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Short Communication

A comparative evaluation of intestinal transit time of two dosage forms of *Haritaki* [*Terminalia chebula* Retz.]

Yogesh M. Jirankalgikar, Ashok B. K.[1], Rambabu R. Dwivedi[2]

Ph.D. Scholar, Department of Basic Principles, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, [1]Research Associate, Drug Discovery Group, Research and Development, Himalaya Health Care, Bengaluru, Karnataka, [2]Professor and Head, Department of Basic Principles, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

Abstract

Haritaki is praised as the best salutary drug which can be used in almost all ages of human life and is reputed for its *Anulomana* property. In Ayurveda, it has been mentioned that fruits of *Haritaki* when used in different forms give different type of actions. As the prime therapeutic utility of *Haritaki* is *Anulomana*, in the present study, two dosage forms of *Haritaki* fruits namely *Churna* and *Vati* were evaluated for intestinal transit time to evaluate its effect in two different dosage forms. Mature fruits were collected, authenticated, and processed as per classics to get *Churna* and *Vati*. Test drugs were administered in the dose of 550 mg/kg and evaluation on intestinal transit time was carried out by adopting kaolin expulsion test in mice. The results show that both the dosage forms of *Haritaki* significantly shortened intestinal transit time and between them *Churna* form is found to be better.

Key words: *Anulomana*, *Churna*, *Haritaki*, intestinal transit, kaolin, *Terminalia chebula*, *Vati*

Introduction

In *Ayurveda*, *Haritaki* [*Terminalia Chebula* Retz] is praised as the best salutary drug which can be used in almost all stages and ages of human life.[1] This drug is having many different properties and actions, one of the important among them is *Anulomana*. *Anulomana* (Aperients a purging medicine; stimulates evacuation of the bowels) can be defined as a mild form of laxative action in which complete process of digestion is achieved and fecal matter which is adhered to intestinal walls is separated without damaging intestinal mucosa.[2] This action is achieved in such way that it accelerates normal digestion process through easy evacuation by altering consistency of fecal matter to normalcy which is sticky because of improper digestion (ingestion).

In Ayurveda, it has been mentioned that fruits of *Haritaki* when used in different dosage forms give different type of actions such as boiled *Haritaki* is *sangrahi* (water absorbent), whereas powder is laxative in nature.[3] As the prime therapeutic utility of *Haritaki* is *Anulomana*, in the present study, two dosage forms of *Haritaki* fruits viz., *Churna* (powder) and *Vati* (tablet) were evaluated for intestinal transit time to ascertain if any difference exists in their pharmacological activity on intestinal motility.

Address for correspondence: Dr. Yogesh Mukund Jirankalgikar, 69, Padolkar Galli, Barshikar Wada, A/P - Umadi, Tal - Jat, Dist - Sangli, 416413, Maharashtra, India.
E-mail: yogeshjir@yahoo.co.in

Materials and Methods

Test formulations

Mature fruits of *Haritaki* (*Terminalia Chebula* Retz.; Family: Combretaceae) were collected from Sasoi Botanical Garden, Jamnagar District, Gujarat, in fully matured condition, during the month of January and were authenticated by qualified taxonomist. These fruits were shade dried for 20 days and then pulverized to fine powder (mesh no 80) and stored in airtight container. This fine powder was triturated in the end runner with decoction of *Haritaki* by adding quantity sufficient to soak it for three times.[4] Total time required for triturating was 64 hours, after which the material was again dried in hot air oven at 80°C for 48 hours so as to get hard balls. This material was divided in two equal parts one of which was powdered (*Churna*) and other was punched in tablet form (*Vati*) of 500 mg each. Final product was stored in air tight containers for experimental purposes.

Animals

Swiss albino mice of either sex weighing between 30 ± 4 g were procured from the animal house attached to pharmacology laboratory. They were housed in large spacious polypropylene cages and fed with Amrut brand rat pellet feed supplied by Pranav Agro Industries and tap water given

ad libitum. The animals were acclimatized for at least one week in laboratory condition before commencement of the experiment in standard laboratory conditions 12 ± 01 hour day and night rhythm, maintained at 25 ± 3°C and 40 to 60% humidity. Institutional Animal Ethics Committee had approved the experimental protocol (Approval number; IAEC/09/11/07) and the care of animals was taken as per the CPCSEA guidelines.

Dose fixation

The dose of *Haritaki* for the purpose of *Anulomana* in human is one *Karsha*[5] which is about ten grams. The dose for the mouse was calculated on the basis of body surface area ratio by referring to the standard table of Paget and Barnes (1964).[6] On this basis, the mouse dose was found to be 550 mg/kg. The test drug was suspended in deionized water with suitable concentration depending upon body weight of animals and administered orally to overnight fasted animals with the help of oral catheter.

