PHARMACOLOGICAL STUDY OF ANTI-INFLAMMATORY ACTION OF HARITAKI PREPARATIONS ON WISTAR RATS IN HEMORRHOIDS (PILES)

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ABSTRACT

The main aim of the present study was to evaluate the anti-inflammatory properties of Ayurvedic preparation of Haritaki (Terminalia Chebula) on wistar rats. Anti-inflammatory activity of Ayurvedic preparations such as Haritaki powder with Anupana (vehicle) buttermilk, Guda Haritaki powder with distilled water and Guda Haritaki powder with anupana (vehicle) buttermilk at a dose of 85 mg/kg, orally was evaluated against the standard drug indomethacin at a dose of 10 mg/kg orally. Wistar rats of either sex of five numbers in each group was undertaken for study and evaluated by carrageenan-induced paw edema method. Haritaki powder with Anupana (vehicle) buttermilk and Guda Haritaki powder with distilled water treated groups showed significant reduction in the carrageenan induced paw edema (P< 0.01) when compared to control group rats. The Ayurvedic preparations of Haritaki have potential anti-inflammatory activity and hence could be established by further more studies.

KEYWORDS: Haritaki (Terminalia Chebula), anti-inflammatory, carrageenan-induced paw edema.

Cite this article:
INTRODUCTION

Inflammation is a local response of living mammalian tissues to injury due to any agent. It is a protective and defensive mechanism of body. Inflammation is of two types - acute and chronic. There are various components responsible to an inflammatory reaction such as edema formation, leukocyte infiltration and granuloma formation that can contribute to the associated symptoms and tissue injury (Brooks, 1991).

No matter what the initiating stimulus, the classic inflammatory response includes calor (warmth), dolor (pain), rubor (redness), and tumor (swelling) (Harsh Mohan, 2002). Inflammation is considered as a primary physiologic defense mechanism that helps body to protect itself against infection, burn, toxic chemicals, allergens or other noxious stimuli. An uncontrolled and persistent inflammation may act as an etiologic factor for many of these chronic illnesses (Kumar V, 2004). It can be evoked by a wide variety of noxious agents (e.g., infections, antibodies, or physical injuries). Some of the inflammatory disorders include Atherosclerosis, asthma, irritable bowel syndromes, Nephritis, hepatitis, arthritis, colitis, nephritis etc. Inflammatory responses occur in three distinct temporal phases, each apparently mediated by different mechanisms: (1) an acute phase characterized by transient local vasodilation and increased capillary permeability; (2) a delayed, subacute phase characterized by infiltration of leukocytes and phagocytic cells; and (3) a chronic proliferative phase, in which tissue degeneration and fibrosis occur.

Hemorrhoids are swollen inflamed veins around the anus or in the lower rectum. About 75 percent of people will have hemorrhoids at some point in their lives (Baker H., 2006). Hemorrhoids are most common among adults ages 45–65 as well as in pregnant women (Chong PS, 2008). Various medicinal plant drugs are used in the treatment of Arshas (Hemorrhoids) and Haritaki (Terminalia chebula Retz.) is one of them, which is also cited in Charaka’s “Arshoghna Mahakashaya” (Sastri Satya Narayana, 2002).

The pathophysiology of hemorrhoid disease in producing acute and chronic symptoms is likely multifactorial involving both anatomic and inflammatory components. The inflammatory component from venous stasis and resulting vascular fragility seems to represent a significant clinical component. Therefore anti inflammatory drugs also plays an important role in the conservative management of hemorrhoids (Jon M Hain, 2011).

There are list of complications occurring as a result of taking anti inflammatory drugs like nausea, vomiting, diarrhea, acid peptic disorders etc. To avoid the above complications, it would be better to go with herbal drugs for the management of Hemorrhoids. In Ashtanga Hridaya, it is advised to use Haritaki along with Takra (Buttermilk) to reduce the doshas which are indulged in the anal region in the patients of Arshas (Tripathi Bramhananda 2007). Some Maharashtrian Vaidyas also have tradition to use Haritaki along with Takra to reduce the pain and swelling in the initial treatment management of Arshas (Ogale, 1921).

Pathya takrena va saha….hrite gudashraye doshe gudaja yanti samkshhayam (A. H. Chi 8/58)

When there are symptoms like swelling, spasmodic pain and itching in the rectal area it is advised to use Haritaki along with Guda (Jaggary) in Ashtanga Hridaya (Tripathi Bramhananda 2007).

Gudshwayathushularto… Khaadet guda haritaki (A. H. Chi 8/33)

Therefore the present study has been carried out to investigate the anti-inflammatory properties of Ayurvedic preparation of Haritaki (Terminalia Chebula).
MATERIALS AND METHODS

Materials

In the present study Terminalia chebula fruits were used (Seedless) as medicine. Three Types of Haritaki i.e. Rangari, Survari and Bal are available in the market of which Survari type of Haritaki was selected for the present study. Fruits of Haritaki were procured from Chennai market (N. Shobhakant).

The fruiting season could not be ascertained as the raw material was procured from the market. Fruit pericarp was used in the drug. (Fruits were taken around 10.5 kg) Seeds were separated and removed and the pericarp was powdered and sieved. 9 Kg was the total yield which indicates a loss of 1.5 kgs during the process.

