Scottish Executive Health Department Chief Scientist Office

FOCUS ON RESEARCH

A Method for Improving the Assessment of Pain in Stroke Patients using Thermal Sensory Analysis: The Influence of Site and Size of Cerebrovascular Lesion on Perceptual Processing

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Aims
a) To inform the assessment and clinical management of stroke patients through the exploration of temperature perception
b) To develop and confirm the validity of Quantitative Sensory Testing (QST) as a means of measuring thermal perception in stroke patients in a clinical setting
c) To gather information about temperature perception thresholds in healthy people
d) To explore thermal perception in people with stroke and compare that to healthy people
e) To establish pain experiences early and late after stroke and to explore any relationships with thermal perception

Project Outline/Methodology
A sample of people with recent strokes, and a group of healthy volunteers, was tested on each hand with a Thermal Sensory Analyser (TSA); a device that can apply hot or cold temperatures to the skin. Participants were asked questions about what they could feel during the test. People with stroke were also asked to talk about any pain they were having before the temperature test, and again at least two months later by telephone. This was recorded using the Short Form McGill Pain Questionnaire.

Key Results
Ninety eight people with stroke and 30 healthy people of similar age were tested. The measurements showed that the people with stroke had significantly reduced ability to perceive hot and cold temperatures on both affected and non-affected sides of the body when compared with the healthy participants. Indeed, 30 (31%) of the stroke participants could not detect a temperature of 40°C, normally felt as extremely hot and bordering on being painful. Around 28% of the people with stroke were in pain at one month and also at three months, although some of the specific individuals were different. People with certain stroke sub-types; particularly those affecting large areas of the brain and involving the cerebral cortex, were most likely to report pain. Having pain early after the stroke was associated with having pain later. The more impaired the perception thresholds were for hot and cold, the stronger the relationships were with having worse pain at three months after stroke.

Conclusions
Pain was common for these people after stroke. Thermal perception was severely affected by stroke on both affected and non-affected sides compared to healthy people. Abnormal thermal perception does appear to be linked with more pain experiences after stroke. QST is an appropriate technique to use in a clinical setting. It is well-tolerated and the results suggest that less sophisticated means of testing than the TSA would be just as appropriate.

What does this study add to the field?
A sample of people with stroke has never before been studied in this way as, thus far, only people who had already developed pain have been assessed in QST studies. This work has helped to confirm that relationships do appear to exist between abnormal hot and cold perception and pain, particularly central post-stroke pain. It has also informed aspects of pain prediction after stroke.

Implications for Practice or Policy
Formal assessment of thermal perception after stroke could improve clinical management by increasing awareness during functional rehabilitation. A more thorough process for the assessment and management of pain after stroke should be developed. Those with abnormal perception of hot and cold should be identified as being at risk of pain syndromes that could be successfully treated.

Where to next?
Future research will further explore the relationships between these data and more discrete pain types after stroke. This will contribute to ongoing work to develop predictive outcome models.

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