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ORIGINAL RESEARCH ARTICLE

EFFECT OF DECOCTION OF *LEUCAS ZEYLANICA* IN WORM INFESTATION WITH SPECIAL REFERENCE TO *ENTEROBIUS VERMICULARIS*

¹E.R.H.S.S. EDIRIWEERA, ²R.P.V.J. RAJAPAKSHA

¹Professor, Institute of Indigenous Medicine, University of Colombo, Rajagiriya, Sri Lanka

²Professor, Department of Pathobiology, Faculty of Veterinary Medicine and Animal Science, University of Peradeniya, Peradeniya, Sri Lanka

Corresponding Author email: ayurvedadocsujatha@yahoo.com

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Abstract

Background: *Enterobius vermicularis* is a parasite that lives in human digestive system and is universally common, especially among school-age children. Krimi roga is a disease described in Ayurveda, which can be correlated with worm infections. Purishaja krimi lives in human digestive system. *E. vermicularis* can be considered as a type of purishaja krimi. *Leucas zeylanica* is a herb, 30–60 cm tall, growing widely in Sri Lanka. *L. zeylanica* is used effectively in the treatment of worm infections by Sri Lankan Traditional physicians. **Aim:** To evaluate the efficacy of *L. zeylanica* on *E. vermicularis* infections. **Methods:** One hundred patients suffering with *E. vermicularis* infections were selected and divided randomly into two groups, namely A and B. Each group consisted of 50 patients. Group A, the treated group, was given 120 ml of decoction of *L. zeylanica* twice a day for 7 days. Decoction was prepared by boiling 120 g of entire fresh plant of *L. zeylanica* in 1920 ml of water, until reduced to 240 ml. Group B, the control group, was given 120 ml of placebo twice a day for 7 days. The placebo was prepared by adding permitted brown food coloring to boiled and cooled water. **Results:** Group A, reported total absence of itching and scratching in the anal region during night, over 80% reduction of abdominal pain, loss of appetite, bad breath, and eructation. Ova in stools were absent after treatment. 12% of the patients complained of burning sensation in the abdomen during the last 2 days of treatment. In group B, the patients reported 14.7% aggravation of itching and scratching in the anal region during night, 26% aggravation of pain in the abdomen, 11.5% aggravation of impaired appetite, and 20% aggravation of eructation. Ova of *E. vermicularis* were present in their stools. **Conclusion:** decoction of *L. zeylanica* is a highly effective, treatment for *E. vermicularis* infections in adults.

Key words: *Leucas zeylanica*, *Enterobius vermicularis*, Thread worm, Purishaja krimi, Krimi Roga

Introduction:

Enterobius vermicularis is a nematode measuring about less than 1 cm in length, is cosmopolitan in distribution, and also is known

as thread worm, pin worm, and seat worm. The clinical features of *E. vermicularis* infection are anal itching, anal scratching and disturbed sleep due to itching, loss of appetite, abdominal pain,

and vaginal itching and discharge^{1,2}. In Ayurvedic texts, diseases caused due to worm infections are described as krimi roga. There are four main types of worms^[5] causing krimi roga, and purishaja krimi^[4] is one of them. *E. vermicularis* can be considered as one subtype of purishaja krimi. The signs and symptoms of krimi roga are eructation, impaired appetite, pain in abdomen, itching in anal region, emaciation, and diarrhea or constipation^[5]. *Leucas zeylanica* (Family: Lamiaceae; Sanskrit name: Drona pushpi; Sinhala name: Getathumba) is a weed that occurs in various habitats (Fig 1,2). It grows in sunny dry localities, often on sandy soil, paddy fields, waste places, and roadsides, from lowlands up to 1000 m elevation. *L. zeylanica* is widely distributed throughout Southeast Asia, but is rather rare in East Asia. It is used medicinally in treatment of coughs, toothaches, abdominal pain, and also as an antihelminthic drug^[6,7]. In Malaysia, the leaves are used to heal wounds and also taken as a sedative^[8,9]. Sri Lankans commonly use this as a vegetable. Traditional and Ayurvedic physicians in Sri Lanka use *L. zeylanica* in the treatment of worm infections successfully^[10], but no known scientific study on its effects as an antihelminthic has been carried out. Therefore, the present clinical study was undertaken to evaluate the effect of *L. zeylanica* on *E. vermicularis* infection.

