

## Clinical Study on Sub-Acute and Chronic Kasa and Its Management with Vasa Avaleha in Children

### Research Article

Suhas A Chaudhary<sup>1\*</sup>, Patel KS<sup>2</sup>, Kori VK<sup>3</sup>, Rajagopala S<sup>3</sup>

1. MD Scholar, 2. Professor & Head, 3. Assistant professor, Dept. of Kaumarbhritya, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar-361008

#### Abstract

As per vital statistics of Gujarat, year by year mortality rate due to Respiratory System disorders is increasing which is also, one of the six major categories of death and on the 3<sup>rd</sup> position. In age group 1-4 it is 2<sup>nd</sup> major cause for death. Status is same for age group of 5-14 years. Majority of the patients are having present with recurrent cough as the manifestation of recurrent respiratory disease. Pathophysiology of *Kasa* almost exactly correlates the mechanism of cough reflex. In childhood age, *Kasa* may hamper the Growth and development, should be treated earlier. In rural India improper food habits and polluting cooking sources affect the pediatric health. While in urban India, congested population, air pollution, pampering in food habit of junk food affects pediatric health. *Kasa* is *Kapha-Vata* dominant disorder and it is shown *Vasa Avaleha* help to decrease the rate of recurrence and symptoms quickly. With this aim, clinical study was undertaken on *Kasa* in sub-acute and chronic stage for duration of 4 weeks with follow-up of 4 weeks to see recurrence. The drug *Vasa Avaleha* was given orally with luke warm water. The results were highly significant on symptoms of *Kasa*.

**Key words:** *Vasa Avaleha*, *Kasa*, Respiratory Disorders, Cough, LRTI, URTI

#### Introduction

Vital statistics of Gujarat shown year by year mortality rate due to Respiratory System disorders is increasing (1) as one of the six major categories (2) for death on the 3<sup>rd</sup> position. The death due of Respiratory disorders in year 2010 is 10.6% of the total. In age group 1-4 years it is 2<sup>nd</sup> major cause (3) with same status for age group of 5-14 years (4).

Cough is the most frequent symptom of respiratory diseases (5) while

majority patients having recurrent cough as the manifestation of recurrent respiratory disease. In classics, descriptions of disease *Kasa* clearly correlate with cough and its pathophysiology exactly correlates the mechanism of cough reflex (6). *Kapha* is the main culprit in production of *Kasa* on the other hand it is dominating *Dosha* in childhood so the incidence is more in this age group. Early intervention is necessary in *Kasa* as it is a potential *Nidanarthakara Vyadhi* (causative factor for another disease) as can produce *Kshaya*(7). It is also important to treat any disease in childhood period at the earliest as it may hamper the proper *Vridhhi* (growth and development) of child is clearly described by Acharya Charaka, that *Avighata* (dis-interruption) as *shareera vridhikara bhava* (growth and development factors)

\*Corresponding Author:

**Suhas A. Chaudhary**

PG Scholar, Department of

Kaumarbhritya,

I.P.G.T. & R.A.,

Gujarat Ayurved University,

Jamnagar-361008,

Email id:- [vdsuhaschaudhary@gmail.com](mailto:vdsuhaschaudhary@gmail.com)

i.e. *Vighata* (interruption) hinders *Shareera Vridhhi* (growth and development)(8).

*Acharya* *Vrundmadhava* shown choice of drug for *Kasa* is *Vasa* (9). For that *Vasa Avaleha* polyherbal ayurvedic compound has been in use since ages, and found useful in treating respiratory disorders. Considering all these points the present work was taken with aim to evaluate the efficacy of *Vasa Avaleha* on *Vataja*, *Pittaja* and *Kaphaja – Doshika Kasa* in sub-acute and chronic stage.

### Materials and methods:

The study was started after Ethical clearance by Institutional Ethics Committee, Vide: Ref- PGT/7-A/Ethics/2012-2013/1964 dated on 21/09/2012 and also registered in Clinical Trials Registry – India (CTRI). The registration number is CTRI/2013/03/003475 [Registered on: 12/03/2013] - Trial Registered Retrospectively. Total 25 patients of *Doshika* variety of *Kasa* were registered from Outpatient Department of Kaumarbritya, Post Graduate Hospital, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar. Out of 25 patients 24 completed the prescribed course of treatment.

