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A Study on Anti ulcer activity of *Uppu Chenduram*-II using pyloric ligation method in Wistar rats

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Abstract

Siddha, the traditional system of medicine followed by people living in southern part of India, which was originated by Siddhars. This paper reveals the one of the pharmacological action of Siddha formulation "*Uppu Chenduram* –II" on wistar rats. The aim is to evaluate the antiulcer activity of "*Uppu Chenduram*- II" at low dose, medium dose, and high dose which are compared with standard drug (Ranitidine) on wistar rats 36 healthy young adult wistar rats between 8 and 12 weeks were categorized into six group named normal control group, disease control group, standard group(ranitidine-50mg/kg/bw, orally), low dose group(x/2-13.36mg/kg/bw, orally), medium dose group(x-26.72mg/kg/bw, orally), high dose group(2x-53.44mg/kg/bw, orally). The ulcer index of experimental rats treated with test substance at the dose level 26.72 mg/kg b wt showed significant ($p<0.01$) decrease in ulcer index compared with disease control group. Similarly ranitidine at the dose level (50 mg/kg b wt) showed significant ($p<0.01$) decrease in ulcer index compared with disease control. When comparing medium dose treatment with standard drug treatment group, medium dose treatment group showed better antiulcer potential.

Keywords: Antiulcer activity, Pharmacological action, Siddha medicine, *Uppu Chenduram* –II, Wistar rats.

Introduction

Siddha, the traditional system of medicine followed by people living in southern part of India, which was originated by Siddhars. Nowadays, there is a need for scientific validation of *sastric* medicines in Siddha. On behalf of this, the study reveals the one of the pharmacological action of Siddha formulation "*Uppu Chenduram* –II" on wistar rats. The aim is to evaluate the antiulcer activity of "*Uppu Chenduram*- II" at low dose, medium dose, and high dose which are compared with standard drug (Ranitidine) on wistar rats.

Materials and Methods

Initially the *Sottruppu* (Common salt) had to be purified. For that it was mixed thoroughly with rain water and filtered. The filtrate is then heated until it attains semisolid state. Then it was subjected to '*Soorya pudam*' (direct sun light). Using the juice of *Agaya thamarai (Pistia stratiotes)* leaves, the purified *Sottruppu* was ground well to obtain a paste form. Then made it into '*villai*'s' (small disc shaped coils). It was allowed to dry in sunshade for 1 day and then made *pudam* (calcification process) with 10 *varatties* (cow dung cakes). The same procedure was repeated for five times (each time increased

with two number of *varatties* for a *pudam* and continued upto reaching the 20 *varatties*)[1]. The trial drug ***"Uppu Chenduram*-II"** was stored in clean and dry air tight containers.

Test species : *Rattus norvegicus*

Strain : Wistar rats

Age : Healthy young adult animals between 8 and 12 weeks

Number of animals : 36

Dose : 13.36, 26.72 and 53.44 mg/kg body weight

Route of administration: Oral

Acclimatization

Five days prior to the experiment.

Identification and treatment

Details of animals

Tags marked with animal number, group number and dose level were attached to the respective cages. Each animal was identified by unique identification number by ear tagging.

Group	Group description	Number of animals	Treatment details
I	Normal control	6	Distilled water only
II	Disease control	6	Pylorus ligation + Distilled Water
III	Standard control	6	Pylorus ligation +Ranitidine (50 mg/kg. B wt. po)
IV	Low dose(x/2)	6	Pylorus ligation + Testsubstance-247 (13.36 mg/kg. B wt. po)
V	Medium dose (x-Therapeutic dose)	6	Pylorus ligation + Testsubstance-247 (26.72 mg/kg. B wt. po)
VI	High dose (2x)	6	Pylorus ligation + Testsubstance-247 (53.44 mg/kg. B wt. po)

Animal house condition

Temperature of the test room was maintained between 22±3°C and relative humidity between 50 to 70 % during the experimental period. The experimental room was provided with a 12h light and 12h dark lighting condition using an automatic timer.

Housing

Standard polypropylene rat cages with stainless steel top grill was used to house the animals. The cages were autoclaved. Sieved and sterilized paddy husk was used as the bedding material. Animals were housed individually.

Sanitation

Bedding material, cages, grills and water bottles were changed weekly twice.

Animal welfare and regulatory compliance

The experiment was conducted at the Central Animal Facility registered (No. 817/PO/ReRc/S/04/CPCSEA dated 20.11.2015) for Breeding and Experiments of Animals by the Committee for the Purpose of Control and Supervision of Experiments on Animals, Ministry of Forest and Environment, Govt. of India.

The study was conducted after the approval by the Institutional Animal Ethical Committee, SASTRA University (IAEC Approval Number: 485/SASTRA/IAEC/RPP).

Diet and water

Standard rodent pellet feed supplied by M/s. ATNT Laboratories, Mumbai, India and Reverse Osmosis (RO) water were provided to the animals *ad libitum*.

Preparation of test substance (*Uppu Chenduram-II*)

The test substance was dissolved in distilled water and was orally administered to the experimental rats as mentioned above.