Aims and Objectives: To evaluate the effect of decoction of *L. zeylanica* in treatment of *E. vermicularis* infections.

Material and Methods

Study design: A randomized single blind, parallel, placebo controlled clinical study.

Selection of drug: In modern medicine there some effective anthelmintic drugs but resistances to these drugs in worms develop day by day. Therefore finding an effective treatment has become a necessity. Decoction of *L. zeylanica* is one of the drugs used by Ayurveda and traditional physicians in Sri Lanka with

considerable efficacy in treatment of *E. vermicularis* infection.

Preparation of decoction of *L. zeylanica*: Fresh herbs of *L. zeylanica* were collected and cleaned. Entire plant was cut into small pieces and 120 g was taken. Then, 1920 ml of water was added to it and boiled down to make 240 ml of decoction.

Preparation of placebo: The placebo was prepared by adding brown, permitted food colouring to boiled and cooled water.

Selection of patients: The patients suffering from *E. vermicularis* infection were thoroughly examined before selection. After selection of patients, they were informed about the study and their written consent was obtained. Further, patients were made to understand that they are able to withdraw from the study any time without prior notice.

Sampling: Randomization was done by using a random numbers table.

Sample size: 100 patients

Study setting: The patients suffering from *E. vermicularis* infection, were selected from Ayurveda Teaching Hospital, Borella, Sri Lanka from August 2008 to August 2010.

Diagnostic criteria: The patients showing symptoms such as udgara (eructation), agni mandaya (impaired appetite), shoola (pain in abdomen), agnisadana (poor digestion), guda kandu (itching in anal region), vidbheda (loose stools), vishtambha (constipation), nihshwasa vid gandha (bad breath), parushya (dryness of the skin), pandutha (whitish-yellow discoloration of the skin), and karshya (emaciation) were selected. In these patients ova of *E. vermicularis* was present in in stools

Inclusion criteria: Patients between 15 and 65 years of age, and showing symptoms such as udgara (eructation), agni mandaya (impaired appetite), shoola (pain in abdomen), agnisadana (poor digestion), guda kandu (itching in anal region), vidbheda (loose stools), vishtambha (constipation), nihshwasa vid gandha (bad breath), parushya (dryness of the skin), pandutha

(whitish-yellow discoloration of the skin), and karshya (emaciation) were selected.

Exclusion Criteria: The patients were thoroughly examined, and those with hypertension, anemia, or diabetes mellitus were excluded from the study. Patients below 15 and over 65 years of age were also excluded from the research.

Grouping: Selected patients were randomly divided into two groups and named as group A and B. Each group consisted of 50 patients. Group A, the treated group, with decoction of *L. zeylanica*. and Group B, with placebo. The changes of signs and symptoms in the patients were recorded using a specially prepared proforma.

During the treatment, it was strongly emphasized to the patients about the importance of washing hands after using toilets, playing with pets, and before taking their meals. Further, patients were advised to keep their nails short, bathe, and change clothes daily. They were also advised to wash towels, bedding, and clothes daily in hot water.

Lab Investigation: Stool examination for ova of *E. vermicularis*

Intervention

Group A

Drug : Decoction of *Leucas zeylanica*

Dose : 120ml twice a day

Duration: Seven days (07)

Follow up: Three months

Group B

Drug: Placebo for decoction of *L. zeylanica*

Dose : 120ml twice a day

Duration: Seven days (07)

Follow up: Three months

Criteria for Assessment

The therapeutic effects were evaluated through symptomatic relief, using a graded scale prepared by the researchers. The details of

scoring patterns for each symptom are given below.

