Specialty Journal of Pharmacognosy, Phytochemistry, and Biotechnology
ISSN: 3062-441X
2023, Volume 3, Page No: 10-14

Available online at: www.galaxypub.co/page/journals

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Exploring Phytotherapy as a Preventive Approach for Ischemic Stroke Recurrence

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Received: 21 December 2022; **Revised:** 04 March 2023; **Accepted:** 08 March 2023

ABSTRACT

In Russia, stroke is the second leading cause of mortality (21.4%), following coronary heart disease (25.7%). The recurrence rate of strokes remains high, constituting around 25% of the cases of acute cerebral circulatory disturbances. In addition, up to 80% of stroke survivors experience lasting disabilities. Consequently, the development of effective methods for the prevention of recurrent strokes is a vital goal for medical science. This study investigated the potential of phytotherapy in the prevention of recurrent ischemic strokes. The study included 84 patients, aged 54 to 72 years, of both sexes, who were treated with a multi-component herbal collection alongside standard medical treatment. Over 4-6 years, there were no instances of cardiovascular death or acute myocardial infarction. In addition, the incidence of recurrent strokes decreased by more than threefold. A patient survey also showed that 78.6% of participants found the phytotherapy to be very effective. Based on long-term follow-up, it was concluded that phytotherapy is a promising and effective treatment for the prevention of recurrent ischemic strokes.

Keywords: Herbal therapy, Phytotherapy, Ischemic stroke, Recurrent stroke prevention

How to Cite This Article: Alkhanova ZK, Abueva SL, Kadaeva FI, Dadaev KM, Esilaeva AV, Isaev EB. Exploring Phytotherapy as a Preventive Approach for Ischemic Stroke Recurrence. Spec J Pharmacogn Phytochem Biotechnol. 2023;3:10-4. https://doi.org/10.51847/UGwxDZUZdR

Introduction

Every year, over 4 million cases of stroke are diagnosed globally, with varying incidence rates depending on the region—ranging from 1 to 4 cases per 1000 people annually [1]. In Europe and the United States, the stroke rate is 2.9 per 1000 population, whereas in Russia, it is approximately 3.4. Acute cerebral circulatory disturbances are responsible for 27-30% of all fatalities, with ischemic strokes contributing to about 85% of these cases [2]. Consequently, stroke is the second leading cause of death in Russia (21.4%), following coronary heart disease (25.7%) [3]. Additionally, up to 80% of stroke survivors experience some form of disability [4]. The recurrence rate of strokes remains alarmingly high, with recurrent strokes making up 25% (ranging from 16-42%) of all acute cerebral circulatory incidents [5]. As a result, cerebrovascular diseases represent a significant public health issue, with primary and secondary stroke prevention being of utmost importance. This highlights the critical need for effective methods to prevent recurrent strokes and aid recovery in patients who have experienced ischemic strokes. Phytotherapy, particularly plant-based cerebroprotective agents, has garnered increasing attention in medical research. These agents offer a range of advantages, including the combined action of various plant compounds [6], low toxicity, detoxifying effects [7], and high efficacy. They provide comprehensive benefits, acting on multiple organ systems and offering broad physiological effects. Moreover, phytopreparations are cost-effective

in comparison to synthetic alternatives [8], and their accessibility makes them an attractive option, particularly in countries where traditional herbal medicine is prevalent. Research has demonstrated that over 200 plant species possess antialterative, anti-destructive, and cerebroprotective properties. Studies have shown that 57-80% of these species also exhibit hepato-, vaso-, pancreas-, and gastroprotective effects [9], helping to prevent damage from various harmful agents like toxins, stress, and certain medications. Many plants contain natural substances, such as salicylic acid and methyl salicylate, that work as antiplatelet agents [10]. Additionally, several plant-based remedies exhibit anti-hypoxic properties [11]. The antioxidant capabilities of these plants, along with their ability to enhance human antioxidant defenses, contribute significantly to their cytoprotective actions [12]. The wide array of protective properties in these phytopreparations underscores the interconnectedness of global ecosystems, demonstrating the deep links between the plant and animal kingdoms [13].

Medicinal plants are known to influence the rheological properties of blood, offering various benefits such as vasoprotective, antihypoxic, and anti-inflammatory effects, while also helping to regulate neuroendocrine functions essential for the body's vital processes [14]. The use of these substances can have a broad impact on the mechanisms underlying cerebral ischemia, providing an overall cerebroprotective effect [15]. One widely used herbal extract in neurology is standardized Ginkgo biloba, which acts by influencing cellular metabolic processes, blood rheology, and microcirculation [16]. Additionally, studies have shown that pomegranate juice can reduce the intima-media thickness in the carotid arteries, decrease low-density lipoprotein peroxidation, enhance antioxidant defenses, and lower systolic blood pressure [17, 18].

Research also suggests that extracts from *Rhodiola rosea* root, *Scutellaria baicalensis* root, and *Leuzea carthamoides* root can improve memory, mental performance, voluntary attention, and overall well-being [19-21]. These effects, which enhance both physical endurance and mental capacity, are hallmark traits of classical adaptogens that have been consistently validated in research [22, 23].

This study aims to conduct long-term observation (spanning 4 to 6 years) of patients who have experienced a single ischemic stroke and received multicomponent phytotherapy during this period.