Preparation of Guda Haritaki

- Guda Haritaki was prepared according to Bhavprakasha (Arsha chikitsa). (Nanal P. G, 1929)
- Equal quantity of Haritaki and Purana guda were taken (4 kg of Haritaki powder and 4 kg Purana guda i.e. old jaggary.
- First Gada was crushed and made into a powder.
- It was melted over heat after adding little water.
- Then the liquid Guda was filtered by using cloth.
- Then Haritaki powder was mixed.
- Then mixture was allowed to dry in shade.

Experimental Animals

Adult Albino Wistar rats weighing about 150–200 g of either sex were procured from the animal house of Krishna Teja College of Pharmacy, Tirupati, Andhra Pradesh, India. The animals were maintained in a well-ventilated animal house approved by Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), with 12:12 hour light/dark cycle in polypropylene cages with 27 ± 2°C temperature. The animals were given standard diet.

Experimental Design

Group I: Buttermilk (3 ml, p.o.) [Control group]
Group II: Indomethacin (10 mg/kg, p.o) [Standard group]
Group III: Haritaki powder (85 mg/kg) with Anupana (vehicle) buttermilk orally, p.o.
Group IV: Guda Haritaki powder (85 mg/kg) with distilled water, p.o.
Group V: Guda Haritaki powder (85 mg/kg) with anupana (vehicle) buttermilk, p.o.

The anti-inflammatory activity of Ayurvedic preparation of Haritaki (Terminalia Chebula) was determined using carrageenan induced rat paw edema assay (Winter CA, 1962). After 30 mins of the treatment, 0.1 ml of 1% carrageenan in saline was injected into the sub plantar region of the left hind paw of each rat to induce edema. The paw volume was measured initially and at intervals of 0, 30, 60, 120, 180 min after carrageenan injection by volume displacement method using Plethysmometer by immersing the paw in mercury cell. The percentage inhibition of paw volume in drug treated group was compared with control group. Indomethacin (10 mg/kg) was used as standard drug. The percentage inhibition of paw edema was calculated by using the following formula;

\[
\text{Percentage of edema inhibition} = \left(\frac{V_c-V_t}{V_c}\right) \times 100
\]

Vc- Volume of paw edema in control group
Vt- volume of paw edema in treated group

Statistical analysis

Results were expressed as Mean ± S.E.M and statistical significance was calculated by applying one way ANOVA followed by dunnett’s test. P<0.05 was considered as significant.
Table 1. Effect of ayurvedic preparation of Haritaki (Terminalia Chebula) on carrageenan induced induced paw edema

<table>
<thead>
<tr>
<th>Treatment &amp; Dose</th>
<th>Paw edema volume (ml)</th>
<th>Percentage of inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 min</td>
<td>30 min</td>
</tr>
<tr>
<td>Group I (Buttermilk 3 ml, p.o.)</td>
<td>74.83 ± 1.222</td>
<td>1.66 ± 0.0175</td>
</tr>
<tr>
<td>Group II (Indomethacin, 10 mg/kg, p.o)</td>
<td>75.5 ± 0.9916</td>
<td>1.07 ± 0.0147**</td>
</tr>
<tr>
<td>Group III Haritaki powder with anupana Takra (85mg/kg, p.o)</td>
<td>73.83 ± 1.249</td>
<td>1.54 ± 0.0154**</td>
</tr>
<tr>
<td>Group IV Guda Haritaki powder with distilled H₂O (85mg/kg, p.o)</td>
<td>75.83 ± 0.8724</td>
<td>1.43 ± 0.0115**</td>
</tr>
<tr>
<td>Guda Haritaki powder with anupana Takra (85mg/kg, p.o)</td>
<td>73.17 ± 0.8724</td>
<td>1.62 ± 0.0099</td>
</tr>
</tbody>
</table>

Values are expressed as mean ± SEM (n=6), *p<0.05; **p<0.01 denotes significance with respect to the control group using one way ANOVA followed by Dunnett’s test.

RESULTS

Anti-inflammatory effect of Haritaki was observed and found to be significant at the level of p<0.01 when compared with the vehicle butter milk (control group) and indomethacin (Standard) (Table 1). The percent inhibition in paw edema after 3 h were recorded 63.49 % in case of indomethacin, 49.74%, 57.14 and 40.74 % in case of Haritaki powder with anupana Takra (buttermilk) (85 mg/kg, p.o), Guda Haritaki powder with distilled H₂O (85 mg/kg, p.o) and Guda Haritaki powder with anupana Takra (buttermilk) (85 mg/kg, p.o) respectively.

DISCUSSION

Anti-inflammatory activity was determined by using inhibition of carrageenan-induced inflammation which is one of the most feasible methods to screen anti-inflammatory agents. The development of carrageenan-induced edema is bi-phasic; the first phase is attributed to the release of histamine, serotonin and kinins and the second phase is related to the release of prostaglandins and bradykinins. (Brooks PM 1991) It was observed that ayurvedic preparation of Haritaki possessed significant inhibition against carrageenan induced paw edema in rats. This response tendency of the extract in carrageenan-induced paw edema revealed good peripheral anti-inflammatory properties of the ayurvedic preparation of Haritaki.

CONCLUSION

The present study concluded that Haritaki had a better effect on treating carrageenan-induced rat paw edema. Therefore this Haritaki has got definite effect in reducing the inflammatory components. Further, extraction of the active ingredient responsible for the above cited results along with biochemical analyses, evaluating its role in inhibition of various inflammatory mediators like COX, LOX and TNF-α, and subsequent human trials may further elucidate the potential role of Haritaki in treating inflammation.
REFERENCES


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