ANTI-PEPTIC ULCER ACTIVITY OF MUKTASHUKTI BHASMA

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Background: Pearl oyster is found at Atlantic and Indian Ocean coasts. Its ash or paste is used in ancient Ayurvedic medicine to manage various gastric disorders. Muktashukti Bhasma (Pearl Oyster Shell) is the calcinated shell of pearl oyster and has calcium, magnesium and iron. It is well known for its antacid and digestive properties. We carried out this study to investigate anti-peptic ulcer activity of Muktashukti Bhasma (MSB). **Methods:** Two hundred and thirty-eight inbred Albino rats of either sex were divided into 7 groups. Group-I (n=10) was control group, it was kept on distilled water. Suspension of Muktasukti Bhasma (MSB) was administered orally 100 mg/kg body wt. in group-II (n=6), 300 mg/kg body wt. in Group-III (n=6), and 1,000 mg/kg body wt. in Group-IV (n=6). In rest 3 groups (in all n=6) Ranitidine was administered subcutaneously at 0.5 mg/kg body wt. in Group-V, 2 mg/kg in Group-VI, and 5 mg/kg in Group-VII. All the Rats were sacrificed at the end of 19 hours after operation for pyloric ligation and gastric secretions were analyzed for *p*H, free acidity, and pepsin activity. **Result:** Muktashukti Bhasma caused reduction in ulcer score and ulcer index with all the doses. MSB caused significant reduction ($p<0.001$) in free and total acidity, and acid output only at 300 and 1,000 mg/kg dose. MSB and Ranitidine caused decrease in peptic activity at all dose levels. MSB also raised *p*H. **Conclusion:** Muktashukti Bhasma shows variable reduction in free and total acidity, acid output and peptic activity.

Keywords: Muktashukti Bhasma, Pearl Oyster, Anti Peptic Ulcer Activity

INTRODUCTION

Muktashukti Bhasma (MSB) is a compound consisting of pearl (*moti*), Aloe Vera Linn (*Guar-Patha*) and vinegar (*kanji*). The compound is prepared from the outer covering of the shell (pearl-oyster), ground and triturated with Aloe Vera and vinegar in sufficient quantity to make a homogenous paste. Recommended proportions of pearl-oyster and Aloe-Vera are in the ratio of 1:4.[1] Medicinal properties have been attributed to this preparation in ancient Ayurveda and Unani systems of medicine. MSB has been used in treatment of tuberculosis, cough, chronic fever, conjunctivitis, abdominal discomfort, biliary disturbances, asthma, heart disease, vomiting, and acidity, dyspepsia, dysmenorrhoea, general weakness, and arthritis, rheumatism and musculoskeletal disorders. MSB is recommended in a dose of 125 to 375 mg twice or the thrice daily in treatment of above mentioned disorders.[1–5] Since, no experimental or clinical studies seem to have been carried out with MSB, it has been thought worthwhile to investigate its anti-peptic ulcer activity.

Chemically MSB consists of calcium carbonate, calcium phosphate, aluminium oxide, magnesium oxide and organic matter.[6–7] The claims made by practitioners of Ayurvedic system regarding the usefulness of MSB in peptic ulcer has so far not been verified and supported by scientific studies. Hence the present preliminary study has been undertaken with the aim to evaluate MSB for anti-gastric ulcer actions which may either support or repute the claims made by the Ayurvedic Practitioners.

MATERIAL AND METHODS

Authenticated supply of the Muktashukti Bhasma was procured from Central Council for Research in Ayurveda and Siddha, New Delhi (India). Suspension of MSB was freshly prepared in distilled water at room temp (33 °C to 38 °C), 15 minutes before the commencement of each experimental procedure. The suspension was so made that each animal (rat) received the desired dose in 1 ml/100 mg body weight per oral through a 18-guage feeding needle. Ranitidine was employed subcutaneously as standard antigastric drug. MSB/Ranitidine were administered orally and subcutaneously in dose at 100, 300, and 1,000 mg/kg and 0.5, 2, and 5 mg/kg respectively. MSB was given per oral to rats once daily for 2 days prior to and immediately before pyloric ligation.

