

The Prevention and Management of Hypertension - An Ayurvedic and Modern View

Archana B. H. Jadav¹, Susheel Shetty²

¹3rd Year PG Scholar, Department of Kayachikitsa, Alva's Ayurveda Medical College

²Professor, and HOD, Department of Kayachikitsa, Alva's Ayurveda Medical College

Abstract: Hypertension is a common disease in today's world. Every fifth person is discovered to be hypertensive. The majority of adults develop it in the latter half of their lives. Each year, heart disease and stroke account for more than half of all deaths and disabilities, killing over 12 million people. It is predicted that by 2020, the global cardiovascular disease burden will be increased by 75%. There is no clear pronunciation of Hypertension in Ayurvedic texts; according to Charakacharya, it is not always possible or necessary to identify a disease by its name (Anuktavyadhi). An Ayurvedic physician should attempt to construct the Samprapti (Pathogenesis) of a given clinical condition in each case based on signs, symptoms, acuteness, chronicity, complication, and investigative findings, and plan management accordingly. Hypertension is a terrible disease with a multifactorial origin and a chronic aetio - pathogenesis. When the Dosha, Dhatu, and Mala theory is applied, the pathology appears to be centred on Shonita Dhatu and Tridosha. As a result, it falls under the Madhyam Rogamarga (intermediate route) and is thus Yapya disease (difficult to cure).

Keywords: Hypertension; Ayurveda; Shonita Dusti; Anuktavyadhi; Madhyam Rogamarga

1. Introduction

The pathology of hypertension appears to be centred on Shonita Dhatu and Tridosha when thought adapting the principle of Dosha, Dhatu, and Mala theory. As a result, it is classified as Yapya disease and falls under the Madhyam Rogamarga and it is difficult to cure¹.

It is well established that untreated hypertension increases mortality and morbidity several fold, and that controlling it can reverse this to a large extent. As a result, hypertension must be treated and controlled, particularly in developing countries. Heart disease and stroke account for more than half of all deaths and disabilities in the United States each year, killing over 12 million people².

There is an urgent need to develop personalised medicine through traditional Ayurvedic medicine, as well as a shift from a single target single intervention approach to integrative system biology, i. e. a holistic approach³.

In modern medicine, antihypertensive drugs lower blood pressure but do not eliminate the risk of cardio - cerebro - reno - opthalmo - vascular involvement. However, Ayurvedic therapy can reduce the risk factor more effectively. There is no clear pronunciation of Hypertension in Ayurvedic texts; however, it may have existed since the beginning of time because diseases such as Pakshaghata (Stroke), Mutraghata (Renal failure), and Hridroga (Heart disease) are very well explained in our texts and are common complications secondary to Hypertension. It establishes the existence of this silent killer since old days⁴.

2. Unresolved Issue: Nomenclature

In this modern era there are several references available for the disease Hypertension. Some different opinion by different Academicians of Ayurveda suggested different names to demonstrate the phenomenon like Raktagata vata

(Y. N Upadhyaya - 1950), Rakta Vikshepa (J. P Shukla - 1954), Shiragata Vata (G. N Chaturvedi - 1962), Avrita Vata (R. K Sharma - 1966), RaktaChapa (Ravani and Mahaishkar UB - 1967), Rakta Sampida (S. B Pandey - 1972), Vyana Bala (B. Triguna - 1974), Dhamani pratichaya (A. D Athawale), Dhamani Prapurnata (AD Athavale 1977), Rasa Bhara (T. S Athawale - 1979), RaktaVridhhi (G. N Chaturvedi - 1981), RudhiraMada (V. N Dwivedi - 1991), Raktavata (P. V Sharma - 1993) and list goes on with different concept by different Acharyas and it makes confusion to upcoming Ayurvedic generation, what could be taken? and what could not?. Until and unless we cannot accept this disease with its causative factors, Pathophysiology, Acuteness, Chronicity, Complications and exact treatment modalities universally⁵.

The disease Hypertension is abnormality of Rakta Dhatu, (Blood) and is popularly known as Shonit Dusti (Vitiated Blood). The unique category of clinical presentation comprising RaktaPitta. (Abnormal bleeding from different roots of the body) Rakta Pradara (excessive vaginal bleeding), RaktaMeha (Hematuria) etc. and Vat Rakta (Group of vascular disorders with Gouty Arthritis) and some of mucosal inflammations as Mukhapaka (Oral Ulcers), Akshiraga (Redness of Eyes) Upakusha and pootigraha are also regarded maladies of Shonita Dusti (vitiating of blood)⁶.

Shiroruk (Headache) Klama (Nausea, Vomiting), Anidra (sleeplessness), Bhrma (imbalance of the body), Buddi Sammoha (Sluggishness in Intellect), Kampa (Tremors) etc.

