



**EVALUATION OF THE MODE OF ACTION OF VARIOUS AYURVEDA HERBS W.S.R.
TO HYPERTENSION – A REVIEW**

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ABSTRACT

Hypertension stands as a disease of high mortality owing to being a major risk factor for cardiovascular diseases, stroke and kidney diseases. Hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated 140/90 mm Hg or above. About 90–95% of cases of hypertension are regarded as "primary hypertension". Remaining 5–10% of cases (secondary hypertension) are caused by other circumstances that affect the kidneys, arteries, heart or endocrine system. Hypertension results from a variety of reasons like stress, obesity, genetic factors, over use of the salts in the diet and ageing. As we all know, hypertension is called a silent killer because it rarely exhibits symptoms before it damages the heart, brain or kidney. Though a lot of potent antihypertensive drugs are available today in modern medicine, but none of them is free from untoward effects. The principal focus of Ayurveda is on maintaining good health and adopting a healthy way of life. This paper is a sincere effort to understand hypertension in terms of Ayurveda and its management through medicinal plants which have antihypertensive activity like as *Sarpagandha*, *Ashwagandha*, *Shankhapushpi*, *Jatamansi*, *Arjuna*, and *Punarnava*.

KEYWORDS: *Sarpagandha*, *Ashwagandha*, *Shankhapushpi*, *Jatamansi*, *Arjuna*, and *Punarnava*.

INTRODUCTION

Hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated 140/90 mm Hg or above.^[1] About 90–95% of cases of hypertension are regarded as "primary hypertension" which means high blood pressure with no apparent underlying medical cause. Remaining 5–10% of cases (secondary hypertension) are caused by other circumstances that affect the kidneys, arteries, heart or endocrine system.^[2] Recent reports indicate that nearly 1 billion adults had hypertension in 2000 and this is predicted to be increased about 1.56 billion by 2025.^[3] Over the period of time, the additional strain on the heart and arteries leads to cardiovascular dysfunction and is a primary contributing cause of congestive heart failure, myocardial infarction, pulmonary embolism, cerebral aneurysm and kidney failure.^[4] Beta blockers often cause fatigue, cold extremities, bradycardia and heart-failure. Similarly, angiotensin converting enzyme inhibitors may cause cough, rash etc.^[5] Ideally, an antihypertensive drug should achieve optimum blood pressure control and improve patient's wellbeing.^[6] Hypertension is a major risk factor for the development of coronary artery disease, stroke, congestive heart failure and renal

disorders.^[7] In Ayurveda there is no description of such a single disease which can resemble with hypertension. As per Ayurvedic principles, in case of unknown disease, the physician should try to understand the nature of the disease through Dosha, the site of manifestation, etiological factors and then should initiate the treatment.^[8] Hence it becomes necessary to study multiple factors viz. *Dosha* *Vruddhi*, *Dhatu Dushti*, *Strotas* involved and their role in causation of hypertension for proper understanding of disease, its prevention and treatment.

METHODOLOGY

Compilation from various sources and review of the information regarding herbs used in hypertension like as *Arjuna*, *Ashwagandha*, *Jatamansi*, *Shankhpushpi* etc.

Causes of hypertension

Factors Affecting Blood Pressure- Hypertension is multifactorial disorder. These factors include 1.Vessel Elasticity 2.Blood Volume 3.Cardiac Output 4.Peripheral Resistance. Several other factors and conditions may play a role in development of hypertension such as smoking, overweight or obesity, lack of physical activity,

excessive salt intake, alcohol consumption, stress and family history of high blood pressure.^[9]

Symptoms: If blood pressure is extremely high, there may be certain symptoms to look out for, including

- Severe headache
- Fatigue or confusion
- Vision problems
- Chest pain
- Difficulty breathing
- Irregular heartbeat

Untreated hypertension can lead to serious diseases, including stroke, heart disease, kidney failure and eye problems.^[10]

