



### Research Article

## ROLE OF DHUMAPANA (NEBULIZATION) AND PANA WITH ARDRAKA ARKA IN THE MANAGEMENT OF TAMAKA SHWASA

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### ABSTRACT

*Tamaka Shwasa* is one among the major disease explained in *Ayurveda* is caused due to vitiation of *Kapha* and *Vata dosha* in *Pranavaha srotas*. The condition is analogous to bronchial asthma as explained in modern medical science. India has an estimated 15-20 million Asthmatics every year and the disease occurs at very young age that survey states one in every six child under the age of 16 is affected.

Asthma is characterized by recurrent attacks of breathlessness and wheezing which vary in severity and from person to person. It is a chronic condition, which frequently requires continuous medical care, comprising of different routes of administration and the important one is the inhalation route which has been developed to administer the drugs by delivering to site of action and to get immediate effects. Most of our *Acharyas* have explained different treatment modalities in the management of *Tamaka Shwasa* that consists of *Shodhana, Shamana* and *Tarpana*, but the concept of '*Arka prayoga*' is explained in *Arka Prakasha* which stands unique. The book written by *Ravana* has explained different drugs used to prepare *Arka* (Extraction of active principles through the distillation process), its preparation method, qualities and application of *Arka* on different diseases internally as *Pana* along with its dosage in detail. In the study during the attack of *Shwasa* one group was administered *Ardraka arka pana* and the second group was administered *Dhumapana* (inhalation) with *Ardraka arka* by Nebulization method to conceptualize the study and parallel new perspective to rising trend in management of asthma in exacerbated condition. Statistical significance of selected criteria showed highly significant results in *Dhumapana* (Nebulization) by proving that natural therapies like *Ayurveda* can provide a better direction in improving the quality of life of *Shwasa* patients without any adverse effects of medications.

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### INTRODUCTION

*Tamaka Shwasa*, one among the five varieties of *Shwasa* happens due to vitiation of *Kapha* and *Vata dosha* with the involvement of *Rasadi dhatus* in *Pranavaha Srotas*. It is a *Yapya vyadhi* (Palliative) which becomes *Asadhya* (incurable) when it reaches to chronicity more than a year. Here the vitiated *Kapha* in *Pranavaha srotas* obstructs *Vata* to produce *Shwasa lakshanas*<sup>1</sup>. The condition like "*Shwasane Krichra Jeevane*" refers to increased respiration with a

great distress, where the life is at risk. *Tamaka Shwasa* in severe condition is life threatening and needs emergency supportive measures, and an identical view is been given in *Charaka Samhita* in *Hikka Shwasa adhyaya* as an *Atyayika* condition (emergency condition). Among many clinical features explained in *Tamaka Shwasa* it can be inferred that only few symptoms like *Shwasa krichrata* (difficulty in breathing), *Kasa* (cough), *Gurguraka* (Wheezing) and *Pranapeedana* (discomfort) appears to be the

*Pradhana lakshana* can be considered as *Prathyatma lakshana* (Cardinal features) because these four symptoms are the direct manifestation of the pathological process.

Asthma is a chronic inflammatory disorder of airway characterized by a reversible airflow obstruction causing cough, wheeze, chest tightness and shortness of breath, which vary in severity and frequency from person to person. In an individual, they may occur from hour to hour and day to day.<sup>2</sup> Several stimuli trigger airway narrowing, wheezing and dyspnoea in Asthmatic patients. While the previous view held that these should be avoided, it is now seen as evidence for poor control and an indicator of the need to increase controller (preventive) therapy.

Asthma is one of the most common chronic diseases globally and currently affects approximately 300 million people worldwide. In developing countries where the prevalence of Asthma had been much lower, there is a rising prevalence, which is associated with increased urbanization. The prevalence of atopic and other allergic diseases has also increased over the same time, suggesting that the reasons for the increase are likely to be systemic rather than confined to the lungs.

**Table 1: Showing the risk factors involved in bronchial asthma<sup>3</sup>**

<b>Asthma Risk Factors</b>
Family History
Indoor Allergens
Emotional Disturbance
Exercise and hyperventilation
Whether change and cold air
Tobacco smoke

Frequent exposure to environmental factors or else repeated attacks of *Tamaka Shwasa* tends to weaken the *Pranavaha Srotas* there by worsening the situation. Chronic and recurrent occurrence of disease determines the poor prognosis of the *Tamaka Shwasa* in *Ayurveda*.

