



## Exploration of the efficacy of panchakarma treatment in endosulfan affected population

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### Abstract

The study "Exploration of efficacy of Panchakarma treatment in Endosulfan affected population" was conducted at Government Ayurveda Hospital Kasaragod & Government Ayurveda Hospital Cheemeni under the leadership of National Research Institute for Panchakarma sponsored by Central Council for Research in Ayurveda & Siddha, of Department of AYUSH during the period 2011-12.

This study was carried out with the objective to find out the efficacy of Panchakarma treatment in Endosulfan affected population. Mild cases of endosulfan affected population and those eligible for svedana (sudation therapy) and virechana (Purgation therapy) were selected. After completion of therapy the results were assessed based on the improvement in presenting clinical features. Statistical Analysis was done to analyze data scientifically. The therapeutic effect of Dooshivishari choornam was also evaluated. A total 52 cases were studied. It was observed that even after 2 decades of aerial spraying of endosulfan; the toxic effects were still prevalent at different parts of Kasaragod district. The affected patients belonged to the villages, where endosulfan was aerielly sprayed. Many of them worked in the plantations. Most of the victims were very poor. The main symptoms that were observed include: skin diseases, deformity, epilepsy, muscular dystrophy etc.

The suitable patients who are eligible for Panchakarma treatment were admitted in the Hospital. Bashpasveda was given for 3 days initially. Virechana with Avipathy choorna was given on fourth day, followed by samana therapy. The Dooshivishari choorna was given orally along with honey. Each patient was observed for a period of 64 days.

It was noted that, after treatment there were symptomatic relief to the patients. The general health of patients was also improved; no side effect was noted. Statistical analysis of blood investigation showed no difference in values before and after the treatment. This shows the safety of this treatment.

Most of them got marked relief. The SF-36 score showed that general health of the patients improved.

**Keywords:** panchakarma treatment, endosulfan, population

### Introduction

Endosulfan is a highly toxic organochloride and carries the signal word 'DANGER' on the label. Evil effect of endosulfan is one of the major social issues. Due to indiscriminate aerial spray of pesticide the soil, water and air are contaminated (*janapadodhvamsa*) which causes disastrous consequences to the life of human beings at Kasaragod district in Kerala State.

- Tragedy happened in between 1978-2000.
- High court of Kerala banned endosulfan spray at 2001.
- Hundreds of death took place.
- About 4000 are still suffering.
- About 200 cases were surgically treated.
- Endosulfan cell established in 2005- 2006.
- Genuine cases were identified and provided necessary medicines & financial support.
- Most of the victims were very poor.

Even now, the sufferings persist. Some treatments were carried out by Ayurvedic Experts and remarkable finding were observed. Medical officer of Cheemeni Government Ayurveda Hospital has tried some Panchakarma treatment on Mamsa sosha, Twakroga etc. In this circumstance classical treatment with research protocol can be studied among selected victims.

As per the data available with endosulfan cell, most common problems in Kasaragod are given below.

- Mental Retardation
- Cerebral palsy
- Seizures
- Down syndrome
- Cancers
- Bronchitis
- Asthma
- Eye diseases
- Recurrent Abortions
- Infertility
- Skin allergies
- Congenital Malformations
- Muscular dystrophy

For more than 20 years, the government owned Plantation Corporation of Kerala aerielly sprayed endosulfan in an area of nearly 4,700 hectares in Kasaragod. Today the people who live close to the plantation are paying the price. Thousands of litres of endosulfan were sprayed between 1975 & 2000. Thousands of people living near to plantation are suffering from large number of diseases such as cancers, Central

Nervous System problems, skin diseases etc.

### Classical Review

As per the Ayurvedic classics the problems can be comprised under 'DOOSHIVISHA'. Dooshivisha is latent poisoning. This type of poison remains in the body for a long period.

The toxic effect of endosulfan can be considered as Dooshi Visha in Ayurvedic science. The branch of Ayurveda which deals with this subject is called Agadatantram. Details of its description are found in various classical Ayurvedic texts such as Ashtanga Hridayam, Ashtanga Samgraham and Susrutha samhitha. The toxic effect of endosulfan is already proved and it persists for a long time. So removal of toxicity is most important regarding the treatment. The available treatment aims only at symptomatic relief. But this approach is considered incomplete. Pesticide is banned now. But evil effect of endosulfan is still effecting the new generations of Kasaragod district. So people needed a systematic approach to overcome the tragedy. The main aim is to remove the toxicity. The treatment principle in Dooshi Visha is considered to be effective in endosulfan victims.

