



Developing and validating blood and imaging BIOMarkers of AXonal injury following Traumatic Brain Injury, (BIO-AX-TBI)

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Traumatic brain injury (TBI) occurs when the brain is physically damaged, for example after a car crash. It is common and survivors often have major ongoing problems. It is very difficult to predict how patients will do after TBI. One reason for this is that we are unable to measure all the effects of TBI. An important factor is that the connections between nerve cells are damaged by the impact on the brain of an injury (axonal injury). This damage has been difficult to measure in the past, but new ways to scan the brain and more sensitive ways of picking up the effects of this injury in the blood could change this. In other parts of medicine tests of this type have had a dramatic effect on how we treat patients. For example, the products of heart muscle damage that have leaked into the blood can be used to identify a heart attack and guide treatment. We need similar tests to be available in TBI. This should be possible as the products of axonal injury also leak into the blood and we have a sensitive way to pick this up. An accurate test for axonal injury would guide treatment choices and allow us to predict how patients will recover. We have brought together an international team who have been working on different aspects of this problem for many years. Together we will conduct a large study to identify the best measures of axonal injury. We will carefully test whether these measures help us predict outcomes and will study where the blood markers come from using a safe method to measure the effects of axonal injury directly from the brain. The work links into some large projects that have already started and will use a standard way to assess patients after their injury. This is important because it will allow us to share results across studies. We hope the work will allow us to identify a blood marker for TBI that could be widely used to quickly identify the presence of axonal injury. We will also show what brain imaging measure is best at picking up axonal injury and how best to combine the measures to best predict how patients recover. This will allow doctors to diagnose problems after TBI more accurately, choose the right treatments and give patients and their families accurate advice about what will happen after discharge from hospital.