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Regulatory effects and clinical application of panax-based compound formula on chronic diseases

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Abstract. Hypertension, diabetes, and hyperlipidemia are common chronic diseases today and can lead to severe complications. Panax-based compound formula, as a comprehensive traditional Chinese medicine formulation, incorporates various components such as Panax, exerting multiple pharmacological effects, including nourishing the kidney qi, strengthening the heart, vasodilation, and increasing blood flow. Through the study of multiple cases, including patients with hypotension, heart disease, diabetes, hyperlipidemia, as well as early and long-term hypertension, preliminary evidence has been provided, indicating the potential positive effects of this compound in different types of hypertensive and diabetic patients. It demonstrates clear antiarrhythmic effects and effectively reduces blood pressure, improves heart failure, and alleviates hyperlipidemia. However, further research and clinical trials are required to verify its long-term therapeutic effects and safety. It is crucial to develop personalized treatment plans when using this compound formula.

Keywords: Chronic diseases, Panax-based compound formula, Pharmacological effects, Case studies

1. Introduction

Hypertension is widely considered a primary risk factor for cardiovascular diseases. It can be categorized into different types based on its etiology and mechanism, including renal hypertension and cervical hypertension. Renal hypertension is commonly caused by renal dysfunction, leading to signals in the heart that require increased pumping force to compensate for insufficient renal blood supply. On the other hand, cervical hypertension is often associated with vascular constriction due to skeletal misalignment, requiring the heart to exert more force to deliver blood throughout the body. Excessive reabsorption of sugar by the kidneys is also one of the causative mechanisms of diabetes. Additionally, the coexistence of hypertension and hyperlipidemia not only affects the cardiovascular system's health but may also give rise to various severe complications such as stroke, coronary heart disease, and heart failure.

According to the World Health Organization, the prevalence of hypertension, hyperlipidemia, and diabetes is continuously increasing globally, posing a significant threat to public health and individual well-being. Traditional approaches for treating chronic diseases primarily involve drug therapy and lifestyle interventions, such as dietary modifications, exercise, and weight control. However, these

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methods only provide symptomatic relief and do not fundamentally address the kidney yin deficiency in renal hypertension.

Panax, a traditional Chinese medicine with a long history, has long been believed to have tonifying effects, especially on kidney function. Rich in components such as dammarane-type saponins, ginsenoside, and panaxatriol, Panax is described in traditional herbal texts as a medicine for "tonifying qi and nourishing blood, assisting in essence nourishment, and spirit cultivation." In clinical practice, Panax has been proven to have remarkable effects in tonifying bone marrow and kidney qi, mitigating the co-action of the liver in hyperlipidemia, and relieving kidney yin deficiency. Furthermore, Panax can increase blood saturation in the heart [1], enhance cardiac contractility, dilate blood vessels, increase blood flow, and thus regulate blood pressure and blood sugar. Compared to traditional deer antler, the reinforcing and bone marrow-tonifying effects of Panax are more significant, especially for the elderly. Deer antler may be too yang-invigorating, leading to spermatorrhea in the elderly. On the other hand, Panax performs exceptionally well in urgent cases of rescuing collapsed yang, as its efficacy has been confirmed through centuries of traditional Chinese medical practice.

Through this study, we aim to provide a new option for the comprehensive treatment of chronic diseases such as hypertension, hyperlipidemia, and diabetes. This option not only focuses on symptomatic treatment but also emphasizes the restoration of kidney function and the enhancement of spinal cord blood production capacity, thereby combating the root causes of chronic diseases such as hypertension, hyperlipidemia, and diabetes. We believe that this study will provide strong support for improving the quality of life of chronic disease patients and reducing the risk of related complications.

2. Current Treatment Status of Chronic Diseases

2.1. Renal Hypertension

Based on different causes and mechanisms, renal hypertension can be further divided into two main types: volume-dependent and renin-dependent.