### Dooshi Visha

At times, when poison enters a body it remains inert due to the influence of various factors like immunity, the climatic

conditions, environment etc. The poison will remain in this state for many years. When the body becomes weak or when the environment becomes suitable, the poison starts to show its toxic nature [1]. Due to less potent nature of dooshivisha and its Kaphanubhandha, it lasts for many years.

### Rupa (Signs & Symptoms)

1. Diarrhea
2. Discoloration of stools
3. Anorexia
4. Vomiting
5. Thirst
6. Stammering
7. Blood impurities
8. Loss of consciousness
9. Symptoms of Ascitis

If Dooshivisha reaches Amasaya, it produces Kapha Vata Roga like Svasa. If it reaches in Pakvasaya, it produces Vata Pitta Roga like Vatarakta, Hairfall, Weakness, and Dhatu pradosha Vikaras according to which Dhatu is effected

### Treatment regimen as per Classics

Swedanam (sudation therapy) and Sodhana (Vamana/Virechana) is indicated in Dooshivisha. Dooshivishari choorna with honey is to be taken after sodhana [2].

**Table 1:** Ingredients of Dooshivishari choorna

Drug	Botanical Name	Family	Parts Used
Pippali	Piper longum	Piperaceae	Dry fruit
Pippalimula	Piper Officinatum	Piperaceae	Root
Hasti Pippali	Scintapsis Officinalis	Araceae	Dry fruit
Dhyamakam	Cymbopogon martinii	Poaceae	Whole plant
Mamsi	Nardostachys Jatamamsi	Valerianaceae	Root
Lodhra	Symplocos racemosa	Symplocaceae	Stembark
Ela	Elatteria cardomum	Zingiberaceae	Seed
Sucharchika	Tribulus Terrestris	Zygophyllacpae	Fruit
Kutannatam	Oroxylum indicum	bignoneaceae	Root
Natham	Valeriana wallichii	Magnoliaceae	Root
Kushtam	Saussuria lappa	Asteraceae	Root
Yashti	Glycyrrhiza glabra	Fabaceae	Root
Chandanam	Santalum album	Santalaceae	Heartwood
Gairikam	Orchre china clay – Ferric Oxide Fe <sub>2</sub> O <sub>3</sub>		

**Table 2:** Pharmacodynamics of Dooshivishari choorna

Drug	Rasa	Guna	Veerya	Vipakam
Pippali	Katu	Laghu, Snigdha, Teekshna	Anushnaseetham	Madhuram
Pippalimula	Katu	Laghu, Rooksham	Ushnam	Katu
Hasti Pippali	Katu	Rooksham	Ushnam	Katu
Dhyamakam	Katu tiktam	laghu	ushnam	katu
Mamsi	Thikta, Kashaya, Madhura	Laghu, Snigdha, Teekshna	Seetam	Katu
Lodhra	Kashaya	Laghu, Rooksham	Seetam	Katu
Ela	Katu, Madhuram	Laghu, Rooksham	Seetam	Madhuram
Sucharchika	Madhuram	Guru, Snigdham	Seetam	Madhuram
Kutannatam	Thikta, Kashaya, Madhuram	Laghu, Rooksham	Ushnam	Katu
Natham	Katu	Theekshnam	Ushnam	Katu
Kushtam	Thikta, Katu, Madhuram	Laghu, Rooksha, Theekshnam	Ushnam	Katu
Yashti	Madhuram	Guru	Seetam	Madhuram
Chandanam	Thikta, Madhuram	Laghu, Snigdham	Seetam	Katu
Gairikam	Kashayam	Snigdham	Seetam	Madhuram

## Materials & Methods

The research studies were conducted by National Research Institute for Panchakarma, Cheruthuruthy in collaboration with Department of Indian System of Medicine, Govt. of Kerala. The studies were carried out at Government Ayurveda Hospital Kasaragod and Government Ayurveda Hospital Cheemeni. It was an extra mural project of CCRAS (Central Council for Research in Ayurvedic Science) monitored by Dept. of AYUSH, Ministry of Health and Family Welfare, Govt. of India. The studies were performed during the period from June 2011 to February 2012. The research studies have focused in establishing the efficacy of Panchakarma treatment and Dooshivishari choorna in Endosulfan affected population.

