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Review Article

CORRELATION OF HYPOTENSION AND HYPERTENSION WITH VATA, PITA AND KAPHA AS BASIC CONSTITUENTS

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ABSTRACT

Tridosha Vata - Pita – Kapha; Dushya Rasa, Rakta and Ojha play an important role in pathogenesis of Hypotension or Hypertension where heart with arteries is the main site of the disease. The symptoms of Vibheti (terror), Hridya Tamyati (Palpitation), Vyatitha-indriya (loss of senses), Tama Darshana (blackouts) etc. due to Vata, Ojha and Rasa Dhatu Kshaya can be compared with hypotension. Vata causes hypertension when it acts alone by raising heart beat too much or in combination with Pita and Kapha Dosha causing Rakta Dhatu, Rasa Dhatu and Meda Dhatu Dushti (intoxicated with wastes). The symptomatology quoted under Raktapradoshaja Rogas by Acharya Charaka almost coincides with essential hypertension symptomatology among those Anidra (insomnia), Shirahashoola (headache), Bhrama (giddiness), Buddhisanmoha (syncope), Klama (tired), Arati (restless), and Krodhaprachurata (too much anger), Akshiraga (redness of eyes) are the common symptoms. Thus Rakta dushti is the common factor which always gets involved in Hypertension. Many patients of Hypo/Hypertension can be fully cured in Ayurveda.

Keywords: Hypotension, Hridya, Hypertension, Kapha, Ojha, Pita, Rasa Dhatu, Rakta Dhatu, Vata.

INTRODUCTION

This century is fastest one in the context of scientific researches and pace of life style. This type of life style produced a lot of hazards also, in the form of some metabolic disturbances. If Hypotension can lead to dizziness, Syncope, orthostatic hypotension symptoms, ischemia of brain and heart then hypertension is also one of the common complaints of this modern era. Hypertension is silent killer of mankind. It 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. Hypotension is an abnormal condition in which an individual's blood pressure is too low for normal functioning. The stages narrated by Achraya Charaka about Mada, Murccha, Sanyasa[1] are similar to the complication of Hypertension.

Hypovolemic shock should be considered in situations in which significant blood or fluid loss has occurred and/or may be continuing, including hemorrhage following trauma, diuresis secondary to hyperglycemia, or polyuria due to diabetes insipidus. Failure of cardiac contractility (cardiogenic shock) may occur as a manifestation of longstanding congestive heart failure or secondary to acute coronary ischemia. Chronic orthostatic hypotension may be caused by an underlying disease such as diabetes, Addison's disease, a buildup of fatty deposits on the arteries (atherosclerosis), multiple system atrophy, cardiovascular disease, alcoholism, and nutritional diseases[2].

Orthostatic hypotension (also called postural hypotension) refers to a sudden decrease in blood pressure that occurs as an individual makes a sudden change in body position, usually from a lying to an upright position. Hypotension can be caused by a number of conditions, including dehydration or electrolyte loss due to physical exertion, exposure to high/humid temperatures, sudden change from low to high temperatures, diarrhea, or vomiting, vasovagal syncope (blood vessels response to stimulation of the vagus nerve), anaphylaxis (life-threatening allergic response), pregnancy, trauma, shock, stress, allergic reactions, anxiety, depression or alcohol toxicity. Certain drugs can also contribute to hypotension, such as those used to treat high blood pressure (hypertension), drugs that cause a decrease in fluid volume in the body (hypovolemia), anesthesia, calcium channel blockers, diuretics, anti-arrhythmics, vasodilators, and drugs of Parkinson's disease[3].