### Plan of study

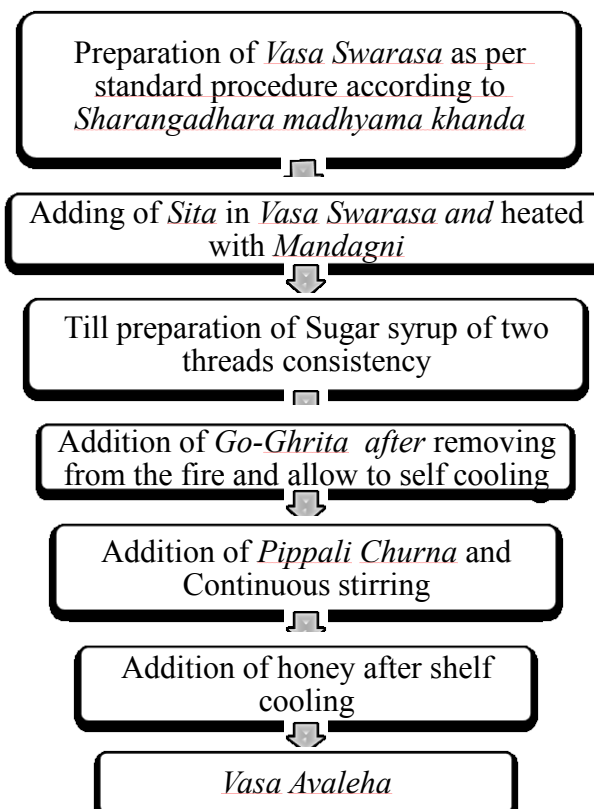
A simple open ended clinical trial with drug *Vasa Avaleha* (10) was planned. Ingredients and method of preparation of the drug is mentioned in Table 1 & Figure 1 respectively.

**Table 1: Ingredients of *Vasa Avaleha***

Sanskrit Name	Botanical / English Name	Parts Used	Parts
<i>Vasa</i>	<i>Adhatoda vasika</i> Nees.	Leaf (fresh)	8
<i>Pippali</i>	<i>Piper longum</i> Linn.	Fruits (Dry)	1

<i>Go-ghrita</i>	Clarified butter	-	1
<i>Madhu</i>	Honey	-	4
<i>Sita</i>	Sugar candy	-	4

**Figure 1: Method of preparation of *Vasa Avaleha***



Dose was fixed according to Young's rule: Adult dose (Child age / Child age + 12). Dose of *Avaleha* in classics is mentioned for adults is 1 *Pala* (48 g), so dose was fixed according to Young's formula as compared to adult dose of *Avaleha* as 1 *Pala* (48 g). Dose as per age mentioned in Table 2.

**Table 2 – Dose as per age**

Age in Years	Dose per day (Divided in 2 doses)	Age in Years	Dose per day (Divided in 2 doses)
3	8 gm	8	16 gm
4	10 gm	9	17 gm
5	12 gm	10	18 gm
6	13 gm	11	19 gm
7	15 gm	12	20 gm

Time of administration was *Abhakta* (empty stomach) twice a day with *Koshna Jala* (Luke warm water). Duration of treatment was 4 weeks and follow up of 4 weeks. Patients were given specific instruction on *Pathyapathya* (diet and lifestyle modification) as per the disease.

### Inclusion criteria

Children of both sex belonging to age group 3 to 12 years, patient presenting with the classical symptoms of *Kasa* i.e. *Shushka Kasa* (dry cough), *Peetanishthivana* (yellow sputum), *Sweta Kaphanishthivana* (white sputum) etc. as per their *Dosha* variety (*Vataja*, *Pittaja*, *Kaphaja*) since 2 weeks.

