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A REVIEW ON ANTIHYPERTENSIVE EFFECT OF MADBHANJAN CHURNA WITH EQUAL QUANTITY OF TRIKATU CHURNA, A TRADITIONAL FORMULATION OF BENGAL

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ABSTRACT

According to world health organisation (W.H.O) a systolic blood pressure of 140 mm of Hg or more and diastolic blood pressure of 90 mm of Hg or more is considered as hypertension.[2] Hypertension being a chronic non-communicable disease constitutes an important public health challenge because of its prevalence and concomitant increase in risk of cardio-vascular diseases.[4] In Ayurveda root of sarpagandha (*Rauwolfia serpentina*) is used since ages for treating hypertension. Reserpine is an indole alkaloid extracted from sarpagandha roots. It was extracted with a motive of treating hypertension in a better way. Previously it was used as first line of treatment for hypertension but currently medical fraternity is refraining from using reserpine (indirectly sarpagandha) as the choice of drug for hypertension because researches are showing various *adverse effects* of reserpine including mental depression, fatigue, sadness and suicidal ideation.[3] In Bengal madbhanjan churna, which is only sarpagandha root powder is used with equal quantity of Trikatu churna for treating hypertension from a long time without any adverse effects. Using trikatu helps in decreasing the blood pressure itself, and overcome the adverse effects of reserpine. Trikatu is composed of equal quantity

of sunthi *(Zingiber officinale*), marich (*Piper nigrum* Linn.) and pippali (*Piper longum* Linn.). Piperine is a phytoconstituent found in both marich and pippali, which has anti-depressant property as well as anti-hypertensive property.[5,7] Sunthi has also anti-hypertensive[12] and anti-depressant property.[6] When we use sarpagandha (indirectly reserpine) with trikatu even for a long time, it shows no adverse *effect* of reserpine, besides it has multiple benefits.

KEYWORDS: Sarpagandha, Trikatu, Reserpine, Hypertension.

INTRODUCTION

Hypertension is ranked as third most important risk factor for attributable burden of disease in South Asia (2010). W.H.O rates hypertension as one of the most important cause of premature death worldwide.[1] According to W.H.O (2023) an estimated 1.28 billion adult aged 30-79 years world-wide have hypertension. Mostly (two-third) living in low and middle income countries. An estimated 46% of adult with hypertension are diagnosed and treated. Approximately 1 in 5 adults (21%) with hypertension have it under control. One of the global targets for non-communicable disease is to reduce the prevalence of hypertension by 33% between 2010-2030.[2] In Ayurveda the root of Sarpagandha has been traditionally used in management of hypertension and other diseases of central nervous system from a long time. The alkaloids, mainly reserpine, extracted from root of sarpagandha which has anti-hypertensive action. Initially rauvolfia, was extracted and later on reserpine was isolated with an objective of predictable and better efficacy in management of hypertension. Reserpine was used as first line antihypertensive drug with clear efficacy including for individual with refractory hypertension. Currently, it is used as second line treatment. Its use dropped down following report of depression after treatment (2004).[3] Psychiatric complication including sadness, fatigue and suicidal tendency was observed if sarpagandha is used for a long time.[3] Effect of reserpine in madbhanjan churna (root powder of sarpagandha) is being used with equal quantity of trikatu churna since ages. Trikatu churna consist of equal quantity of sunthi, maricha and pippali. This combination protects the individual from all the adverse effect of reserpine found in sarpagandha and thus not showing any side effects like depression, sadness, fatigue or suicidal tendencies, in the patients, inspite of using sarpagandha for a long time in hypertensive patients. Moreover, using trikatu additionally supports sarpagandha in lowering the blood pressure in the patients. Using trikatu also have many other benefits.

MATERIALS AND METHODS

An extensive literature review has been carried out related to hypertension which include ayurvedic texts as well as modern textbooks along with various journals from pubmed, google scholar, Research gate etc. The information have been collected and presented in a systematic way.

