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## Hypertension: Concept and Prevention through Ayurveda

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### Abstract:

*Modernization in medical field has changed the understanding of illness. Many a diseases has been vanished and newer emerged with the time. Hypertension is one among them, a newer condition which has been creating burden on health expenditure of mankind and being the risk factor for many diseases. Hypertension is not curable condition, so the prevention is major factor to avoid the condition. Hypertension is not directly mentioned in ayurvedic literature but knowledge prevailing to the condition is scattered under different headings in ayurveda classics. This article is an attempt to conceptualize and to search preventive measures in ayurveda.*

### Introduction

An infinite group of lifestyle diseases haunting the mankind today include certain forms of cancer, most heart diseases, high blood pressure<sup>1</sup>, type 2 diabetes, obesity and certain diseases of the internal organs. Hypertension is one commonest cardiovascular disorder affecting about 20% adult populations worldwide and is an important risk factor for cardiovascular mortality.<sup>2</sup> Its rapidly increasing prevalence in developing countries as leading cause of death and disability.<sup>3</sup> The prevalence of hypertension in India is reported as ranging from 10 to 30.9 %<sup>5</sup>; 25% in urban and 10% in rural people;<sup>6</sup> and is projected to cause 4.6 million deaths by 2020.<sup>4</sup>

In last century, human population witnessed major shift in lifestyle; healthy traditional food practices being replaced by readymade, attractive but nutritiously poor stuffs. Environment, consisting of many factors including atmosphere, habitat, stress etc. also play decisive role in lifestyle disorders. Stress in modern society is skyrocketing with the urbanization and busy schedule of individuals. For their slow pathology and high degrees of resultant impairments, prevention becomes the key to lifestyle diseases.

*Ayurveda* being the science of life, has well highlighted the effect of food and environment in causing various diseases. However the disease hypertension has not been directly explained but understanding the disease in terms of *Ayurvedic* principles is more preferable than naming the disease. So this paper is a humble attempt to find out probable correlation and prevention of the hypertension in *Ayurvedic* perspective.

### Understanding Blood Pressure (B.P.):

Blood pressure means the *force exerted by the blood against any unit area of the vessel wall*<sup>7</sup>. Normal blood pressure according to Seventh Report of the Joint National Committee (JNC 7) report is systolic pressure 90-119mm of Hg and diastolic of 60 -79 mm of Hg. Normal blood pressure is necessary for blood and nutrient flow to all the body parts. The blood pressure is maintained mainly by heart and blood vessels and nervous control. In terms of *Ayurveda*, *Vyana vayu*, the type of *vata* which is situated in heart and flow all over the body have the similar function with that of the mechanism responsible for maintaining normal blood pressure. The function of *vyana* is to maintain the flow of *rasarakta dhatu*<sup>8</sup>. So for maintaining normal blood pressure the role of *vyana vata* is vital.

### High blood pressure (hypertension)

High blood pressure or hypertension is defined by JNC 7 report in three categories which can be summed up as systolic pressure ranging from 140 & >140mmofHg and diastolic as 90 & > 90 mm of Hg. In *Ayurveda*, neither the concept of hypertension is mentioned directly nor its objectivity as because of discrepancy in the concept and the instrument like **sphygmomanometer** or blood pressure meter were not invented at that time. When the blood pressure increases above the normal it causes various diseases of major organs like heart, brain, kidney etc. Vitiating *vyana* cause impact on general body<sup>8</sup>. Showing that *vyana vata* can affect the multiple organs of the body. From this it can be understood that, for high blood pressure the underlying pathology is *vyana vata* vitiation. The hypertension is classified into mainly two types: 1) essential hypertension 2) secondary hypertension.

The essential hypertension or primary hypertension is the type in which no appreciable cause is identified for the increase in B.P, which is found in 90% hypertensive cases. The secondary hypertension is that in which increase in blood pressure is due to other systemic illnesses. As the causes of essential hypertension are not well understood, many lifestyle changes are being postulated for the causation of the disease. So in this context *vyana vikriti* along with vitiation of *kapha/pitta* which take place directly from *nidana sevana* can be considered with essential hypertension and the *vikriti of vyana* which takes place as the *upadrava* of other diseases can be taken as secondary hypertension.

### Causes of Hypertension(Nidanas):

There is no specific cause for hypertension but following risk factors are associated with the hypertension.

