ABSTRACT

Hypertension i.e., increased blood pressure is itself a cause of various cardiac and other vascular diseases like CHF, IHD, CHD, Stroke, renal failure etc. According to Ayurveda patho-physiology of Hypertension can be correlated with naantamaja kapha vyadhhi i.e., dhamanipratichaya. There are many single herbal medicines that have direct action on heart and various abnormal cardiac conditions. Shunti (Zingiber officinale) is one of the herbal medicinal plant mentioned as ‘Hridya’ i.e., action on heart (useful in various cardiac conditions) by Acharya Charak and Sushruta. Shunthi by its medicinal properties improves functions of heart and maintain elasticity of walls of blood vessels, so it is useful to maintain and cure hypertension.

Keywords: Hypertension, Shunthi (Zingiber officinale), Dhamanipratichaya, Cardiac conditions.

1. INTRODUCTION

Hypertension i.e., increased blood pressure is a serious medical condition that significantly increases the risk of heart, brain, kidney and other vascular diseases. It is also a major cause of early death in all over world and is a life-threatening condition of today’s era. Blood pressure is the force exerted by circulating blood against the major blood vessels wall in the body. It is written as two numbers- systolic pressure / diastolic pressure. i.e., 120/80. Systolic pressure means pressure in the blood vessels during contraction of heart and diastolic blood pressure is pressure in the vessels when heart is in relaxed stage between two beats. Hypertension is diagnosed when systolic pressure is more than 140 mmHg and diastolic blood pressure is more than 90 mmHg on two different days. In the earlier stage, most of the patients are asymptomatic and unaware about problem hence it also called a “silent killer.” Today’s sedentary life style, obesity, unhealthy diet and food, lack of exercise, stressful jobs, night shifts and consumption of tobacco, alcohol are increasing prevalence of hypertension day by day. Hypertension gradually develops in body due to various abnormal cardiovascular conditions and it is itself a cause of various cardiac and other vascular diseases like CHF, IHD, CHD, Stroke, renal failure etc.

According to Ayurveda patho-physiology of gradually developing hypertension can be correlated with naantamaja kapha vyadhhi i.e., dhamanipratichaya. Blood vessels i.e., Sira and Dhmani are made up from Mansa and Meda dhatus, and blood flowing through these vessels is a mixture of Rasa-Rakta dhatu along with prakrut Kapha and Piita dosha, and this flow of blood is due to force exerted by Vyan vayu. Abnormal increase in Mansa and
Meda dhatu, increases thickness of inner vessel wall, which decreases lumen of blood vessels and becomes thick and narrow which resist flow of blood (Ras-Rakta dhatu and Vyan Vayu) and increases blood pressure. Further, if this obstruction of dhatus and Vata persist longer, then Ruksha guna of Vata dries Kapha dosha and Rasa-Rakta dhatu which decreases elasticity of blood vessels and leads to atherosclerosis / hardening of blood vessels i.e., Dhamani paratichaya. In Ayurvedic texts and brihattrayee, there are many medicinal plants are mentioned as ‘Hridya’ i.e., action on heart (useful in various cardiac conditions). Shunthi (Zingiber officinale) is one of the medicinal plants mentioned as ‘Hridya’ by Acharya Charak and Sushruta. Shunthi by its medicinal properties improves functions of heart and maintain elasticity of walls of blood vessels, so it is useful to maintain and cure hypertension.

In this article various clinical and animal trials of Shunthi extracts on hypertension and cardiovascular conditions are reviewed. Also, chemical constituents, active principles and ayurvedic medicinal properties of Shunthi in terms of Rasa, Veerya, Vipaka, Guna and Karma are reviewed. After reviewing its ayurvedic medicinal properties and scientific clinical trials, probable mode of action of Shunthi on hypertension with different cardiovascular conditions is explained by Ayurvedic and modern prospective.

2. METHODS

References from Ayurvedic texts and bhratrayee which shows usefulness of Shunthi in cardiovascular conditions were collected. Medicinal properties of Shunthi in terms of Rasa, Veerya, Vipaka, Guna and Karma were reviewed. Chemical constituents and active principles of Shunthi were reviewed from scientific journals. Various animal and clinical trials of different extracts of Shunthi were reviewed from scientific journals and articles. Probable mode of action of Shunthi on different cardiovascular conditions is explained by both Ayurvedic and modern prospective.