Regard to the management of this condition *Shodhana, Shamana, Nidana parivarjana* plays a major role in *Samprapthi vighatana* of the disease thereby balancing the *Doshas* involved. As the *Vata* and *Kapha* are the important *Dosha* and being *Amashayotha vyadhi*, *Shodana* is the best treatment by means of *Vamana* and *Virechana*.

The drugs used in conventional system are Anti inflammatory agent, long acting bronco dilators, antileukotrienes, short acting medicines like Beta2 agonists, anti cholinergic, phospho diesterase inhibition, glucocorticoids and anti-microbial which also has adverse effects like dry or irritated throat,

sneezing, stuffy or itchy nose, watery eyes, nose bleed, nausea, frequent urination, dizziness, drowsiness, headache, skin rash, bruising, severe tingling, numbness, pain, muscle weakness, joint pain and general illness.

In *Arka Prakasha* the author has explained intake of *Ardraka Arka* and its benefits in tackling the signs and symptoms of Asthma. In the prevailing situations the inhalation routes developed so far is the unsurpassed method to reduce the undesirable effects of systematic administration. In *Ayurvedic* literature, the inhalation of medicated *Dhooma* is called *Dhoomapana* and the procedure was advised in managing *Shwasa* particularly when *Alpadosha* is present in an episode. Thus keeping the importance of Nebulization in managing *Tamaka Shwasa* the classic preparation was conceptualized with certain modifications for convenience and which was also economical was taken up in one group and advised *Ardraka arka* Nebulization, whereas internal administration of *Ardraka arka* was advised in second group during the episodic attack of *Shwasa*.

#### AIMS AND OBJECTIVES

1. To evaluate the efficacy of *Ardraka arka Pana* in the management of *Tamaka Shwasa*.
2. To conceptualize *Ardraka Arka* for the purpose of *Dhoomapana* by inhalation method with certain modification and convenient administration.
3. To assess the therapeutic effect of *Arka Dhoomapana* in the form of nebulization in *Tamaka Shwasa*.
4. To compare the above two groups and ascertain the added effect of inhalation of aqueous extract of *Ardraka* (root) through nebulizer in *Tamaka Shwasa*.

#### MATERIALS AND METHODS

##### Source of data

Patient of *Tamaka Shwasa* attending the Outpatient Department of SKAMCH & RC, Bangalore was selected for the present study after the clearance from ethical committee of the institution. Written consent was taken from each patient willing to participate prior to the study and patients were free to withdraw from the study at any time without giving for any reason thereof.

##### Diagnostic criteria

Patient presenting with signs and symptoms of *Tamaka Shwasa* (Bronchial Asthma). The parameters with complaints of difficulty in breathing, wheeze, cough, expectoration (Sputum) and variation in normal Peak Expiratory Flow (PEF).

**Table 2: Showing the inclusion criteria and exclusion criteria for bronchial asthma**

INCLUSION CRITERIA	EXCLUSION CRITERIA
<ul style="list-style-type: none"> <li>• Patients of either sex between 10 to 70 years.</li> <li>• Patient presenting with <i>Lakshanas of Tamaka Shwasa</i> (Bronchial asthma).</li> </ul>	<ul style="list-style-type: none"> <li>• Other systemic disorders which interfere with the course of treatment.</li> <li>• Asthma associated with any upper respiratory or lower respiratory tract infection.</li> </ul>

**ABOUT THE MEDICAMENT**

In *Arka Prakasha*, while explaining different types of *Arka* preparations author mentions that *Ardraka Arka* is beneficial for *Tamaka Shwasa* because of its *Kapha Vatahara* and *Ushna* properties.<sup>4</sup>

**DRUG - ARDRAKA**

**Latin Name:** Zingiber Officinale

**Family:** Zingiberaceae

**Synonyms:** *Vishwa, Nagara, Vishwabheshaja, Ushana, Katubhadra, Shringavera, Mahoushadha.*

**Rasa panchaka**

**Rasa:** *Katu, Guna:* *Laghu. Veerya:* *Ushna. Vipaka:* *Madhura*

**Doshaghната:** *Kaphavatahara. Rogaghната:* *Swarabheda, Vamana, Swasa, Shoola, Kasa, Hridroga, Shoola, Shleepada, Arshas Udara, Anaha.*

**Chemical composition:** Out of all the chemical constituents Gingerol, Zingiberenes, Zingerol, Shogaol, isoproterenol, Essential oils are those which act on respiratory system.

