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CLINICAL EVALUATION OF *TERMINALIA BELERICA* IN DIARRHOEA

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ABSTRACT: *Terminalia belerica (behada) fruit has been evaluated as a promising agent against E. histolytica and a variety of bacteria associated with dysentery and diarrhoea. These in vitro studies were extended further for evaluating clinical efficacy among patients of acute and chronic cases of diarrhoea and dysentery. The Studies were carried out on 25 patients by five medical practitioners practicing at different clinics in the urban areas of Pune. The data was collected as per the protocol given to the concerned clinicians. Inclusion and exclusion criteria were critically followed. Record of patients' history, clinical evaluations and investigations like stool, urine examination were carried out where necessary.*

The maximum treatment period was 14 days and the dose was 150 mg. tablets of bioactive fraction three times a day. 11 out of 12 patients responded to therapy and required around twelve tablets for recovery. Seven patients having the presence of cyst of amoeba, E. coli etc. became negative at the end of treatment. Improvement started on second day. No side effects of any nature were observed.

INTRODUCTION

Terminalia belerica, commonly known as Behada, Baheda and Bibhitaka is in wide use against variety of ailments. It is one of the three myrobalans of the popular Ayurvedic drug Triphala. Its use in dysentery and diarrhoea is indicated (Nadkarni, 1975). In the extensive screening programme on Indian Medicinal Plants carried out at Central Drug Research Institute, Lucknow; number of plants were reported to be active against growth of E. histolytica (Dhar et al. 1973).

From the thick seed coats of *T. belerica* fruits, ellagic, gallic and protocatechenic acids have been isolated from the polyphenolic fraction of lower chromatographic and electrophoretic mobilities by fractional precipitation. Besides these phenolic acids, free sugars have also been separated. (Row and Murthy 1970), (Row, et al).

These studies were extended further by researchers at Regional Research Laboratory, Jammu Tawi, with primary aim to screen a limited number of readily available plants with antidysenteric reputation against axenic and polyaxenic cultures of *E. histolytica* and other bacterial species encountered in diarrhoea and dysentery. In this program thirty five plants were examined out of which the most significant activity was observed in *Terminalia belerica.*

T. belerica fruit extract showed amoebicidal and bactericidal activity *in vitro.* Its bactericidal activity was better than that of nalidixic acid and chloramphenicol (Bhutani et al., 1987).

MATERIALS AND METHODS

Bioactive fraction (BAF) was prepared by extraditing dry pericarp (3 Kg.) of the fresh fruits (20 Kg.) with hot methanol. The methanol extract (300 g.) was vacuum dried is hot desicator till all the traces of solvent were evaporated. Ayurvedic physicians recommend about 8 – 10 g. of Tirphala powder | day | patient for long term therapy without any adverse effects. With this view of dose of BAF was designed.

BAF prepared by the Regional Research Laboratory, Jammu Tawi, was formulated into tablets of 150mg. A common protocol was provided along with the drug to the clinicians. 25 patients were included in this preliminary study and were divided equally among five different clinicians. The studies were carried out by them independently at their individual clinics. Samples were coded and patients received either drug or placebo in random fashion. The inclusion and exclusion criteria were also determined along with records of patient history. Patients were examined clinically and pathological investigations were recommended for confirmation if necessary.

Dose recommended was 2 tablets TDS up to 14 days. The clinicians were allowed to stop the treatment in case of adverse reaction or complete recovery even before this time limit. The clinicians were free to vary the dose from 1 TDS to 2 TDS depending on the severity of the disease as reflected by number of loose motions, duration of gripping and cramps.

The results obtained from clinicians in form of the filled up protocol were analysed critically.

RESULTS

Twenty five patients suffering from diarrhoea were entered into the trial. Their characteristics on entry are given in Table 1. They were given BAF | placebo tablets three times a day. No other drug was administered. However oral rehydration therapy was allowed in patients with mild to moderate degree of dehydration. Total six patients required oral rehydration therapy. Three patients dropped out due to personal reasons. The response to therapy in all patients is given in the Table 2. All patients responded to therapy with BAF tablets. Around twelve tablets were required for their recovery. Cyst positive, bacteria positive patients from drug treatment group became negative. However placebo group stools showed presence of the same even after seventh day.

DISCUSSION

Amoebic dysentery though labeled as tropical has incidences to the extent of 10% in the temperate zones also. This disease has a tendency to chronicity specially in

tropical countries. Drugs available for treatment include, metronidazole, Quiniodochlor, diloxanide furoate, emetine etc. but most of these drugs have their own limitations and toxic effects giving rise to problems in patients compliance (Goodman and Gilman 1975).

In the present study a possibility of new drug development against *E. histolytica* and bacteria involved in dysentery or diarrhoea has been explored. The significance of this work is that most of the patients were relieved from the disease and became symptom-free within 2 – 3 days. The drug did not show any side effects nor was there any problem of patient's compliance.

TABLE 1

Patient characterstics on entry into the study (Mean ± SD)

	BAF	Placebo
No. of patients (End of Study)	12	10
Median age	23.6 ± 2.5	21.7±3.5
Male | Female Ratio	10 : 2	8:2
Median number of watery stools in the previous 24 hrs	8 ± 1.6	7 ± 1.6
Median duration since watery stools (hrs)	22	20
No. of patients with cysts	7	6

The extract chemistry of the active fraction has to be carried out in order to get an idea about the active ingredients. The mechanism of activity of this preparation cannot be commented from this study. It is possible that the amoebicidal and bactericidal effect of BAF is responsible for patients' improvement. In order to confirm this hypothesis a detailed chemical and biological screening programme has to be undertaken under multidisciplinary approach. It is needless to stress the importance of such agents which can control effectively the pathogens which can develop or have developed resistance to current drugs.

TABLE 2
Response to therapy

	BAF	Placebo
No. of patients completed therapy	12	10
No. of patients responded therapy by 48 hours	11*	2
No. of tables taken (Mean ± SD)	12 ± 2.8*	42 ± 6.8

Time from first & last dose (hrs.)	42 ± 6.4*	82 ± 6.2
Time from first dose to diarrhoea stopped (hrs)	29.6 ± 2.8*	78 ± 8.6
Time from first dose to cramps stopped (hrs.)	38.4 ± 6.2*	70 ± 8.2

* Significantly different from control $p < 0.05$

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