Incidence and Prevalence: In the elderly population, approximately 10% to 20% have postural hypotension and according to data from the National Health Examination Surveys (NHANES), the age-adjusted prevalence of hypertension varies from 18-32%. Hypertension has increased from 53% over 1960-1962 to 89% over 1988-1991 [4]. A 2005 NHANES report in the United States found that in the population aged 20 years or older, an estimated 41.9 million men and 27.8 million women had prehypertension (SBP, 120-139 mm Hg; DBP, 80-99 mm Hg), 12.8 million men and 12.2 million women had stage 1 hypertension (SBP, 140-159 mm Hg; DBP, 90-99 mm Hg), and 4.1 million men and 6.9 million women had stage 2 hypertensions (SBP ≥160 mm Hg; DBP ≥100 mm Hg)[4]. It is identified 30 or more variants with relatively modest contribution of the risk of hypertension, such as in the adrenergic receptor (ADRB1) and angiotensinogen genes[5]. The inheritance of the mutation almost always results in the development of hypertension[6]. However, hypertension is a broad phenotype, which results from perturbations of many mechanistic pathways and usually requires multiple hits to manifest. As both hypertension and hypotension are affecting many people its treatment should be there without side-effects on long term basis.

REVIEW OF LITERARY WORK

Acharaya Charak says vitiated Dosha due to different etiology produces different kind of diseases, So, Prakruti (nature), Sthaan (Site), Nidana (Etiology) of disease should be considered when treatment is done[7]. Here a correlation is tried to establish how Dosha play role in hypo/hypertension and enable their treatment as per Ayurveda texts. Many scholars have compared the hypertension with following disease of Ayurveda - Raktagata Vata, Kaphapitia Avaruta Vyana Vata, Sirogata Vata, Dhamani Pratichaya, Dhamani Kathinya etc.

Tridosha Prakopa symptoms which can be correlated with hypo/hypertension

Vata Prakopa: Vata causes eighty types of ailments. Among them Hrinamoha (feeling of heart filled with despair), Hriddrava (Fast heart beats), Vakshoudgharsh (Rubbing pain in chest), Vakshoprodh (feeling of stopping movements of chest), Vakshatodd (pricking pain in chest), Bahushosh(Pain in arm), Grivastambh (stiffness in neck), Manyastambh (stiffness along jugular vessels), Tama (Blackout), Brahma (dizziness), Vepathu (Tremors), Shiroruk (headache) and many diseases like Ekangaroga (Paresis), Ardita (Facial paralysis), Muktava (Dumbness), Badhirya (Deafness), Akshi Roga (Eyes problems) with decrease in vision, Anidra (Insomnia), Shyavta (blackening of skin, urine and stool), Vyas (Dilatation) can be result of alteration in blood pressure due to Vata[8].
Pita Prakopa: Pita causes forty types of diseases independently and Aush (Feeling of hot flushes and palpitation), Davathu (Burning sensation in eyes), Dhumak (Hot air comes out of mouth), Amlak (burning sensation in chest), Vidaha (Burning sensation), Jeevadaan (bleeding from external openings), Tamapravesh (Feeling of entering in blackout) and many symptoms which show any type of burning, perspiration can be related with Pita Prakopa in body [9].
Kapha Prakopa: It leads to twenty disorders independently among them Balasak (swelling, Loss of energy or low grade fever), Hridyauplepa (Paste applied on heart), Dhamnipratichaya (Arteries full of waste matter/atherosclerosis), Atisthoolta (Heavy weight)[10].

Dhatu Dusti Symptoms which can be correlated with hypo/hypertension

Rasa Dhatu: Hrillas (Vomiting), Gauravta (Heaviness in body), Tandra (sleepiness), Angamarda (pain in body), Tama (Balckout), Pandutava (Anaemia), Strotorodha (Blockage of body channels), Klebya (erectile dysfunction) [11].
Rakta Dhatu: Raktapita (Oozing of blood from body external orifices), Raktapradar (Menorrhagia), Akshiraga (Redness in eyes), Shirsruk (headache), Krodhaprachurta (increase in anger), Bhudhi Samoha (Loss of consciousness), Sweda (perspiration), Tamas Atidarshanam (blackouts) [12].
Ojha Kshaya (reduction) symptoms: Vibheti (Terrorized), Durbala (weak), Bhikshana Dhyayati (Tension), Vyatitha-indriya (Senses weak), Dushchaya (Complexion fades), Durmana (Unhappy thoughts), Ruksha (Dryness)[13].
Rasa Kshaya (reduction) symptoms: Ghattate (Tremor of heart), Sehate Shabdam na Ucche (Can't bear high pitch sound), Dravti (sinking heart), Shoolyete (stretching pain in heart), Hridya Tamyati (Palpitation) and Swalpa Chesta (lethargic) [14].

