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Relationship between combat-related traumatic injury and ultrashort term heart rate variability in a UK military cohort: findings from the ADVANCE Study

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What is the ADVANCE Study?

The ADVANCE Study investigates the physical and psycho-social outcomes of battlefield casualties in the long-term. The study has 1,145 participants who served in the Afghanistan War of 2002-2014. Half of the cohort have sustained serious battlefield injuries, and the other half are the control group of non-injured servicemen. The participants attend 6 study visits over a 20-year period.

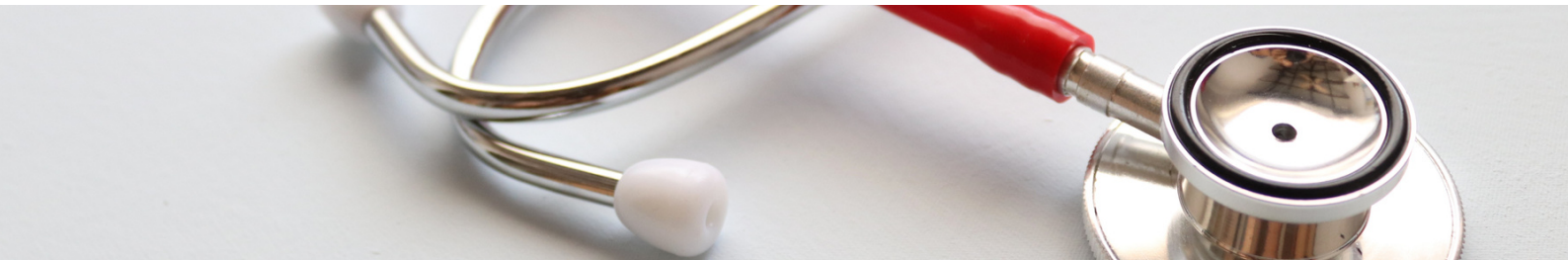
What does this piece of ADVANCE research look at?

Findings on the relationship between cardiovascular disease risk and combat-related traumatic injury in the ADVANCE cohort were reported previously. Following from this, we investigated heart rate variability (HRV). HRV looks at the variation in time between each heartbeat. More variation means higher HRV, which is an indication of better wellbeing and better health outcomes. HRV is important for functions such as breathing and maintaining your heart rate.

HRV studies in military populations are limited. We therefore studied, for the first time, the relationship between combat trauma and HRV in a military cohort - the ADVANCE cohort.

We looked at the following parameters in relation to HRV:

- Injury status - whether or not there was combat-related traumatic injury
- Injury severity - using the New Injury Severity Score (NISS) system, NISS of lower than 25 being low injury severity, and NISS of 25 or higher being high injury severity
- Injury mechanism - blast injury or other injury



What were the findings?

Overall, HRV was found to be lower in the injured group compared to the uninjured group, even almost 8 years after the combat injury occurred. Furthermore:

- Participants with high injury severity had lower HRV compared to the uninjured group and also compared to the injured group with low injury severity.
- Participants with blast injuries had lower HRV compared to participants with other injuries.

What do the findings mean?

Our findings suggest relatively poorer health and wellbeing in participants with combat injury compared to those without combat injury. Fortunately, something can be done about this, as there are ways to elevate HRV, e.g. HRV biofeedback interventions. However, this is yet to be investigated in a military population. Therefore, our findings may be used to inform interventions and allow regular HRV monitoring in military personnel.

In the future, we aim to explore the underlying mechanisms of the relationship between combat injury and HRV, such as the influence of mental and physical health factors. More research is needed to relate HRV to specific disease outcomes. We call for further research in the area to better understand the cardiovascular profile of military populations exposed to combat trauma.

Many thanks to the ADVANCE cohort for taking part and to all ADVANCE funders for their generous support.