Scholar Publishing Group
International Journal of World Medicine
https://doi.org/10.38007/IJWM.2024.050111
ISSN 2789-7133 Vol. 5, Issue 1: 94-98

Progress in the Treatment of Apoplexy Based on Astragalus

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Keywords: Stroke, Astragalus, Make up Qi, Tongbi

Abstract: Astragalus has the effects of tonifying qi and uplifting Yang, benefiting Wei and strengthening surface, dissolving swelling, promoting fluid and blood, promoting stagnation and tongbi, supporting poison and discharging pus, restraining sores and generating muscle. It is widely used in the treatment of various diseases in clinical practice, with accurate efficacy and high safety. It belongs to the drug and food homology drugs. Based on the etiology and pathogenesis of apoplexy, the pharmacological action and clinical application of astragalus were reviewed in this paper.

1. Introduction

Stroke is a common disease, frequently occurring, is on the basis of the deficiency of human qi and blood, induced by internal injury, anxiety and anger, excessive eating, fat and sweet taste and tobacco and alcohol, with zang-fu Yin and Yang disorder, Qi and blood reverse disorder, straight into the brain, causing brain pulse obstruction or blood overflow outside the brain pulse as the basic pathogenesis. Clinically, the main symptoms are sudden dizziness, hemiplegia, deviated mouth and tongue, astringency or non-speech, and hemiplegia [1].

Astragalus, the root and rhizome of Astragalus, is one of the important components of traditional Chinese herbal medicine and has a variety of pharmacological effects and medical value [2-5]. The main effects of Astragalus include the following aspects: (1) supplementing Qi and nourishing blood: Astragalus is widely used to treat diseases caused by qi deficiency and blood deficiency, such as weakness, shortness of breath, palpitations, anemia, etc. (2) Enhance immunity: Astragalus is believed to regulate the function of the immune system, which can enhance the body's resistance and prevent infection and disease. (3) Anti-inflammatory and antioxidant: Astragalus contains a variety of active ingredients, with anti-inflammatory and antioxidant effects, can reduce

inflammation and cellular oxidative damage. (4) Liver protection: Astragalus can protect the liver from damage and promote the repair and regeneration of liver cells. In addition, astragalus is also used to treat kidney deficiency, spleen and stomach weakness, edema, shingles and other symptoms. It can be used alone or in combination with other herbs, depending on the specific condition and doctor's advice. It should be noted that Astragalus is a traditional Chinese medicine, and the use should follow the doctor's guidance to ensure the correct dosage and usage. For individual groups, such as pregnant women, children, chronic patients, etc., it should be used under the guidance of a doctor. At the same time, if there is an inappropriate or allergic reaction, you should immediately stop using and consult a doctor. Therefore, this study analyzed the pharmacological action and clinical application effect of Astragalus, which was reported as follows.

2. Chemical Composition of Astragalus

Astragalus is rich in chemical components, mainly phenols and their glycosides, polysaccharides, organic acids, sterols and a variety of amino acids and trace elements needed by the human body. It mainly includes Astragalus polysaccharides, saponins, flavonoids, amino acids, trace elements and so on. The main components of Astragalus are polysaccharides, flavonoids and saponins. Astragalus has a variety of biological activities, including immune regulation, anti-cancer, hypoglycemic, antioxidant, heart protection and liver protection [6]. In recent years, nearly 40 kinds of flavonoids have been isolated from Astragalus, mainly including flavonoids, isoflavones, isoflavanes and santalanes [7-8]. Many scholars have studied the flavonoids of Astragalus. Zhang Yazhou et al. [9] isolated 14 isoflavones from 70% ethanol extract of Astragalus root of Mongolia, among which: Compounds 6'' - O - acetyl - (3R) - 7, 2' - dihydroxy - 3', 4' - dimethoxy - isoflavan - 7 - o - β - D - glucoside are new compounds, compounds 6'' - o-acetyl ononside, 6'' -o-acetyl - (6aR, 11aR) - 3-hydroxy - 9, 6'' - O - acetyl - 10 - dimethoxy - santalan - 3 - O - β- D - glucoside, 5, 7-dihydroxy-4'-methoxyisoflavone-7-β-d-glucoside, 5, 7, 4' -trihydroxy-3' -methoxyisoflavones were isolated from Astragalus mongolicus for the first time. Wang Xue et al. [10] isolated 8 flavonoids from the ethanol extract of Astragalus membranaceus. Among them, compounds 2', 7-dihydroxy-3', 4' -dimethoxy-isoflavan-2'-o-β-D-glucopyranoside were isolated from this genus for the first time. Astragalus flavones play an important role in promoting cellular immune function, anti-myocardial ischemia, vascular endothelial cell protection, liver injury protection, anti-inflammation, anti-mutation, anti-injury, free radical scavenging, anti-osteoporosis, etc. [11]. Astragalus is an ideal drug in the treatment of apoplexy. The mechanism of its therapeutic effect is summarized in this paper.

3. Pharmacological Action of Astragalus

3.1. Role of Immune Regulation

Astragalus polysaccharide can stimulate the immune function of the immune system of bone marrow, thymus, spleen and mucosa, and activate a variety of immune cells such as macrophages, glial cells, natural killer cells, dendritic cells and T lymphocytes. They enhance immune necrosis factor by releasing signaling molecules IL-1β, IL-4, IL10, and tumor necrosis factor α(TNF-α) [12]. Astragalus saponins can enhance the vasodilation function of rat aortic endothelial cells by regulating the PI3K/AKT/eNOS signaling pathway. It can also inhibit the apoptosis of human umbilical vein endothelial cells induced by lipopolysaccharide by inhibiting ROS/ nlrp3 mediated inflammation. Anthostin extracted from isoflavones can inhibit the development of atherosclerosis through the interaction between regulatory factor 4 and scavenger receptor A [13].