More to add, Mada (Delirium), Moorcha (Stupor) and Sanyasa (Coma), the different diseases caused by Shonita Dushti (vitiating of blood) are described also as progressive manifestation of increasing Shonita Dushti. So also, such a sequele is equally true in relation to malignant Hypertension⁷.

When the principles of Dosha, Dhatu, and Mala theory pathology are applied, the essential hypertension appears to be centred on Shonita Dhatu and Tridosha. There is a need to understand the disease's cause, pathogenesis, acuteness, chronicity, complications, and symptomatology, as well as its overall management⁸.

Regulation of Blood Pressure in Ayurveda

In Ayurveda regulation of Blood pressure can be understood by functions of *PranaVayu*, *Vyana Vayu*, *Sadhaka Pitta*, *Avalambaka Kapha*, *Rasa* and *Rakta Dhatu* which are situated in *Hridaya*. (Heart). According to Ranjit Rai Desai, vitiation of *Vata*, *Pitta*, and *Kapha* (Premordial factors), *asthi meda* etc. affects blood pressure. *Kapha* vitiation (*avalambak kapha*) increases cardiac strength but due to sluggishness of *kapha*, it decreases the *kapha* and on other hand *Pitta* (*sadhak pitta*) and *Vata* (*vyana vata*) vitiation increases blood pressure. Here one thing must be clarified that term for blood circulation is not the *rakta samvahana* (transportation of blood) but *rasanudhavana* (Circulation of Plasma) *Ayurveda* believes that *rasa* (plasma) is the circulating medium and not the *rakta* (blood)⁹.

Etiology of Hypertension

Essential Hypertension is idiopathic where exact etiology of the rise in blood pressure is not yet clear. There are many pre disposing factors which causes hypertension is mention as follow.

- Alcohol intake (*Madyapana*)
- Salt intake (*Lavana*)
- Sedentary life style (*Ati Snighda*, *Madhur & Divaswapna*)
- Mental Stress. (*Krodha*, *Bhaya*, *Shoka*)
- Physical Strain (*Shrama*)
- Seasonal variations (*Rutu Sandhi*)

Nidanarthkara Roga – Madhumeha (Diabetes), *Sthoulya* (obesity), *Hridroga* (Heart disease), *Vrika roga* (Renal disease) are the precipitating diseases to form secondary hypertension¹⁰.

Pathogenesis of Hypertension in Ayurveda

Ati lavana sevana (Excessive salt intake), *madyapana* (Alcohol consumption) *snighda bhojana* (oily diet) *Divaswap* (day time sleep) and *manovighata* (Mental accident) leads to vitiation of *Shonita* (blood). But *Shonita* being *Dhatu* (tissue) is not capable of vitiating *Doshas* (pre-mordial factors of body) independently.

The over use of salt, alcohol vitiates the *Sadhaka pitta* and *Shonita* (blood). Sedentary habits vitiates the *Avalambaka kapha* and psychological stress induces vitiation of *Prana vayu*. Initially *Prana vayu* gets *prakopa*. Since *Prana vayu* has influence on *Hridaya* (heart), vitiates *Hridaya* and its residing components like *Vyana vayu*, *Sadhaka pitta*, *Avalambaka kapha*. *Shonita* is also involved as it is located in *hridaya*.

Prakupita (vitiated) *Avalambaka kapha* induces exaggerated contractility of the heart, while aggravated *Vyana vayu* leads increased *gati* (speed), the force of ejection of blood from *Hridaya*. These events result into forceful expulsion of blood through *dhamanis* (blood vessels), ultimately leading into increased resistance in vessels ensuring High blood pressure.

SYMPTOMATOLOGY

- Headache (*Shirorukh*)
- Tiredness (*Shrama*)
- Irritability (*Krodhaprachurata*)
- Raised body temperature (*Jwara*)
- Dizziness (*shirobhram*)
- Vomiting (*Klama*)
- Altered consciousness (*tamasatidarshan*)
- Seizures (*Kampa*)
- Visual Disturbances (*Akshiraga*)
- Focal neurological signs (*Ardita*)
- Urinary symptoms (*Raktameha*)
- Delirium in Hypertensive (*Shiro Bhrama*)
- Delirium in encephalopathy (*Mada*)
- Stupor (*Moorchha*)
- Coma (*Sanyasa*)¹¹.

Principle of Management¹²

Ayurveda has certain limitations in the management of hypertension. Specially in the emergency treatment for the hypertensive crisis & other vascular episodes. However Ayurveda can contribute significantly in the chronic hypertensive conditions. Where the precipitating factors are hyperlipidemia, obesity and other life style problems. The management of this condition is according to predominance of *Dosha*, intensity of symptoms and involved relevant target organ damage in the pathogenesis.

