



Case Study

## PERIPHERAL VASCULAR RESISTANCE IN HYPERTENSION: AN AYURVEDIC INTERPRETATION THROUGH *STHAULYA*

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### ABSTRACT

Ayurveda, with its holistic understanding of physiology and pathology, offers valuable insights into the etiopathogenesis of hypertension through the concepts of *Dosha*, *Dhatu*, and *Srotas*. Ayurveda recognises *Sthaulaya* (obesity) as a *Santarpanjanya vyadhi* that lead to systemic *Srotorodha* (obstruction in body channels) contributing to circulatory disturbances.

**Objective:** The present review aims to explore the role of obesity (*Sthaulya*) in the pathogenesis of increased peripheral vascular resistance in hypertension from an Ayurvedic perspective and to correlate these classical concepts with contemporary biomedical understanding. **Materials and Methods:** A comprehensive review of classical Ayurvedic texts, including *Charaka Samhita*, *Sushruta Samhita*, was undertaken. Relevant contemporary medical literature, published research articles, and recent scientific updates from standard biomedical databases were also analyzed to elucidate the etiological factors and pathophysiological mechanisms of hypertension. **Results:** Obesity (*Sthaulya*), characterized by *Medo Dhatu Vriddhi* and *Medo-Dhatvagni Dushti* (disturbed fat metabolism), causes structural and functional alterations in blood vessels, leading to increased peripheral vascular resistance. Also, it plays a key role in vascular remodelling of the *Sira* (vessel), responsible for body circulatory mechanism. **Conclusion:** Hypertension can be comprehensively understood as a multifactorial disorder involving the interplay of *Vata*, *Pitta*, and *Kapha* through disturbances in *Dosha*, *Dhatu*, and *Srotas*. Obesity act as key modifiable etiological factors. Integrating Ayurvedic principles with modern scientific knowledge may provide a broader conceptual framework for understanding hypertension and may support the development of holistic preventive and therapeutic strategies.

### INTRODUCTION

Although modernization has significantly improved convenience and efficiency in daily life, it has also led to profound lifestyle changes that increase vulnerability to non-communicable diseases. Disordered dietary habits, physical inactivity, and chronic psychological stress disrupt mental equilibrium and physiological balance, resulting in psychosomatic imbalance. Such disturbances contribute substantially to the emergence of lifestyle-

related disorders, including dyslipidemia, obesity, and hypertension.

According to the World Health Organization, approximately 1.4 billion individuals aged 30–79 years were affected by hypertension globally in 2024 [1]. In India, hypertension represents a major public health concern, contributing to nearly 57% of stroke-related mortality and 24% of deaths due to coronary heart disease[2]. Furthermore, findings from the ICMR–INDIAB study (2023–2024) indicate that over 315 million Indian adults- representing nearly 30–35% of the adult population- are living with hypertension. Uncontrolled hypertension is a well-established risk factor for serious complications involving vital organs, including the brain, heart, kidneys, and peripheral vasculature [3].

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In approximately 95% of cases, the precise etiology cannot be clearly determined, categorizing it as essential hypertension, although genetic susceptibility and environmental influences are acknowledged as significant contributing factors.<sup>[4]</sup>

Hypertension is commonly described as a “silent disease,” as nearly 85% of affected individuals remain undiagnosed owing to the absence of overt clinical manifestations.<sup>[5]</sup> But its relationship with obesity is loud and evident.

Obesity is classified by the World Health Organization (WHO) as a chronic, relapsing disease arising from complex interactions between genetics, neurobiology, eating behaviours, access to healthy diet, market forces, and the broader environment. In the last decades, obesity has expanded globally as countries have experienced greater food security, socioeconomic development, and shifts in diet, physical activity, and societal and individual behavior driven by globalization and industrialized food systems. These forces have created increasingly obesogenic environments, contributing to what is now a global public health crisis with more than 1 billion people living with obesity and prevalence rising in nearly every country.<sup>[6]</sup>

From an Ayurvedic perspective, hypertension is not described as a distinct *Vyadhi* but is understood as *Anyukt Vyadhi* through the assessment of functional imbalances involving *Doshas*, affected tissues (*Dūṣyas*), and deranged *Srotas*. Obesity (*Sthaulya*) is considered major key factor in its manifestation. Various *Ayurvedic* scholars have proposed interpretations to explain the condition; however, a universally accepted and standardized model of its *Samprapti* remains lacking, resulting in diverse viewpoints and ongoing scholarly discourse. Against this background, the present study seeks to comprehensively elucidate the pathogenesis of increased vascular resistance in hypertension with special reference to obesity as causative factors, integrating classical Ayurvedic concepts with contemporary scientific understanding while critically examining existing perspectives.