RESULT AND DISCUSSION

Reserpin[8] Reserpine is an indole alkaloid extracted from root of *Rauwolfia Serpentina* (Sarpagandha). It became commercially available in western medicine in 1952 after being used for centuries in Indian medicine for a variety of illness. It is one of the first agent developed to treat hypertension in clinical practice. It was used as first line anti-hypertensive therapy when initially introduced but currently used as second line of treatment. This change in status is due to various adverse effects. It was developed with intension of better management of hypertension. Recent studies examined the association between reserpine and depressogenic action.[8] The first reports of depression in humans, as a potential consequence of resepine, emerged in early 1950. Fries (1954) observed psychiatric complication including sadness, fatigue and suicidal ideation in five patients with hypertension, treated with large doses of reserpine.[9,3]

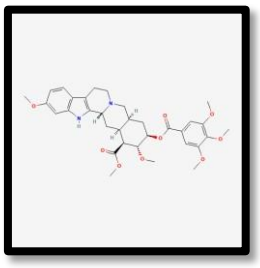
Mechanism – Reserpine functions as a sympatholytic agent and antihypertensive medication by acting as an adrenergic uptake inhibitor. Reserpine is lipid soluble, so it can cross the blood-brain barrier and slow the activity of nervous system, resulting in decreased heart rate, decreased cardiac output, decreased peripheral resistance and lowers the blood pressure.

Administration – For hypertension: Orally start initially at 0.5 mg once a day with or without food, for 1 or 2 weeks. For maintenance, reduce 0.05to 0.25 mg daily.

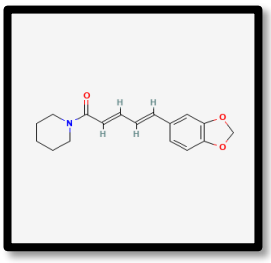
Adverse effect – Side effects commonly occur when patients have taken tricyclic anti-depressants before starting reserpine. Nasal congestion, dizziness, drowsiness, depression, headache, nausea, vomiting, diarrhoea, loss of appetite, dry mouth, arrhythmias, syncope and gastrointestinal upset.

Contra-indications: Active peptic ulcer, ulcerative colitis, electroconvulsive therapy, pregnancy, Parkinson's disease, Psychiatric depression etc.

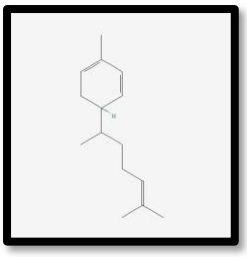
Trikatu[10]**:** Trikatu has equal quantity of sunthi, maricha and pippali.



Reserpine



Piperine



Zingiberene

Table 1: Composition and rasapanchak of Trikatu.

	Sunthi	**Maricha**	**Pipali**
Botanical name	*Zingiber officinale* Gaertn.	*Piper nigrum* Linn.	*Piper longum* Linn.
Family	Scitaminae	Piperaceae	Piperaceae
Rasa	Katu	Katu	Katu
Guna	Guru, Ruksha, Tikshna	Laghu, Tikshna	Laghu, Tikshna, Snighda
Virya	Usna	Usna	Usna
Vipak	Madhura	Katu	Madhura
Prabhav	-	-	-
Karma	Vata kapha hara, deepan.bhedan	Kapha-vaat hara Dipan, pramathi	Vata- kapha hara Dipan, vrsya, rasayan
Indications (mainly)	Sula, amavata, adhman, atisara, kasa, swas, hrdroga, sopha, arsa, hikka, pandu, jvara Kusta, agnimandya.	Pinas, kasa, krimi Pravahika, hridroga Sula.	Udar, pliha roga Jwar, kustha, prameha, Gulma, arsa, sula Ama vata.
Chemical compositions (mainly)	Zingiberenes, zingiberol, Gingerols	Piperene, piperethine Piperolin, ascorbic acid	Piperine, Pipercide, Piperlatin

