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Antihypertensive Drugs - Ayurvedic Perspective

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ABSTRACT

Hypertension is a very common disorder, particularly in past middle age. It is not a disease in itself, but is an important risk factor for cardiovascular mortality and morbidity. According to WHO, it is above 140/90 mmHg. An estimated 1.28 billion adults aged 30-79 years worldwide have hypertension. American Association of Heart mentioned that normal blood pressure is less than 120 mmHg systolic and less than 80 mmHg diastolic. Epidemiological studies have confirmed that higher the pressure (systolic or diastolic or both) greater is the risk of cardiovascular disease. The principal focus of *Ayurveda* is on maintaining good health and adopting a healthy way of life. There is no description of such a single disease which can resemble with hypertension. It can be correlated with *Vata Pradhaan Tridoshaj Vyadhi, Raktabhaar, Uchharaktachapa* etc and involves *dhatus* like *Rasa* and *Rakta* and gets influenced by *Mana.* Our ancient science has provided us various drugs which influences the pressure of the blood. These drugs has directly or indirectly role in curing HTN for example *Sarpagandha, Jatamansi, Rudraksh, Ashawgandha* etc. which should be analysed by the physician clinically. This article would help future researchers and clinicians for administrating these drugs in different forms clinically and help further researches. There are specific alkaloids present in these drugs which influence different centres resulting in decrease in the Blood pressure. The present work deals with enhancing the role of *Ayurvedic* drugs and promoting more natural ways of treatment.

Key words: *Raktabhaar, Uchharaktachapa, Hypertension, Antihypertensive drugs in Ayurveda.*

INTRODUCTION

Hypertension is a *Vatapradhaan Tridoshajvyadhi.*[1] There is no any disease in *Ayurveda* which completely resembles with hypertension mentioned in modern but by viewing the signs and symptoms, analysing *Dosh, Dushya, Srotas etc,* different nomenclature are given to HTN. By viewing the signs and symptoms, it can be said that it is a *Vata Pradhan* disease in association with *Pitta* and *Kapha*.

As per American Association of Heart Stage 1 HTN is when systolic pressure is 130-139 mm Hg and diastolic pressure is 80-89 mm Hg. Stage 2 is when systolic is 140 mm Hg or higher and diastolic is 90 mm Hg or higher. Stage 3 (Hypertensive crisis) is when systolic is higher than 180 mm Hg and diastolic is higher than 120 mm Hg.[2]

Nature has gifted us with immense herbs that help to cure the ailments. There are drugs helpful in treating the hypertension. They work according to their *Rasa*, *Guna*, *Veerya*, *Vipaaka*, *Prabhava*. The exploration of such herbs help in more natural treatment which is compatible and has less adverse effects.

AIMS AND OBJECTIVES

1. To explain hypertension as per *Ayurveda*.

2. To explain Antihypertensive drugs mentioned in *Ayurveda*.

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Materials and Methods

To study the *Ayurvedic* perspective of Hypertension and drugs involved in lowering the blood pressure mentioned in different classical texts, modern literature, research articles with recent clinical researches updates etc were studied and analysed.

Nomenclature given To HTN

Various *Ayurvedic* scholars have coined different names for Hypertension such as; *Raktagatavata, Siragata Vata, Avritavata, Dhamani prapurana, Rakta vikshepa, Vyana prakopa, Raktamada, Raktavriddhi, Uchharaktachapa, Raktabhaar*. It is mainly *Vatapradhana Tridoshaja Vyadhi* involving *Rasa-Raktadhatu* in heart greatly influenced by morbid state of *Mana* and *Oja*. It is therefore be considered as *Sharira* and *Mansik Roga.*

According to *Acharya Charaka*, *'Vikshepana'* (circulation) of *Rasa Dhatu* is the *karma* of *Vyan Vayu* and *Hridaya.*[3] *Acharya Sushrut* has described the circulation process in detail.[4] *Chakrapani* has mentioned that circulation is a continuous processing in which *Rasa, Rakta* and other Liquid *Dhatus* circulate in the body.[5]

Nidaana according to *Ayurveda*

Ayurveda has mentioned involvement of different *Doshas* in increasing the pressure of Blood in the body. Any disturbance in their functioning increases the pressure of flow of *Rakta Dhatu* in the body.