Ayurvedic Perspective- Description of *Hridaya* and processes of *Rasa Vikshepana* (circulation) by *Vyana Vayu* is helpful to understand the disease. Though the exact nomenclature of the disease to some extent is controversial, the signs and symptoms of the disease can be understood in terms of *Dosha*, *Dushya*, *Strotasa* and probable *samprapti* of hypertension etc. we can correlate with *Raktagata vata*. Looking at hypertension from this perspective, we can assume that vitiated *Vata Dosha* is the main cause of the disease, as the *Dhatu Gati (Rasa Gati)* or *Vikshepa* is achieved by *Vayu* itself. *Pitta* and *Kapha* complement the effect of vitiated *Vata* and support the progress of the disease with *Rasa*, *Rakta* (whole blood) being the main mediator of vitiation. This suggests the involvement of *Tridosha* in hypertension. Inference of previous research work done is that hypertension is nothing but a '*Vata Pradhan Tridoshaja Vyadhi*', be greatly influenced by *Mana*. Therefore it may be considered as *Sharir* and *Manas Roga (Ubhayashrita Vyadhi)*. *Sharir* and *Satva (Mana)* have been designated as the habitats of *Vyadhi* by Acharya *Charaka*.^[11]

Samprapti (Pathogenesis of hypertension): Most of the mechanisms associated with secondary hypertension are clear and completely understood. However, those associated with essential hypertension are far less understood. The pathogenesis of hypertension takes place at both physical and psychic level one at a time or simultaneously depending upon the *Dosha Dushya Sammurchhana*. *Agnidushti* results in *Ama* formation and subsequent *Dhatudushti (Rasa and Rakta)*. This leads to *KhaVaigunya* i.e. obstructive pathology in channels. The *Ama* production results into *Strotorodha* (obstruction) and thus partially blocks the normal *Rasa- Rakta* circulation which further vitiates *Vyana Vayu*. This obstructed *Vyana Vayu* leads to forcible blood flow in the blood vessels causing increased resistance, thereby increasing blood pressure.^[12]

Ayurvedic management: The goal of an Ayurvedic approach is to enliven the body's natural healing and self-repair ability in a holistic treatment that typically takes into consideration nutrition and diet, lifestyle,

exercise, yoga, breathing exercises (pranayama) and meditation, along with various herbs.

Treatment of hypertension should be planned according to *Dosha* and *Dushya* involved in pathogenesis. *Manasa Bhavas* like *Chinta*, *Krodha*, *Bhaya*, etc., plays an important role in the pathogenesis, progression, and prognosis of the disease, and also have effect on the response to the treatment. Hence, the type of therapy recommended should be one that can pacify these disturbed *Manasika Bhavas*.

The main aims of Ayurvedic therapy in hypertension are

- To clear obstruction in the arteries.
- Detoxification of body.
- Strengthening and revitalizing the cardiovascular system.
- Rectifying hormonal imbalance.

Diet recommendations for hypertension

Dietary modification is very important to prevent the development of hypertension or potentially combat and reduce high blood pressure.

- Lowering sodium intake (especially from table salt) reduces excessive water retention, which helps maintain normal blood pressure.^[13]
- Adopting a high potassium diet helps rid the renal system of excess sodium and restore sodium/potassium balance.
- Additional dietary changes beneficial for reducing blood pressure include adopting the diet which is rich in fruits, vegetables, whole grains.
- Avoid dairy, butter, eggs and high fat foods
- Reducing consumption of refined sugar and heavily processed food, reducing caffeine intake.^[14]

Life style recommendations

- Quit smoking
- Avoid alcohol.
- Physical activity: Regular exercise leads to weight loss and improves your capacity to deal with stress.
- Practicing yoga and meditation is very effective. Regular yoga practice and meditation will help in leading a stress free life.
- Sound sleep and proper rest is very essential. Try to get at least 8 hours of sleep and proper rest
- Avoid anger, stress, anxiety and loud speaking as all these increases blood pressure. Reducing stress can help balance hormones.
- Laughter therapy is considered a good medicine for the treatment of hypertension.
- Avoid smoking as cigarette smokers tend to have high blood pressure due to its nicotine content.
- Simple breathing exercise will help in calming down the mind. Adopt breathing exercise whenever you are tensed, nervousness or anxious.

Yoga

Stress reduction from practicing meditation, *yoga*, and other mind-body relaxation techniques can lower blood pressure.^[15] *Yoga* is formulated for many reasons and the health restoration is one of them. *Shavasana*, *Sukhasana* *Dhanurasana*, *Makarasana*, *Vajrasan*, along with regular practice of *Pranayama* like *anuloma viloma* are found to be very useful for lowering blood pressure in normal as well as hypertensive individuals if performed accurately and adopted as a lifestyle.^[16]

Panchakarma: *Abhyanga* (Massage) – *Sarvanga Abhangya* with specially formulated oils helps to increase elasticity and flexibility. It correct and enhance the blood flow in healthy manners. a- *Vaman* and *Virechan* (Emesis and purgative therapy) – If the patient is having *Uttam Bala* and having mild or moderate type of hypertension without any other complications then *Shodhana* procedures like *Vaman*, *Virechan* can be advised according to *Dosha Pradhanya*. b- *Basti* (Medicated enema): – *Basti* therapy is specially designed for the *Vata* disorders.