Other pharmacological activities of trikatu

Sunthi[6]: Pharmacological and phytochemical studies of sunthi reveals that it is *anti-depressant* (Sunthi has been found to act as an anti depressant in rat model.[11]), digestive disorders, anti arthritis, anti-oxidant, anti-inflammatory., anti-microbial, anti-cancer, anti-diabetic, hepato-protective, anti-emetic[12], anti-coagulant[12] hypo-lipidemic[12], *anti-hypertensive*.[12] Oral administration of Zingiber officinale rhizome hydro-alcoholic extract in rats caused a decrease in the duration of immobility in the forced swim and tail suspension tests thereby demonstrating the anti-depressant activity of this plant. 132 In silico studies have indicated that the Z. officinale constituents gingerol and shogoal can bind to 5- HT1A which warrants further investigation as a mechanism of action behind the *anti-depressant* activity of this plant.[6] Mainly rat studies, have suggested that ginger exerts many direct and indirect effects on blood pressure and heart rate. More recently, Ghayur and Gilani reported that the crude extract of ginger induced a dose-dependent (0.3–3 mg/kg) fall in the arterial blood pressure of anesthetized rats. In Guinea pig paired atria, the crude extract exhibited a cardio

depressant activity on the rate and force of spontaneous contractions.[13] These studies have confirmed *anti-hypertensive* effect of sunthi. Katu rasa of sunthi helps in overcoming adverse effect of reserpine like nasal congestion, dizziness, drowsiness, deepan karma of sunthi helps in overcoming gastrointestinal adverse effect of reserpine. Administering sunthi with sarpagandha helps sarpagandha to manage hypertension in a better way and moreover anti-depressant activity of sunthi also helps in overcoming the adverse effect of reserpine which includes, depression, suicidal tendencies.

Marich[7]: Piperine found in marich has many properties which is found during phytochemical and pharmacological studies(pharmacological activities of the extract, piperine, black pepper essential oil)[7]– Antioxidant, anti-inflammatory, anti-bacterial activity, anti-cancer activity, anti-obesity activity, anti-ageing and wrinkling, *antihypertensive activity*, antiasthmatic activity, *antidepressant*, anticonvulsant, insecticidal activity, analgesic, hepatoprotective and bronchodilator. Due to Piperine in marich, it acts as *anti-hypertensive*. And this activity of marich with sarpagandha helps to lower the blood pressure in a better way. Due to same phytochemical in it, it is also an anti depressant. and thus giving marich with sarpagandha (indirectly reserpine) in equal quantity overcome its adverse effect of depression. Katu rasa and vata kapha hara property of marich helps with nasal congestion, dizziness, drowsiness and headache. its deepan karma helps in overcoming nausea, vomiting, diarrhoea, loss of appetite and other gastro intestinal upset.

Pippali[14]: The phytochemicals which are found in pippali found to have following pharmacological effects. - Immunomodulatory action, stimulant effect, anti bacterial, anti asthmatic, bio availability enhancement, hepato protective, hypo cholesterolemic, anti-inflammatory, anti-amoebic. Piperine, a major alkaloid of Piper longum (also in *Piper nigrum*) presents analgesic, antiinflammatory, anticonvulsant, antioxidant, *antidepressant* and cognitive-enhancing effects as well as *antihypertensive* effects.

CONCLUSION

Root powder of *Sarpagandha* (indirectly reserpine) when given with trikatu shows no adverse effects even when used for a long time. We can use sarpagandha safely with equal quantity of trikatu in hypertensive patient. Using trikatu with sarpagandha has many other benefits. It overcomes the adverse effects of reserpine. It helps in overcoming gastro-intestinal issues which are found as adverse effects of reserpine, moreover trikatu itself is having anti-hypertensive property so it acts synergistically with sarpagandha to reduce hypertension.

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