## AIMS & Objectives

1. To improve the quality of life of endosulfan affected patients.
2. To study the effect of Panchkarma regimen in the Endosulfan affected patients at Kasaragod.

## Methodology

- The Endosulfan affected patients were selected from the list published by endosulfan cell which is established in 2006.
- Only the patients without any severe complications like tube feeding, were selected on the basis of survey.
- Patients were selected and given Panchakarma therapy at GAH Kasaragod & GAH Cheemeni. (Indian System of Medicine, Kerala State)

Number of subjects studied: 52

	Number of patients	Period of studies
Government Ayurveda Hospital, Cheemeni	30	June 2011- Feb 2012
Government Ayurveda Hospital, Kasaragod	22	June 2011- Dec 2012
Level of study: IPD		

## A. Treatment Schedule

- Bashpa Sweda – 3 days
- Virechana – 1 day – with Avipathi choorna (10 gm with honey)
- Dooshivishari choorna- 1.5 gm twice daily with honey for 9 weeks. (Continue Bashpa Sweda and virechana Regimen every 2 weeks)

## Diet prescribed

General balanced vegetarian diet was prescribed as per the guidelines of standard hospital pattern.

## Source of procurement of drugs

The trial drugs were supplied by NRIP, Cheruthuruthy.

## Criteria for inclusion of patient

- On the basis of survey and from the approved list of Endosulfan affected victims
- Those eligible for swedana and virechana.
- Patients who are willing and able to take participate in

the study for 9 weeks

## Criteria for exclusion

Those who are not able to undergo Panchakarma therapy especially Swedana and Virechana.

- Those who have undergone major surgeries.
- Severe Kidney problems, Heart problems, Cancer etc.
- Pregnant and lactating women.
- Complicated cases of Endosulfan poisoning
- Patients undergoing tube feeding

## Criteria for Withdrawal

1. If patient does not follow the instructions
2. If any complications are developed during the course of treatment.

**B. Routine examination & assessments:** The patients were thoroughly informed about the study & drug, dosage, schedule etc. Detailed history was taken. The data on physical examination, laboratory investigations were recorded on the 1<sup>st</sup> and last day of study.

**C. Duration of Treatment:** 64 days.

**D. Criteria for assessment of results of Treatment:** Results were assessed based on improvement in presenting clinical features.

**E. Statistical Analysis:** Blood Investigations carried out before and after the treatment were analyzed statistically. Each and every aspect of Short Form Health Survey (SF 36) also analyzed statistically using paired t test.

## Observation & discussion

Total of 52 Cases were studied and data on various aspects is provided under.

## Demographic data

**Table 3:** Distribution of cases according to age and sex

Age in years	Male	Female	Percentage (%)
0-10	13	6	36
11-20	5	4	17
21-30	2	1	6
31-40	2	1	6
41-50	5	2	13
51-60	3	2	10
61-70	2	3	10
71&above	1	0	2
Total	33	19	100

- Most of the patients belong to the age group of 0-10.
- Majority of the patients involved in the study were males

**Table 4:** Distribution of cases according to Prakriti.

Prakriti	No.	Percentage
Vata	1	2
Pitta	0	0
Kapha	0	0
Vata-pitta	25	48
Pitta-kapha	17	33
Vata-kapha	9	17
Samadosha	0	0

Most of the patients belonged to vata-pitta prakriti

## Statistical analysis of blood investigation

Table 5

Lab Parameters	Assessment Stage	N	Mean	Std. Deviation	t-value	p-value
HB	BT	50	11.788	1.6523	1.508	0.138
	AT	50	11.95	1.549		
TLC	BT	50	8272.00	1690.072	2.869	0.006
	AT	50	9248.00	1827.928		
Neutrophil	BT	50	56.38	12.167	0.659	0.513
	AT	50	55.62	11.674		
Lymphocytes	BT	50	39.56	12.685	0.800	0.428
	AT	50	38.52	14.203		
Eosinophils	BT	48	3.04	2.466	2.543	0.014
	AT	48	4.50	4.253		
Monocytes	BT	24	1.46	0.658	3.021	0.006
	AT	24	2.08	0.717		
ESR	BT	48	16.27	12.727	2.242	0.030
	AT	48	13.21	9.708		