2.1.1. Volume-dependent Hypertension. In volume-dependent hypertension, the kidney's processing capacity is impaired, leading to the ineffective elimination of excess sodium and water by the kidneys. When the intake of sodium and water by the body exceeds the kidneys' excretory capacity, water-sodium retention occurs. This retention can primarily occur within the blood vessels, leading to an expansion of blood volume and thus causing hypertension. Simultaneously, water-sodium retention can also increase the water-sodium content within the smooth muscle cells of the blood vessels, making the vessel walls thicker, less elastic, and increasing vascular resistance, thereby reducing the responsiveness of the vessels to catecholamines. Additionally, water-sodium retention can increase the affinity of angiotensin II for vascular receptors, leading to elevated blood pressure even if the angiotensin levels are normal.

2.1.2. Renin-dependent Hypertension. The pathogenesis of renin-dependent hypertension usually involves factors such as renal artery stenosis, decreased renal perfusion pressure, renal parenchymal disease, and secretion of renin by cell tumors. These conditions can cause the juxtaglomerular cells in the kidneys to release a large amount of renin, leading to increased activity of angiotensin II, which in turn causes spasm and hardening of the small arteries throughout the body, resulting in hypertension. Additionally, renin and angiotensin II can also stimulate increased aldosterone secretion, further causing sodium and water retention, increasing blood volume, and consequently leading to hypertension. Renal parenchymal hypertension can be caused by various kidney diseases, and the chances of developing hypertension vary with different types of kidney diseases. Therefore, the clinical manifestations of renal hypertension are diverse.

2.2. Diabetes

Diabetes is caused by defects in insulin secretion, its action, or both, leading to chronic damage and dysfunction in various tissues, especially the eyes, kidneys, heart, blood vessels, and nerves. If the

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patient already has primary renal glycosuria or secondary renal glycosuria, it is easy to become a precursor to diabetes. Additionally, organic kidney damage patients such as nephritis and multiple myeloma are prone to renal glycosuria. Some secondary renal glycosuria is often accompanied by other renal tubular dysfunctions and typical clinical manifestations of the primary disease.

2.3. Hyperlipidemia

Hyperlipidemia in some patients is primary, related to congenital and genetic factors, while secondary hyperlipidemia mostly occurs in metabolic disorders such as diabetes and hypertension, as well as liver and kidney diseases or kidney deficiency. Environmental factors such as dietary and lifestyle habits can also lead to hyperlipidemia. Hyperlipidemia refers to excessively high blood lipid levels, which can directly cause severe diseases harmful to human health, such as atherosclerosis, coronary heart disease, and pancreatitis.

2.4. Current Treatment Status

2.4.1. Pharmacological Treatment. Pharmacological treatment is a common method in the management of chronic diseases, primarily focused on control. Various antihypertensive drugs such as diuretics, β-blockers, calcium channel blockers, ACE inhibitors, ARBs, as well as oral sulfonylureas, biguanides for hypoglycemia, α-glucosidase inhibitors, insulin sensitisers, glinides, or insulin injections, are widely used for the treatment of hypertension and diabetes. These medications have varying mechanisms but all work through different pathways to control the condition, such as vasodilation, reducing cardiac contractility, promoting urine excretion, balancing hormone levels within the body, and alleviating the burden on the pancreas. However, pharmacological treatment typically requires long-term maintenance and may be accompanied by some side effects.

2.4.2. Lifestyle Intervention. In addition to pharmacological treatment, lifestyle modification is also an important component of chronic disease management. Lifestyle interventions include dietary improvements, increased physical activity, weight reduction, smoking cessation, and alcohol intake restriction. These measures help in reducing weight, improving cardiovascular health, lowering blood pressure and lipid levels, controlling blood sugar, and reducing the risk of related complications. Lifestyle interventions also aid in improving the quality of life for patients and can reduce dependence on pharmacological treatments.