### Exclusion criteria

Age below 3 years and above 12 years, patient presenting with symptoms of *Tamaka Shwasa* (Bronchial asthma), *Kshayaja & Kshataja Kasa*, patient presenting with Pneumonia, COPD, Emphysema, Diphtheria, Pertusis, patient associated with systemic illness such as TB, HIV and any other chronic debilitating diseases.

### Investigations

Routine blood examination [Hemoglobin % (Hb), Total White Blood Cells (TC), Differential Count (DC), Erythrocyte Sedimentation Rate (ESR)] and Absolute Eosinophil Count (AEC) were carried out in all the patients before initiate the administration of the drug and after completion of treatment.

### Assessment criteria

Subsidence of the clinical signs and symptoms i.e. *Shushka Kasa* (dry cough), *Peetanishthivana* (yellow sputum), *Sweta Kaphanishthivana* (white sputum), duration of bouts of cough, frequency of bouts of cough, rhonchi, crepitation etc; absence of recurrence during follow-up, changes in general health conditions, changes in hematological parameters. The result in the clinical study was analyzed on 24 patients by applying paired student ‘*t*’ test on all the signs and symptoms mentioned in assessment criteria. The difference of individual score SD was calculated with Standard Error in Mean (SEM). These data are shown as Mean ± SEM, to quantify the percentage of improvement in each patients, it was calculated using the formula  $(BT-AT)/BT*100$  except *Sharira Upachaya* (Body weight) and Hb%, for these two parameters formula was  $(AT-BT)/AT*100$ . Symbol “↑” show value is increase and “↓” for value is decrease. Values in tables <0.05 show statistically significant and <0.001 statistically highly significant results.

### Effect of therapy

In each patients’ individual statistical analysis, results less than 25% as unchanged, 26 to 50% as mild positive response, 51 to 75% as moderate positive response, 76 to 99% as marked positive response and 100% as cured, complete remission of signs and symptoms were evaluated.

## Observations & Results:

**Table 3: Effect on the symptoms of disease *Kasa***

Features	Features	n	BT	AT	% relief	± SD	± SEM	t	P
<i>Vataja</i>	<i>Shushka Kasa</i> (dry cough)	8	1.25	0.00	100	0.46	0.16	7.63	<0.001
	<i>Parshwashoola</i> (pain in sides of chest)	8	1.00	0.00	100	0.00	0.00	-	<0.001

<i>Kasa</i>	<i>Shirahshoola</i> (headache)	8	1.25	0.12	90	0.83	0.29	3.81	<0.001
	<i>Swarabheda</i> (hoarseness of voice)	15	1.00	0.00	100	0.00	0.00	-	<0.001
	<i>Shushka-ura, kantha, vaktra</i> (dryness in chest, throat and mouth)	7	1.00	0.00	100	0.00	0.00	-	<0.001
	<i>Daurbalya</i> (weakness)	21	1.04	0.04	95.45	0.21	0.00	-	<0.001
<i>Pittaja Kasa</i>	<i>Peetanishthivana</i> (yellow sputum)	12	1.16	0.08	92.85	0.28	0.08	13.00	<0.001
	<i>Moha</i> (stupor)	7	1.00	0.00	100	0.00	0.00	-	<0.001
	<i>Daaha</i> (burning sensation)	6	1.00	0.00	100	0.00	0.00	-	<0.001
	<i>Jwara</i> (fever)	22	1.00	0.00	100	0.00	0.00	-	<0.001
<i>Kaphaja Kasa</i>	<i>Swetakaphanishthivana</i> (white sputum)	17	1.47	0.11	92	0.49	0.11	11.32	<0.001
	<i>Mandagni</i> (suppression of digestive power)	18	1.11	0.11	90	0.34	0.08	12.36	<0.001
	<i>Aruchi</i> (anorexia)	19	1.05	0.21	80	0.50	0.11	7.32	<0.001
	<i>Peenasa</i> (rhinitis)	16	1.00	0.06	93.75	0.25	0.06	15.00	<0.001
	<i>Kaphapoornavaksha</i> (fullness of chest with cough)	10	1.10	0.10	90.90	0.47	0.14	6.70	<0.001

The drug had provided relief in all the cardinal and associated symptoms of *Kasa* irrespective of their *Doshika* presentations. All the changes on effect on symptoms of *Doshika Kasa* were statistically highly significant.