Ayurveda has a wide range of medicinal plants which have antihypertensive action.

Some commonly used medicinal plants (reported as antihypertensive drug) are

Arjuna

Latin name: *Terminalia arjuna* (Roxb.) W & A.

Family: Combretaceae

Habit: Tree

Rasa: *Kashya rasa*, *Laghu*, *ruksha guna*, *Sheeta virya*, *Katu vipaka*, *Kaphapittaghna* Pharmacological actions & uses: The bark is astringent, cooling, cardiotonic. It is useful in fractures, ulcer, spermatorrhoea, leucorrhoea, diabetes, anaemia, cardiac disorders, haemorrhoids, diarrhoea associated with blood, cirrhosis of liver and hypertension.^[17]

Parts used: Bark

Action on hypertension: *Terminalia arjuna* bark contains chemicals such as; triterpene glycosides, arjunetoside, together with oleanolic, arjunolic and arjunic acids and a cardenolide. Arjuna bark works as a heart tonic, helps to maintain normal blood pressure, promotes proper blood flow and normal homocysteine levels. *Arjuna* bark helps to reduce the effects of stress and nervousness on the heart.^[18] Arjun bark rich in Co-enzyme Q-10 has been used in Ayurveda for treatment of hypertension. It protects LDL cholesterol from damage through oxidation.^[19]

Ashwagandha

Latin name: *Withania somnifera* (L.) Dunal

Family: Solanaceae

Habit: Shrub

Rasa: *Tikta kashaya rasa*, *Laghu snigdha guna*, *Ushna virya*, *Madhura vipaka*, *Vatakaphaghna*

Pharmacological actions & uses: The roots are astringent, bitter, somniferous, thermogenic, stimulant, aphrodisiac, diuretic and tonic. They are useful in leucoderma, constipation, insomnia, lumbar pain, nervous disorders, asthma and cardiac disorders.^[20]

Parts used: Root

Chemical constituents: Withaferin A, withanol, nicotine, somniferine

Action on hypertension: The effect of *Ashwagandha* was studied on the cardiovascular and respiratory systems in dogs and frogs. The alkaloids had a prolonged hypotensive, bradycardiac, and respiratory-stimulant action in dogs. The study found that the hypotensive effect was mainly due to autonomic ganglion blocking action and that a depressant action on the higher cerebral centers also contributed to the hypotension. Stress, as a major cardiovascular risk factor leads activation of sympathoadrenal and hypothalamic pituitary adrenal (HPA) axis and causes oxidative stress. *Withania* possesses a potent antistressor effect and alleviates stress induced changes and provides cardioprotection (Ojha and Arya 2009).^[21]

Punarnava

Latin name: *Boerhaavia diffusa* Linn.

Family: Nyctaginaceae

Habit: Perennial creeping herb

Rasa: *Madhura*, *tikta*, *kashya rasa*, *Laghu ruksha guna*, *Ushna virya*, *Katu vipaka*, *Tridoshaghna* Chemical

Constituents: Liriodendrin & Hypoxanthine

Parts used: Whole plant, root

Action on hypertension: The aqueous extract of *Boerhaavia diffusa* root is found to be effective in ethylene glycol induced hyperoxaluric oxidative stress and renal injury in rat kidney. It inhibits the renal cell damage and show antioxidant activity. Exhibit significant free radicals scavenging activity. Renal cell damage prevention and free radical scavenging activity may help in management of hypertension. In *Boerhaavia diffusa*, Liriodendrin & Hypoxanthine are active antihypertensive agents and the former is Ca+2 channel antagonist. *Boerhaavia diffusa* is diuretic by increasing renal blood flow, which contributes to its antihypertensive action.^[22]

Sarpagandha

Latin name: *Rauwolfia serpentina* Benthex kuntz.