#### AIM AND OBJECTIVES

The present study aims to critically examine the contribution of obesity (*Sthaulya*) in the pathogenesis of hypertension from an Ayurvedic standpoint, and to establish a conceptual correlation by which *Sthaulya* directly contributes to vascular resistance observed in hypertension through classical principles and contemporary biomedical understanding.

#### MATERIALS AND METHODS

The study is based on an extensive review of classical Ayurvedic texts, relevant contemporary

literature, and recent research findings. In addition, scientifically validated information was sourced from internet-based databases to comprehensively analyze the etiological factors and pathophysiological mechanisms of hypertension from both *Ayurvedic* and modern medical perspectives.

#### Literature Review

#### Concept of Blood Pressure: Contemporary and Ayurvedic Perspectives

Contemporary medical science offers an in-depth explanation of the regulatory mechanisms and pathophysiology underlying hypertension. However, for a more holistic and integrated understanding, these modern concepts need to be interpreted and correlated with fundamental Ayurvedic principles. Hypertension is now understood as a multifactorial condition resulting from the interaction of genetic predisposition and environmental influences. Clinically, it is diagnosed when systolic and diastolic blood pressure values exceed defined thresholds associated with an increased risk of cardiovascular morbidity and mortality.<sup>[7]</sup>

Blood pressure is primarily determined by two key physiological parameters: cardiac output and peripheral vascular resistance. In this review, we aim to explore in greater depth the influence of obesity on peripheral vascular resistance, interpreting the underlying mechanisms through the lens of Ayurvedic principles.

#### Peripheral Vascular Resistance

Peripheral vascular resistance, also referred to as systemic vascular resistance, represents the opposition offered by blood vessels to blood flow and is a crucial determinant of arterial pressure. Vasoconstriction increases resistance, whereas vasodilation reduces it.<sup>[8]</sup> Anatomical and functional alterations in small arteries and arterioles play a significant role in modifying peripheral resistance<sup>[9]</sup>.

#### The Bridge correlating Obesity (*Sthaulya*) and Peripheral Resistance: Ayurvedic Explanation

- **Dhamini Praticaya (atherosclerotic changes/vascular stiffness)**

In Ayurveda, *Sthaulya* is classified as one of the *Ashta Nindita purusha* (eight despicable physical condition) described as a condition characterized by excessive accumulation of *Meda Dhatu* (adipose tissue)<sup>[10]</sup>. Intake of *Madhura* (sweet), *Snigdha* (unctuous), *Guru* (heavy) and high-calorie (fat-predominant) diet, as well as *Avyayam* (lack of physical activity), and excess daytime sleeping hours (*Divasvapana*) leads to *Medo-Vah srotodushti*<sup>[11]</sup>, that is disturbed lipid metabolism. And simultaneously, due to *Aashrya-aashriya bhav* (structural-functional relationship) there will be *Kapha Dushti* as well. Persistent nutritional overload weakens

*Medo-Dhatu Agni*, resulting in the vitiation of *Meda dhatu paachan* (improper digestion and absorption) which further causes formation and accumulation of *Ama* in body channels leading to the condition of *Dhamani pratichaya*. This can be correlated with

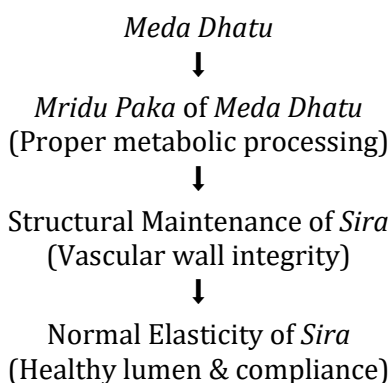
building up of plaque inside the blood vessels leading to condition of atherosclerosis which further give rise narrowed lumen and vascular stiffness ultimately leading to hypertension.