3. Ingredients and Preparation of Compound of Panax Ginseng Medicinal and Edible Origin

3.1. Main Ingredients

The compound of Panax ginseng medicinal and edible origin is primarily composed of Panax ginseng as the main ingredient, combined with various botanical medicinal ingredients. The main ingredients are as follows:

Panax ginseng: This is the core component of the compound, renowned for its remarkable effects in replenishing qi, nourishing yin, and aiding in the enhancement of vitality. Panax ginseng contains abundant components such as ginsenosides, dammarane saponins, panaxatriol saponins, and panaxadiol saponins. These components help in enhancing kidney qi, alleviating kidney yin deficiency, increasing blood saturation in the heart, strengthening cardiac function, dilating blood vessels, increasing blood flow, and thereby playing a positive role in regulating blood pressure.

Lycium barbarum (Goji berries): It possesses properties that nourish the liver and kidneys, replenish blood and nourish yin, and nourish yin and yang. It balances yin and yang, promotes the flow of energy within the body, and has a positive effect on liver and kidney function, synergizing with Panax ginseng to enhance the production of vital energy.

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Morus fruit (Mulberries): It has the effect of nourishing the liver and kidney, nourishing yin, and promoting blood. It aids in nourishing the kidneys and nourishing yin, working in synergy with Panax ginseng to strengthen kidney function.

Polygonatum sibiricum (King Solomon's seal): It has the functions of nourishing yin and replenishing the kidney, generating fluids, and moistening the lungs. It assists in the restoration of kidney function while improving lung function, enhancing overall immunity.

Black sesame: Rich in high-quality fats, proteins, and trace elements. It aids in the absorption of the effective components of Panax ginseng, providing necessary fats and proteins, and supplying the required nutrients for the kidneys and heart.

Chinese black dates: They help in nourishing the blood, nourishing the heart, invigorating the spleen, and calming the mind. They play a balancing and harmonizing role in the combination, helping to alleviate anxiety and tension, while strengthening cardiac function.

Walnuts: They contain abundant unsaturated fatty acids, vitamin E, and trace elements. They benefit heart health, enhance cardiac function, and provide essential fatty acids for chemical reactions within the body.

Sour jujube seeds: They have calming and heart-nourishing effects, aiding in calming emotions, reducing anxiety, and improving sleep.

Mint: Mint disperses wind, clears heat, and detoxifies, aiding in digestion. Its role in this compound is to dispel internal heat, ensuring that the consumption of Panax ginseng does not lead to symptoms of excessive internal heat, while also assisting in digestion.

3.2. Preparation Method

The key steps in preparing the compound of Panax ginseng medicinal and edible origin include herbal extraction, mixing, and forming.

3.2.1. Herbal Extraction. Firstly, various herbs undergo meticulous processing to ensure their purity and the preservation of active components. Water extraction technology is employed to thoroughly mix the herbs with water for extraction. This technique aids in extracting the effective components of the herbs, preparing high-purity traditional Chinese medicine extracts.

3.2.2. Mixing. The extracted traditional Chinese medicine extracts are mixed together to ensure the synergistic effects of various herbs. The proportions of various herbs are determined based on clinical needs during mixing to achieve the best therapeutic effects. Additionally, honey is added to the mixture to enhance the convenience of medication administration.

3.2.3. Forming. Finally, the mixture is formed into pills or other easily consumable forms for patients. This ensures that patients receive accurate dosages and facilitates ease of administration.

3.3. Traditional Chinese Medicine Extraction Technology

To better preserve and enhance the active components of traditional Chinese medicine, water extraction technology is adopted. This technology aids in extracting high-purity active components from the herbs to ensure the efficacy of traditional Chinese medicine. Water extraction is a relatively gentle extraction method that can reduce losses and damage to herbal ingredients. Moreover, the use of high-purity traditional Chinese medicine extracts allows for better absorption by the human body, enhancing the medicinal effects.

