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A CLUSTER-RANDOMISED CONTROLLED TRIAL EVALUATING THE EFFECTIVENESS OF STROKE RISKOMETER IN IMPROVING STROKE RISK PROBABILITY IN ADULTS: A PRELIMINARY ANALYSIS

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ABSTRACT

Background: Stroke is considered as global public health problem and mainly caused greatest burden to the low- and middle-income countries. The Stroke Riskometer application (app) represents a new stroke prevention strategy that is distinctly different from the conventional high-cardiovascular disease (CVD) risk approach.

Objectives: This proposed study aims to evaluate the effectiveness of the Stroke Riskometer app in improving stroke risk awareness and stroke risk probability amongst the adult population.

Methods: The study was designed as a parallel-group non-blinded cluster-randomised controlled trial (RCT). It was conducted in Kelantan, Malaysia with 6-weeks follow-up. Total 116 participants were randomized to either interventional group (n = 58) who equipped with free Stroke Riskometer app and informational leaflets or control group (n = 58) that receive standard management.

Results: The mean age of participants was 31.97 (SD 9.89). There were no significant differences in baseline characteristics except household income (p-value = 0.023) and body mass index (BMI) (p-value = 0.038). The stroke risk awareness was successfully improved within the study duration ($\beta=2.76$; 95% CI, 1.46 – 4.07; $R^2=0.062$) with the interventional group achieved as early in third weeks. The stroke risk probability of the interventional group was significantly lower than that of control group ($\beta= -0.24$; 95% CI, -0.44 – -0.61; $R^2=0.020$) especially in 10 years' time.

Conclusion: The results suggest that Stroke Riskometer app produces more effective impact on both stroke risk awareness as well as the stroke risk probability changes. The implementation on larger scale as a primary preventive modality in Malaysia potentially give a positive effect on stroke and other non-communicable disease preventive strategies.

PH-WEIGHTED AMIDE PROTON TRANSFER MAGNETIC RESONANCE IMAGING (APT MRI) BETTER DELINEATES THE ACIDOTIC ISCHEMIC PENUMBRA

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ABSTRACT

Introduction: The aim of recanalization therapy in acute ischemic stroke is to salvage tissue at-risk of infarction known as the penumbra. Conventional magnetic resonance imaging (MRI) technique for identifying the penumbra relies on spatial mismatch between diffusion and perfusion MRI. However, the mismatch often fails to estimate the extent of the at-risk tissue, falsely including benign oligemia. Amide proton transfer (APT) is a pH-weighted chemical exchange saturation transfer MRI technique that may better identify the penumbra as tissue acidosis occurs prior to cerebral infarction. This study investigated the use of APT MRI for identifying the ischemic penumbra in acute ischemic stroke.

Methods: Six rats underwent middle cerebral artery occlusion and were imaged using a 9.4 T MRI scanner to acquire diffusion, perfusion, and APT MR images. The apparent diffusion coefficient (ADC), cerebral blood flow (CBF), and APT effect were quantified from the MR images respectively. The deficit areas of the parametric maps were automatically segmented through K-means clustering and the mismatch between the ADC/APT/CBF deficit areas were analyzed.

Results: In all the six animals, the APT deficit areas coincided well with the ADC deficit areas, highlighting the potential of the previous to identify the ischemic area. Upon analyzing the three deficit areas, it was observed that the APT deficit areas were larger than the ADC deficit areas, but smaller than the CBF deficit areas. This demonstrated that the APT deficit area could further separate the diffusion-perfusion mismatch into zones of acidotic ischemic penumbra and benign oligemia.

Conclusion: APT MRI is a non-invasive pH-weighted imaging technique that shows promise in complementing conventional MRI techniques to better delineate the acidotic ischemic penumbra and improve acute stroke diagnosis.