Experimental procedure

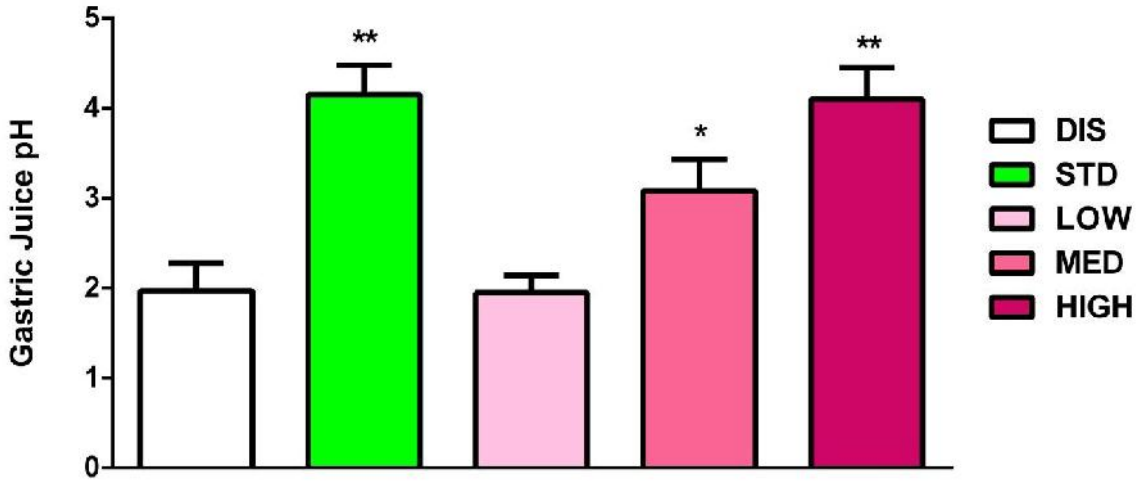
Male Wistar rats were divided into six groups of six each.
According to the treatment schedule, the respective drugs were orally administered for 1 week.
All the experimental rats were fasted for 24-36 hours prior to pyloric ligation.
After 7 days of treatment, pylorus ligation was performed in all the groups except Group1 Under anesthesia (Thiopentone sodium 50 mg/kg b wt., ip), the abdomen of the rat was opened.
The pyloric end of the stomach was ligated using suture.
The stomach was carefully replaced and the abdominal wall was closed by interrupted sutures.
After 4 hours of pyloric ligation, animals were sacrificed and the stomachs were dissected out.
The gastric contents were drained into centrifugal tubes and were centrifuged to measure the gastric volume.
The pH of the of the gastric juice were also measured.
The stomachs were carefully exposed and fixed in a board for gross pathology.

Statistical Analysis

The values are represented as mean±SD. Statistical differences between the treatments and the controls were tested by one-way analysis of variance (ANOVA) followed by the Tukey's multiple comparisons test using the “GraphPad prism 5”. A difference in the mean values of $p<0.05$ was considered to be statistically significant.

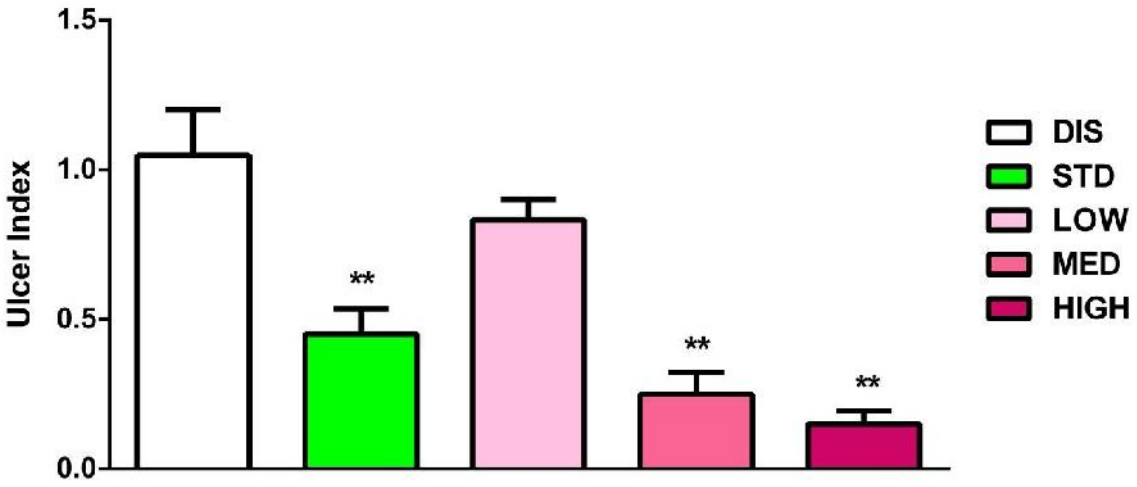
Results

Effect of test substance on gastric pH



Values expressed as Mean ± SD, Statistical analysis was performed using ANOVA followed by the Tukey's test *p<0.05, **p<0.01Vs Disease control.

Effect of test substance on ulcer index



Values expressed as Mean ± SD, Statistical analysis was performed using ANOVA followed by the Tukey's test *p<0.05, **p<0.01Vs Disease control.

Conclusion

Pyloric ligation is a very useful ulcer model for studying the efficacy of drugs on gastric secretions. The ligation of pyloric end of the stomach leads to accumulation of gastric HCl which result in ulcer formation. These ulcers result from autodigestion of the gastric mucosa resulting in the damage of gastric mucosal barrier. Thus, eventual raise in acid– pepsin accumulation triggered by pylorus obstruction might cause consequential mucosal digestion.

Significant ($p<0.01$) decrease in gastric volume was in rats treated with test substance at the dose level 53.44 mg/kg b wt, whereas the reference drug, ranitidine (50 mg/kg b wt) also showed significant ($p<0.01$) decrease in volume of gastric juice compared with disease control

The pH of the gastric juice was significantly increased ($p<0.01$) in ranitidine and also in both medium and high dose of test substance compared with disease control.

The ulcer index of experimental rats treated with test substance at the dose level 26.72 mg/kg b wt showed significant ($p<0.01$) decrease in ulcer index compared with disease control group. Similarly ranitidine at the dose level (50 mg/kg b wt) showed significant ($p<0.01$) decrease in ulcer index compared with disease control. When comparing medium dose treatment with standard drug treatment group, medium dose treatment group showed better antiulcer potential.

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