During water extraction, the herbs are first ground and crushed to increase their surface area, then mixed with an appropriate amount of water. The mixture is then heated, usually at a moderate temperature, to aid in the release of active components. During the extraction process, the active components in the herbs are transferred to the water, forming a high concentration of extract. This extract undergoes filtration and concentration to remove impurities and moisture, ultimately resulting in high-purity traditional Chinese medicine extracts. Water extraction is a relatively gentle method that helps

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preserve the active components of the herbs, making them more effective. Through water extraction, the obtained traditional Chinese medicine extracts generally have higher purity, reducing the presence of impurities and aiding the effectiveness of the medicine. Water extraction technology helps reduce losses and damage to herbal ingredients, fully utilizing the potential of the herbs.

4. Pharmacological Effects of the Compound of Panax Ginseng Medicinal and Edible Origin

The compound of Panax ginseng medicinal and edible origin is a comprehensive traditional Chinese medicine preparation containing various herbal components, primarily centered around Panax ginseng. This compound exhibits multiple pharmacological effects, including bone marrow nourishment, kidney qi replenishment, cardiac stimulation, vasodilation, and increased blood flow. The following sections provide a detailed elucidation of its pharmacological effects.

4.1. Kidney Qi Replenishment

Panax ginseng, a well-known herbal remedy in traditional Chinese medicine, is widely utilized for its kidney nourishing properties, believed to aid in improving kidney function. In the context of traditional Chinese medicine theory, the kidneys are regarded as the foundation of one's innate constitution and the fundamental source of life. Kidney deficiency is a common pathological condition in traditional Chinese medicine, typically manifesting as fatigue, soreness and weakness of the lower back and knees, aversion to cold, dizziness, among other symptoms. The kidney-nourishing effect of Panax ginseng helps ameliorate these symptoms and enhances the body's vitality. Its function in enhancing renal metabolism contributes to its efficacy in addressing chronic conditions such as kidney stone formation and uric acid-related gout.

4.2. Cardiac Stimulation

Panax ginseng exhibits a positive inotropic effect, enhancing the heart's contractile force and pumping efficiency, thereby increasing the blood flow to the heart and kidneys. This is particularly crucial for patients with hypertension, as the heart requires greater force to propel blood to meet the body's demands. The cardiac stimulatory effect of Panax ginseng can alleviate the burden on the heart [2] and enhance its function. The active components of Panax ginseng possess the ability to scavenge free radicals. MDA, a lipid peroxide formed during myocardial ischemia, is the most important metabolite reflecting tissue lipid peroxidation in the body. Ligation of the coronary artery leads to a gradual increase in blood MDA levels, while SOD can lower these levels, indicating the involvement of oxygen free radicals in myocardial ischemic injury, and SOD can mitigate myocardial ischemic injury. Ginsenosides can increase SOD activity [3], directly quenching O_2, and eliminating H_2O_2-induced damage to the body.

Existing research has also demonstrated through animal experiments that total ginsenoside has a protective effect against arrhythmias [4], significantly inhibiting QRS prolongation, increasing T-wave amplitude, and reducing the incidence of ventricular arrhythmias.

4.3. Vasodilation and Softening

Existing research has demonstrated that both panaxadiol and panaxatriol saponins can significantly accelerate the blood flow velocity in arterioles and venules [5], increase the diameter, number, and openness of microvessels, improve blood flow dynamics, and inhibit the formation of blood clots. The components of the compound of Panax ginseng medicinal and edible origin possess vasodilatory effects, helping to dilate blood vessels and reduce vascular resistance. This aids in lowering blood pressure, as blood can flow more easily through dilated vessels, reducing the workload on the heart. Vasodilation also contributes to improved blood supply to various parts of the body, helping to enhance microcirculation and reduce tissue ischemia.

4.4. Bone Marrow Nourishment and Increased Blood Flow

The components of the compound of Panax ginseng medicinal and edible origin can increase bone marrow content, improve blood flow, enhance cardiac output, and stimulate bone marrow hematopoiesis.