3. RESULTS

3.1. Ayurvedic medicinal properties of Shunthi

Acharya Charak has mentioned hridya and vata -shleshm vibandhahar property of ginger (Shunthi) in annapanvidhi adhyaya of surasthana. Acharya Sushruta also mentioned Shunthi as hridya in annapanvidhi adhyaya of surasthana. Raj nighantu and Bhavpraksha nighantu mentioned vibandhahar property of Shunthi, i.e., release obstruction in the way of dosha and dhatu viz. rasa-rakta dhatu and vyana vayu etc. Bhavamishra explained pharmacological properties of Shunthi in Haritakyadi varga of Bhavaprakash Nighantu. He stated that Shunthi possess katu-madhur rasa (taste), madhur vipaka (taste after digestion) and ushna virya. Also, snighdha and sukshma guna. Due to these medicinal properties, Shunthi acts as hridya i.e., useful in various cardiovascular conditions and release vibandha (obstruction) in the ways of blood vessels.

3.2. Chemical constituents and active principles

Active ingredients present in Shunthi are terpenes and oleoresin called ginger oil, phenolic compounds i.e., gingerol, shogaol and lipophilic rhizome extracts are major components from terpene. Potentially active gingerols can be converted to shogaols, zingerone, and paradol. Ginger and it’s all constituents- gingerol, shogoal, zingeron, paradol, flavonoids show antioxidiant activity and prevent damage of macromolecules caused by the free radicals or oxidative stress. Gingerol, shogoal, zingeron also shows anti-inflammatory activity. Chief active principle gingerol shows cardio tonic activity- potent positive inotropic effect on guinea pigs isolated left atria.

3.3. Animal and clinical trials of different extracts of Shunthi

Shown in Table No. 1.

4. DISCUSSION

From various animal studies, evidences
shows that Shunthi extract exert effects on blood pressure and heart rate directly and indirectly. In Guinea pig paired atria model, crude extract of Shunthi shows cardio-depressant effect on the rate and force of spontaneous contractions. In thoracic aorta model of rabbit, Shunthi extract relaxes vascular contraction induced by phenylephrine. As like to the effect of verapamil, the crude extract of Shunthi shows shifting of Ca\(^{2+}\), dose–response curves to the right, which confirmed Ca\(^{2+}\) channel-blocking activity of shunthi. Also, Shunthi extract acts on both types of calcium channels i.e. membrane-bound and the intracellular Ca\(^{2+}\), as it shows inhibition of the phenylephrine control peaks in normal Ca\(^{2+}\) plus and Ca\(^{2+}\)-free solutions. All these studies indicate that the Shunthi lowers blood pressure through blockade of voltage dependent calcium channels. In another paper, Shunthi extract by its PPAR agonist action, attenuate PAAC induced increase in CK-MB and LDH levels on (PAAC) model of rat.

The probable mechanism of action of Shunthi can be stated from above mentioned animal and clinical trials. Calcium channel blocker action Zingiber Officinale inhibits influx of calcium ion into cell membrane which causes relaxation of blood vessels and ultimately reduces blood pressure. Inhibited entry of Ca\(^{2+}\) ions into smooth muscle walls of blood vessels causes vasodilatation and decreases blood pressure Peroxisome proliferator activated receptor (PPAR\(\alpha\)) is expressed in tissues like the liver, kidney intestine skeletal muscles and heart and is primarily involved in fatty acid oxidation. Activation of these PPAR\(\alpha\) inhibits pro-inflammatory responses of vascular smooth muscle and attenuating the development of atherosclerosis. Zingiber Officinale activates PPAR (Peroxisome proliferator activated receptor) on myocytes and vascular smooth muscles which increase oxidation of fatty acid and reduce chances of atherosclerosis and reverse cardiac hypertrophy, decreases oxidative stress.

According to Ayurveda blood vessels i.e., Sira and Dhmani are made up from Mansadharakala and mrudupaka of Meda dhatu. RBC, WBC, Platelets, Plasma these components of blood can be correlated with rasa and rakta dhatu. This mixture rasa and rakta dhatu along with prakrut kaph and pitta dosa is continuously flowing through sira and dhaman. This flow of blood (rasa-rakta dhatu) through vessels is due to force exerted by vyana vayu. Abnormal increase in mansa and meda dhatu increases thickness of inner wall of blood vessel called as dhamani upalepa which decreases lumen of blood vessel i.e., dhamani atipuran and become thick and narrow which resist flow of blood (rasa-rakta dhatu and vyana vayu) and increases blood pressure. Further, if this obstruction persists longer, the ruksha guna of vata dries kapha dhatu and oiliness of mansa dhatu (vasa), which decreases elasticity of blood vessels and leads to hardening of blood vessels called atherosclerosis i.e., Dhamaniparatichaya.

