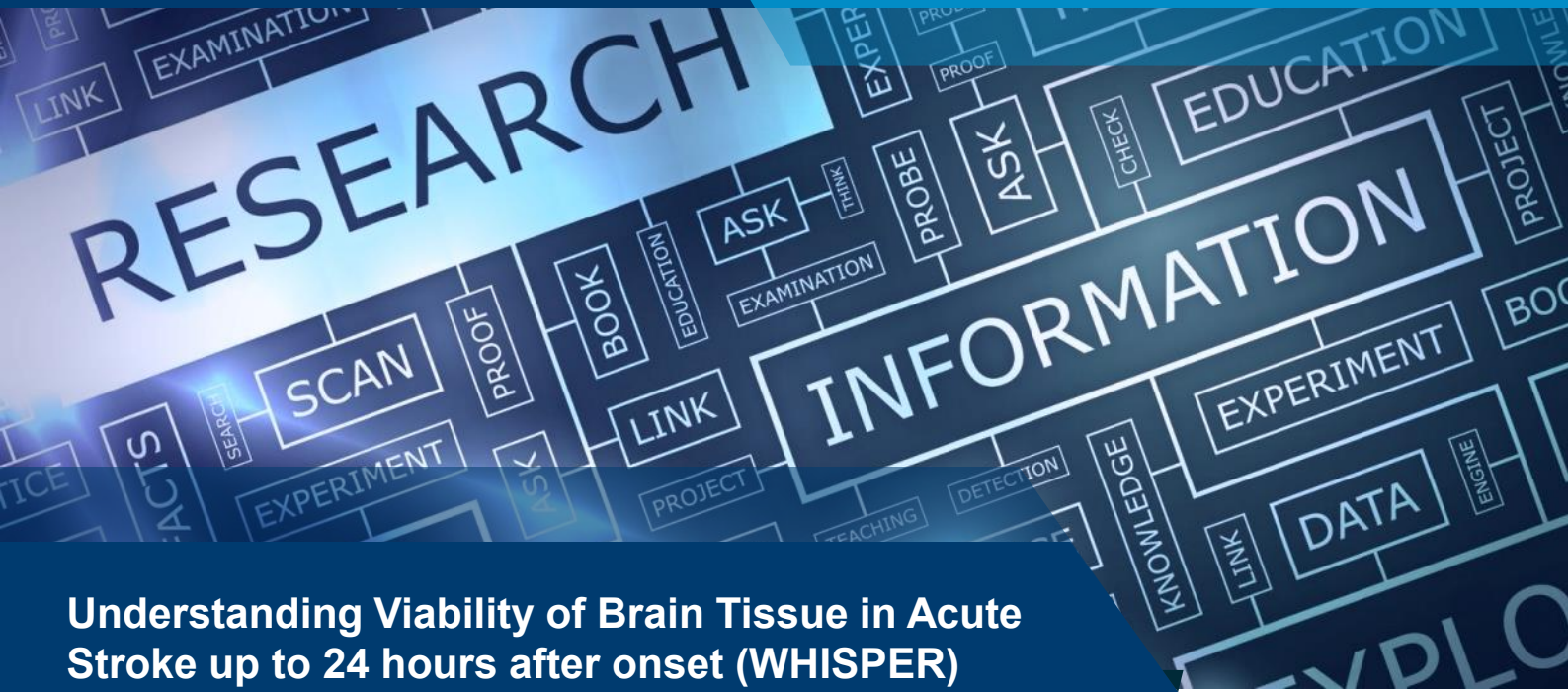
CHIEF SCIENTIST OFFICE

CODE: TCS/18/19

RESEARCH PROJECT BRIEFING



Understanding Viability of Brain Tissue in Acute Stroke up to 24 hours after onset (WHISPER)

AIMS

Restoring blood flow to the brain after a stroke is highly effective, but treatments become less effective the later they are used, over a period of a few hours. We sought to understand how commonly people retain significant amounts of viable brain tissue up to 24 hours after the onset of symptoms, and what factors might influence this.

