Research Article



Comparative Study on the Effect of Ranitidine and Its Combination with Antioxidant in Experimentally Induced Gastric Ulcer on Mice

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ABSTRACT

Ranitidine, a H2 receptor antagonist, one of the major drugs which are used currently for ulcer disorders, but reoccurrence was reported in Ranitidine therapy. It may be due to free radicals which interact with other etiological factors of ulcer. So scavenging of these free radicals may prevent the reoccurrence. The combined effect of anti-oxidants with Ranitidine may overcome the above mentioned problem which was evaluated in this study by Modified pylorus ligated SHAY rat ulcer model. The effect of Allopurinol a, well known antioxidant with Ranitidine was selected for the evaluation. Parameters such as ulcer score and gastric volume of ranitidine and its combined effect of Ranitidine and Allopurinol significantly reduces the ulcer score and gastric volume comparing with the effect of Ranitidine alone. From these results, it was clear that Ranitidine with Allopurinol provides a better anti-ulcer activity when compared to Ranitidine alone in pylorus ligated SHAY rat ulcer method. Further detail pharmacological screening may give more valuable results.

Keywords: Anti ulcer activity, Ranitidine, Allopurinol, Modified pylorus ligated SHAY rat ulcer model.

INTRODUCTION

Icer disease persists as a constant clinical problem in society; mainly affect all age group ¹. Specifically, gastric ulcer is a deep lesion penetrating through the entire thickness of the gastrointestinal mucosa². Treatment of peptic ulcer is aimed at relieving the pain expediting ulcer healing, reducing ulcer associated complication, eradicating H. pylori infection if present and minimizing ulcer reoccurrence.

Ranitidine, notable H2 receptor antagonist is widely in usage for the treatment of ulcer. But the reoccurrence is reported in the ranitidine therapy. Of course, free radical formed by oxidative stress in one among the several mediators of gastric ulcer. It interacts with other etiological factors and contributes to the progress of the disease particularly for its reoccurrence. Obviously, scavenging these free radicals may prevent the reoccurrence of ulcer. Various literatures ³⁻⁷ clearly indicate the significance of antioxidants in ulcer management.

With this view, the present study was undertaken to evaluate the effect of ranitidine with its combination with allopurinol, a well known antioxidant, an attempt to provide a direction for further research.

MATERIALS AND METHODS

Animals

Healthy young adult Swiss albino mice of both sexes weighing 150- 200 g were used for the study. They were obtained from the Central animal house, Nandha College of Pharmacy, Erode, Tamil Nadu, India. They were housed in standard environmental conditions like ambient temperature ($25 \pm 1^{\circ}$ C), relative humidity ($55\pm 5\%$) and 12 hour light / dark cycle. The animals were fed with standard pellet diet and water *ad libitum*except during the study period.All animal experiments were carried out in accordance with the guidelines of committee for purpose of control and supervision on experiments on animals (OECD 423). Approval from institute animal ethical committee has obtained for conducting animal experiments (NCP/PY/PHARMA - 001).

Treatment protocol

Swiss albino mice were divided in to 3 group of 2 each. Group 1 served as control received 0.3% CMC. Group 2 was treated with Ranitidine hydrochloride at 30 mg /kg body weight. Group 3 received Allopurinol and Ranitidine hydrochloride in the dose of 50 mg and 30 mg/kg body weight respectively.

Modified pylorus ligated SHAY rat ulcer model

Animals were housed in individual cages and fasted for 24 h prior to pyloric ligation. Care being taken to avoid coprophagy. Drugs were administered by oral route one hour before the pyloric ligation. Under light anaesthesia, the abdomen was opened by a small incision below the xiphoid process. Pylorus portion of the stomach was slightly lifted out and ligated avoiding fraction to the pylorus or damage to its blood supply, the stomach was replaced carefully and abdominal wall was closed by interrupted sutures. The animals were deprived of both food and water during the post-operative period and sacrificed at the end of 4 h after ligation. The stomachs



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were dissected out and the contents were drained in to the tubes and the gastric volume was measured. Then the stomachs were cut open along the greater curvature and the inner surface was examined for ulceration. Results are expressed as means \pm Standard Error Mean (S.E.M). Statistical significance was determined by one way analysis of variance (ANOVA) followed by Newmann Keul's multiple range tests. *P* values less than 0.01 were considered significant.

RESULTS AND DISCUSSION

At the end of the study, gastric volume and ulcer score were assessed. In case of gastric volume analysis, the group 1 (Control) animals received CMC showed a score 4.7 \pm 0.279. but in case of group 3 animals received Ranitidine and Allopurinol, it was significantly reduced to the level of 1.18 \pm 0.369 comparing with the score of 2.43 \pm 0.219 showed by group 2 animals received ranitidine hydrochloride only (Table 1).

Table 1: Gastric volume findings of the study

Animal Group	Gastric volume
Group 1	4.7 ± 0.279
Group 2	2.43 ± 0.219**
Group 3	1.18 ± 0.369***

P < 0.001***; P < 0.01**

In ulcer score assessment, the group 1(control) animals showed the ulcer score of 9.17 ± 0.902 followed by group 2 animals showed the score of 2.83 ± 0.459 . But it was significantly reduced to 1.18 ± 0.223 in case of group 3 animals (Table 2).

 Table 2: Ulcer score findings of the study

Animal Group	Ulcer score
Group 1	9.17 ± 0.902
Group 2	2.83 ± 0.459**
Group 3	1.18 ± 0.223***

P < 0.001***; P < 0.01**

From this results, it was clear that the combined effect of Ranitidine with Allopurinol significantly reduces the gastric volume at P <0.01 level comparing with Ranitidine alone. Likewise, the ulcer score also greatly reduced by combined effect.

CONCLUSION

It can be suggested from our study that Allopurinol with ranitidine provides better anti-ulcer activity when compared to Ranitidine alone in pylorus ligated SHAY rat ulcer model. The antiulcer activity of Allopurinol is due to anti-oxidant property and partly by decrease in gastric volumes. Further evaluation of Allopurinol with Ranitidine in different experimentally induced rat ulcer model may be enhancing the healing of the ulcer. The combined effect of antioxidant with Ranitidine may prevent the reoccurrence of ulcer.

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