3.2. The Role of Regulating Blood Sugar and Improving Diabetic Complications

In vitro experiments showed that Astragalus polysaccharide had strong antioxidant activity, excellent α-glucosidase inhibitory activity and cholic acid binding ability. In vivo studies have also shown that Astragalus polysaccharide can effectively reduce serum glucose level and insulin activity, improve glucose intolerance and insulin resistance, regulate lipid levels, alleviate oxidative stress, and protect the liver [14]. Astragalus saponins, flavonoids and polysaccharides can increase insulin receptor substrate-2 (IRS-2), phosphatidylinositol 3-kinase, Phosphorylation of PI3K and Akt and activation of peroxisome proliferator-activated receptor-γ (PPAR-γ) regulate pancreatic β cell proliferation and insulin signaling pathway. PPAR-γ is directly involved in the development and regulation of beta cells, and also directly regulates nuclear translocations of pancreatic and duode nal homeobox-1 (PDX-1). The key transcription factor PDX-1 binds to the insulin promoter and regulates glucose-stimulated pancreatic transcription. In addition, the increased expression of IRS-2 can stimulate the PI3K/Akt pathway in pancreatic beta cells, promote the proliferation and survival of beta cells, and improve the insufficient insulin secretion of pancreatic beta cells in patients with type 2 diabetes [15].

3.3. Effects on the Nervous System

High dose of astragalus solution can improve the long-term memory ability of bees to a certain extent [16]. Astragalus can not only improve memory, but also treat nervous system related diseases and analgesia. acetylcholinesterase (AChE) is very active in the brains of Alzheimer's patients, and cholinesterase causes the depletion of neuroacetylcholine, which is associated with the pathogenesis of Alzheimer's disease. Five plant components of Astragalus (luteolin, quercetin, naringenin, rosmarinic acid and kawanol) are potent inhibitors of acetylcholinesterase. These polyphenol compounds form stable structures with high affinity for AChE [17]. Vascular cognitive impairment (VCI) is a group of syndromes ranging from vascular cognitive impairment to vascular dementia caused by factors such as homocysteine, diabetes, hyperlipidemia or cerebrovascular disease risk factors. The active ingredients of astragalus in the treatment of vascular cognitive impairment are callein isoflavone and quercetin. MMP9 is a risk factor for cerebral infarction and related cognitive impairment, and the MAPK family has anti-apoptotic effects, promoting neuronal cell survival and inhibiting autophagy. In addition, the PI3K/Akt signaling pathway protects neurons and regulates neuronal apoptosis induced by cerebral ischemia and hypoxia associated with cognitive impairment resulting from cerebrovascular disease. MAPK3 and MMP9 are potential key targets of Astragalus for the treatment of VCI, and Astragalus affects the complex molecular mechanism of VCI through multiple synergistic mechanisms by regulating key signaling pathways such as PI3K/Akt and MAP [18]. Astragaloside directly inhibits acetylcholinesterase, which is involved in cognitive processes, so astragaloside is a candidate for the treatment of cognitive dysfunction. Buyang Huanwu Decoction is commonly used to treat stroke.

4. Conclusion

Traditional Chinese medicine believes that the cause of stroke is zang-fu dysfunction, Qi deficiency is the most common, Qi deficiency is easy to cause phlegm obstruction, wet stop, blood stasis, and a variety of pathological factors can be mixed with Qi deficiency. The Huangdi Neijing believes that stroke is closely related to blood stasis and Qi deficiency, such as the Synopsis of Golden Chamber: "If the five viscera Yuan is really smooth, people will be peaceful." "Disease and evil have no reason to enter its interstices." "The vein is empty, the thief does not purge." It is believed that the five viscera deficiency in the human body, the vein is empty, and external evil is

easy to take advantage of the deficiency and cause disease. "On the source of diseases" said: "stroke hemiplegia, spleen and stomach qi weak, blood qi deficiency, for the wind evil by the reason." It shows that the important internal factor of hemiplegia in apoplexy is spleen and stomach qi deficiency. Blood stasis and ischemia cause and effect each other, blood stasis blocks collaterals, new blood does not transport, can aggravate blood stasis. Li Dongyuan believes: "stroke, not foreign wind evil, is the original qi disease, ordinary people more than forty years old, qi decline, or because of sadness and anger hurt its qi, there are many diseases." Qi-deficiency is the foundation, Qi-deficiency is easy to cause blood stasis, Qi-blood is not good, viscera dysfunction, Yingwei deficiency, stroke. The ancients have studied that Astragalus has the effect of invigorating qi and uplifting Yang, stagnation tongbi and so on, and has obtained remarkable curative effect in clinical practice. With the continuous development of modern science and technology, our cognition of traditional Chinese medicine has become more profound, and the pharmacological mechanism of Astragalus has been further confirmed. Modern medical research has provided rich theoretical guidance for Astragalus to treat a series of diseases such as stroke and cognitive impairment. However, the mechanism of astragalus in the treatment of apoplexy still needs to be further explored. This paper summarizes the pharmacological mechanism of Astragalus, which is helpful to the treatment of stroke and cognitive impairment. With the further development of technology and research, it is necessary to further improve the theory. Chinese traditional medicine has a long history. Therefore, clinical practitioners should conduct deeper and broader research and study on Astragalus on the basis of previous studies, so as to better apply it to clinical practice.

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