MEDICAL SCIENCES

PHARMACOLOGİCAL EFFECTS OF MEDİCİNAL PLANTS İN MANAGİNG DİSEASES AND PATHOLOGİCAL CONDİTİONS ASSOCİATED WİTH ARTERİAL PRESSURE VARİATİONS

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Abstract

This article delves into the multifaceted nature of hypertension, a prevalent cardiovascular disorder characterized by persistently elevated arterial blood pressure. It underscores the significant health risks associated with untreated hypertension, including myocardial infarction, stroke, renal dysfunction, and vision impairment, which collectively can severely degrade quality of life and lead to disability. The pathogenesis of hypertension is explored, highlighting the pivotal roles of vascular tone dysregulation, cardiac rhythm abnormalities, alterations in blood volume and pressure, and imbalances in water-salt homeostasis. A distinction is made between essential arterial hypertension, which lacks a specific organ disease cause, and secondary hypertension, which results from underlying organ or systemic diseases.

Furthermore, the article addresses the symptomatic presentation of hypertension, emphasizing common manifestations such as persistent headaches, facial edema, chest pain, visual disturbances, and tinnitus. The severe implications of a hypertensive crisis are also discussed, noting its sudden onset and potential life-threatening symptoms.

The management strategy for hypertension is outlined, advocating for a progressive approach to normalize blood pressure levels. This includes both non-pharmacological interventions—like lifestyle modifications and dietary adjustments—and pharmacological treatments when necessary. Risk factors contributing to the development of hypertension, including genetic predispositions and lifestyle choices, are examined to provide a comprehensive understanding of its etiology.

Lastly, the article proposes the integration of medicinal plants alongside conventional medications in hypertension management, cautioning about the potential interactions and emphasizing the importance of selecting therapeutic plants compatible with pharmaceutical treatments. This holistic approach aims to offer a more nuanced perspective on hypertension management, blending traditional and modern medical practices for optimal patient care.

Keywords: Hypertension Management, Medicinal Plants, Pharmacological Properties

Hypertension, characterized by an elevated diastolic and systolic blood pressure, is a condition that correlates with age; an increment in arterial tension (AT) alongside aging is deemed physiological. Globally, 15-30% of the population is afflicted by hypertension, with its prevalence being notably lower in individuals below 40 years of age. Gender and age play significant roles in its occurrence: it is more prevalent in men under 50 and in women post-50. Despite the unclear etiology, racial and gender disparities in incidence rates are evident. Normal blood pressure is identified as 130/85 mmHg across all ages, with values starting from 140/90 mmHg indicative of arterial hypertension. This condition is not uncommon, affecting 10-30% of the elderly, with primary arterial hypertension representing 90% of cases as an idiopathic disorder. Secondary arterial hypertension, comprising the remaining 10%, arises due to underlying diseases, predominantly affecting kidneys, endocrine glands, and lungs. Furthermore, certain treatment regimens including corticosteroids, cyclosporine, MAO inhibitors, erythropoietin, and excessive fluid intake can induce drug-induced and transient hypertension.[2]

Overview of Hypertension and Its Comprehensive Management

Hypertension, if left unaddressed, can significantly impact various organs and systems within the body, potentially resulting in critical conditions such as myocardial infarction, stroke, renal impairment, and loss of vision, which may decrease quality of life, reduce work productivity, and lead to disability. The development of arterial hypertension involves several key mechanisms, including vascular tone dysregulation, cardiac rhythm and contractility abnormalities, changes in blood volume and pressure, and imbalances in the body's water-salt equilibrium. These factors, particularly the efficiency of the heart's pumping action and the regulation of vascular tone—often influenced by renal function—play crucial roles in the dynamics of blood pressure. [3]

Arterial hypertension is classified into two main types:

Essential Arterial Hypertension: This type pertains to high blood pressure that is not caused by any identifiable organ diseases.

Secondary (Symptomatic) Arterial Hypertension: This type refers to high blood pressure that arises as a consequence of specific diseases affecting organs or systems.