Role of *Vayu* in Blood Flow

Prana Vayu- The function of *Prakrita Prana Vayu* is '*Hridaya Dhruka'*[6] (i.e. *Dharana* of Heart) which can be correlated with the stimulation and inhibition of the nervous system. In addition to this, vasomotor center controls the blood pressure by vasoconstriction and vasodilation of nerves. Similarly, *Prana Vayu* also controls the regulation of blood pressure by controlling *Vyana Vayu*.

Vyana Vayu - With the help of *Vyana Vayu*, heart contracts and propels blood (*Rasa Rakta Dhatu*) continuously all over the body.[7]

Samana Vayu - *Samana Vayu* helps in circulation of *Rasa* to the body from Heart. This concept has been explained by *Sharangdhar.*[8]

Apanavayu - *Apana Vayu* helps in proper chanelling of *Vayu* and maintains its proper balance. Obstruction of *Apana Vayu* lead to abstruction of *Mutra* and *Purisha*, so any vitiation in its chanelling could affect the Blood pressure.[9]

Sadhaka Pitta - The *sthana* of *Sadhaka Pitta* is heart. In emergency situations, anger, fear, the adrenal glands get stimulated where the *Nidaana* is *Pittaj* and release adrenaline affecting heart rate and cardiac output which can be correlated with vitiation of *Sadhaka Pitta*. This justifies role of *Sadhaka Pitta* in heart and maintaining Blood pressure.[10]

Avlambak Kapha - Acc to Ranjit Rai Desai, *Avlambhak Kapha* is responsible for contraction and maintaining tone of cardiac muscles. Hence helping in continuous pumping of heart.[11]

Rasa Dhatu - *Rasa Dhatu* circulates in the blood vessels. *Acharya Charaka* in *Vimanasthana* described that excessive intake of *Guru* (heavy), *Shita* (cold), excessively unctuous food and constant worry leads to deterioration of *Rasa dhatu srotas*.[12] Any disturbance in the flow or fluidity of *rasa* can affect the pressure on the blood vesssels thus increasing blood pressure.

Rakta Dhatu - *Raktavaha Strotas* get vitiated due to intake of food and drinks which are irritant, unctuous, hot and liquid; excessive exposure to sunlight and fire. This affects the *Doshas* and the vitiated *Vata* gets lodged in the circulating *Rakta Dhatu* and causes disturbance in its circulation.

Agni - *Jathragni* is the fire in the body that is responsible for digestion of food and formation of *Dhatus* in proper way. Vitiation of *Agni* could lead to many problems. *Agni Dushti* occurs at two levels *Jatharagni Mandya* and *Dhatwagni Mandya*.[13] *Jathragnimandya* lead to formation of *Ama* which blocks the channels due to its various *Guna* can cause *strotorodha* and vitiation of *Doshas*. This leads to narrowing of path of the blood vessels and causing peripheral resistance leading to Hypertension.

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Mana **-** Hypertension is considered as *mansik vyadi* (psychosomatic), emotional disbalance that could be due to *Chinta* (worry), *Krodha* (anger), *Bhaya* (fear) could lead to disturbance in *Mansik Dosha*. In Ayurveda *Pradnyaparadha* and *Asatmendriyartha Samyoga* are considered as the root causes for every disease[14], which indicate the involvement of *manas* in HTN.[15]

Samprapti Ghatakas (Components of pathogenesis)

Doshas

- *Vata - Prana Vayu, Vyana Vayu, Samana Vayu.*
- *Pitta - Sadhaka Pitta*
- *Kapha - Avalambaka Kapha*
- *Manas Dosha - Raja, Tama*

Dushyas **-** *Rasa, Rakta*

Updhatu **-** *Sira, Dhamani*

Agni **-** *Jatharagni, Dhatwagnimandya*

Srotas **-** *Rasavaha, Raktavaha, Pranvaha & Manovaha Srotodushti*

Prakar **-** *Sanga* type *of srotorodha*

Udabhava Sthana **-** *Hridaya, Dhamani*

Adhisthana **-** *Mano-Daihika, Shira, Dhamani.*

Srotas Sancharasthana **-** *Sarva Sharir*

Rogamarga **-** *Madhyama Rogamarga*

Drugs used In HTN

Ayurveda has mentioned various drugs which are used in hypertension. They work on the basis of their *Rasa, Guna, Veerya, Vipaaka, Prabhava*. They affect the blood pressure by depressing CNS, Cardiac Output, Vasodilation, relaxing muscles. Diuretics etc.