The studies were conducted on inbred albino rats (238) of either sex weighing 150–300 gms and maintained on 'Ani-diet' and water *ad libitum*. Rats were divided into seven groups of 6 animals each. Each group was balanced for sex and weight. The control animals were given equal volume of distilled water, Group I served as control and Group II, III and IV received Muktashukti Bhasma, Group V, VI, and VII received ranitidine in different doses. The results were analysed statistically using student's *t*-test.

The ulcer was produced by pylorus ligation method of Shay.[8] The gastric anti-secretory effect of drugs was determined by using method of Ghosh.[9] Albino rats were starved for 48 hours before operation but allowed water *ad libitum*.

The rats were housed in individual cages especially with designed grid floor to prevent coprophagy. The pyloric ligation was performed under light either anaesthesia under aseptic conditions. The abdomen was opened by a small midline incision below the xiphoid process. Pyloric portion of the stomach was identified and slightly lifted out and ligated using silk thread taking care not to occlude any blood vessels within the ligature.

The stomach was replaced carefully and the abdominal wall was closed by interrupted sutures. The rats were then kept in their cages with no access to food and water.

The MSB was administered orally to rats once daily for two days prior to and immediately before pyloric ligation. Rats were sacrificed at the end of 19 hours after operation. Stomach was dissected out and the contents were drained into a test tube and were subjected to analysis for *p*H, free acidity, total acidity and pepsin activity. The stomach was then cut open along the greater curvature and the inner surface was examined for ulceration.

The degree of ulceration was graded from 0 to 5 depending upon the size and severity of ulcers as described by Adami *et al*.[10] The mean ulcer score was calculated for each group, the ulcer index was calculated by the formula described by Zaidi.[11]

The *p*H was determined by using universal Indica torpapier (Merk). The free acidity, total acidity, and peptic activity, were determined in the gastric juice.[2] The peptic activity was denoted in terms of pepsin unit as discussed by Northrop.[13]

RESULTS

Muktashukti Bhasma caused reduction in ulcer score and ulcer index with 100, 300 and 1,000 mg/kg. Ranitidine also caused reduction in ulcer score and ulcer index but the reduction was insignificant with all the three doses. MSB increased the volume of the gastric juice with 2 and 5 mg/kg dose.

The results obtained with MSB and Ranitidine on ulcer score, percent ulcerations, ulcer index and mean changes are shown in Table-1.

MSB caused significant reduction in free acidity and total acidity only at 300 and 1,000 mg/kg dose. MSB also decreased acid output at 300 and 1000 mg/kg dose. MSB caused insignificant reduction in acid output at 300 and 1,000 mg/kg dose whereas the Ranitidine caused insignificant decrease in acid output at 0.5 and 2 mg/kg dose and significant reduction at 5 mg/kg dose.

MSB and Ranitidine caused decrease in peptic activity at all dose levels. MSB increased in *p*H, the significant increase in *p*H being at 300 and 1,000 mg/kg dose levels. Ranitidine caused significant increase in *p*H at all the three dose levels, thus the results of the present study indicate that Muktashukti Bhasma show variable reduction in free acidity, total acidity, acid output and peptic activity and an increase in *p*H of the gastric juice in pylorus-ligated Shay rats. (Table-2)

Table-1: Effects of Muktashukti Bhasma and Ranitidine on Gastric Volume and Ulcers in Shay Rats

Group	Treatment	Oral Dose mg/kg	Ulcer Score Mean±SE (% inhibition)	% ulceration	Ulcer Index	Volume (ml) Mean±SE (% Change)
I	Control Group (n=10)	DW	2.00±0.47	100.0	200.0	3.40±0.63
II	Muktashukti Bhasma (n=6)	100	1.66±0.20 (17)	100.0	166.0	5.20±0.86 (+83)
III	Muktashukti Bhasma (n=6)	300	0.66±0.20* (67)	67	44	5.95±2.14 (+75)
IV	Muktashukti Bhasma (n=6)	1000	0.50±0.22* (75)	50.0	25.0	6.21±2.03 (+83)
V	Rantidine (n=6)	0.5	1.5±0.33 (25)	100.0	150.0	3.43±0.62 (+0.88)
VI	Rantidine (n=6)	2.0	1.33±0.41 (34)	83	111.0	2.38±0.10 (-30)
VII	Rantidine (n=6)	5.0	1.16±0.40 (42)	67	77	1.98±0.35* (-42)

