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Effect of *Shankha Bhasma* on Gastrointestinal Tract Ulcer in Guinea Pig (White Rat)

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Abstract

Gastric ulcers were induced in guinea pig by indomethacin and cold restraint stress, and the effect of two different doses of shankha bhasma was studied and observed. *Shankha bhasma* is conch shell ash. The response of the bhasma on ulcer index, lipid peroxidation (thiobarbituric acid reacting substance) in gastric tissue and serum calcium was estimated. *Shankha bhasma* led to significant reduction in ulcer index ($p<0.001$) in both the indomethacin and cold resistant models. TBARS of stomach in indomethacin treated guinea pig was also reduced ($p<0.001$) when treated with shankha bhasma, but serum calcium level was not allowed. *Shankha bhasma* induced dose offers protection against experimental gastric ulcers.

Keywords: *Shankha bhasma,* gastrointestinal ulcer, Liquid peroxidation (TBARS).

INTRODUCTION

The genesis of gastro duodenal ulcer requires acid, peptic activity and a breakdown of mucosal defence mechanism[1]. Recent studies have implicated the production of free radicals and lipid peroxidation in the development of ulcers[2]. Endeavours were made to find a suitable agent for the treatment of peptic ulcer in natural products of plants and animal origin. In Indian traditional system of medicine, *Shankha bhasma* derived from conch-shell (Gastropoda, class: Mollusca) is used in the treatment of ulcers, dysentery, dyspepsia, indigestion and jaundice. The constituent of *shankha bhasma* is mainly silicate of magnesia.[3&4.] However, *shankha bhasma* does not seem to have been subjected to experimental studies for its anti-ulcer activity. Therefore, the present study aimed to investigate the potential anti-ulcer activity of *shankha bhasma* in experimental animals.

MATERIAL AND METHODS

Shankha bhasma Preparation: The preparation of *shankha bhasma* was done according to the procedure prescribed in Ayurveda. It was prepared by calcining the outer shell in covered vessels and reducing it to powder.[5]

Animals: Male guinea pig (185 ± 5 g) were provided with standard guinea pig feed and tap water. The animals were kept in our animal room situated in Laboratory with maintenance of room temperature (22± 2^0 c) and light: dark exposure of 12: 12 h.

Drug induced gastric ulcer in rats

Animals of control group received saline (5ml / kg) and test group received *shankha bhasma* (25 mg / kg and 50 mg / kg) for 6 days. From day 6, the animals received saline or test drug, 2h prior to the administration of indomethacin (20 mg / kg, orally). Overnight fasted guinea pigs were sacrificed by cervical dislocation 3h after the last dose of ulcerogen. The stomach was incised along the greater curvature and examined for ulcers. The gastric lesions were counted and the mean ulcerative index was calculated as follows:

1. Presence of edema, hyperaemia and single submucosal punctiform haemorrhages
2. Presence of submucosal haemorrhagic lesions with small erosions.
3. Presence of deep ulcer with erosions and invasive lesions.[6]

Table 1: Effect of *shankha bhasma* on ulcer index serum calcium and tissue TBARS in rats

Treatment	Ulcer inde (mg/dl)		Serum calcium	TBARS
	Indometnacin	Cold resistant	(n mole/mg protein)	
Control	31.7 ± 0.75	28.7 ± 1.50	9.95 ± 0.20	14.65± .50
Shankha bhasma (25 mg / kg)	14.6 ± 1.05*	16.9 ± 2.02*	10.76 ± 045^{ns}	10.01±0.42*
Shankha bhasma (50 mg / kg)	10.1 ± 0.56*	12.6 ± 1.36*	10.93 ± 0.82^{ns}	10.93±0.82^{ns}

Values are mean ± SEM of 6 animals in each group
*P < 0.001 when compared to control
Ns = statistically not significant.
Ulcer index = (No. of lesion I) + (number of lesion II) + (number of lesion III) x 3

Cold restraint stress induced ulcers

Shankha bhasma 25, 50 mg / kg) were introduced for 7 days. On the day 7, the overnight fasted guinea pig were restrained in a metallic restraint chamber 30 min after the administration of test drug and kept for 2 h in a refrigerator at 4-6 ^{0} c. After the period of immobilization, the guinea pigs were sacrificed by cervical dislocation and the stomachs were removed for ulcer scoring.[7]

Biochemical estimations

Serum calcium[8] and gastric tissue lipid peroxidation were estimated in rats that developed ulcers due to indomethacin. The stomach homogenates were prepared in chilled 0.15 M Kcl and lipid peroxidation (thio barbituric acid reacting substances or TBARS) was determined[9]. Protein estimations of tissue homogenates were made according to Lowry et. al.[10]

Statistical Analysis: Results were analyzed using student's't' test. P values less than 0.05 were considered significant.

RESULTS

Shankha bhasma showed doses dependent reduction of ulcer index in indomethacin treated guinea pigs as well as in guinea pigs subjected to cold restraint stress, when compared to control. It showed reduction in TBARS content of stomach tissue in indomethacin treated ulcer group. No significant difference was noted in serum calcium activity between the groups (See Table 1).

DISCUSSION

It is generally accepted that gastric ulcer results from an imbalance between aggressive factors and the maintenance of the mucosal integrity through the endogenous defence mechanism. Several studies have indicated that gastroduodenal protection by prostaglandins (PG) include both increases in mucosal resistance as well as decrease in aggressive factors, mainly acid and pepsin. Inhibition of PG synthesis by indomethacin coincides with the earlier stages of damage to the cell membranes of mucosal, parietal and endothelial cells. Similarly, cold restraint stress induced ulcer represents a unique ulcer model in examining the cause, course, consequence and treatment of peptic ulcer.

In this study we observed dose dependent protection offered by *shankha bhasma* in indomethacin and cold restraint stress induced gastric ulcers. There is extensive experimental evidence that indicates certain substances, through scavenging of free radicals protect the gastric mucosa. The thio barbrituric acid reactive substance (TBARS) is used as an indicator of lipid peroxidation and free radical activity in biological samples. In the present study, *shankha bhasma* exhibits a potent anti-peroxidative effect without altering serum calcium level.

Hence, it can be suggested from our study that *shankha bhasma* provides anti-ulcer activity in guinea pig. It may act as gastric cytoprotective agent by modulating scavenging of free radicals .Further studies like acid and mucopolysaccharides estimation by pyloric ligated models are required to establish the role of shankha-bhasma in protection against gastroduodenal ulcer.

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