Heart site of Life: Heart is connected with ten major vessels of body in which Ojha located in heart which is distributed to whole body along with Rasa Dhatu[15].

Etiology of Hridya/Heart disease
Vyama (Exercises), Tikshana Aahar (Spicy-salty diets), Virechan (Purgation), Basti (Rectal route medicines) when taken in too much amount, Chinta (Tension), Bhaya (Fear), Trasa (Terror), Gadatichara (Due to non-cure of other ailments), Chardi (Excessive vomiting), Aamdosha (Excessive production of toxic byproducts), Sandharana (to stop natural urges), Karshan (poor diet and over excursion), Abhighata (injury on heart or body parts) can lead to Hridya or Heart diseases[16].

Symptoms of Hridya Roga: Vivarnata (Change in color), Murcha (Syncope), Jvara (fever), Kasa (cough), Hikka (hiccups), Shvasa (Asthma), Aasyavirasta (loss of taste), Trishna (thirst), Moha (Loss of consciousness), Vamana (Vomiting), Kapha Utklesha (Overproduction), Vedana (Pain), Aruchi (loss of appetite) and others[17].
Vataj Hridya Roga: Hritshoonya (Emptiness in heart), Dravta (Sinking feel/Palpitation), Sosha (dryness) and Bheda (stabbing pain in heart), Stambha (rigidity) and Samoha (loss of consciousness) [18].
Pitaj Hridya Roga: Tamoduyan (Blackout in front of eyes), Daha (burning sensation in body especially in heart), Moha (faintness), Santrass (fearsome), Jvara (fever) and Pitabhava (body appeals yellow) [19].
Kaphaj Hridya Roga: Stabhdha (Tightness), Guru (Heaviness), Stimita (rigidity in heart), Kapha Praseka (Salivation), Jvara (Fever), Kasa (cough), Tandra (Hypersomnia) are seen[20].
Sanipattaj and Krimij Hridya Roga: When all symptoms are present, it is Sanipattaj and when there is Kandu (itching) with Tivra-Arti (Too much pain), Toda (sharp pain), it is Krimij[21].

Physiology of blood pressure

Blood pressure is continuously regulated by the autonomic nervous system, using an elaborate network of receptors, nerves, and hormones to balance the effects of the sympathetic nervous system, which tends to raise blood pressure, and the parasympathetic nervous system, which lowers it. Low blood pressure can be caused by low blood volume, hormonal changes, widening of blood vessels, medicine side effects, anemia, heart problems or endocrine problems. The cardinal symptoms of hypotension include lightheadedness or dizziness[22].
The autonomic nervous system plays a central role in maintaining cardiovascular homeostasis via pressure, volume, and chemoreceptor signals. It does this by regulating the peripheral vasculature, and kidney function, which in turn affect cardiac output, vascular resistance, and fluid retention. Excess activity of the sympathetic nervous system increases blood pressure and contributes to hypertension[23-27]. The mechanisms of increased sympathetic nervous system activity in hypertension involve alterations in baroreflex and chemoreflex pathways at both peripheral and central levels[28, 29, 30]. Furthermore, there is central resetting of the aortic baroreflex in hypertensive patients, resulting in suppression of sympathetic inhibition after activation of aortic baroreceptor nerves. This baroreflex resetting seems to be mediated, at least partly, by a central action of angiotensin II[31, 32]. Additional small-molecule mediators that suppress baroreceptor activity and contribute to exaggerated sympathetic drive in hypertension include reactive oxygen species and endothelin[33]. Hypertensive patients who do not show the normal response to increased circulating norepinephrine levels, is genetically inherited[32]. Exposure to repeated stress results in vascular hypertrophy, leading to blood pressure.