Additionally, episodic increases in blood pressure may be triggered by conditions such as obstructive sleep apnea syndrome, neuroses, improper use of certain medications, and the excessive intake of caffeine or other stimulants. [1]

Symptoms of Arterial Hypertension:

The condition often presents with persistent headaches, edema around the eyes or face, chest pain under various conditions, disturbances in vision, and ringing in the ears. A hypertensive crisis, marked by sudden, extreme elevations in blood pressure, can result from stress, physical exertion, or the abrupt discontinuation of antihypertensive drugs, and is characterized by severe symptoms including intense headache, visual problems, nausea or vomiting, facial flushing, chest discomfort, shortness of breath, and in some cases, seizures. [5]

Approaches to Managing Arterial Hypertension:

The primary goal in treating arterial hypertension is to normalize high blood pressure gradually and methodically, as advised by medical experts worldwide. The comprehensive management strategy includes:

- Adopting non-pharmacological measures in milder cases through lifestyle changes such as reducing salt intake, losing weight, participating in moderate exercise, quitting smoking, and using herbal sedatives.
- Initiating pharmacological treatment when lifestyle adjustments are insufficient. [4]

Risk Factors for Developing Arterial Hypertension:

The risk of developing hypertension can be influenced by aging, genetic predisposition to heart disorders, pre-existing coronary artery diseases or cardiac surgeries, obesity, diabetes, obstructive sleep apnea, and alcohol use. [6]

Lifestyle Modifications for Hypertension:

Patients are encouraged to embrace a healthier lifestyle that includes a nutritious diet, increased physical activity, avoidance of smoking and limiting caffeine and alcohol intake, stress management, and the preference for herbal teas. [7]

Seeking Medical Consultation:

Consulting with a healthcare provider is essential for effective hypertension management.

Incorporating Medicinal Plants in Hypertension Treatment:

In addition to conventional medication, the management of hypertension may benefit from the judicious use of herbal teas. It is essential to acknowledge that the chemical composition of certain herbal remedies may differ from pharmaceuticals, which could result in adverse interactions. Therefore, the selection of medicinal plants for treatment should consider their therapeutic properties and compatibility with standard medical therapies. [3]

Hawthorn (Crataegus):

Hawthorn, a plant with a rich history of medicinal use, is recognized for its therapeutic benefits, particularly in cardiac health. It thrives in various environments, including rocky terrains, thickets, mountainous areas, and forests. Hawthorn is lauded for its efficacy in lowering high blood pressure associated with arterial hypertension, aiding in the repair of vascular nodules and atherosclerotic thickenings, enhancing vascular elasticity, reducing the risk of myocardial infarction, facilitating the elimination of edema, and exerting anxiolytic effects. [2]

Hawthorn (Crataegus) Utilization in Medical Practice:

Hawthorn Flowers: Indicated for functional cardiovascular disorders, hypertension, angina pectoris, angioneuroses, climacteric neuroses, insomnia, and physical or mental exhaustion. Preparation involves steeping one tablespoon of the flowers in 200 ml of boiling water for 15 minutes in a water bath, then cooling and straining. The infusion is taken three times daily, consuming one-third of a cup 30 minutes prior to meals.

Hawthorn Fruits: Recognized for their rich content of antioxidant flavonoids and vitamins, particularly vitamin C, these fruits are beneficial in managing hypertension, angina, and atherosclerosis. One method of preparation involves boiling one tablespoon of dried hawthorn fruit in 200 ml of water, allowing it to steep for 10 minutes, straining, and then adding one teaspoon of honey before consumption. This tea may be consumed twice daily. Alternatively, seven tablespoons of dried berries may be steeped in a 2-liter thermos overnight, strained in the morning, and consumed daily with added honey for enhanced taste. [8]

Hawthorn Leaves: Used predominantly for cardiovascular and vascular conditions, including as a treatment to alleviate vein blockages. Leaves are steeped by removing boiling water from heat, adding the leaves, and allowing them to brew for 5-6 minutes.

Hawthorn Vinegar: Known for its vasodilatory properties, it can be consumed by adding one teaspoon of hawthorn vinegar to a glass of water, twice daily. Its benign nature facilitates ease of consumption.

Continued use of hawthorn fruits and leaves positively impacts blood pressure regulation, nerve calming, and sleep improvement.

Leonurus cardiaca (Motherwort) in Phytotherapy:

Leonurus cardiaca, commonly known as motherwort, holds a distinctive place in herbal medicine due to its broad therapeutic effects. Of the 25 known species, only three are extensively used in phytotherapy. Motherwort is a resilient wild herb, with several species cultivated for medicinal purposes. [1]

This herb is rich in vitamins, minerals, bioactive compounds, and essential oils. Its bioflavonoids, notably quercetin and rutin, diminish capillary fragility and safeguard against damage, enhancing capillary circulation and normalizing blood clotting. The saponins present confer diuretic and sedative properties, beneficial in alleviating severe coughs. The vitamins in motherwort, particularly tocopherol and carotenoids, bolster the immune system, augmenting disease resistance and offering antioxidant protection against free radical damage and aging. Quindarin, found in motherwort, diminishes reflex wakefulness in the central nervous system, aiding in stress and tension relief. Oleuropein regulates cardiac muscle contraction, stabilizes heart rhythm, and maintains arterial pressure. The plant's richness in calcium, sodium, and potassium renders it invaluable in cardiovascular disease management. [4]

Motherwort's glycosides and organic acids provide cardioprotective and vasculoprotective benefits, combating peripheral edema associated with cardiovascular system ailments. Its spasmolytic and diuretic effects enhance heart function and normalize arterial pressure, while also managing plasma glucose levels and lowering cholesterol and triglycerides.