Management of Essential Hypertension¹³

It can be understood by various treatment modalities given for different conditions as follows: - Treatment of *Rakta Pradosha*, i. e. *Rakta Pittahara* (Pacification of blood and *Pitta Dosha*) Herbal Medicine & Diet. . *Virechana* (Therapeutic Purgation), *Upavasa* (Fasting), *Shonita Sraavana* (Bloodletting).

- Vatapradhana Vatapitta*: (Stress, Senility or Neurotic) - *Manobrimhana* (Psychological up gradation) and *Murdhnitaila* usage (Group of Procedures for Mental relaxation)
- Pitta pradhan Vatta pitta*: *Virechana*, *Raktamokshan* (bloodletting).
- Kapapradhana Vata kapha* - (hyper lipidemia, atherosclerosis, obesity or cardio vascular disorders) - *Panchkarma Therapies* - *Vamana* (therapeutic vomiting), *Virechana* (therapeutic purgation), *Lekhan Basti* (medicated enema), *Medohara* (lipid lowering) drugs. A combination of these three is also possible. A single line diagnosis and treatment not help to tackle the problem.

Management of Secondary Hypertension

- Renal hypertension - *Mutraghata Chikitsa* (T/t of Renal failure) - *Gokshura*, *Punarnava*, *Shilajit*.
- Endocrine disorders - Cushing syndrome, and acromegaly - *Pitta Shamak & Agni Deepak Chikitsa*.

Therapeutic Management¹⁴

Hridya	Haritaki, Arjuna, Hridya maha kashaya
Srotasprasadana	Guggulu, pushkarmula, Kustha
Ojasya	Nagabala, Jivaniyavarga, Vayasthapak, Kakolyadigana
Manasa Prasadana	Brahmi, Shankapushi, Sarpagandha

Life Style Management¹⁵

Metabolic Correction	<i>Triphala / Ghrita, Louki, Haritaki, Vacha, Rasna, Pippali, Sunthi, Puskar Moola, Katuki</i>
Physical Support	Daily routine, seasonal routine, <i>Panchakarma, Rasayana, Vajikarna</i>
Mental Support	Avoid conflict, emotions, Mediation – Yoga including Pranayam

Fiber rich diet is the form of unrefined whole grain, water soluble dietary fibers can incorporated into diet & result in significant lowering of cholesterol (4weeks)¹⁶.

- Omega 3 fatty acids can be gained by eating fish at least twice a week.
- Avoid beverages and food that contain added sugars.
- Avoid table salt or take low salt diet.
- Regular intakes of some of the vitamins and minerals which may be associated with a healthy heart (chromium, selenium, vitamin & magnesium vitamin C and Calcium)
- Barely butter milk, curd water, cow's urine, kanji (sour vinegar), *tila taila* etc¹⁷.

Modern Treatment View**Transforming Hypertension¹⁸**

- Digital Transformation
- Biotech And Biomedical Transformation
- Health Care Delivery Transformation
- Data Science Transformation And Artificial Intelligence

Need for Transformation

- Despite the huge public health burden and sustained research efforts focused on hypertension, there is slow progress in global control of hypertension. Transformation is urgently needed to reduce the global burden of hypertension.
- In spite of these efforts, recent research has not yielded major advances in hypertension. There have not been new targets identified for hypertension drug development.
- Hence there is a need for reversing these trends and achieving meaningful improvement in hypertension control and management

Digital Transformation

- With promising new digital technologies, it enables home blood pressure measurement that can be transmitted directly to health providers and the electronic medical record.
- Automated blood pressure devices with remote data transmission to providers or the electronic health record have been shown to be useful in improving hypertension control in clinical trials.
- Importantly, research indicates that ambulatory blood pressure data has been reported to better predict health outcomes than blood pressure measured in the clinic.
- Examples of recent promising technologies for non invasive blood pressure measurement include: Omron Heartguide,⁵ which has an extra - stiff band that inflates to measure BP like a normal blood pressure cuff as well as Checkme cuffless blood pressure monitoring device¹⁹ based on pulse transit time. Both devices are able to synchronize data with smartphone apps.
- Several smart watches that measure BP have also been introduced, such as the Heartisans Blood Pressure Watch (Heartisans, Hong Kong,) or the BPro device

(HealthSTATS Technologies, London, United Kingdom)
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In An Emergency this Smartwatch will Save Your Life – Smartkavach²¹

- It is capable of transmitting live videos of road accident victims to the emergency doctors of the nearest hospitals.
- The signal can be sent to the family members at the same time as well.
- Researchers have engineered a wearable ultrasound patch that can noninvasively monitor blood pressure in arteries far beneath the skin and can be worn as a flexible skin patch.²²
- For now, further research is needed to ensure the accuracy of new BP monitoring devices, assess the feasibility in different settings, evaluate such devices in a hypertensive population, and ensure that such devices are affordable and easy to use.