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This helps improve blood supply to various tissues and organs, reduces the risk of Parkinson's disease, stimulates lumbar nerve repair, and alleviates ankylosing spondylitis. Moreover, it effectively alleviates tissue ischemic symptoms such as dizziness, vertigo, and fatigue that may occur in patients with hypertension and hyperlipidemia. Increased blood flow also helps eliminate excess waste and toxins from the body, promoting overall metabolism.

4.5. Lipid-lowering Effects

A substantial body of research has indicated that ginseng protein has a lipid-lowering effect on animal models of hyperlipidemia. These research findings suggest that ginseng protein can significantly reduce serum total cholesterol (TC) and triglyceride (TG) levels in hyperlipidemia models. It can also increase the content of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) in the liver and reduce alkaline phosphatase (ALP) levels [6].

4.6. Blood Glucose Reduction

Research has confirmed that oligopeptide components in ginseng have a potential inhibitory effect on α-glucosidase [7]. Ginseng demonstrates pharmacological effects such as blood glucose reduction, immune regulation, anti-tumor activity, cardiovascular regulation, antioxidant properties, and anti-aging effects. Experimental evidence has shown that ginseng extracts can lower blood glucose levels, reduce ketones, and promote glucose absorption in diabetes. It has been verified that the water extract of ginseng can not only lower blood glucose levels in mice and improve their glucose tolerance, but also reduce serum triglycerides and increase insulin sensitivity [8].

4.7. Clinical Application Prospects

The compound of Panax ginseng medicinal and edible origin exhibits multiple pharmacological effects, particularly suitable for patients with renal hypertension. Renal hypertension is commonly associated with renal dysfunction, and the kidney-nourishing effect of Panax ginseng can specifically improve kidney function. Additionally, its pharmacological effects of cardiac stimulation, vasodilation, and increased blood flow can synergistically help regulate blood pressure and reduce the risk of hypertension. There is also a significant body of experimental and clinical research on its effectiveness in hyperlipidemia and diabetes. As the majority of patients are elderly, the kidney and bone marrow nourishing effects of the compound of Panax ginseng medicinal and edible origin have helped alleviate the suffering of some elderly patients from lower back and leg pain. The comprehensive effects are encouraging.

With the increasing understanding and acceptance of traditional Chinese medicine, the compound of Panax ginseng medicinal and edible origin has a promising application outlook in the treatment of hypertension. It can serve not only as an alternative option to traditional treatments but also be combined with conventional antihypertensive drugs to enhance treatment efficacy. Moreover, the compound has good safety and tolerability, reducing the risk of adverse reactions in patients.

In summary, the compound of Panax ginseng medicinal and edible origin, with its multiple pharmacological effects, provides a comprehensive solution for the treatment of renal hypertension, diabetes, and hyperlipidemia. It has a broad clinical application prospect, offering the potential to provide more effective treatment options for patients with chronic diseases and improve their quality of life. However, despite its many advantages, further research and clinical trials are needed to verify its long-term efficacy and safety.

5. Clinical Research and Case Studies

5.1. Case Study One: Treatment Experience of Ms. Li

Ms. Li, a female aged over 60, had been suffering from hypotension for an extended period. She took the compound of Panax ginseng medicinal and edible origin in pill form for three months, with a daily dosage of 2 pills. As the treatment progressed, her blood pressure gradually returned to normal levels.

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This case provides clear evidence of the compound's effectiveness. Ms. Li's treatment experience demonstrates that the compound can significantly elevate the blood pressure levels of hypotensive patients without any significant adverse reactions during the course of treatment.

5.2. Case Study Two: Treatment Experience of Ms. Wang

Ms. Wang, a female aged between 30 and 40, experienced postpartum cardiac discomfort and was suspected of having coronary heart disease after hospital examination, along with a diagnosis of depression and anxiety. She used the compound of Panax ginseng medicinal and edible origin in pill form for one month, taking 2 pills daily. As the treatment progressed, her symptoms of palpitations and dyspnea were significantly alleviated. This case indicates that the compound can improve cardiovascular disease symptoms and also has a positive effect on emotional disorders.

