

Mini Review

Mini-Review of a Pilot Behavioral and Neuroimaging Investigation on Photothrombotic Stroke Models in Rhesus Monkeys

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Cerebral stroke, also known as cerebrovascular accident. It is an acute cerebrovascular disease, that result from the interruption of blood supply to the brain region due to various factors, resulting in damage to brain tissue. According to the report of the World Health Organization in 2012, stroke is the third leading cause of death worldwide after coronary heart disease and cancer, and often leads to long-term disability with no efficient clinical therapy in place. Stroke can be divided into ischemic stroke and hemorrhagic stroke. Ischemic stroke is the ischemic necrosis of local brain tissue that occurs on the basis of atherosclerosis; it accounts for 85% of the total number of strokes, and has the characteristics of high morbidity, high disability rate, high mortality and high recurrence rate.

The difficulty of treating cerebral apoplexy is to propose a reasonable treatment plan according to its pathophysiological mechanism. This has been a hot research topic for many years. Animal model is very important to study the occurrence, development, treatment and prognosis of ischemic stroke. Non-human primates (NHPs) exhibit a high degree of similarity to humans with respect to genetics, anatomy, physiology, behaviour, emotional processing, and cognitive function. It has been indicated that the location of the infarct and the therapeutic window are similar to human stroke patients. As a result, NHPs have become irreplaceable models. In this study, two photothrombotic (PT) stroke models with proximal or distal thrombosis of the middle cerebral artery (MCA) were established in rhesus monkeys [1-5]. This study is the first that compares the two approaches of PT stroke using behavioral and pathophysiological measurements and neuroimaging of rhesus monkeys. The study found that, There were no significant differences in basic physiological measures

such as body weight, rectal temperature, and electrocardiogram between the two groups prior to and post stroke; However, after PT stroke. The neutrophil to lymphocyte ratio (NLR) was found increased and the lymphocyte to monocyte ratio (LMR) decreased, these results suggested that NLR and LMR can be important prognostic factors of acute ischemic stroke. Ischemic stroke can lead to motor, cognitive and neurological dysfunction in rhesus monkeys, which was consistent with findings in human stroke patients. According to the dynamic observation of brain imaging before and after stroke by MRI, it was found that the infarct area and edema size changed correspondingly with time. The histopathological analysis showed that neurons in ischemic infarcts area were lost and astrocytes and microglia numbers were increased after stroke, this suggested that long-lasting damage occurred in the brain.

Stroke has a high disability rate, heavy disease burden, and low quality of life for Patients, effective treatment are urgently needed to improve disease and prognosis. This study confirmed that the sequentially photo-irritated PT stroke in rhesus monkeys is similar to ischemic stroke in humans. Therefore, this model can be used to study the pathophysiological mechanism of human stroke and is expected to develop new therapeutic drugs.

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