**PREPARATION OF ARKA**

One part of fresh *Ardraka* was cleaned with water and smashed. Then it was transferred into a distillation apparatus with attached condenser. Twenty parts of water was added and the apparatus was closed securely. The apparatus was heated for 1 *Muhurta* (48 minutes) and then the *Arka* was collected which was draining out of the receiver after leaving first 5 to 7 drops. Then the *Arka* was collected till water is reduced to 50% of total water taken. The collected *Arka* was stored in an air tight glass bottle.<sup>5</sup>

**Inhalation principles**

Inhalation of chemicals prevents the most rapid and direct avenue of entry because of the intimate association of air passage in the lung with the circulatory system. When a foreign agent is inhaled it may be deposited in the respiratory tract and subsequently absorbed, exhaled or neutralized by the lungs defense. They are intended for administration to the lower respiratory tract for local or systemic effect by adversely affecting the functions of the mucosa of the respiratory tract and its cilia. The preparations are supplied in multi dose or single-dose containers provided with a suitable administration device. Two categories of preparations for inhalation may be distinguished: liquid and solid preparations like powders, tablets, capsules that consist of one more active ingredient.

These preparations are converted into an aerosol and are generally administered by nebulizers, by pressurized metered dose inhalers or by dry-powder inhalers.<sup>6</sup>

**Particle size and ph**

In inhalation liquid if the size and shape of particle, is less than 5 micron mili diameter it can affect their solubility (May and Kolthoff 1948). As particle size decreases the solubility will increase. The pH of the liquid used for inhalation should not be lower than 3. If a liquid is provided in concentrated form, it should be diluted in the nebulizer to the prescribed volume before use.<sup>7</sup>

The prepared *Arka* for the study was tested in Bangalore Test House for particle pointer and pH. The particle size in the prepared *Arka* was 5 micron mili diameter and pH was 5.

**STUDY DESIGN**

The study followed Randomized open case study of 10 subjects who satisfied the study criteria and were divided into two groups with 5 in each group, Group A (study group) and Group B (control group). The patients of Group A was treated with 5ml of *Ardraka Arka* nebulization and patients of Group B was given one *Pala* (48ml) of *Ardraka Arka* internally in single dose.

**Criteria for Assessment:** The assessment was done on improvement in signs & symptoms before treatment and 20 minutes after treatment in Group A and 40 minutes after treatment in Group B with the help of suitable scoring method ranging from 0 - 3.

The subjective & objective parameters considered are

**Table 3: Showing the subjective parameters and objective parameters for bronchial asthma.**

Subjective Parameters	Objective parameters
✓ Wheeze	✓ Respiratory rate
✓ Sputum	✓ Heart rate
	✓ Ronchi
	✓ Peak expiratory flow

**Statistical analysis:** The data obtained before and after the treatment were subjected for statistical analysis in terms of mean score, standard deviation (SD), and standard error (SE) and by applying paired test for validation of results.

**OBSERVATIONS AND RESULTS**

**Table 4: Showing the sex wise distribution of bronchial asthma**

Variables	Group A		Group B	
	Number	%	Number	%
<b>GENDER</b>				
Male	1	20%	3	60%
Female	4	80%	2	40%
<b>Total No. of patients</b>	5	100%	5	100%

**Table 5: Showing the age wise distribution of bronchial asthma**

Variables	Group A		Group B	
	Number	%	Number	%
<b>AGE IN YEARS</b>				
21-30	1	20%	0	00%
31-40	0	00%	1	20%
41-50	2	40%	1	20%
51-60	1	20%	2	40%
61-70	1	20%	1	20%
<b>Total No. of patients</b>	5	100%	5	100%

**Table 6: Showing the education wise distribution of bronchial asthma**

Variables	Group A		Group B	
	Number	%	Number	%
<b>EDUCATION</b>				
Illiterate	1	20%	1	20%
School/PUC	3		3	
Graduates	1	20%	0	00%
Post- Graduates	0		1	20%
<b>Total No. of patients</b>	5	100%	5	100%

**Table 7: Showing the socio-economic distribution of bronchial asthma**

Variables	Group A		Group B	
	Number	%	Number	%
<b>SOCIO-ECONOMIC STATUS</b>				
Poor	1	20%	3	60%
Middle class	3	60%	1	20%
Upper middle class	1	20%	1	20%
Rich	0	00%	0	00%
<b>Total No of patients</b>	5	100%	5	100%