Renin–angiotensin–aldosterone system
Another system maintaining the extracellular fluid volume, peripheral resistance and that if disturbed may lead to hypertension, is the renin–angiotensin–aldosterone system[34]. Angiotensin II causes vasoconstriction as well as release of aldosterone from adrenal glands[35, 36]. Obesity is a risk factor for hypertension because of activation of the renin-angiotensin system (RAS) in adipose tissue[32, 37], and also linked renin-angiotensin system with insulin resistance [38].

Endothelial dysfunction
Local nitric oxide and endothelin, which are secreted by the endothelium, are the major regulators of vascular tone and blood pressure. In patients with hypertension, endothelial activation and damage also lead to changes in vascular tone, vascular reactivity, and coagulation and fibrinolytic pathways. Alterations in endothelial function are a reliable indicator of target organ damage and atherosclerotic disease, as well as prognosis[39]. Inactivation of nitric oxide (NO) by superoxide and other reactive oxygen species (ROS) seems to occur in conditions such as hypertension[40, 41, 42]. Normally nitric oxide is an important regulator and mediator of numerous processes in the nervous, immune and cardiovascular systems, including smooth muscle relaxation thus resulting in vasodilation of the artery and increasing blood flow, suppressor of migration and proliferation of vascular smooth-muscle cells[43]. Angiotensin II enhances formation of the oxidant superoxide at concentrations that affect blood pressure minimally[44]. Endothelin is a potent vasoactive peptide produced by endothelial cells that has both vasoconstrictor and vasodilator properties. Circulating endothelin levels are increased in some hypertensive patients[45].

DISCUSSION

Hypo/hypertension correlation: As explained above there are Tridosha in body which mainly control all the functioning of a body. Vata along with Ojha Kshaya (reduction) and Rasa Dhatu Kshaya is mainly responsible for hypotension. Reduced blood volume, hypovolemic, is the most common cause of hypotension. This can result from hemorrhage; insufficient fluid intake, as in starvation; or excessive fluid losses from diarrhea or vomiting which all increases Vata in body. Body may have enough fluid but does not retain electrolytes. Absence of perspiration, light headedness and dark colored urine are also indicators. Low blood pressure is sometimes associated with certain symptoms, many of which are related to causes rather than effects of hypotension: chest pain, shortness of breath, irregular heartbeat, fever higher than 38.3 °C (101 °F) ,headache, stiff neck ,severe upper back pain ,cough with sputum ,dyspepsia (indigestion) ,dysuria (painful urination) ,adverse effect of medications ,acute, life-threatening allergic reaction ,seizures ,loss of consciousness ,profound fatigue ,temporary blurring or loss of vision which are the symptoms of increased Vata in body. In hypotension Angamarda (pain in body), Tama (blackout), Pandutava (anaemia), Strotorodha (blockage of body channels), Klebya (erectile dysfunction) all are due to Rasa Dhatu reduction and Vibheti (Terrorized), Durbala (weak), Bhikshana Dhyayati (Tension), Vyatitha-indriya (Senses weak), can be seen in Ojha reduction. Vata is a dominating factor of all Doshas in body and controlling all functions of body[46]. Here the above mechanisms of autonomic nervous system, renin angiotensinogen and endothelin system is not able increase blood pressure. It means this system improper functioning and Vata/Ojha Kshaya are same. The mechanism by which hypotension is occurring in the body, can be understood through line of treatments of these Doshas.