Some of the drugs are mentioned below in Table no. 1

Table 1: List of *Ayurvedic* drugs used in Hypertension.

SN	Drug	B.N	Active cons. & Pharmacological action.	Class	*Karma*	Part used	Formulation and Dose
1.	*Sarpagandha*	*Rauwolfia serpentina* Benth ex kurz.	Reserpine Serpentine Rauwolfinine Cardiodepressant [16] Tranquilizer ACE inhibitor	*Aparajita Gana* *Nidrajanana*	*Raktabhar Shamaka* *Hridya* *Avsadhaka*	Root	*Sarpagandhadi Churana*- 1-2 g[17] *Sarpagandhadi Vati*
2.	*Jatamansi*	*Nordostachys jatamansi* DC.	Jatamansik Jatamansone Valeranone Ursolic acid Effects RAAS Diuretic Mind relaxant[18]	*Eladi gana* *Tikta* *Skanda* *Kandughana* *Sajna Sthapana*	*Raktabhar Shamaka* *Hridya* *Niyamaka*	Root	*Churan* -10 g[19]
3	*Rudraksh*	*Elaeocarpus ganitrus* Roxb.	Rudrakin Quercetin Terpenes	*Raktabhaar Shamaka*	*Raktabhar Shamaka*	*Phalasthi*	*Churan*-3-5 g[21]

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			Cardiac glycosides Antidepressant Effects RAAS[20]				
4.	*Ashawgandha*	*Withania somnifera* Linn.	Cuseohygrine Anahygrine Withanolides Cardioprotective Diuretic Reduce cortisol[22]	*Balya Gana* *Madhura Skanda* *Rasayana*	*Raktabhar Shamaka*	Root	*Churan*-3-6 g[23]
5.	*Tagara*	*Valeriana wallichii* DC.	Valepotriates Dihydrovaltrate Cyclopentapyrans CNS depressant Diuretic Sedative[24]	*Sheetaprashmanam* *Tikta* *Skanda* *Eladi gana* *Vedana Sthapana*	*Raktabhar Shamaka*	Root	*Churan*-1-3g[25]
6.	*Bhringaraja*	*Eclipta alba* Hassk.	Ecliptine Wedelolactone Diuretic Antioxidant[26]	*Keshya*	*Raktabhar Shamaka*	*Panchang* seeds	*Churan* *Swarasa*-5-10ml[27]
7.	*Vacha*	*Acorus calamus* Linn.	Asaryl aldehyde A- Asarone B-Asarone Ca^{+2} channel antagonists[28]	*Lekhniye gana* *Arshogana* *Tikta* *Skanda* *Mustadi gana* *Sanjaya Sthapana*	*Raktabhar Shamaka* *Hridyagati Shamaka*	Root, *Kaand*	*Mool Churana*-125-500mg[29]
8.	*Shankhpushpi*	*Convolvulus pluricaulis* Chois	Shakhpushpeen Convolvuline Palmitic acid ACE inhibitor[30] Anti-depressant activity	*Medya*	*Raktabhar Hara* *Raktagata Vata Shamaka*	*Panchang*	*Churan*-10-20 g[31] *Kshaya*-50-100ml
9.	*Tambool*	*Piper betle* Linn.	Eugenol Chavibetol Hydroxy chavicol	*Hridyadi Varga*	*Raktabhar Hara* *Hridya Balya*	Leaves	*Swarasa*-5-10ml[33]