Udgara (Eructation)

Nil = 0 = no eructation

Mild = 1 = occasional eructation

Moderate = 2 = intermittent eructation

Severe = 3 = eructating often

More severe = 4 = very frequent eructation

Agni Mandaya (Impaired Appetite)

Nil = 0 = normal appetite

Mild = 1 = appetite impaired and does not feel hungry at regular meal times

Moderate = 2 = skips some meals due to impaired appetite

Severe = 3 = appetite impaired and cannot stand the sight of food

More severe = 4 = appetite seriously impaired and does not like to see or even hear about food

Udara Shoola (Pain In Abdomen)

Nil = 0 = no pain in abdomen

Mild = 1 = occasional pain in abdomen

Moderate = 2 = intermittent pain in abdomen

Severe = 3 = frequent pain in abdomen and disturbs daily routine work

More severe = 4 = continual pain in abdomen; even sleep is disturbed due to pain

Agnisadana (Poor Digestion)

Nil = 0 = normal digestion

Mild = 1 = digestion impaired. Passing stools emitting foul odour

Moderate = 2 = digestion impaired. Passing loose stools emitting foul odour

Severe = 3 = digestion impaired. Passing loose stools containing some undigested food particles, emitting foul odour

More severe = 4 = digestion impaired. Passing loose stools containing large quantity of undigested food particles, emitting foul odour

Guda Kandu (Itching in Anal Region)

Nil = 0 = no itching in anal region in the night

Mild = 1 = occasional itching in anal region in the night

Moderate = 2 = intermittent itching in anal region in the night

Severe = 3 = frequent itching in anal region in the night

More severe = 4 = continual itching in anal region in the night and sleep is disturbed

Vidbheda (Diarrhea)

Nil = 0 = passing normal stools

Mild = 1 = passing loose stools once a day

Moderate = 2 = passing loose stools twice a day

Severe = 3 = passing loose stools thrice a day

More severe = 4 = passing loose stools more than three times a day

Vishtambha (Constipation)

Nil = 0 = passing stools normally

Mild = 1 = passing hard stools daily

Moderate = 2 = passing hard stools on alternative day

Severe = 3 = passing hard stools once in 3 days

More severe = 4 = passing small volumes of hard stools once in three or more days with rectal pain

Nihshwasa Vid Gandha (Bad Breath)

Nil = 0 = no bad breath

Mild = 1 = occasional bad breath

Moderate = 2 = intermittent bad breath

Severe = 3 = often bad breath

More severe = 4 = always bad breath

Parushya (Dryness of the Skin)

Nil = 0 = normal skin

Mild = 1 = dryness of the skin present occasionally

Moderate = 2 = dryness of the skin present intermittently

Severe = 3 = dryness of the skin present frequently

More severe = 4 = Severe dryness of the skin and skin is fissured

Pandutha (Whitish-Yellow Discoloration of the Skin)

Nil = 0 = normal skin complexion

Mild = 1 = skin has a slight pallor complexion

Moderate = 2 = skin has a mild pallor complexion

Severe = 3 = skin has a moderate pallor complexion

More severe = 4 = skin has a severe pallor complexion

Karshya (Emaciation)

Nil = 0 = no emaciation

Mild = 1 = losing 0.5 kg of body weight during the treatment period

Moderate = 2 = losing 1 kg of body weight during the treatment period

Severe = 3 = losing 1.5 kg of body weight during the treatment period

More severe = 4 = losing more than 1.5 kg of body weight during the treatment period

Statistical analysis:

Statistical comparisons were made using Mann-Whitney U test using the statistical package Minitab 12.1 for windows. *P* value <0.05 was considered as significant effect.

Observations and Results:

In this clinical study, it was observed that the patients complained of itching and scratching in the anal region. This seemed to occur especially in the night and sometimes even disturbed the sleep. They occasionally complained of aversion to food, and also complained of loss of appetite, abdominal pain, eructation, diarrhea, or constipation. The therapeutic effect was evaluated through symptomatic relief, and the results are given in Table 1, 2. Ova of *E. vermicularis* were present in stools before

treatment in 12% of patients in both groups. But ova were absent in stools of group A patients after they were treated with decoction of *L. zeylanica* twice a day for 7 days. Almost all the

patients reported absence of itching in the anal region by fourth or fifth day. 12% of the patients complained of burning sensation in the abdomen on sixth and seventh days.