For controlling Vata use Madhur (Sweet), Lavana (Salty) and Ushna (hot medications), Abhyanga (Massage), Swedana (Fomentation), Asthapan Basti (medicated decoction through rectal route), Anuvasan Basti (medicated oil through rectal route), Nasya Karma (nasal medication), food etc. is used[47]. Ojha is reduced in body by Vyayama (exercises), Anshana (eating less), Chinta (more thinking), Ruksha and Alpa (dry and light diets), Vata (high velocity wind), Atapa (sunrays), Bhaya (fear), Shoka (agony), Rukshapaana (dry liquids), Prajagara (sleepless nights), Kapha-Rakta-Shukra-Mala Kshaya (excreted too much out of body), Vridha Kala (old age), Aadaan kala (Seasonal time in which naturally body loses power) and Bhutoupghata (Spirits)[48]. Ojha is compared with Bala/Kapha (power) at each Dhatu (Building blocks of body) level in body[49]. When hypotension shows symptoms of Hrillas (Vomiting), Gauravta (Heaviness in body), Tandra (sleepiness), Angamarda (pain in body), Tama (Balckout), Pandutava (Anaemia), Strotorodha (Blockage of body channels), Klebya (erectile dysfunction) due to Rasa Dushti with Ama then Langhana by which body feels lightness should be done[50].

Physiology of Abhyanga/massage: It is important to understand this physiology as it helps to cure both Hypo/Hypertension. Abhaynga (Massage) decreases inflammatory cytokines, increases levels of proteins for muscle repair, it relieves muscle tension, spasm, and stiffness, improves blood circulation and massage relieves mental stress and anxiety[51]. Abhaynga decreases cortisol level which increases blood pressure by increasing the sensitivity of the vasculature to epinephrine and norepinephrine[52]. Abhaynga also increases dopamine[53]. Dopamine has a number of important functions in the brain; this includes regulation of motor behavior, pleasures related to motivation and also emotional arousal[54]. Dopamine reduces stress levels and depression by acting in number of ways its precursor of norepinephrine[55]. Dopamine and angiotensin II serve counter regulatory functions in the kidney. Furthermore, deficiency of intra-renal dopamine can lead to augmented responsiveness to angiotensin II, with an accelerated increase in blood pressure and increased renal damage[56].
A study has shown that fasting leads to increased levels of norepinephrine (NE) in the blood for up to 4 days of fasting[57]. Glucose intake was found to significantly increase plasma NE levels. In contrast, protein and fat intake was found to have no effect[58]. That means fasting and dry food items rich in carbohydrates which increase Vata in body are also responsible for increasing norepinephrine in body. Other treatments which involve curing Vata like said above will pacify Vata which is responsible for increased heart rate, arrhythmias, and hypotension.
Hypertension can be correlated with following Dosha by understanding their lines of treatments:
In Paitik Hridyaroga Pita can be cured with Madhur (Sweet), Tikta (Bitter) and Kashaya (astringent) medicines along with Virechan (Purgation) which will help in alleviating symptoms of hypertension as Blackout in front of eyes, burning sensation in body especially in heart, fearsome, fever and body appeals yellow. These symptoms are same as release of Epinephrine hormones responsible for fear fight flight raising blood pressure of body. When Pita increases in body then along with Vata it causes hypertension which should be treated with a combination of both Vata and Pita pacifiers. In Rakta dhatu symptoms leading to hypertension, treatments for Pita should be done. When Kapha increases in body it causes Stabhdha (Tightness), Guru (Heaviness), Stimita (rigidity in heart), Kapha Praseka (Salivation), Jvara (Fever), Kasa (cough), Tandra (Hypersomnia), Balasak (swelling, Loss of energy or low grade fever), Hridyauplepa (Paste applied on heart), Dhamnipratichaya

(Arteries full of waste matter/atherosclerosis), Atisthoolta (Heavy weight) which are responsible for increasing blood pressure by constricting vessels. In this Swedana (fomentation), Vamana (emesis) and other treatments which pacify Vata, Kapha and Meda Dhatu in body should be applied[59]. Blood pressure is not caused by single factor in body and to control it multiple system acting drug is needed[60]. Ayurveda Vata, Pita and Kapha are located in whole body in each and every system. To control blood pressure, it is better to view it in terms of these constituents.

CONCLUSION

Vata can be held responsible along with Ojha and Rasa Dhatu reduction for hypotension. Vata causes hypertension when it acts alone by raising heart beat too much or in combination with Pita and Kapha Dosha affecting Rakta Dhatu, Rasa Dhatu and Meda Dhatu Dushti (intoxicated with wastes) showing their affect in heart and body as whole.

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