Risk factors <sup>8</sup>	Ayurvedic nidana <sup>10</sup>
Genetic causes and age	These are due to mostly <i>vata</i> predominance
Obesity(high caloric intake, inactivity etc)	<i>Atiguru, snigdha, atimatra aahara, avyayama</i>
Atherosclerosis(high fatty food)	Above and <i>divaswapna</i> etc
Abnormal glucose tolerance	<i>Asyasukham, samashana, atiamlalavana etc</i>
Sedentary physical activity	<i>Avyayama</i>
Smoking, alcohol	<i>Atidhumapana , vatapittaprakopa nidanas</i>
Stress	<i>chinta, harsha, vishada etc</i>

To sum up, because of these hetus or *nidana vata, pitta, kapha* either alone or in combination get vitiated. These *nidanas* are also responsible for *rasa, rakta, medostrotas dusti*.

### Mechanisms of Hypertension:

The pathology of hypertension is multidimensional. One or more factors contribute in manifestation of disease. The volume of blood, nervous control of cardiovascular system, kidney function and peripheral vessel resistance are the important factors in causation of hypertension. Cardiac output and peripheral resistance are the two determinants of arterial pressure. Cardiac output is mainly governed by *vyana vayu* and peripheral resistance depends upon the proper functioning *dhamanis/strotasas* in which *vyana* flows.

### Intravascular Volume:

Intravascular volume is a primary determinant of arterial pressure over the long term. Increase in intravascular volume lead to hike in B.P. From Ayurvedic perspective this can be well understood by *rasarakta dusti lakshanas* like *hritakleda, praseka* and *sirapurntava*. The observation that high sodium level is associated with increased blood volume is also mentioned in classics “*लवणं पित्तं कोपयति , रक्तं वर्धयति।*“ (cha. Su 26/43). So increase in *rakta dhatu* means increase in its volume as well as vitiation of *pitta*.



**Autonomic Nervous System:**

The autonomic nervous system maintains cardiovascular homeostasis via pressure, volume, and chemoreceptor signals. By increasing cardiac output and peripheral resistance, Nervous signals as well as hormones like adrenaline, noradrenaline are responsible for maintaining normal blood pressure and increased activity of these manifest into hypertension. In the same way *vyana vayu* in normal condition do the function of *rasarakta samvahana*<sup>9</sup> and when it vitiated the pathological condition arises.

**Renin-Angiotensin-Aldosterone:**

The renin-angiotensin-aldosterone system contributes to the regulation of arterial pressure primarily via the vasoconstrictor properties of angiotensin II and the sodium-retaining properties of aldosterone. Alteration in function of these lead to hypertension. “स्वेदासृक् स्वावणश्चापि.....” (su. Ni. 1/18) is the *karma* of *vyana*. So the obstruction in *vyana vayu* along with vitiation of *apana* may lead to the above mentioned pathology.

**Vascular Mechanisms:**

In hypertensive patients, structural, mechanical, or functional changes may reduce lumen diameter of small arteries and arterioles. Main change in these patients is arteriosclerosis of blood vessels and atherosclerosis is one type of arteriosclerosis. In this the hardening of blood vessels and reduction in the lumen of the vasculature occurs. This mechanism of atherosclerosis, closely mimics with the concept of *dhamnipratichaya*, which is *kaphaja nanatmaja vikarara*. So *kapha* also have role in hypertension.

**Signs and symptoms:**

High blood pressure (HBP) itself usually has no signs or symptoms. Rarely, headaches may occur. In early stage of hypertension and in pre hypertensive's as well there are no symptoms. Signs and symptoms of vitiated vata which are not totally manifested are called *purvarupa*. अव्यक्त लक्षणं तेषां पूर्वरूपमिति स्मृतम्। आत्मरूपं तु तद् व्यक्मुपायो लघुता पुनः॥ (cha. chi. 28/19). And as the *doshanubandha* and *Kha vaigunya* gets associated the symptoms will get manifested. If the *doshanubadha* is more then it will show more symptoms. A small percentage, perhaps 5%, of hypertensive persons show a rapidly rising blood pressure that if untreated, leads to death within a year or two. Called accelerated or malignant hypertension, the clinical syndrome is characterized by severe hypertension.

**Malignant hypertension:**

Malignant hypertension is very high blood pressure that comes on suddenly and quickly. The lower (diastolic) blood pressure reading, which is normally around 80 mmHg, is often above 130 mmHg. Clinically characterized by Blurred vision, Change in mental status, Anxiety, Confusion, Decreased alertness, decreased ability to concentrate, Fatigue, Restlessness, Sleepiness, stupor, lethargy Chest pain (feeling of crushing or pressure), Headache, Nausea or vomiting Numbness of the arms, legs, face, or other areas, Seizure etc. this can be accommodated under the *pitta-kapha aavaruta vyana lakshanas*<sup>9</sup>. Severity of symptoms depends upon *dosha* predominance and amount of *dosha dusti*.