Experimental design

The selected animals were divided into three groups of six each comprising three male and three females. The first group served as control and deionized water was administered to it in requisite quantity. Second and third groups were administered with two dosage forms of *Haritaki* at the dose of 550 mg/kg respectively. The test formulations and vehicle (deionized water) were administered to overnight fasted animals. The effect of the test formulations on intestinal transit time was carried out based on previous study.[7] In short, one hour after drug administration, 40% kaolin (Sigma-Aldrich) solution was administered with the help of oral catheter. The animals were placed in a transparent arena and were carefully observed for the beginning of the kaolin expulsion which begins in the form of white-colored fecal pellets.

Statistical analysis

The data were expressed as mean ± standard error mean (SEM). The significance of differences among the groups was assessed using one-way analysis of variance and the test followed by Dunnett's test. *P* values less than 0.05 were considered as significant.

Results

The result of the present study shows that both the dosage forms of *Haritaki* significantly decreased the intestinal transit time in comparison to control group [Table 1]. Furthermore, between the two dosage forms, the decrease observed in intestinal transit time of *Churna* dosage form was found to be comparatively better. This difference is not statistically significant.

Table 1: Effect of *Haritaki Churna and Vati* on intestinal transit time

Groups	Kaolin pellet expulsion time (Minutes)	% Change
Control	311.96±24.30	–
Churna	193.60±4.82*	37.94 ↓
Vati	200.10±3.54*	35.85 ↓

Data: Mean±SEM; ↓-Decrease; *One-Way ANOVA df-17, F=21.207, *P*<0.05

Discussion

In this experiment, to assess the action of two dosage forms of *Haritaki* on the intestinal motility, latency of onset of kaolin expulsion in fecal matter was selected as a parameter. It is well-known fact that it is not an easy task to prove the *Anulomana* action of a drug in experimental animal model because of its broader meaning. It may be the reason why attempts were not made by researchers to provide experimental basis for *Anulomana* effect of drug. As explained by *Acharya Sharangadhara*, during defining *Anulomana* is to break the bonds between *mala* (fecal matter) and intestinal mucosa by completing the digestion process and brings quick excretion of flatus and fecal matter. In quick excretion, there is all the chance of increase in intestinal motility.

Results of present study show that administration of both the dosage forms of *Haritaki* significantly decreased the intestinal transit and among them the observed decrease in intestinal transit time of *Churna* dosage form is found to be marginally better. The mechanism of observed effect may be due to interference with local stimulant effect on motility or acceleration of gastric emptying. *Haritaki* helps in proper absorption of water and other liquids in undigested material so as to help separation of fecal matter and maintaining its normal consistency by virtue of its *Ruksha*, *Ushna Gunas*. Another mechanism may be breaking of any lineage between fecal matter and intestinal walls which may be caused because of constipation. It may also increase stimulation of the enteric nervous system so as to accelerate the intestinal motility. It may not be affecting the fluid dynamics because the test drug did not change the consistency of the expelled fecal matter to significant extent.

It has been reported that the fruits of *Haritaki* (*Terminalia chebula* Retz) contain phytoconstituents like tannins, anthraquinones, and polyphenolic compounds.[8] It is possible that one or the combination of these phytoconstituents may be responsible for the observed effect.

Conclusion

Both the dosage forms of *Haritaki* possess significant intestinal motility-enhancing effect, indicating towards some of the working mechanisms of *Anulomana* drug as described in Ayurveda. Among them, *Churna* form has slightly stronger effect and can be preferred over *Vati* in the treatment of *Malavibandha* (constipation).

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हिन्दी सारांश

हरीतकी फल के चूर्ण और वटी की औषध मात्रा का आंत्र पारगमन समय पर मूल्यांकन

योगेश एम. जिरांकलगीकर, अशोक बी. के., रामबाबू आर. द्विवेदी

हरीतकी सबसे अच्छी हितकारी औषध है जो लगभग सभी आयु वर्ग में प्रयोग की जा सकती है । यह अनुलोमन कर्म हेतु प्रतिष्ठित एवं प्रशंसित है । आयुर्वेद में यह उल्लेख किया गया है कि हरीतकी का फल जब अलग अलग रूपों में प्रयोग किया जाता है तो विभिन्न प्रकार के कर्म करता है । हरीतकी का प्रधान चिकित्सकीय उपयोग अनुलोमन है । वर्तमान अध्ययन में हरीतकी फल के चूर्ण और वटी रूपों का आंत्र के पारगमन समय पर मूल्यांकन किया गया । हरीतकी के परिपक्व फल एकत्र किये गये । प्रमाणीकृत और ग्रन्थोक्त पद्धति से संसाधित चूर्ण और वटी बनायी गयी । परीक्षण औषधियाँ ५५० मिली ग्राम/किलो मात्रा में चूहों को दी गयी और आंत्र के पारगमन समय पर केओलीन निष्कासन परीक्षण के द्वारा मूल्यांकन किया गया । परिणाम में हरीतकी के दोनों प्रपत्र रूप आंत्र के पारगमन समय को कम करते हैं और उन दोनों में चूर्ण बेहतर पाया गया ।