(*p**<0.05, ***<0.001; + indicates increase and - indicate decrease in volume)

Table-2: Effects of Muktashukti Bhasma and Ranitidine on Gastric Contents in Shay Rats

Group	Treatment	Oral Dose mg/kg	Free Acidity (mEq/L), Mean±SE (% Inhibition)	Total Acidity (mEq/L), Mean±SE (% Inhibition)	*p*H Mean±SE (%Inhibition)	Acid output (mEq/L), Mean±SE (% Inhibition)	Peptic Activity (Pepsin Units/ml) Mean±SE (% Inhibition)
I	Control Group (N=10)	DW	29.54±5.26	46.54±6.36	2.0±0	9.75±3.47	16.64±2.73
II	Muktashukti Bhasma (N=6)	100	21.33±4.05 (28)	39.83±6.32 (14)	2.66±0.42 (33)	11.00±2.64 (+13)	5.94±2.17** (64)
III	Muktashukti Bhasma (N=6)	300	9.66±3.33** (67)	18.83±2.90** (60)	3.66±0.61* (83)	7.72±4.72 (-21)	4.45±1.88** (73)
IV	Muktashukti Bhasma (N=6)	1000	0.83±0.34** (97)	14.66±2.89** (69)	6.00±0.00** (200)	5.62±2.69 (-42)	3.28±0.93** (80)
V	Ranitidine (N=6)	0.5	23.33±0.71 (21)	436.83±1.40 (6)	2.83±0.16** (42)	7.88±1.43 (-19)	6.69±1.55* (60)
VI	Ranitidine (N=6)	2.0	15.5±0.56* (48)	39.33±0.61 (15)	3.0±0.36* (50)	4.93±0.23 (-49)	6.37±1.15* (62)
VII	Ranitidine (N=6)	5.0	6.16±0.65** (79)	18.66±0.49** (60)	4.16±0.47**(108.0)	1.94±0.36* (-80)	5.36±1.21* (68)

(*p**<0.05, ***<0.001; + indicates increase and - indicate decrease in volume)

DISCUSSION

The data of the present study shows variable inhibitory effects of MSB on free acidity, total acidity, acid output, peptic activity, ulcer and ulcer index and an increase in volume and *p*H of the gastric contents. These observations suggest the MSB possibly has an antacid like action. The presence of calcium carbonates calcium phosphate, aluminum oxide and magnesium oxide in 80–90% of the weight of pearl oyster and may account partly for the present observed effect.

Salts of aluminum, magnesium and calcium are well documented as antacids.[14] The observed effects are nearly parallel and in agreement with the reported observations and antacids, further, the inhibitions of ulcer score and ulcer index may be due to Aloe Vera gel in the Muktashukti Bhasma formulation.

Aloe-Vera gel being mucilaginous may have ulcer protective action. Saga and Hirata (1983)[15] used Aloe Vera gel suspension in the treatment of duodenal ulcers in human patients. Since Muktashukti Bhasma inhibits prostaglandins, which are considered to protect stomach against ulcers, this is paradoxical and difficult to explain. However, in literature there are few examples where compound have been shown to possess anti-inflammatory activity mediated through prostaglandin inhibition and also possess anti gastric ulcer activity and these compounds are ocimum sanctum Linn[16], Shilajit[17] and Karmpgero[l9] Flyone[18].

The experimental data of the present preliminary study reviewed in the light of available literature point out that MSB besides being an effective anti-inflammatory[19] has also anti gastric ulcer activity. However, more detailed studies are warranted to refute or substantiate the observed experimental claims.

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