5.3. Case Study Three: Treatment Experience of Mr. Zeng

Mr. Zeng, a male aged over 60, exhibited early symptoms of hypertension along with high blood lipids and had not received any antihypertensive drug treatment. He took the compound of Panax ginseng medicinal and edible origin in pill form for three months, with a daily dosage of 2 pills, resulting in a gradual return of both blood pressure and blood lipid levels to normal. This case reveals the effectiveness of the compound in early-stage hypertensive patients. Mr. Zeng's treatment experience demonstrates that the compound can play a significant role in the early stages of hypertension without the need for traditional antihypertensive drugs.

5.4. Case Study Four: Treatment Experience of Mr. Yu

Mr. Yu, a male aged over 60, suffered from hypertension accompanied by hyperlipidemia, kidney stones, and had undergone coronary bypass surgery several years ago. He took the compound of Panax ginseng medicinal and edible origin in pill form for six months, with a daily dosage of 4 pills. His blood pressure returned to normal levels, lipid indicators decreased, and there was good softening of the blood vessels, with a corresponding reduction in kidney stones. This case demonstrates the significant effects of long-term use of the compound in controlling blood pressure in patients with complex diseases. Mr. Yu's treatment experience emphasizes the importance of the compound in the long-term management of patients with complex diseases accompanied by hypertension.

5.5. Case Study Five: Treatment Experience of Ms. Zhang

Ms. Zhang, a female aged over 60, suffered from diabetes. She took the compound of Panax ginseng medicinal and edible origin in pill form for six months, with a daily dosage of 4 pills, resulting in a reduction in blood sugar. This case indicates that long-term use of the compound has significant effects on blood sugar control. Ms. Zhang's treatment experience underscores the importance of the compound in the long-term management of diabetes.

5.6. Case Study Six: Treatment Experience of Ms. Zhuo

Ms. Zhuo, a female aged over 70, had diabetes and knee cartilage degeneration, often experiencing knee pain at night, affecting her sleep. She took the compound of Panax ginseng medicinal and edible origin in pill form for six months, with a daily dosage of 4 pills. As a result, her blood sugar decreased, and the pain in her knee bones significantly reduced, leading to an improvement in sleep quality. This case illustrates the significant effects of the long-term use of the compound on blood sugar control and the alleviation of waist and knee pain caused by osteoporosis. Ms. Zhuo's treatment experience emphasizes the importance of the compound in the long-term management of diabetes.

6. Conclusion

Through the study of multiple cases and the analysis of examples, the potential effectiveness and multifunctionality of the compound of Panax ginseng medicinal and edible origin in the treatment of chronic diseases such as hypertension, diabetes, and hyperlipidemia have been established. This

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compound, with Panax ginseng as its core ingredient, incorporates the pharmacological effects of various traditional Chinese medicinal herbs, including kidney nourishment, cardiac stimulation, vasodilation, and increased blood flow. These cases demonstrate the compound's positive effects on patients with various chronic diseases, including hypotension, heart disease, diabetes, hyperlipidemia, early-stage hypertension, and long-term hypertension. However, it should be noted that although these preliminary results are encouraging, further research and clinical trials are still necessary to validate the compound's long-term therapeutic effects and safety. Treating chronic diseases is a complex task that usually requires comprehensive treatment methods, including medication, lifestyle changes, and more. Therefore, personalized treatment plans are crucial for each patient. In summary, the compound of Panax ginseng medicinal and edible origin represents a comprehensive traditional Chinese medicine treatment approach that offers new options for patients with chronic diseases. It has a broad clinical application prospect, with the potential to improve patients' quality of life and reduce the risk of complications related to chronic diseases. However, when using this compound, it is essential to follow the guidance of a physician and develop personalized treatment plans based on the specific conditions and needs of the patients. This will help better leverage its advantages and provide better medical services for patients with chronic diseases.

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