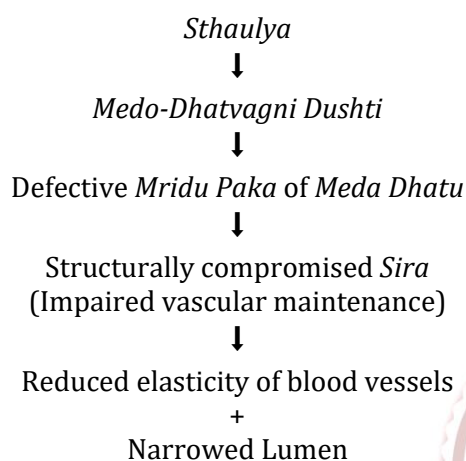
### Inadequate in Vascular Remodelling

Acharya Sushruta states that *Sira* (blood vessels) are formed from the *Mridu Paka* of *Meda Dhatu*<sup>[12]</sup>. Thus, *Meda dhatu* serves as a constant structural maintenance component of vascular channels. In *Sthaulya*, *Medo-Dhatvagni Dushti* leads to structurally compromised maintenance of *Sira*, resulting in reduced elasticity and narrowed lumen (endothelial hypertrophy). As whenever there is atherosclerotic narrowing of the vascular lumen, its not simply the result of enlargement of atherosclerotic lesion<sup>[13]</sup>. Rather than merely remodelling a narrowed lumen, blood vessels undergo several adaptive changes- such as an increase in external diameter- to

preserve adequate blood flow<sup>[14]</sup>. However, in *Sthaulya*, this adaptive capacity of the vascular wall to maintain an appropriate structural configuration that allows normal blood flow becomes impaired. Such anatomical and functional alterations lead to increased peripheral vascular resistance, compelling the heart to pump against higher resistance and ultimately resulting in elevated blood pressure

**Table 1**

Indicative Concept: *Meda Dhatu* → structural support & elasticity of vascular channels (*Sira*)

**Table 2**

↓  
Increased peripheral vascular resistance

## DISCUSSION

The present review emphasizes *Sthaulya* as a key etiopathogenic factor in the development of increased peripheral vascular resistance in hypertension. Evidence from contemporary medical science consistently associates obesity with vascular stiffness, endothelial dysfunction, and impaired vascular remodelling, leading to elevated peripheral resistance. These observations show close conceptual alignment with Ayurvedic principles of *Meda Dhatu Dushti*, *Srotorodha*, and *Dhamani Pratichaya*.

Classical texts describe *Sthaulya* as a *Santarpanajanya Vyadhi* and one of the *Ashta Nindita Purusha*, arising from excessive intake of *Madhura*, *Snigdha*, and *Guru Ahara* along with *Avyayama* and *Divasvapana*. These causative factors result in *Medovaha Srotodushti* and *Medo-Dhatvagni Mandya*, leading to accumulation of morbid *Meda* and *Ama* within the vascular channels. The resulting *Dhamani Pratichaya* can be correlated with atherosclerotic changes and vascular stiffness described in modern medicine, ultimately increasing peripheral vascular resistance and blood pressure.

*Acharya Sushruta's* description of *Sira* formation from the *Mridu Paka* of *Meda Dhatu* highlights the essential role of *Meda* in maintaining vascular integrity and elasticity. In *Sthaulya*, impairment of *Medo-Dhatvagni* leads to defective vascular maintenance and loss of adaptive remodeling capacity. This results in persistent luminal narrowing, increased vascular rigidity, and heightened peripheral resistance, forcing the heart to pump against greater pressure.

From a therapeutic perspective, these insights reinforce the importance of *Nidana Parivarjana* (elimination of causative factors) as the first and most crucial step in disease management. Avoidance of *Santarpana Ahara*, correction of sedentary lifestyle, and regulation of sleep patterns directly address the root causes of *Sthaulya* and prevent further *Meda* accumulation. As correction of lifestyle factors responsible for *Meda vrddhi* directly address the root causes of the disease rather than merely suppressing its manifestations.

Simultaneously, *Samprapti Vighatana* (breaking the pathogenesis) through *Agni Deepana*, *Ama Pachana*, *Meda Shodhana*, and restoration of *Srotas* patency helps in reversing the pathological sequence leading to increased peripheral resistance. Such an approach not only aids in blood pressure control but also contributes to long-term cardiovascular health.

The limitations of this review include its conceptual and interpretative nature and the limited availability of direct clinical evidence correlating specific Ayurvedic entities with vascular parameters. Nevertheless, the integrative understanding presented offers valuable implications for holistic hypertension management and underscores the need for future clinical studies evaluating Ayurvedic interventions on vascular resistance and obesity-related hypertension.

## CONCLUSION

*Sthaulya* plays a pivotal etiopathogenic role in the development of hypertension by promoting *Meda Dhatu Dushti*, *Srotorodha*, and *Dhamani Pratichaya*, which collectively lead to increased peripheral vascular resistance. Interpreting obesity-related vascular changes through Ayurvedic principles provides a holistic understanding of hypertension beyond symptomatic blood pressure control. Emphasis on *Nidana Parivarjana* and *Samprapti Vighatana* through dietary regulation, lifestyle modification, and correction of metabolic dysfunction offers a rational and sustainable approach for the prevention and management of hypertension. Integrating these *Ayurvedic* principles with contemporary medical care may enhance long-term cardiovascular outcomes.

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