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

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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 actio - 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 Yapa 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 Yapa disease and falls under the Madhyam Rogamarga and it is difficult to cure.

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 people.

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 approach.

In modern medicine, antihypertensive drugs lower blood pressure but do not eliminate the risk of cardio - cerebro - reno - ophthalmal - 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 days.

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), Shiraagata Vata (G. N Chaturvedi - 1962), Ayrita 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), RaktaVriddhi (G. N Chaturvedi - 1981), RudhirMada (V. N Dwivedi - 1991), Raktavata (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 universally.

The disease Hypertension is abnormality of Rakta Dhatu, (Blood) and is popularly known as Shonita 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) Upakushaad pootigharaare also regarded maladies of Shonita Dusti (vitiates of blood).

Shiroruk (Headache) Klama (Nausea, Vomiting), Anidra (sleeplessness), Bhirma (imbalance of the body), Buddi Sammohaa (Sluggishness in Intelect), Kampa (Tremors) etc.

More to add, Mada (Delerium, Moorcha (Stupor) and Sanyasa (Coma), the different diseases caused by Shonita Dushthi (vitiates of blood) are described also as progressive manifestation of increasing Shonita Dusthi. So also, such a sequel is equally true in relation to malignant Hypertension.

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When the principles of Dosha, Dhatu, and Mala theory pathology are applied, the essential hypertension appears to be centred on Shonita Dhatu and Tridosh. There is a need to understand the disease's cause, pathogenesis, acuteness, chronicity, complications, and symptomatology, as well as its overall management.1

**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 Kaptha (Predisritional factors), asthi meda etc. affects blood pressure. Kaptha vitiation (avalambak kapha) increases cardiac strength but due to sluggishness of kapha, it decreases the kapha and on other hand Pitta (sadakhat pitta) and Vata (vyan vata) vitiation increases blood pressure. Here one thing must be clarified that term for blood circulation is not the rakta samvahanah (transportation of blood) but rasamudhavana (Circulation of Plasma) Ayurveda believes that rasa (plasma) is the circulating medium and not the rakta (blood).2

**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.

a) Alcohol intake (Madyapana)
b) Salt intake (Lavana)
c) Sedentary life style (Ati Snigdha, Madhur & Divaswapan)
d) Mental Stress. (Krodha, Bhaya, Shoka)
e) Physical Strain (Shrama)
f) Seasonal variations (Ruta Sandhi)

Nidanarthkara Roga – Madhumeha (Diabetes), Shhoolya (obesity), Hiridroga (Heart disease), Vrika roga (Renal disease) are the precipitating diseases to form secondary hypertension.9

**Pathogenesis of Hypertension in Ayurveda**

Ati lavana sevana (Excessive salt intake), madyapana (Alcohol consumption) snigdha bhoojana (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 vitiate 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.10

**SYMPTOMATOLOGY**

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

**Principle of Management**

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 Dosh, intensity of symptoms and involved relevant target organ damage in the pathogenesis.

**Management of Essential Hypertension**

It can be understand 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 Sravana (Bloodletting).

1) Vatapradhada Vatapitta: (Stress, Senility or Neurotic) - Manobrimhana (Psychological up gradation) and Mudhnitaila usage (Group of Procedures for Mental relaxation)
2) Pitta pradhan Vatta pitta: Virechana, Raktamokshan (bloodletting).
3) Kapapradhada 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.

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<th>Therapy Management</th>
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<tr>
<td>Hridaya</td>
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<td>Srotasprasadana</td>
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Fiber rich diet is the form of unrefined whole grain, water soluble dietary fibers can be incorporated into diet & result in significant lowering of cholesterol (4weeks) 16.

1) Omega 3 fatty acids can be gained by eating fish at least twice a week.
2) Avoid beverages and food that contain added sugars.
3) Avoid table salt or take low salt diet.
4) 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)
5) Barely butter milk, curd water, cow’s urine, kanji (sour vinegar), tila taila etc 17.

Modern Treatment View

Transforming Hypertension 18

1) Digital Transformation
2) Biotech And Biomedical Transformation
3) Health Care Delivery Transformation
4) 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, 3 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 device 19 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)

In An Emergency this Smartwatch will Save Your Life – Smartkavach 21

- 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.2
- 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 Intelligence 22

- 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 Transformation 23

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 Therapy 24

This procedure uses radiofrequency ablation to burn the nerves in the renal arteries to treat HTN. It was successfully performed in CIMS hospital, ahmedabad. Currently it is available in
- BLK super speciality hospital; Delhi
- Global hospital; Chennai
- Apollo super speciality hospital; Bangalore 23

Baroflex Activation Therapy 25

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 Stimulation 26

Is a surgical procedure in which electrodes are implanted in certain areas of brain. It is currently available in
- Yeshwanthpur Neurosurgeons Hospital; Bangalore
- Narayana Super Speciality Hospital; New Delhi

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Renal Artery Stenting
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 Interference
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
- 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
- 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 & don'ts), Shamana (pacification) & Shodhan (biopurification), Rasayan (immunomodulatory), and Vajikaran Chikitsa. (aphrodiasiac 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 Yapyya 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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