**Table 8: Showing the family history of bronchial asthma**

Variables	Group A		Group B	
	Number	%	Number	%
<b>FAMILY HISTORY</b>				
Present	2	40%	1	20%
Absent	3	60%	4	80%
<b>Total No. of Patients</b>	5	100%	5	100%

**Table 9: Showing the pattern of changes in clinical features before and after the treatment in group-A**

Parameters	X of diff.	% relief	SD	SE	't'	P Value	Results
Wheeze	2.4	98%	0.54772	0.24561	9.77	<0.001	HS
Sputum	1.2	62%	0.44721	0.20054	5.98384	<0.01	HS
Respiratory Rate	1.6	77%	0.54772	0.24561	6.5143	<0.001	HS
Heart Rate	1.4	70%	0.54772	0.24561	5.70009	<0.01	HS
Ronchi	1	56.7%	1.41	0.37	2.74	<0.05	S
PEF(Person's Best)	1.6	63.6%	0.54772	0.24561	6.5143	<0.01	HS

Group A showed highly significant results with p value ( $p < 0.001$ ) in wheeze, respiratory rate, highly significant results with p value ( $p < 0.01$ ) in PEF, heart rate and Sputum whereas significant results ( $p < 0.05$ ) in ronchi.

**Table 10: Showing the pattern of changes in clinical features before and after the treatment in group-B.**

PARAMETERS	X	% relief	SD	SE	't'	P Value	Results
Wheeze	1.6	63.66%	0.54772	0.24561	6.5143	$p < 0.01$	HS
Sputum	1	56.7%	1.41	0.37	2.74	$p > 0.05$	HS
Respiratory Rate	1	56.7%	1.41	0.37	2.74	$p < 0.05$	HS
Heart Rate	1.6	63.66%	0.54772	0.24561	6.5143	$p < 0.01$	HS
Ronchi	1	56.7%	1.41	0.37	2.74	$p > 0.05$	IS
PEF(Person's Best)	1	56.7%	1.41	0.37	2.74	$p < 0.05$	S

In Group B, improvement in wheeze, heart rate was observed with highly significant results with p value ( $p < 0.01$ ), decrease in respiratory rate, PEF was seen with significant results with p value ( $p < 0.05$ ) and showed insignificant with p value ( $p > 0.05$ ) in ronchi and sputum.

On concluding statistically Group A has shown considerable result in reducing the symptoms when compared to Group B with p values ( $p < 0.001$  &  $p < 0.01$ )

**MODE OF ACTION**

*Ardra* (Zingiber Officinale) mainly acts on *Tamaka Shwasa* by its *Vatakaphahara* and *Ushna Veerya* properties. Its *Bhedana karma* mainly helps in *Kapha Bhedana* and helps in clearing *Marga avarana* caused by *Kapha* during an episode by providing easy movement of *Vayu*. The essential oil of *Ardra* which has Gingerol and when dried or cooked it is converted into Shogaol and Zingerone. These components are found to have anti tussive, anti inflammatory, anti bacterial, anti histaminic and anti histamine action and also have potent inhibitory effect on prostaglandin synthesis. The anti inflammatory activity helps in reducing the inflammation & edema of the mucous membrane, lining the airway.

- The anti tussive property helps to liquefy and drain the mucous plugged in airways causing obstruction, which has secreted from inflammatory cells thereby clearing the airway by providing respiration at ease and reducing the cough.
- The antihistamine property helps in inhibition of the mast cells thereby by stabilizing the release of chemical mediators like histamine, serotonin, leukotrienes.
- The inhibitory activity of the prostaglandin biosynthesis regulates the contraction and relaxation of smooth muscles of lungs thus helps in reducing the bronchospasm and inflammation. As these prostaglandins are synthesized by mast cells and basophils they also help in their inhibition and thereby reducing the inflammatory reaction.
- The antioxidants property reduces body inflammation in general and helps to identify and nullify the disease causing free radicals.

**DISCUSSION**

*Tamaka Shwasa* is explained since classical age of *Ayurveda* by both greater and lesser trials. It is closely correlates with Asthma. *Shwasa Krichrita, Kasa, Gurguraka* are the *Pradhana laxana* of *Tamaka Shwasa* with a variation in PEF. Classical texts clearly mentions the occurrence of *Tamaka Shwasa* in *Tama* or *durdina* that means cloudy / darkness which refers to night hours. Multiple cause approach is encouraged by the fact that this Grosodic disorder itself is defined a multi factorial disease with a large series of causative, inducing, triggering and aggravating factor.