**Table 4: Effect on the signs of disease *Kasa***

Features	<i>n</i>	BT	AT	% relief	± SD	± SEM	<i>t</i>	P
Bouts of cough-Duration	24	1.91	0.20	89.13	0.46	0.09	18.02	<0.001
Bouts of cough-Frequency	24	1.91	0.20	89.13	0.46	0.09	18.02	<0.001
Sleep disturbance	8	1.00	0.00	100	0.00	0.00	-	<0.001
Fever	22	1.00	0.00	100	0.00	0.00	-	<0.001
Crepitation	7	1.00	0.00	100	0.00	0.00	-	<0.001
Rhonchi	13	1.00	0.00	100	0.00	0.00	-	<0.001

Fever, crepitation and rhonchi are the indicators of infection to lower respiratory. Result in these parameters shown drug efficacy on the infectious conditions. The results were statistically highly significant.

**Table 5: Effect on *Aaturabala***

Features	<i>n</i>	BT	AT	% relief	± SD	± SEM	<i>t</i>	P
<i>Abhyavaranashakti</i> (capacity of food intake)	24	1.87	0.41	77.77	0.65	0.13	10.85	<0.001

<i>Jaranashakti</i> (capacity of digestive power)	24	1.87	0.41	77.77	0.65	0.13	10.85	<0.001
<i>Ruchi hi aaharakale</i> (appreciation of taste at time of food)	22	1.13	0.09	92	0.37	0.08	13.07	<0.001
<i>Bala vridhi</i> (increase in strength)	20	1.35	0.25	81.48	0.30	0.06	15.98	<0.001
<i>Sharira Upachaya</i> (body weight)	24	19.29	19.89	3.03↑	0.65	0.13	4.51	<0.001
<i>Swaravarnayoga</i> (texture, luster and voice)	19	1.05	0.10	90	0.40	0.09	10.20	<0.001
Activity	24	1.75	0.83	52.38	0.71	0.14	6.26	<0.001
<i>Nindralabhoyathakalam</i> (adequate sleep at night)	14	1.07	0.07	93.33	0.00	0.00	-	<0.001
<i>Vaikarikaranam cha swapnanamadarshanam</i> (Absence of pathological dreams)	9	1.00	0.11	88.88	0.33	0.11	8.00	<0.001

All results were statistically highly significant. *Abhyavaranashakti* (capacity of food intake), *Jaranashakti* (capacity of digestive power) and *Ruchi hi aaharakale* (appreciation of taste at the time of food) are the parameters for *Agni Bala* (digestive power strength). All these changes might due to *Dipana –Pachana* property of *Pippali* and *Go-ghrita*. *Balavridhi* (increase in strength) and *Swaravarnayoga* (texture, luster and voice), body weight and activity are parameters for *Dehabala* (physical strength). The drug might build immunity due to *Rasayana* (rejuvenation) effect on *Pranavaha srotas*. *Nindralabhoyathakalam* (adequate sleep at night) and *Vaikarikaranam cha swapnanamadarshanam* (absence of discomfort dreams) are parameters for *Satva Bala* (mental strength). *Satva bala* (mental strength) is very much related to the counseling of the patients during the treatment. Improvement in sleep may be due to decreased symptoms of *Kasa*.

**Table 6: Effect on hematological parameters**

Features	n	BT	AT	% relief	± SD	± SEM	t	P	
Hb%	24	10.88	11.29	3.57↑	0.78	0.16	2.52	<0.05	
T.C.	24	8566.6	9570.8	11.71↑	2621.7	535.1	1.87	>0.05	
D.C.	Neutrophiles	24	45.5	47.6	4.67↑	10.86	2.21	0.95	>0.05
	Eosinophiles	24	4.58	5.25	14.55↑	2.88	0.58	1.13	>0.05
	Lymphocytes	24	47.33	45.75	3.34↓	10.25	2.09	0.75	>0.05
	Monocytes	22	2.63	2.40	8.62↓	0.97	0.20	1.09	>0.05
ESR	24	12.50	13.91	11.33↑	14.60	2.98	0.47	>0.05	
AEC	24	397.9	510.4	28.27↑	263.44	53.77	2.09	<0.05	

On Hb% significant changes was found. Increase in Hb% shown built up immunity towards specific disease and its associated conditions. The parameters ESR and AEC indicate the action on allergic conditions while TC and polymorphs indicate infectious conditions. Drug didn't found much effective as these parameters as compare to subjective parameters.