Table 6

Lab Parameters	Assessment Stage	N	Mean	Std. Deviation	t-value	p-value
Urea	BT	49	21.51	4.669	0.684	0.497
	AT	49	22.05	4.332		
Uric acid	BT	48	4.354	0.8942	0.159	0.875
	AT	48	4.379	0.8346		
Serum Creatinine	BT	49	0.798	0.1677	0.511	0.612
	AT	49	0.810	0.1597		
SGOT	BT	49	31.78	25.592	0.321	0.749
	AT	49	32.35	20.983		
SGPT	BT	49	33.84	27.020	0.544	0.589
	AT	49	34.94	23.283		
Bilirubin	BT	28	0.814	0.2353	6.019	0.0001
	AT	28	0.679	0.1853		
Alkaline Phosphatase	BT	49	189.33	150.498	0.360	0.720
	AT	49	195.00	120.242		

Table 7

Lab Parameters	Assessment Stage	N	Mean	Std. Deviation	t-value	p-value
Sodium	BT	48	144.75	8.099	1.029	0.309
	AT	48	143.71	6.098		
Potassium	BT	48	4.32	0.419	0.110	0.913
	AT	48	4.325	0.4029		
Calcium	BT	48	9.790	0.7051	0.932	0.356
	AT	48	9.694	0.5994		
Phosphorous	BT	33	4.539	0.8983	1.068	0.293
	AT	33	6.318	9.4866		
T3	BT	48	120.98	66.647	0.220	0.826
	AT	48	121.75	53.219		
T4	BT	48	11.402	11.6409	0.882	0.382
	AT	48	26.165	115.1532		
TSH	BT	48	1.8435	1.25534	1.745	0.087

No significance increase/ decrease was noticed in any of the parameters of blood investigations except Serum Bilirubin level. But it was within the normal range only.

**Result of the study with appropriate data**

On the basis of SF-36 score, functional aspects were analyzed.

Table 8

SF-36 Health Survey	Assessment Stage	N	Mean	Std. Deviation	t-value	p-value
Physical Functioning	BT	52	45.38	28.367	8.447	0.0001
	AT	52	68.67	29.242		
Role Limitations due to Physical Health	BT	52	16.69	28.296	10.099	0.0001
	AT	52	69.15	34.510		
Limitations due to Emotional Problems	BT	52	24.21	37.408	10.346	0.0001
	AT	52	84.67	27.792		
Energy/ Fatigue	BT	52	42.88	24.958	9.915	0.0001
	AT	52	75.29	16.521		
Emotional Well Being	BT	52	48.31	21.326	9.121	0.0001
	AT	52	74.48	14.472		
Social Functioning	BT	52	32.85	26.421	10.215	0.0001
	AT	52	67.29	23.235		
Pain	BT	52	57.78	32.899	6.775	0.0001
	AT	52	79.40	25.811		
General Health	BT	52	36.06	14.188	7.694	0.0001
	AT	52	55.15	13.212		

All the health parameters were showed significant increase towards the normalcy of health.

### Observation & discussion

- The disease was found to be more prevalent in the areas where endosulfan was sprayed.
- Major clinical symptoms observed in Kasaragod area were Mental Retardation, cerebral palsy, seizures, Down's syndrome, cancers, bronchitis & asthma, eye diseases, recurrent abortions, infertility, skin allergies, congenital malformations and muscular dystrophies.
- The symptoms such as muscular dystrophy, cerebral palsy etc was found in new born children also.
- Symptomatic relief was observed post treatment.
- There was an improvement in general health of patients.
- No evidence of side effect was found
- Detail blood investigations carried out before and after treatment were found to be within normal limit. This indicates the safety of the medicines.
- Most of the patients belong to the age group of 0-10.
- Male patients are affected more.
- Most of the patients belonged to vata-pitta prakriti.

### Conclusion

- This study is the first scientific attempt towards the endosulfan affected population through Ayurveda.
- The study was based on classical Ayurvedic references. The endosulfan tragedy was compared to dooshivisha as explained in classical Ayurvedic texts.
- Treatment procedure followed was as per the principle of dooshivisha treatment.
- While analyzing the results it is observed that most of the patients got symptomatic relief.
- Blood investigation carried out before and after the treatment for each patients, the results shows the medicine is very safe and without side effects.
- Availability of Dooshivishari choorna is to be ensured for better results in endosulfan poisoning.
- Further studies are needed to ensure the results.

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