Scottish Government Health Directorates Chief Scientist Office

Troponin measurement and prediction of heart attacks and strokes in Scotland

Researchers
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Aim
Troponin I and troponin T are molecules released into the blood by damaged heart cells. Does measurement of troponin I or troponin T improve treatment decisons in Scottish patients to prevent development of heart attacks and strokes?

Project Outline/Methodology
Blood troponin is currently only measured to diagnose heart attacks. We asked whether measuring it in healthy people helps in making treatment decisions, such as who should be prescribed a statin. Such decisions are normally made on using "risk prediction scores" on the basis of age, blood pressure, and blood cholesterol measurments. The Generation Scotland Scottish Family Health Study (GS) recruited 21,476 people aged 18+ from across Scotland to participate in the study in 2006-2010. Participants blood samples were stored. We used these to measure cardiac troponin I and T (two different components of the same structure). Participants were tracked for ~8 years and >1100 went on to have a heart attack or stroke. We also tested which troponin (T or I) best predicted heart attacks and strokes, and assessed whether it was cost effective to do either troponin test to help prevent future heart disease.

Key Results
Both troponins were stongly associated with future risk of heart attacks and strokes. Compared to people with no detectable troponin I in their blood, people with the 5% highest troponin measurements were at >10-fold increased risk over the next 8 years. After considering risk factors already in the risk prediction score, troponin I was the stronger risk marker. Our estimates suggest that if troponin I was measured in the Scottish general population alongside cholesterol, 2% more people who would develop heart attacks and strokes would get early preventative treatments. If troponin I was measured in Scotland we estimate an additional 30,000 years of life would be gained across the lifetime of 2.2M people. This test appears worth paying for as only costs £20 per troponin I test.

Conclusions
Troponin I is the most likely blood marker to improve clincal risk prediction of heart attack and strokes. Troponin I measurement in the general population (alongside cholesterol) would improve treatment decisions for Scottish patients. As such, adding routine troponin measurement would mean more patients correctly getting preventative cholesterol lowering statin therapy, and so more at risk would avoid heart attacks and strokes.

What does this study add to the field?
This study provides the first evidence that troponin I measurement in risk prediction scores would improve treatment decisions in a cost-effective manner. In contrast our findings suggest troponin T does not achieve these goals. Our findings provide clear evidence to clinical decision makers. The study also provides important new information about "usual" population levels of these troponin tests.

Implications for Practice or Policy
Our results may help guide the development of the next set of SIGN guidelines for CVD prevention; Dr Priess and Prof Sattar were involved in the development of the latest such guidelines (SIGN 149).

Where to next?
To expand on our findings we are:
1) applying for funding to measure troponin I in UK Biobank; a UK-wide study with 500,000 participants. The availability of heart imaging in that study will allow us to ascertain how much troponin tells us about the structural health of the heart.
2) considering a trial to implement an improved risk prediction score in Scotland

Further details from:

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