The *Samprapthi* is also complex as the role of *Nidana agnimandya, Ama, Khavaigunya* is very important in its process. *Vata* initiates while the *Kapha* drives the illness along with hyper secretion of *Kapha* to produce obstruction in *Pranavaha srotas* and is responsible for its clinical manifestation. The *Chikitsa* of *Shwasa* mainly bifurcated under two headings.

- *Kapha adhika, Balasta* is to be managed by *Vamana* followed by *Virechana, Patya, Dhumapana, Lehyadi shamana Oushadies*.
- *Vatadikya, durbala* such as *Baala, Vrudda* are to be treated with *Tarpana* and *Shaman Chikitsa* which includes *Sneha Yusha*.<sup>8</sup>

*Acharya Chakarapani's* statement- *Tamaka Shwasa* can be treated with *Dhoomapana* alone without *Vamana* if a condition is arising out of *Swalpa dosha* and further line of treatment includes the advice of *Oushadhies* or *Ahara* or *Pana* which have *Kapha Vataghna* and *Ushna* property can be substantiated here as in these days diagnosed patients of Bronchial Asthma, experiencing mild symptoms on exposure to various triggering factors like *Rajo, Dhuma, Vata sevana*, residing in *Sheeta stana, Sheeta jala sevana, Ati vyayama* when approach any physician, can be administered with *Dhoomapana* for instantaneous effect.

Bronchial Asthma is a condition characterized by generalized but reversible bronchial airway obstruction. Patient present with dyspnoea and wheezing due to increased resistance for the passages of exhaled air. The main aim is to give relief to the patient from the attack/exacerbation and then to be maintained to arrest the frequency of attacks.

Also there is a specific instruction given in the same chapter 148<sup>th</sup> quotation the drugs which alleviates *Kapha* but aggravates *Vayu* and vice versa should never be used along with this *Chakrapani* quotes *Kapha Vataghna chikitsa is Pradhana chikitsa*. In this context the drug *Ardraka* holds the properties to balance these *Doshas* and it is a very easily available drug everywhere throughout the year having the property *Kapha Vataghna, Ushna* thus this drug was selected.

Ginger contains a number of pungent constituents and active ingredients. Steam distillation of powdered ginger produces ginger oil, which contains a high proportion of sesquiterpene hydrocarbons, predominantly zingiberene. The major pungent compounds in ginger, from studies of the lipophilic rhizome extracts, have yielded potentially active gingerols, which can be converted to shogaols, zingerone, and paradol. These compounds appear to be responsible for its beneficial action in bronchial asthma when administered through inhalation or oral route. Nebulization is a method which is very popular these days to manage mild symptoms of *Tamaka Shwasa* with certain modifications and *Dhoomapana* can be administered as Nebulization. There by *Ardraka Arka* which has the *Kapha Vataghna* and *Ushna* properties and *Dhoomapana* which is advised to be given in *Swalpa dosha* without *Vamana* can be best alternative method for the management of *Tamaka Shwasa*.

## CONCLUSION

*Tamaka Shwasa* can attain acute condition any time during the course of illness. In 69<sup>th</sup> *shloka* of *Shwasa* and *Hikka chikitsa adhyaya* of *Charaka Samhita* it suggest if immediate measures is not instituted it is '*Pranahara*' (fatal). Hence, *Atyayiki chikitsa* i.e., emergency and supportive treatment should be instituted. Thus the improvised method of *Dhoomapana* like inhalation of the drugs which would act on the target organ, the lung directly to the need of hour is established here.

The volatiles oils when administered orally or inhaled with steam increase the respiratory secretions probably by direct stimulation. They act like expectorant which help in production of demulcent respiratory tract fluid that covers and protects the mucosa. They liquefy by increasing the secretions, expel out and relax the irritated mucosa. When these constituents are distilled the vapors collected and condensed will be more concentrated. *Dhoomapana* is one of the procedure performed

particularly when *Alpa dosha* is present and also for *Shodhana anarha* patients, as told in the classics. The procedure can dispense the drug directly into the target organ through inhalation. Use of inhalation of *Ardraka* extract through nebulizer in mild to moderate condition is of utmost benefit to the patient, as it reduces the chest tightness along with good expectoration and a reduction the intensity of ronchi. Based on the references a single drug *Ardraka* has good broncho dilatation effect as outcome of inhalation was found less than 20 minutes in reduction of symptoms and increase of PEFr whereas the changes were seen after 40 minutes when *Arka* was administered internally.

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**PREPARATION OF ARDRAKA ARKA THROUGH DISTILLATION PROCESS**

