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Chinese Herbal Medicine and Stroke - A Short Review

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ABSTRACT

Stroke is one of the primary cause of long- term disability. Although mounting studies focused on stroke research, currently, only available treatment for stroke is t-PA, with the limitation of a very narrow therapeutic window because of the risk of hemorrhage. So, new therapeutic methods for stoke are expected. Chinese herbal medicine has been used to treat stroke with a history of many centuries and is stilling wildly used in China. This review focuses on reporting the research progress of the Chinese herbal medicine including *Acorus tatarinowii* Schott, Borneol, Moschus and other herbal medicine in stroke. The Conclusion is Chinese herbal medicine including *Acorus tatarinowii* Schott, Borneol and Moschus could reduce stroke injury and help brain recovery after stroke. More studies in Chinese herbal medicine and stroke may help us to develop a useful treatment for stroke.

Keywords:

Chinese herbal medicine, stroke, *Acorus tatarinowii* Schott, Borneol, Moschus

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Figure 1 Beta-asarone down-regulates stroke injury through decreasing autophagy.

INTRODUCTION

Stroke is one of the primary cause of long-term disability, no matter in developing or developed countries. In United States of America, stroke leads to 130,000 deaths each year^[1]. In China, the annual mortality rate of stroke is about 1,600,000, which became the top reason of death and disability^[2]. There are mainly two types of stroke namely ischemic and hemorrhagic stroke. The ischemic stroke is the major type of stroke. It happens as a result of blood clots that blocks the brain blood supply and represents 87% of all stroke cases^[3]. Hemorrhagic stroke occurs due to blood vessel ruptures. It has two sub-types including intracerebral hemorrhage and subarachnoid hemorrhage, and accounts for about 20%^[4]. Although mounting studies focused on stroke research, currently, only available treatment for stroke is t-PA, with the limitation of a very narrow therapeutic window because of the risk of hemorrhage^[5]. So new therapeutic methods for stroke are expected.

Chinese herbal medicine has been used to treat stroke with a history of many centuries and is stilling wildly used in China^[6]. This review will focus on reporting the research progress of the Chinese herbal medicine including *Acorus tatarinowii* Schott, *Borneol* and *Moschus* in stroke.

***Acorus tatarinowii* Schott**

Acorus tatarinowii Schott has been wildly used in treating stroke in China for thousands of years, although its molecular mechanism were not clear. Recent studies suggest that beta-asarone, the major component of *Acorus tatarinowii* Schott, has significant pharmacological effects on stroke^[7]. In vivo, beta-asarone could reduce stroke injury and ischemia-reperfusion-induced autophagy by modulating JNK, p-JNK, Bcl-2 and Beclin 1 (Figure 1). Meanwhile, in vitro, beta-asarone can protect PC12 cells against oxygen-glucose deprivation and reperfusion-induced stroke injury through decreasing Beclin-1-dependent autophagy^[8].

Other mechanism is that beta-asarone significantly helps the recovery by restoration of the antioxidant homeostasis in the brain after stroke^[9].

Borneol

Borneol (C₁₀H₁₈O; 4,7,7-trimethylbicyclo[2.2.1]heptan-3-ol) is a bicyclic monoterpenes widely found in many plants^[10]. It can easily go through the blood-

brain barrier and acts directly in neurons and stroke. Recent study showed *Borneol* can protect cortical neurons from oxygen-glucose deprivation/reperfusion injury by anti-oxidation and anti-inflammation through nuclear transcription factor kappaB signaling pathway^[11]. Additionally, combination of *edaravone* and *borneol* have a synergistic effect on treating ischemic stroke in a rat model of ischemic stroke^[12].

Moschus

Moschus together with *Borneol* is a well known herb in Chinese medicine to treat brain damages. Recent data suggests that *Moschus* compatible with *borneolum synthcticum* significantly reduced infarct volumes and helped brain recovery after stroke by decreasing the expression of caspase-3 and caspase-9 as well as up-regulating the ratio of Bcl-2 to Bax^[13], a neuroprotective pathway.

Others

Other Chinese herbal medicine including *An-Gong-Niu-Huang* pill, *Qing-Kai-Ling* injection, *Nao-Shuan-Tong* capsule, *Tong-Luo-Jiu-Nao* capsule and *Tong-Xin-Luo* capsule have been well known in Chinese clinic to treat central nervous system diseases and implied effectiveness for stroke treatment by anti-inflammation and anti-oxidation after ischemic injury^[14-19].

CONCLUSION

Till now, we do not have a effective for stroke treatment except stroke is t-PA, with the limitation of a very narrow therapeutic window because of the risk of hemorrhage. More studies in Chinese herbal medicine in stroke may help us to develop a useful treatment for stroke (Figure 2).

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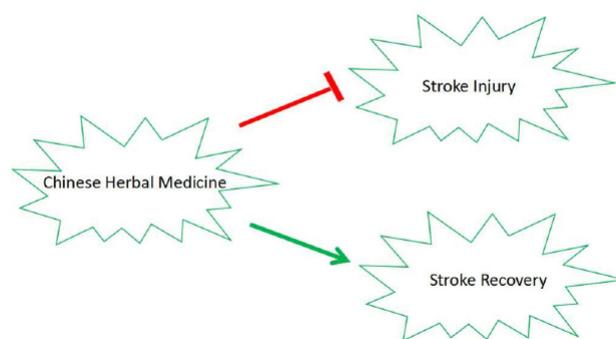


Figure 2 the roles of Chinese herbal medicine