The hypertension if left untreated then it will affect the multiple systems and it is true in the case of *aavarana* also. *Vyana aavarana* left untreated or not treated properly then will affect the main *sthana* of *vyana* i.e. *hridaya* and consequently it will affect the *prana* and *ojas* which is situated in *hridaya*.

**Pathologic Consequences of Hypertension (Upadravas):**

Hypertension is a risk factor for all clinical manifestations of atherosclerosis. It is an independent predisposing factor for heart failure, coronary artery disease, stroke, renal disease, and

peripheral arterial disease (PAD). *Nidana sevana* if continued then *ojas vikritis* will take place. This will lead to further complications.

**Heart(hridaya):**

Heart disease is the most common cause of death in hypertensive patients. Hypertensive heart disease is the result of structural and functional adaptations leading to LVF coronary heart diseases. These conditions can be collectively understood with the help of *ojokshaya lakshanas*<sup>9</sup>.

**Brain(shira):**

Hypertension is an important risk factor for cerebrovascular accident (CVA). This will lead to dysfunction and loss of function of the body parts. This condition can be understood with the help of *ojjovimsransa lakshanas*<sup>9</sup>.

**Kidney(basti):**

Hypertension is a risk factor for renal injury. Renal failure secondary to renal hypertension is common which showing oedema and uremic coma symptoms can be understood with the *lakshanas* of *ojjoviyapana*<sup>9</sup>.

That's why *charakacharaya* highlighted to take care of *hridaya* and *ojas*, because their departure from normal lead to death.

**Management:**

According to modern science screening, diagnosis and control of B.P. by various medicines according to pathology are suggested and in prevention lifestyle changes like salt and fat intake restrictions along with exercises are mentioned.

**Ayurvedic management:**

For management purpose the hypertension can be divided into two types,

- 1) Acute cases of symptomatic or malignant hypertension which can be reverted by following *avarana* treatment according to *dosha* predominance.
- 2) Chronic cases, can be managed by mainly treating the risk factor. In this stage the *shodhana* and *samana oushadas* can be given.

But the prevention is more important than cure, because according to conventional medicine complete cure is not possible in the hypertension. Importance of prevention is well said in *bhagavatgita*, “प्रक्षालनात् हि पंकस्य दूरात् अस्पर्शनं परं ।” It is better to avoid the diseases rather than treating them.

**Prevention through ayurveda:**

The prevention can be divided into two: general prevention and prevention for risk factors

General prevention: Proposed for health conscious people and people with family history of hypertension. Following changes can be done in diet(*Aahara*) and daily routine(*Vihara*).

**Aahara:**

Mental as well as physical health is dependent on *aahara*. According to *charaka* – “ हितशि स्यान्मितशि स्यात् कालभोजी जितेन्द्रियः। पश्यन् रोगान् बहून् कष्टान् बुद्धिमान् विषमाशनात् ॥ (*cha. Ni.6/11*). Abiding by the regimes of food preparation and consumption will be helpful. Following food items can be incorporated into routine diet.

Food items	karmas	Benefits
<i>Ajja mamsa</i> / Goat meat(grilled/boiled)	<i>Shariradhatusamanya</i> (does not increase <i>kapha</i> )	contains more mono unsaturated fat <sup>12</sup>
<i>Amalki</i> / Gooseberry	<i>Tridoshaghnam, rasayan am</i>	Reduce TC, LDL, VLDL and increase HDL cholesterol <sup>13</sup>
<i>Ardraka</i> / Ginger	<i>vatasleshmavibandhahara</i>	lowers blood pressure, reduces inflammation, acts as an antioxidant, reduces cholesterol and acts as a blood thinner <sup>14</sup>
<i>Draksha</i> / Grapes	<i>Shita , madhura, snigdha</i>	Good for HTN and anxiety <sup>15</sup>
<i>Dugdha</i> / Milk	<i>Ojovardhaka, rasayana</i>	ACE inhibition action



Also *vartaka*, *shigru*, *mugda* are can be beneficial in hypertension.

Avoid: excess of any *rasa* including *lavana*, *vidhahi*, *atisnigdha*, *atiruksha* *aahara*. (heavy food, deep fried food, fast food, bakery items, tea, coffee etc), Taking meals frequently because all these affect the *agni* and bring about the *dosha* vitiations.

