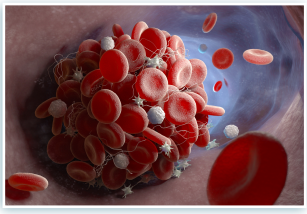
CENTRE FOR TRAUMA SCIENCES



BLOOD CLOTTING PROBLEMS

PRE-HOSPITAL RESEARCH

the PAIR *bulletin*

Patient Public advisors for Injury research

ACIT

Within minutes of injury, up to 1 in 4 severely injured patients develop a clotting problem called Acute Traumatic Coagulopathy (ATC) that makes bleeding worse. This can lead to more transfusion, disability and even death. The research project Activation of Coagulation and Inflammation in Trauma (ACIT) was designed to understand how ATC happens and to explore changes in blood clotting and the body's immune response after serious injury. Taking blood samples straight after injury and 1, 3 and 7 days later is helping the team understand how it reacts to injury and how it changes afterwards. This will mean doctors can tell which patients are most likely to suffer ATC and help decide which blood products to give and when. The aim is to make best use of precious blood resources and improve outcomes for people who have major bleeding. All people requiring admission to the emergency dept with activation of the trauma team can be included in the study, except those with major burns. Contributions to the study from overseas hospitals has helped the project obtain data from over 3500 people.

Blood clotting problems

The process of blood clot formation is a complex series of reactions which are activated when tissues are damaged. This leads the production of fibrinogen which combines with platelets and red blood cells to form the clot. Clots are only needed at the site of the injury, so to prevent them forming in other places the body also begins a processs which breaks them down. Coagulopathy can be caused by problems with clot forming or an increase in the breakdown of clots. ACIT has shown that this Fibrinolysis is very common after trauma and suggests that people need anti-fibrinolytic drugs to stop the body removing clots. Other patients may benefit from being given clotting factors such as fibrinogen to help them make clots. The need for these treatments can be identified very quickly so that the correct treatment can be given to those that need it and not wasted on those that don't

Pre-hospital research

In 2020 the ACIT study was extended to allow earlier testing. Eligible people who are transferred to 3 hospitals by the London Air Ambulance are now have having blood samples taken to add to the study.

Working with teams on the air ambulance and at The Royal London Hospital, John Radcliffe Hospital and the Royal Victoria Infirmary increases the number of samples in the study and importantly means that the way blood reacts to trauma can be identified earlier. It is vital to take the first sample within 2 hours of injury and even earlier tests provide new information about ATC.

Meet the researcher

Rebecca Stoner

I'm an orthopaedic registrar in the Mersey region and have been doing my PhD at C4TS since 2020. My research is part of the COMBAT-AID project led by Prof Nigel Tai.

When patients have multiple injuries, it can be difficult to predict their risk of developing conditions such as severe bleeding or organ failure, or to predict what is needed to improve their chances of survival. Calculating these risks can help:

- prioritise which patients should be treated first,
- plan which treatments will have the greatest benefit
- assess the performance of medical teams.

Our research group has developed artificial intelligence tools that can accurately predict risk in civilian patients. My work focuses on adapting these for military patients who have different kinds of injuries and different resources available.