Data Science Transformation and Artificial Intelligence²²

- AI, which refers to the science and engineering of making intelligent machines, especially intelligent computer programs and includes machine learning, natural language processing, deep learning and other related applications, is poised to transform all of health care—this holds true for hypertension.
- In the future, AI - based technologies may even enable patients to take care into their own hands.
- Other AI - based smartphone apps are being developed to diagnose medical conditions such as, skin lesions and rashes, ear infections, migraine headaches, and retinal diseases such as diabetic retinopathy and age - related macular degeneration.

Biotechnological and Biomedical Transformation²³

For those patients who either do not tolerate or wish to take medication for hypertension or in whom BP control is not attained despite multiple antihypertensives, many new interventional procedures to manage hypertension have emerged, such as renal denervation, baroflex activation therapy, deep brain stimulation, and renal artery stenting.

Renal Denervation Therapy²⁴

This procedure uses radiofrequency ablation to burn the nerves in the renal arteries to treat HTN.

1st successfully performed in CIMS hospital, ahmedabad. Currently it is available in

- BLK super speciality hospital; Delhi
- Global hospital; Chennai
- Apollo super speciality hospital; Bangalore²³

Baroflex Activation Therapy²⁵

Used to treat resistant high BP that uses an implanted device to electrically stimulate baro receptors in carotid sinus region. Currently its is not available in India.

Deep Brain Stimulation²⁶

Is a surgical procedure in which electrodes are implanted in certain areas of brain.

It is currently available in

- Yeshwantpur Neurosurgeons Hospital; Bangalore
- Narayana Super Speciality Hospital; New Delhi

- Apollo Hospital; Chennai
- Fortis Memorial Research Institute; Gurgaon

Renal Artery Stenting²⁷

Its a procedure to open the renal arteries when they have become blocked due to renal artery stenosis.

Its currently available in

- Max Super Speciality Hospital; New Delhi
- Artemis Hospital; Gurgaon; India
- Fortis Research Institute; Gurgaon
- Indraprasta Apollo Hospitals, New Delhi

RNA Interference²⁸

RNA interference (RNAi) is a promising strategy for new hypertensive agents. . RNAis are short RNAs that activate ribonucleases to target homologous mRNA resulting in the silencing of a specific gene. RNAi is an important tool for researchers to learn about the function of a gene but also for therapeutic intervention—to target diseases that may result from undesirable activity of a gene.

Already, RNAi has been used successfully for cardiovascular research and is being evaluated for human therapy.

Gene Editing—Somatic Gene Editing of PCSK9^{29, 30, 31}

- Another promising strategy is the use of genome editing to target genes for human hypertension therapy.
- In the future, genome editing (using CRISPR cas9) holds promise for curing genetic hypertension, and in targeting angiotensinogen, resulting in possible long - term control of essential hypertension.

Healthcare Delivery Transformation: Implementation Science^{32, 33}

- For hypertension in particular, high - quality care requires patient awareness of preventive care, regular blood pressure screening, effective communication between healthcare providers and patients, involvement of other clinical specialties, and active self - management by patients.
- Importantly, studies indicate that a team - based, coordinated care and shared decision - making are associated with improved outcomes and reduced costs for the treatment of hypertension.

3. Discussion

Hypertension is one of the most significant public health challenges and the biggest contributor to the global burden of disease. Improving health outcomes worldwide will require concerted global action to address the burden of hypertension. The field of hypertension needs transformation.

Its future will depend on the successful convergence of digital data and biotechnological and biomedical sciences coupled with their implementation in healthcare delivery with new models of delivery and the effective strategy for population health

4. Conclusion

To control or eliminate hypertension, there is a need for system - wide transformation in research and clinical care as well as the convergence of disciplines.

We can provide prevention and treatment of the condition by, *Nidan Parivarjan (avoid etiological factors)*, *Pathya Apathya (do & donts)*, *Shamana (pacification) & Shodhan (biopurification)*, *Rasayan (immunomodulatory)*, and *Vajikaran Chikitsa. (aphrodisiac treatment)*). Hypertension is dreadful disease which is multifactorial in its origin with a chronic aetio - pathogenesis. So it falls in the *Madhyam Rogamarga (intermediate route) & hence it is Yasya disease (difficult to cure)*.

This explains the 5 key areas where progress is needed to advance hypertension control and treatment. Achieving maximum benefit will require convergence of these areas.

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