KEY FINDINGS

- People with more severe strokes present to hospital earlier, but even so around one third of those scanned more than 6 hours from onset were suitable for clot-busting drug treatment and one in six for clot removal
- Among those with blockage of a major blood vessel causing the stroke, around two-thirds still had brain blood flow patterns indicating possible benefit from treatment up to 24 hours from onset
- The blood flow measures that identify viable brain tissue in the first 6 hours are also relevant between 6 and 24 hours from onset
- High blood glucose was associated with poorer back-up blood supply to the brain
- In addition to opening large blood vessels, restoring blood flow to very small vessels is an important contributor to recuing brain tissue and improving recovery

WHAT DID THE STUDY INVOLVE?

We involved people with an acute stroke due to loss of blood supply to the brain who presented to the Queen Elizabeth University Hospital up to 24 hours after the onset of their symptoms. Study participants underwent scans of brain tissue, blood flow, and major blood vessels as early as possible, and had repeat scans using MRI around 48-72 hours later to measure damage to brain tissue, blood supply and blood flow. The recovery from stroke was checked 3 months after the stroke.

WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

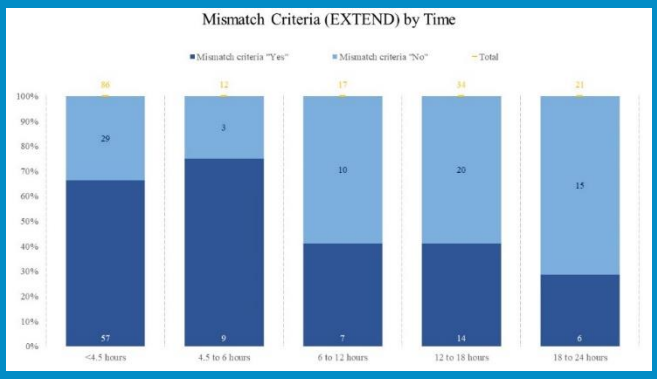
We involved 185 patients, 174 of whom had final diagnosis of stroke. Their age and medical history were typical of people coming to hospital with stroke. Around half received treatment with clot-busting drugs. Just over half had their first set of scans within 6 hours from onset of symptoms (55%) and one third (34%) more than 12 hours from onset.

More than half had scans indicating suitability for clot-busting drugs, with the proportion reducing at later times to scan. One person in five (20%) had scans indicating suitability for clot removal treatment, and this proportion did not change over time. However, taking into account that more severely affected people presented earlier to hospital and focusing only on those who had a major blood vessel blockage as the cause of their stroke, a similar proportion was suitable for treatment at all time intervals up to 24 hours from onset.

We confirmed that the scan measures that are used to identify rescuable brain tissue in the first 6 hours performed equally well up to 24 hours. We also confirmed that high blood sugar was linked to poorer quality of the “back-up” circulation that maintains brain blood flow.

Finally, we confirmed that restoring blood supply was strongly linked with recovery from stroke and with saving brain tissue. Importantly, we found that return of blood flow in the smallest blood vessels was as important for recovery as opening large blood vessels.

The graph shows the proportion of people with acute stroke in whom brain blood flow patterns indicate suitability for clot-busting drug treatment.



WHAT IMPACT COULD THE FINDINGS HAVE?

- The majority of patients with stroke due to a major vessel being blocked could benefit from treatment to restore blood flow up to 24 hours from onset
- Current scan analyses that predict tissue viability are valid up to 24 hours

HOW WILL THE OUTCOMES BE DISSEMINATED?

Findings from the project have been communicated at scientific meetings (the European Stroke Organisation Conference and SINAPSE Annual Scientific Meeting).

Publications describing different key findings are in preparation and will be submitted to scientific journals.

CONCLUSION

The majority of stroke patients with occlusion of a major blood vessel could benefit from treatment to restore blood flow up to 24 hours from onset.

Recovery could be further improved by targeting the restoration of flow in extremely small blood vessels in addition to the major arteries.

RESEARCH TEAM & CONTACT

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Additional Information

The project ran from March 2018 to March 2022. A pilot phase was supported by the Neurosciences Foundation (£9,600) and the main project received £299,934 from CSO.