Overall, motherwort is beneficial for insomnia, sleep disorders, headaches, migraines, tachycardia, arrhythmias, cardiovascular issues, hypertension, atherosclerosis, bronchitis, tracheitis, laryngitis, menopause, and climacteric syndrome. However, its use is not recommended for pregnant women, children, individuals with arterial hypotension, hyperacid gastritis, gastric ulcers, or bradycardia. [6]

Usage: A standard preparation involves steeping two tablespoons of the herb in 200 ml of boiling water for 15 minutes in a water bath, cooling, and straining. Consumption is advised twice daily, half a cup an hour before meals. Alternatively, 30 grams of motherwort can be macerated in 70% alcohol for two weeks; the resultant tincture, taken four times a day at one teaspoon each time half an hour before meals, can alleviate neuroses, palpitations, pressure, cardiopathies, and dyspnea. Those with bradycardia, thrombosis, thrombophlebitis, and arterial hypotension should consult a healthcare provider before use, as excessive intake may lead to fainting or cardiac arrest.

Melissa officinalis (Lemon Balm) in Pharmacotherapy:

Melissa officinalis, commonly known as lemon balm, is a medicinal herb recognized in the pharmacopoeia for its multifaceted therapeutic properties. It exerts a calming, antispasmodic, analgesic, and hypnotic effect. The bioflavonoids and other organic compounds present in lemon balm contribute to the normalization of heart rhythm. It is employed in the treatment of neuroses, hypertension, tachycardia, insomnia, premenstrual and climacteric syndromes, chronic fatigue syndrome, headaches, gastrointestinal discomfort such as flatulence and intestinal cramps, rheumatism, gout, and neuritis. Additionally, it is associated with a reduced risk of Alzheimer's disease. [7]

Usage: To prepare, one tablespoon of the herb is steeped in 200 ml of boiling water for 15 minutes in a water bath, then cooled and strained. Enhancing the infusion with half a teaspoon of honey may increase its benefits. It is recommended to consume one-third of a cup three times daily, 30 minutes prior to meals.

The efficacy of complex herbal teas lies in their ability to soothe the nervous system, alleviate internal spasms, stabilize arterial pressure, improve the function of vital organs, and detoxify the body. Their intake can enhance kidney and heart functions, reduce leg edema, and facilitate the elimination of toxins. It is crucial to adhere to the recommended dosage for optimal outcomes.

When crafting complex herbal teas, it is vital to grind or finely chop the herbs for uniform mixing. The constituents should be measured by weight, combined, and stored in a dry, dark place. Medicinal plants used in these mixtures can be obtained from pharmacies or specialized centers, although many can also be self-sourced.

Anti-Stress Herbal Complex: A formulation comprising catnip, eggplant, and blackberry extracts is noted for its rapid and sustained calming effects. A specific blend might include 60 grams of watermelon herb, 80 grams of hawthorn flower, 50 grams each of corn fringe and sorrel flower, 90 grams of damotu herb, 50 grams of blackberry leaves and flowers, 60 grams each of myrtle leaf and Ginkgo biloba leaf. This mix can be prepared with 1 liter of boiled water, including additional components like 10 grams of medicinal lemon leaves, 20 grams of daz dried flowers, and 10 grams of dried hawthorn fruits. [3]

Hypericum perforatum (St. John's Wort) in Medical Use:

St. John's Wort, utilized predominantly for its aerial parts including leaves and flowers, is rich in hypericin, flavonoids (quercetin, rutin), hyperoside, xanthones, and other compounds. Its constituents, hyperforin and adhyperforin, enhance neurotransmitter levels (serotonin, noradrenaline, dopamine), making it widely used for depression treatment. The aqueous infusion's activation of the CYP 3A4 enzyme facilitates the breakdown of chemical drugs, preventing their accumulation in tissues, thereby supporting its co-administration with various pharmaceuticals.

