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 stroke are expected. Chinese herbal medicine has been used to treat stroke with a history of many centuries and is still widely 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

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 still 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[8].

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 an 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