Short Communication

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

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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 sangrahī (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.

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 Anrut brand rat pellet feed supplied by Pranav Agro Industries and tap water given

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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 Raksha, 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.[3] 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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