Indications: St. John's Wort is recommended for various forms of depression, tachycardia, menopausal symptoms, attention deficit and hyperactivity disorders, conditions of weakness, fatigue, asthenia, fibromyomas, pain reduction, adjunctive tumor treatment, vitiligo, neuritis and nerve pain, gout, diarrhea, and the healing of wounds and burns.

Usage: An infusion can be made by steeping 3 tablespoons of the herb in 3 cups of water, consumed one cup thrice daily before meals. Alternatively, 2.5-3 teaspoons of dried herb can be boiled in 1 cup of boiling water for 10 minutes, then strained for use. Fresh plant tea is also possible; however, the water should not be boiled, and the fresh plant only needs to be left in boiling water for a few minutes. [4]

Hibiscus Sabdariffa (Hibiscus) Utilization in Herbal Medicine:

Hibiscus tea, derived from the petals of the Hibiscus sabdariffa plant, is distinguished by its sour taste and vibrant red hue. It contains 13 organic acids, alongside a plethora of microelements, vitamins, and biologically active substances. The drink, known historically as the "Egyptian Pharaoh" beverage, offers several health benefits due to its rich antioxidant content. It aids in rejuvenating the body, protecting against the effects of free radicals, and potentially preventing the development of both benign and malignant tumors.

Hibiscus Applications: Hibiscus is employed for its diuretic, choleretic, and antiseptic properties. Its consumption is associated with numerous health advantages, including alleviation of nervous tension, facilitation of digestion, detoxification of the kidneys and gallbladder, enhancement of liver function, bolstering of bodily resistance, reduction of blood pressure, elimination of toxins, and contribution to weight loss. [5]

Preparation and Consumption: To prepare hibiscus tea, steep 1 teaspoon of hibiscus flowers in 200 ml of boiling water for 3-5 minutes. The tea can be enjoyed hot or cold, consumed 2-3 times daily in 1-cup servings. Sweeteners such as sugar or honey may be added to taste. It is advisable not to exceed a steeping time of 15 minutes or to use a metal container for brewing.

The therapeutic significance of complex herbal teas lies in their comprehensive health benefits. These blends calm the nervous system, alleviate internal spasms, stabilize arterial pressure, enhance organ functionality, and promote body detoxification. Proper dosage is critical for achieving the desired therapeutic outcomes. [6]

Preparation of Complex Herbal Teas: For effective preparation, it is crucial to finely grind or chop the herbs for uniform mixing. Ingredients should be accurately measured by weight, combined, and stored in a dry, dark place. These medicinal plants can often be sourced from pharmacies or specialized centers, though many can also be collected personally.

Anti-Stress Herbal Complex: A specific formulation comprising catnip, eggplant, and blackberry extracts is recognized for its rapid and sustained calming effects. Additional blends may include 60 grams of watermelon herb, 80 grams of hawthorn flower, 50 grams of corn fringe, 50 grams of sorrel flower, 90 grams of damotu herb, 50 grams of blackberry leaves and flowers, 60 grams of myrtle leaf, and 60 grams of Ginkgo biloba leaf. Another recipe calls for 10 grams of watermelon or medicinal lemongrass leaves, 20 grams of yarrow flowers, and 10 grams of dried hawthorn fruits to be infused in 1 liter of boiled water.

Conclusion

In conclusion, this article has comprehensively explored the significant role of medicinal plants in the pharmacological landscape, particularly in the context of managing diseases and pathological processes associated with changes in arterial pressure. Through a detailed examination of the pathogenesis of hypertension and the risk factors contributing to its development, we have underscored the necessity for a multifaceted treatment approach that integrates conventional pharmacological interventions with the therapeutic benefits of medicinal plants. The pharmacological properties of these plants offer promising avenues for supporting cardiovascular health, regulating arterial pressure, and mitigating the adverse outcomes associated with hypertension.

Moreover, the discussion has illuminated the importance of understanding the interactions between medicinal plants and conventional medications, highlighting the need for healthcare professionals to consider these factors in treatment planning. This ensures the safe and effective use of herbal remedies in conjunction with pharmacological treatments.

Future research should continue to investigate the pharmacological effects of medicinal plants, with an emphasis on clinical trials and pharmacokinetic studies to better understand their efficacy, safety, and potential interactions with standard medications. This will enable the medical community to harness the full potential of these natural resources in a manner that enhances patient care and outcomes in hypertension management. In essence, the integration of medicinal plants into the therapeutic landscape represents a pivotal step towards a more holistic and personalized approach to healthcare, particularly in the realm of cardiovascular disease and hypertension management.

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