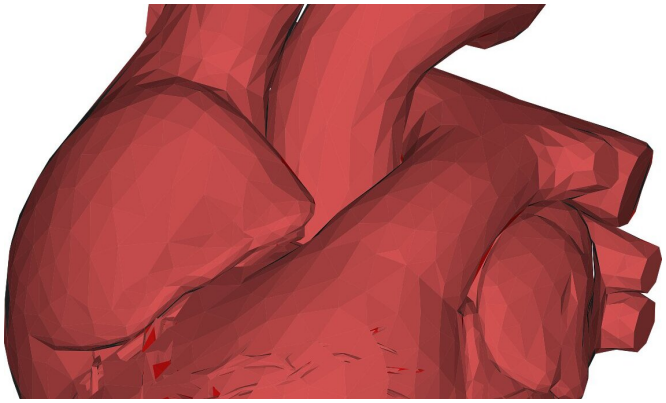

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A new analysis of patients' heart data has shown that even a slight increase in a protein linked to heart attacks, called troponin, is linked to an increased risk of early death at all ages.

Clinicians use troponin testing, alongside other investigations, to determine whether a patient is having a heart attack and to inform treatment choices. It has been assumed that the higher the amount of troponin in the blood, the higher the risk of death in all age groups.

In a large new study, published in the *British Medical Journal*, researchers from the National Institute of Health Research Health Informatics Collaborative (NIHR-HIC) led by Imperial College Healthcare NHS Trust and Imperial College London found that a raised troponin level was associated with an increase in risk of death in all age groups. This was seen even if the troponin result was slightly raised, with the increased risk of death occurring very early.

They also showed that that regardless of age, the higher the amount of troponin in the blood, the higher the risk of death in patients with a heart attack. The results suggests that even a small rise in troponin in all age groups is clinically significant and can indicate underlying health problems.

However, the team also found that, contrary to what they expected, very high levels of troponin in the blood in patients with a heart attack was associated with a lower risk of dying. They suggest that a possible reason is that patients with very high troponin levels are more likely to have a type of heart attack which can be treated by an operation to improve blood flow to the heart and therefore reduce the risk of dying.

Amit Kaura, lead author of the research and NIHR Clinical Research Fellow at Imperial College London, said: "There have been many advances in treating heart disease yet it remains the leading cause of death in the UK and around the world. This is the first study to address the implications of raised troponin in a real world large sample of patients across a wide range of ages. Doctors will be able to use this information to help identify the risk of early death in patients who have a troponin level measured; this could lead to interventions at a much earlier stage in a wider group of patients than are currently treated."

The researchers found that in young patients (18-29 years), those whose blood showed a raised troponin had a 10-fold higher risk of death than those whose blood did not. This increased risk fell with age, reaching 1.5 times the risk in patients over the age of 90. Nevertheless, even in very elderly patients, raised troponin in the blood signifies a higher risk of dying. Over the age of 80, almost half of patients with a raised troponin level died within three years.

They also found that even when doctors do not think the primary problem is a heart attack, the presence of a raised troponin in the blood signifies an increased risk of death. Therefore, the troponin result provides meaningful information in all age groups, regardless of the underlying problem.

Troponins are a group of proteins that helps regulate the contractions of the heart and skeletal muscle. The heart releases troponin into the bloodstream following an injury to the heart such as a heart attack. High levels of troponin usually mean there is a problem with the heart.

Doctors carry out a blood test to measure the levels of troponin in the blood which enables them to assess the damage caused to the heart and how patients are responding to treatment. It has previously been assumed that higher levels of troponin, mean a higher mortality risk.

However, it has been unclear how to manage patients who have small troponin rises, particularly if they do not have other symptoms associated with heart disease or a heart attack.

The researchers behind today's study wanted to examine the impact of raised troponin across different ages, specifically the very elderly. They also wanted to investigate the significance of very small troponin levels, compared with larger levels, on patients' prognosis.

The team analysed the anonymised cardiovascular data of more than 250,000 patients who had troponin tests at National Institute for Health Research Health Informatics Collaborative sites including: Imperial College Healthcare NHS Trust, University College London Hospitals NHS Foundation Trust, Oxford University Hospitals NHS Foundation Trust, King's College Hospital NHS Foundation Trust and Guy's and St Thomas' NHS Foundation Trust from 2010-2017. The team grouped the patients by age and compared their troponin results with their outcomes over a period of three years.

The team are currently designing a trial to see if patients with a raised troponin, without a heart attack, may benefit from cardiac treatments including cholesterol lowering medication, such as a statin.

The work is part of the NIHR Health Informatics Collaborative (NIHR-HIC) which Imperial College London and Imperial College Healthcare NHS Trust is part of. The NIHR-HIC was established to improve the quality and availability of patient data for research purposes. This will enable researchers to gain new insights into areas such as the effectiveness of different treatments and what factors influence patient outcomes and recovery.

The collaboration is between five leading NHS trusts, each of which has a strong relationship with a partner university.

The ultimate aim of all this work is to find ways to improve the experience and outcomes of patients in the NHS.

The study was funded by NIHR Imperial Biomedical Centre (BRC) and was conducted using National Institute for Health Research Health Informatics Collaborative (NIHR HIC) data resources.

This research is an example of the work carried out by Imperial College Academic Health Science Centre, a joint initiative between Imperial College London and three NHS hospital trusts. It aims to transform healthcare by turning scientific discoveries into medical advances to benefit local, national and global populations in as fast a timeframe as possible.

Provided by Imperial College London