Materials and Methods

Between 2012 and 2022, a comprehensive long-term follow-up study was conducted on patients from the Republic of Chechnya, Russia, who had experienced ischemic stroke [24]. The study included 84 participants, ranging in age from 54 to 72 years, with 38 females and 46 males. Before the study, participants had experienced between one (66 patients) and two to four (18 patients) ischemic strokes, all of mild or moderate severity. Among these individuals, 72 had strokes in the carotid basin, while 12 were affected in the vertebral-basilar basin. Additionally, 58 patients had a history of coronary artery disease, and 16 had suffered an acute myocardial infarction. Overall, the cohort displayed a notable burden of cerebrovascular events.

Phytotherapy was initiated in the 1st year following the most recent stroke for 78 patients, while 6 individuals began treatment in the second year or later. Treatment durations ranged from 4 to 6 years, with follow-up continuing for up to 10 years. The key outcomes tracked included occurrences of transient ischemic attacks, myocardial infarction, stroke recurrence, and cardiovascular death [25].

For the phytotherapy treatment, a multi-component herbal formulation was used, the specifics of which are detailed in **Table 1**.

Table 1. The formulation of a multi-component collection for the conducted phytotherapy.

Name of the component	Part of the plant	Content, in mass. %
Glycyrrhiza	Root	16
Spiny eleuterococcus	Root	8
Meadowsweet	Flower	8
Betula alba	Leaf	8
Southern thorn	Flower	8
Stinging nettle	Leaf	8
Clammy everlasting	Leaf	8
Mountain ash	Fruit	4

Bilberry	Leaf	4
Sugar maize	Fruit	4
Coriander	Fruit	4
Garden sage	Leaf	4
Sedge cane	Root	4
Garden heliotrope	Root	4
Marigold	Flower	4
Ginger plant	Root	4

Results and Discussion

Over 4-6 years of treatment with a multi-component herbal therapy, only 6 cardiovascular incidents occurred in the group of stroke patients, including 4 transient ischemic attacks and 2 strokes. This represents 7.14% of the total cases **(Table 2)**. In comparison, after discontinuing the phytotherapy and continuing with standard medication, 22 cardiovascular events occurred, including 4 transient ischemic attacks, 4 strokes, 2 cases of acute myocardial infarction, and 12 cardiovascular deaths, which accounted for 26.19% of the cases. These results align with data from the REACH registry for the Russian population, which found a similar rate of recurrent events in individuals with cerebrovascular conditions, with 18.8% experiencing the combined outcome of acute myocardial infarction, ischemic stroke, or cardiovascular death over three years [26]. Furthermore, the REACH registry noted a 9.8% rate of recurrent strokes in cerebrovascular patients [27], which closely matches the 9.5% recurrence of nonfatal strokes and transient ischemic attacks observed in our study following standard treatment.
It is worth mentioning that the REACH registry followed patients for a maximum of three years, while our study extended the follow-up period to a full 10 years.

Table 2. Clinical outcomes in patients with ischemic stroke during and after phytotherapy (4-6 years of treatment, n = 84 patients)

Patient groups	Transient ischemic attack (%)	Acute stroke (%)	Cardiovascular mortality (%)	Acute myocardial infarction (%)	Total cardiovascular events (%)
1. While undergoing phytotherapy (4-6 years)	4 (4.7%)	2 (2.4%)	–	–	6 (7.1%)
2. After completing phytotherapy (Follow-up: 4 months to 5 years)	4 (4.7%)	4 (4.7%)	12 (14.3%)	2 (2.4%)	22 (26.2%)
3. Data from the REACH Registry (3 years of observation)	–	9.8%	5.6%	3.4%	18.8%

Patients were asked to provide their assessment of the effectiveness of herbal treatment, focusing on overall improvements in well-being, mood, and the reduction or complete relief of symptoms like headaches, dizziness, chest pain, and other stroke-related issues. Among the group who initiated treatment within a year of their stroke (78 patients), 64 reported positive effects from the phytotherapy, 8 were unsure, and 6 did not find it helpful **(Table 3)**. In contrast, among those who started treatment later after the stroke, 2 patients noticed benefits, 3 were uncertain, and 1 did not consider it effective **(Table 3)**.

Table 3. Self-assessment of phytotherapy effectiveness by patients (n = 84)

Degree of effectiveness	Less than a year from stroke to start of phytotherapy, n = 78	More than a year from the stroke to start of phytotherapy, n=6	Duration of treatment less than a year, n = 32	Duration of treatment more than a year, n = 52	Tota, n = 84
Effective	64	2	18	48	66
Ineffective	8	3	9	2	11
Not Sure	6	1	5	2	7

Thus, after 4 to 6 years of continuous multicomponent phytotherapy, patients who had experienced either a single or recurrent stroke showed a reduction of over two times in the frequency of cardiovascular events, compared to the period following the completion of phytotherapy (from 4 months to 5 years). In terms of self-assessment, 66 patients (78.6%) reported that phytotherapy was effective for them.

Conclusion

The issue of primary and secondary prevention of ischemic strokes remains unresolved, despite the established standards for pharmacological treatment (antiplatelet agents and statins). In Russia, however, the potential of medicinal plants for preventing ischemic strokes, both initially and recurrently, has been underexplored. While there are some isolated studies on this topic, the findings align with our results, highlighting the high effectiveness of phytotherapy. Our research indicates that combining medication with phytotherapy resulted in more than a threefold reduction in the occurrence of cerebrovascular and cardiovascular events during long-term follow-up.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

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