**Vihara:**

Following the proper *dincharya* (Daily Routine) is good for health. But due to difference in working schedules and busy lifestyle following *dinacharya* in total may not be possible so, practicing as far as possible could be thought of. At least on weekend full *dincharya* can be incorporated and rest of the days as much as practicable can be practised. *Vyayama* (Exercise) should be done regularly with *ardhashakti* (Half of power). Doing exercise increase tolerance, it is best in obesity and bad effect due to wrong food habits can also be minimized due to it. As said by *shusruta* – “व्यायामं कुर्वतो नित्यं विरुद्धमपि भोजनम्। विदग्धं अविदग्धं वा अविदोषं परिपच्यते ॥ (su. Chi. 24/44). According to research exercise is good in prevention; treatment and control of hypertension especially aerobic exercises are proven to be effective in all types of hypertension with resistant hypertension.<sup>18</sup>

**Yoga:** yoga is considered as a form of aerobic exercise with mind involvement. Ample numbers of researches proven the effect of yoga in stress managing and are effective in hypertension, reducing cholesterol, blood sugar, specially *pranayamas* (*chandranuloma*, *bhramari pranayama*), meditation, *asanas* like *suryanamaskara*, *sukhasana*, *padmasana*, *ardhamatsendrasana*, *bidalasana* are more helpful.<sup>19,20</sup> so it can be used in prevention as well as treatment of hypertension.

Avoid: Sleeping in day time, late night work which bring about the *dosha* vitiation.

**Ritucharya:**

Observing the *ritucharya* can help to overcome the effect of environment on body, by making changes accordingly in the food habits, routines and *shodhana* procedures so as to prevent diseases due to changing seasons. Their role in preventing Hypertension is scientifically evaluated. Few studies are available in this regard:

- 1) *Vasantika vamana* (Seasonal emesis) which has showed good result in the patients of hypertension. The systolic B.P of 160mmofHg reduced to 140 mmofHg and remained stable in *sansarjana kala*.<sup>16</sup> It is better to avoid in uncontrolled hypertension. However study to see the effect on dyslipidemic patients should be carried out.
- 2) *Sharat ritu virechana* (Seasonal Purgation): The study conducted as a part of dissertation on healthy volunteers<sup>17</sup> showed that participants reduced their weight, there was statistical change in T. cholesterol and LDL reduced significantly and HDL increased significantly. In this study it also noted that reduction in lipid peroxidation and increase in anti oxidants like superoxide dismutase after *shodhana*. In the formation of atherosclerotic plaque oxidation of lipid is important which causes invasion of monocyte at the site causing atheroma can be prevented if *virechana* is given as a preventive measure. According to *ayurveda* *virechana* is the *shodhana* for *pitta* and *anuomana* of *vata* can be utilised in prevention of hypertension. Further studies are needed with seasonal diet and *shodhana* procedures in this regard.

**Prevention of risk factors:**

Above mentioned risk factors can be broadly divided into *santarpanaja* (over nutrition) and *aptarpanaja* (poor nutrition).

- **Prevention for *santarpanaja*<sup>10</sup> risk factors:** In this obesity, impaired glucose tolerance and dyslipidemia can be taken. Along with the above mentioned general prevention protocol inclusion of *Triphala*, *yava* (barley), *mudga* (green gram), *patola* (pointed gourd), *takra* (buttermilk) in routine diet. Honey with water should be taken after diet. And in *vihaara* (Daily Routine) along with *vyayama* (excercise), *abhyanga* (Body oilation) with *tila taila*

(Sesame oil) and *udvartana* (Dry Powder Massage) should be done. These all are helpful in reducing *kapha* and *meda*(Fat).

**Prevention of *apatarpanaja*<sup>10</sup> risk factors:** In this stress , smoking and excess of alcohol consumption can be taken. Along with above mentioned general prevention protocol *ghrita* (Ghee), *dugdha* (Milk), *kharjura* (Dates),*dadima* (pomegranate) should be incorporated in diet. *Abhyanaga* with *tila taila* and meditation along with other yoga can help in this condition

Like this many promising modalities are there in *ayurveda* which can prevent and treat hypertension. However further extensive research is needed in this regard.

## Conclusion:

Hypertension is silent killer of the world which is responsible for heavy morbidity, mortality and economical burden on healthcare system.

Due to change in food and work habit of mankind its prevalence is increasing in society. In *ayurveda* , hypertension is not mentioned but it can be treated with the *dosha dusti lakshanas*. Treatment of this disease is not accomplished with the cure. So the prevention is the main area of interest. It can be achieved by adopting *ayurvedic* lifestyle.

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