

Second paper

A Comparative Study on the Possible Protective Effect of Esomeprazole, Spirulina, Wheatgrass on Indomethacin-Induced Gastric Ulcer in Male Albino Rats

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Abstract

Gastric ulcer is a common problem affecting the gastrointestinal tract. Spirulina and wheatgrass are natural substances that have anti-inflammatory and antioxidant effects.

The aim of the Work was to elucidate the possible protective role of spirulina and wheatgrass versus standard treatment esomeprazole on indomethacin-induced gastric ulcer in adult male albino rats.

Eighty adult male albino rats were divided into eight groups: group I (the control group), group II that received indomethacin (100 mg/kg orally), group III that received esomeprazole (20 mg/kg orally), group IV that received spirulina (1000 mg/kg orally), group V that received wheatgrass (1000 mg/kg orally), group VI that received indomethacin (100 mg/kg) + esomeprazole (20 mg/kg), group VII that received indomethacin (100 mg/kg) + spirulina (1000 mg/kg) and group VIII that received indomethacin (100 mg/kg) + wheatgrass (1000 mg/kg). Six hours after indomethacin treatment, all rats were anesthetized and their stomachs obtained for measures of gastric acidity, pepsin activity, mucin content, gastrin, ulcer index, total antioxidant capacity (TAC), tumor necrosis factor α (TNF- α), interleukin-8 (IL8), proapoptotic protein (Bax). Histological (using H&E stain, PAS reaction) and immunohistochemical (using anti Ki67 immunostain) techniques were performed. Western immunoblot analysis for heat shock protein 70 (HSP70) was also done. Moreover, a morphometric study was done for area % of positive immunoreactive cells for Ki67 and optical density and area % of PAS reaction. All performed measurements were followed by statistical analysis.

Indomethacin induced loss of normal architecture of gastric mucosa with sloughing of surface epithelium and inflammatory cellular infiltration. It also led to a significant increase in gastric acidity, inflammatory mediators (TNF- α , IL-8), pro-apoptotic protein Bax and a significant decrease in TAC levels and HSP-70 expression. There was also a significant decrease in area % of Ki67 immunoreactivity and area % and optical density of PAS reaction as compared with the control group and other pre-treated rats. These disturbed parameters were associated with increased ulcer index. In pre-treatment groups, the structure of the mucosa was similar to control with marked improvement in the biochemical assay.

In conclusion, Spirulina and wheatgrass can partly protect the gastric mucosa against indomethacin-induced damage to a degree similar to that of the classical treatment esomeprazole.

Keywords: indomethacin, spirulina, wheatgrass, esomeprazole, HSP-70.