Table No1: Percentages of Symptomatic relief during the treatment with decoction of *Leucas zeylanica* and placebo

Symptoms	Control Group				Treated Group			
	% Completely relived	% Partially relived	% Unchanged	% Aggravated	% Completely relived	% Partially relived	% Unchanged	% Aggravated
udara shoola (pain in abdomen)	00.0	12.0	62.0	26.0	88.0	12.0	00.0	00.0
agni mandaya (impaired appetite)	00.0	05.3	83.2	11.5	45.3	37.6	15.1	02.0
guda kandu (itching in anal region)	00.0	08.5	76.8	14.7	100.0	00.0	00.0	00.0
udgara (eructation)	00.0	12.6	67.4	20.0	68.8	18.0	8.7	04.5
vidbheda (diarrhoea)	00.0	15.0	60.4	24.6	30.8	62.8	0.9	05.5
vishtambha (constipation)	00.0	16.7	71.2	12.1	45.4	29.0	25.6	00.0
nihshwasa vid gandha (bad breath)	00.0	10.5	80.7	8.8	58.4	26.4	15.2	00.0
parushya (dryness of the skin)	00.0	08.0	88.0	04.0	06.0	09.0	82.5	2.5
pandutha (whitish-yellow discolouration of the skin)	00.0	14.6	78.0	07.4	18.0	28.0	42.0	12.0
karshya (emaciation)	00.0	3.5	96.5	00.0	00.0	18.7	81.3	00.0

Table No2: Symptomatic relief during the treatment with decoction of *Leucas zeylanica* and placebo (mean \pm SE)

Symptoms	Control Group Mean \pm SE		Treated Group Mean \pm SE	
	BT	AT	BT	AT
udara shoola (pain in abdomen)	2.58 \pm 0.21	2.64 \pm 0.11	3.02 \pm 0.18	0.55 \pm 0.32*
agni mandaya(impaired appetite)	1.56 \pm 0.42	1.66 \pm 0.22	1.32 \pm 0.66	0.56 \pm 0.10*
guda kandu (itching in anal region)	3.26 \pm 0.11	3.11 \pm 0.54	2.78 \pm 0.11	0.88 \pm 0.11*

udgara (eructation)	0.78 ± 0.14	0.84 ± 0.24	1.04 ± 0.11	0.64 ± 0.21*
vidbheda (diarrhoea)	1.48 ± 0.24	1.32 ± 0.55	1.68 ± 0.26	0.76 ± 0.22*
vishtambha (constipation)	2.02 ± 0.16	1.94 ± 0.33	1.98 ± 0.45	1.10 ± 0.22*
nihshwasa vidg (bad breath)	2.04 ± 0.38	2.10 ± 0.14	2.44 ± 0.18	0.88 ± 0.12*
parushya (dryness of the skin)	1.32 ± 0.44	1.28 ± 0.24	1.48 ± 0.48	0.99 ± 0.30
pandutha (whitish-yellow discolouration of the skin)	1.64 ± 0.17	1.72 ± 0.33	1.88 ± 0.14	0.55 ± 0.17*
karshya (emaciation)	1.21 ± 0.24	1.14 ± 0.18	0.98 ± 0.32	1.10 ± 0.11
P<0.05 significant				

Discussion:

L. zeylanica is a plant used in treatment of worm infections by Traditional and Ayurvedic physicians of Sri Lanka. According to Ayurveda, the increase of kapha dosha promotes the growth, reproduction and propagation of worms. *L. zeylanica* has the properties of katu rasa, ruksha guna, tikshna guna, katu vipaka and ushna veerya. Hence it act as a kaphaghna dravya (ingredient which reduces kapha dosha). As *L. zeylanica* possess the aforesaid kaphaghna (reducing kapha dosha) properties, it inhibits the growth, reproduction and propagation of worms. This plant contains the property of krimighna and as such, it acts as a vermicide. Further, according to Ayurveda, as this plant has rechana guna (property of purgation), it acts on

gastrointestinal tract promoting the expulsion of contents of gastrointestinal tract including worms. With its rechana guna (purgative effect) it may induce paralyzation of muscles of the worms, thereby acting as a vermifuge. Malaysians, use *L. zeylanica* as a sedative. Therefore it may expel worms acting as a vermifuge through sedation. These factors based on properties of *L. zeylanica*, indicate it's action and effectiveness in controlling and managing of *E. vermicularis* infections.

Conclusion:

It can be concluded that decoction of *L. zeylanica* can be used as an effective, low-cost, and indigenous treatment for *E. vermicularis* infections among adults.

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