**Table 7: Overall effect of treatment on subjective and objective parameters**

	<i>n</i>	BT	AT	% change	± SD	± SEM	<i>t</i>	P
<b>Overall effect</b>	24	99.69	13.76	85.93↓	43.67	5.33	16.10	<0.001

Overall effect of treatment in was 85.93% percentages, which was statistically highly significant it shown the drug having all the properties required to break the manifestation of *Kasa*.

**Table 8: Individual overall effect on subjective and objective parameters**

Zones based on % relief	Number of patients	%
Cured (100 %)	00	00
Marked positive response (76 - 99 %)	02	8.33
Moderate positive response (51 – 75%)	18	75
Mild positive response (26 – 50 %)	04	16.67
Unchanged (0 – 25%)	00	00
<b>Total</b>	<b>24</b>	<b>100</b>

Individualized overall effect of therapy were considered highest number of patient (75%) got Moderate positive response, 8.33% got Marked positive response, and Mild positive response in 16.67% of patients. In the present disease condition, till date there is no definite known cure (11). So any sort of improvement in the overall condition is fairly acceptable.

**Table 9: Effect on recurrence of symptoms of *Kasa***

Recurrence during follow-up	<i>n</i>	No event (%)	Less frequency and intensity (%)
	24	75	25

75% of the patients had no recurrence of the symptoms during the follow up period while 25% of the patients had recurrence but with lesser frequency and intensity may be due to *Rasayana* (rejuvenation) effect of the drug on *Pranavaha srotas* and preventive qualities to the disease.

## Discussion

*Kasa* has been considered as a disease in Ayurveda with elaborate description of separate etiology, pathogenesis, premonitory symptoms, signs with symptoms and treatment (12). The disease *Kasa* explained in Classics includes many of the upper and lower respiratory disease as it is evident by the vast collection of signs and symptoms. The diseases of systems other than respiratory system are dealt as the symptom *Kasa* described at the context of respective diseases. Since the *Kasa* is a *Vata - Kapha*

dominated disease, its incidence should be witnessed more during the childhood, which is normal time of *Kapha* dominance. In addition to above data the description of the *Samprapti* (manifestation) of *Kasa* almost exactly correlates the mechanism of cough reflex.(13, 14)Thus beyond doubt *Kasa* can be considered as ‘Cough’ in modern terms.

Cough is a symptom of underlying disease in modern medicine, it is the reflex generated predominantly by the receptors located in the respiratory tree. Patient

presenting with cough at first draws the attention of physician towards respiratory system and many times the pathology is located within upper or lower respiratory tract.(15) Respiratory tract infections are most common infection and thus recurrent *Kasa* (Recurrent respiratory Tract Infections) is considered as the indicator of decreased *Vyadhikshamatva* (Immunity against specific disease) or *Bala* (strength) or *Ojas* (absence of *dhatu*) or Immunity.(16)

In modern perspective *Shushka Kasa* (dry cough) and *Shirahshoola* (headache) can be co-related to allergic conditions whereas *Swarabheda* (hoarse voice) indicates the infection with involvement of larynx(17) as occurs in many of viral CROUP (Laryngo-tracheobronchitis), *Daurbalya* (weakness) is also more common in infectious conditions rather than in allergy. *Peetanishthivana* (yellow colour sputum) by tradition has been considered as the purulent sputum in cases of acute infections, one should very cautiously differentiate the proportions of mucoid part and the purulent part of it. Even the *Kaphaja Kasa* may be infective in origin. The initial phases of viral upper respiratory infection (viz. Sinusitis, Pharyngitis or Tonsillitis) present with *Kaphaja* symptoms (*Shirogaurava*, *Mandajwara*, *Praseka*, *Anannabhilasha* etc.)(18).