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			Antioxidant Cardio protective[32]				
10.	*Banafsha*	*Viola odorata* Linn.	Violine Alkaloids Saponins Tannins Vasodilator Ca^{+2} channel inhibitor[34]	*Chedana*	*Raktabhaar Hara*	*Panchang*	*Churana*-3-6 g *Kwatha*[35]
11.	*Kantakari*	*Solanum surattense* Burm. F.	Diosgenin Diuretic[36]	*Kaas hara* *Kanthya* *Hikka nigreh* *Shoth hara* *Varunadi gana*	*Raktabhaar Hara* *Rakta Shodhaka*	*Panchang*	*Kwatha*-40-70ml [37]
12.	*Kankusht*	*Garcinia morella* Desr.	Garcenoline Morellin Diuretic[38] Antioxidant	*Teekshan* *Virechak*	*Raktabhaar Hara*	*Niryaas*	*Niryasa*- 50-125 mg[39]
13.	*Arlu*	*Ailanthus excelsa* Roxb.	B- Sitosterol Vitexin ACE inhibitor[40] Cooling effect	*Kshaya Skanda* *Pureesh Sangreha* *AamaHara*	*Raktabhaar Hara* *Raktashodhaka*	Bark	*Swarasa*-10-20ml *Churan*-1-3 g[41]
14.	*Shatavari*	*Asparagus racemosus* Willd.	Steroidal Saponins Shatavarin 1-4 Diuretic[42] Mind relaxant	*Madhura Skandha* *Shukra Janana*	*Raktabhaar Hara* *Raktachaap Hridroga*	*Kandh*	*Swarasa*-10-20 ml *Kwatha*-50-100ml *Churan*-3-6 gm[43]
15.	*Pooga*	*Areca catechu* Linn.	Catechin Arecoline Arecaidine Guavacoline Guavacine Inhibit pressor response to Ang. 1 & Ang. 2 [44]	*Vikasi*	*Raktabhar Hara* *Hridya Avsadaka*	Fruit, seeds	*Churana*- 1-3 g[45]

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16.	*Chilhint*	*Cocculus hirsutus* Linn.	Trilobine Coclaurine Diuretic[46]	*Vishagana*	*Raktabhar Hara* *Rakta shodhak*	Root, Leaves	*Swarasa*-10-20 ml[47]
17.	*Ankol*	*Alangium salvifolium* Linn. F.	Alangine Diuretic[48]	*Vishagana*	*Raktabhaar Shamaka Hridya Prasarana*	Root bark	*Churan*-1-2 g[49]
18.	*Sadpushpa*	*Lochnera rosea* Linn.	Lochnerin Virosin Lochnericine Anti-Depressant activity[50]	*Rakta Arbuda Nashaka*	*Raktabhaar Shamaka*	Root, Leaves, Panchang	*Swarasa*-10-20 ml *Kalka*- 10 g[51]

Discussion

Hypertension is one of the leading health problems worldwide. It leads to various cardiac problems and affects other organs too. This problem is increasing day by day, conventional medicines play a vital role to treat it. *Ayurvedic* drugs have proved to be affective in lowering the blood pressure and improving heart functions. This article has documented several drugs which acts as antihypertensive as per mentioned in the text. The main alkaloids are mentioned in the table and their mechanism of lowering the blood pressure. Some affects the RAAS, some acts as diuretics, cardio depressants, muscle relaxants, ACE inhibitors etc. Drugs like *Sarpagandha, Jatamansi, Ashawgandha* have mind relaxant properties and leads to reduction in cortisol level thus relaxing the blood vessels leading to lowering of blood pressure. *Ashawgandha, Bhringraja, Kankusht, Kantakari, Shatavari, Chilhint, Ankol* act as Diuretics. They pull out water from the body thus decreasing pressure on the vessels and heart. *Vacha* and *Banafsha* act as Calcium channel antagonists. *Tagara* helps in Katp channel activation, lowering the Blood pressure. *Shankhpushpi* and *Pooga* are ACE inhibitors. *Pooga* inhibits Ang 1 and Ang 2. *Sadpushpa* has anti-depressant activity which cools the hyperactivity of the mind which releases the constriction in the blood vessels and relaxes the flow of blood. The dose of the drugs mentioned are either the clinical trials dose which has shown results and the dose mentioned in the text itself. The specific function of the drug is mentioned as per the Ayurvedic text which helps directly or indirectly in Hypertension. We believe that this article would help to enhance knowledge of the antihypertensive drugs, their alkaloids and how they act as antihypertensive. This will provide a base for further studies to find out more uses of the alkaloids and their working. This would promote the use of more natural medicines for the treatment of the health issues.

Conclusion

Natural medicinal products are considered in the case of primary healthcare because of better cultural acceptability, safety, potency, and lesser side effects. Several traditional herbal medicines and supplements have been recognized as potential therapeutic agents to manage hypertension and its associated complications. This review aims to document medicinal plants having potential Antihypertensive action given in Ayurveda. This compilation may help the Researchers, Pharmaceutical companies, and Investigators to further use these plants for Clinical research purposes.

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