Family: Apocynaceae

Habit: Shrub

Properties: *Tikta rasa*, *ruksha guna*, *ushna virya*, *katu vipaka*, *Kaphavataghna*, *Nidrajanaka*

Chemical constituents: Reserpine, Serpentine, Ajmaline, Yohimbine

Parts used: Root

Action on hypertension: *Rauwolfia serpentina* is a well proven antihypertensive drug. Reserpine, the purified alkaloid of *R. serpentina*, was the first potent drug widely used in the long-term treatment of HTN. Alkaloid Reserpine possesses marked and long lasting hypotensive activity. 1. By action on the vasomotor centre, it leads to generalized vasodilatation, with a lowering of blood pressure. 2. By depressant action on the cerebral centers, it soothes the general nervous system. Studies have shown *Sarpagandha* to have anti-adrenergic and anti-depressant property.^[23]

Jatamansi

Latin name: *Nardostachys jatamansi DC.*

Family: Valerianaceae

Habit: Erect, Perennial aromatic herb

Properties: *Tikta, kashaya rasa, Laghu, snigdha guna, Sheeta virya, katu vipaka, Manasdoshhar, Tridosaghagna*

Chemical constituents: jatamansone, nardostachone, jatamansic acid, coumarins, lignan, neolignans and sesquiterpenes.

Parts used: Rhizome.

Action on hypertension: Jatamansone is one of the main sesquiterpene found in *Nardostachys jatamansi* which has been reported as antihypertensive through animal studies.^[24] Oily extract of jatamansi which has been found to have antioxidant, anti-ischemic and anti-arrhythmic potentials. It also increases high density lipoprotein levels, which are protective lipids.^[25] The sesquiterpene valerenone isolated from the subterranean parts Of *Nardostachys Jatamansi* (DC) is found to having sedative, tranquilizing and antihypertensive properties in animal experiment.^[26]

Shankhpushpi

Latin name: *Convolvulus pluricaulis Choisy.*

Family: Convolvulaceae

Habit: Herb

Properties: *Tikta, katu rasa, Snigdha, pichhila guna, Sheeta virya, Madhura vipaka, Medhya, Tridosaghagna.*

Chemical constituents: n-hexacosanol, n-octacosanol, n-triacontanol, β - sitosterols, E-sitosterols, shankhpushpine.

Parts used: Whole plant.

Action on hypertension: *Shankhpushpi* is a *Medhya rasyana*, which controls the production of stress hormones. Its ethanolic extract has been found to reduce cholesterol, triglycerides and phospholipids. Being an antioxidant also, its use in cardiovascular disease, such as hypertension is known. Its stress lowering effect adds to its antihypertensive action.^[27]

DISCUSSION

The majority of the drugs performing antihypertensive action are predominant in *tikta rasa* (bitter taste); *katu vipaka* (pungent metabolism); *laghu* and *ruksha guna* (light and rough property) and *ushna veerya* (tepid active potency). Such kinds of properties of the drugs are responsible for *srota shodhana* (purification of channel) & *srotovivarana* (dilatation of channel) action which in turn reduce hypertension. *Kaphaharathwa* and associated *dosha shamakatwa* properties are having a vital role in controlling the blood pressure.

CONCLUSION

It has been found that the percentage of hypertensive patients is rising sharply in spite of number of antihypertensive drugs in modern medicine. Human race today is looking towards *Ayurveda* in a search of an ideal and safe treatment. Hence to get the perfect management of hypertension without any side effects is a need of present era. In *Ayurveda* equilibrium of *Doshas, Dhatus, Malas* and *Agni* are considered as healthy state of an individual. We can say that while observing hypertension through *Ayurvedic* approach one or more of the following three possibilities should be considered.

1. Pathophysiological changes in the form of vitiation of *Dosha* (*Vata, Pitta* and *Kapha*), *Dhatu* and *Mala Dushti*.
2. Psychological changes i.e. disturbances at the level of *Mana* (*Manovah Strotas Vikara*).
3. Structural changes as complications of long term hypertension on various organs like heart, blood vessels, kidney etc.

This review of hypertension showed that the disease can be well managed by following *Pathya- Apathyas* mentioned in *Ayurveda* (avoidance of the etiological factor). *Ayurveda* describes appropriate lifestyle and diet management called as *Aahar* and *Vihar* for maintaining homeostasis and thereby preventing hypertension. Proper medication as per *Ayurvedic* guidelines (along with proper *Aahar, Vihar* and *Yoga*) will definitely control blood pressure without any untoward effects. Commonly used antihypertensive drugs like *Arjuna, Ashwagandha, Jatamansi, punarnava* etc. target various factors involved in the pathogenesis of hypertension.

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