Shunthi by its vibandhahar property, destroy obstruction in the ways of blood and also due to its snigdha (unctuous) guna decreases rukshata (dryness) of vata and maintain elasticity of blood vessels which results in decrease in blood pressure. Acharya Charaka and Sushruta mentioned that Shunthi possess Hridya property i.e., Action on heart. Charaka also mentioned, Shunthi is useful in vatsashleshma vibandha i.e., obstruction caused by Kapha and Vata dosha. This vibandha (obstruction) may occurs anywhere in the body e.g., obstruction in blood vessels, lymphatic channels, intestinal lumen etc. This obstruction further causes vata and kapha disorders. Increased blood pressure in hypertension is one of the vata-kapha disorders. Increased kapha dosha in blood causes vitiation of rasa rakta dhatus and obstruction in the way of blood. Dryness of vata dosha causes hardening of blood vessels which results in increased blood pressure. Shunthi by its hot potency liquefy the kapha dosha and its snigdha guna pacify dryness of vata, which may help to remove obstruction in the way of blood/lumen. Snigdha guna of Shunthi also improves elasticity of blood vessels which further improve endo-
5. CONCLUSION

- **Shunthi** reduces blood pressure and cardiac hypertrophy by activating PPAR receptors on heart and blood vessels.
- **Shunthi** reduces blood pressure by inhibiting entry of Calcium ions in to the cell. (CCB action)
- **Shunthi** reduces blood pressure by reducing obstruction of flow of blood through its *vibandha har* property.
- **Shunthi** reduces blood pressure by reducing dryness of *vata* and maintain elasticity of blood vessels though its unctuous (*snigdha*) property.

REFERENCES

19. L.S. Ojulari, O.T. Olatubosun1, K.B. Okesina1, B.V. Owoyele. The Effect of Zingiber Officinale (Ginger) Extract on Blood Pressure and Heart Rate in Healthy Humans. IOSR Journal of Dental and Medical


22. Ibidem 3, Sutrasthana: Chapter 14, Verse 13, p. 62

---

**Table No. 1. Animal and clinical trials of different extracts of Shunthi**

<table>
<thead>
<tr>
<th>Anti-hypertensive Activity</th>
<th>Model</th>
<th>Extract / formulation</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anesthetized rats ¹⁶</td>
<td>Crude extract</td>
<td>Dose-dependent (0.3–3 mg/kg) fall in the arterial blood pressure.</td>
</tr>
<tr>
<td></td>
<td>Guinea pig paired ¹⁷ atria</td>
<td>Crude extract</td>
<td>Cardio-depressant activity on the rate and force of spontaneous contractions.</td>
</tr>
<tr>
<td>Animal Trial</td>
<td>Rabbit thoracic aorta preparation ¹⁷</td>
<td>Crude extract</td>
<td>shifted the Ca²⁺ dose–response curves to the right, similar to the effect of verapamil, confirm Ca²⁺ channel-blocking activity.</td>
</tr>
<tr>
<td></td>
<td>Partial abdominal aortic constriction (PAAC) model of rat ¹⁸</td>
<td>Crude extract</td>
<td>inhibited the phenylephrine control peaks in normal Ca²⁺-plus and Ca²⁺-free solutions, indicating that it acts at both the membrane-bound and the intracellular Ca²⁺ channels.</td>
</tr>
<tr>
<td></td>
<td>Healthy Humans ¹⁹</td>
<td>Extract</td>
<td>significantly attenuated PAAC-induced increase in LVW/BW, LVWT, LV protein content, LV RNA concentration and collagen deposition in a dose-dependent manner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>attenuated PAAC induced increase in CK-MB and LDH levels perhaps due to PPAR agonist action</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Decreases MABP induced by cardiac hypertrophy due to PAAC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>shows dose-dependent blood pressure lowering effect</td>
</tr>
</tbody>
</table>
Cite this article as:
DOI: http://dx.doi.org/10.51446/IJRAMS.2021.4107

Source of Support: Nil; Conflict of Interest: None declared.