Majority of the times different *Doshika* symptoms manifest during the course of a single disease such as upper respiratory tract manifestation of allergic etiology may show *Vataja* symptoms for few days later modify itself to a *Kaphaja* or *Pittaja* based upon the course of the disease. If allergic inflammation reached the sinuses to block the Ostia then secretions collect there and present with *Kaphaja* symptoms for next few days, if

they not resolved it may get infected by the opportunistic pathogens and may cause fulminate sinusitis or rhino-sinusitis which then is definitely a *Pittaja* disorder. *Dvandvaja* (dominancy of two *Dhosha*) presentations manifest during transient phases. The results support the hypothesis that *Vasa Avaleha* may be effective in all the types of *Kasa* irrespective of *Doshika* variants. Even though it effective in all types of *Kasa*.

When the child suffers from recurrent *Kasa* there is chances of developing the complications such as severe lower respiratory infections (LRTI - Pneumonia etc), hyper reactive airway diseases (HRAD), leads to nutritional deprivation and hampered growth. In *Astanga Sangraha* it is described that on long run *Kasa* leads to *Oja* (absence of *dhatu*), *Bala* (strength) and *Mamsa Kshaya*(19) (loss of *mamsa dhatu*). Thus the situation warrants an immediate insight deep in to the matter with timely intervention.

*Avaleha* form (20) indicated in obstruction in flow of *Prana Vayu* due to vitiated *Kapha* which the main factor to produce *Kasa*. *Deepana-Pachana* properties of the drug will help by kindling the *Jatharagni* as well as *Rasagni* and *Bhutagni*. Furthermore, the *Shothahara Karma* neutralize the *Srotorodha* in *Pranavaha Srotas* due to *Shotha* (inflammation) created by *Saama Khapa* and *Aama* which stop natural flow of *Vata*.

### **Probable mode of action**

The *Dosha Prashamana* effect (*Vasa*, *Pippali*, *Madhu*) acts on the main *Doshas* which contribute to the *Samprapti* (manifestation of disease), viz. *Vata* and *Kapha* while in *Go-ghrita Tridoshahara* properties are present. *Deepana-Pachana Karma* (*Pippali*, *Go-grhita*) digest *Aama*.

*Srotoshodhana* and *Chhedana* property of *Madhu* remove *Saama Kapha* and *Aama* and help in *Vatanulomana* property (*Pippali, Sita*) maintains the normal flow of *Vata*. Drugs indicated in *Shwasa, Kasa* and *Peenasa* (*Vasa, Pippali, Madhu*) also act on the symptoms. *Avaleha* may work as *Rasayana* (rejuvenation) for the *Pranavaha Srotas* and also shows *Kapha-Vatahara* effect. The pharmacological studies already reported on the individual drugs also favour its effect in Respiratory Tract Diseases as given below:

Anti-bacterial (21) - *Vasa*  
 Immunostimulatory(22) - *Pippali*  
 Anti-asthamatic(23) - *Pippali*  
 Anti-microbial (24, 25) - *Vasa, Pippali*  
 Anti-allergic (26) - *Pippali*  
 Immunomodulatory(27) - *Pippali*  
 Anti-tussive (28) - *Vasa*  
 Bronchodilator (29) - *Vasa*  
 Anti-inflammatory (30) – *Vasa*  
 Antioxidant (31, 32) - *Vasa, Madhu*

### Conclusion

*Vasa Avaleha* showed statistically highly significant result on most of the signs and symptoms of all type of *Doshika Kasa*. On *Aturabala* (strength of the patient) statistically highly significant results were found. The drug had not shown much effect on hematological parameter as compare to subjective parameters. The drug might build immunity due to rejuvenation effect on *Pranavaha srotas* as observed by low recurrence rate during follow-up. On overall effect, highly significant result is found which is highly promising and encouraging for more explorations of its kind in future.

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