ABSTRACT

Key words: β_2-adrenergic agonist
gastric acid
plasma HCO_3^-
gastric mucus

An experimental study has been done to investigate the role of β_2-adrenoceptor agonists (salbutamol, salmefamol and fenoterol) on the gastric acidity and the protective factors of gastric mucosa. The role of the sympathetic nervous system on the pathophysiology of peptic ulcer is not completely understood.

In this study which has been done in vivo and in vitro gastric acid secretion was measured besides the level of plasma HCO_3^- and thickness of mucus layer on the gastric wall as indicators of gastric defence mechanism.

The study of gastric acidity in vivo was carried out on rats using the Shay method; in vitro it was done on isolated fundi of the stomach. The plasma HCO_3^- level was measured in the blood aspirated directly from the rat's hearts. The thickness of the mucus was studied using a simple method developed by Kerss, Allen, Garner (1982).

The result of the study showed a significant role of β_2-adrenoceptor agonist in inhibiting the basal state as well as histamine and carbamylcholine-stimulated acid secretion respectively. β_2-adrenoceptor agonist also increased the plasma HCO_3^- level and the thickness of the mucus gel which adheres to the surface of the gastric

epithelial cells, both in basal condition as well as after histamine or carbamylcholine stimulation.

There is no significant difference in the effects of inhibition of gastric acidity, increased plasma HCO_3^- and the thickness of gastric gel mucus layer by the three different β_2-adrenergic agonists. Furthermore administration of propranolol abolish the effect of β_2-adrenoceptor agonist on gastric acidity, plasma HCO_3^- level and gastric gel mucus thickness.

Peptic ulcer disease arises when the normal mucosal defence factors are impaired or are overwhelmed by aggresive luminal factors such as acid and pepsin. The mucus gel provides an unstirred water layer, which slows inward diffusion of H^+ toward the mucosa. Bicarbonate which is secreted by surface epithelial cells throughout the stomach converts H^+ penetrating the mucus layer to CO_2 and H_2O. Both the mucus layer and secretion of HCO_3^- serves as a protection of the surface epithelium against injurious acid.

From this study we conclude that the sympathetic nervous system via β_2-adrenergic receptors might play an important inhibitory role in the development of peptic ulcer disease by decreasing gastric acidity, increasing plasma HCO_3^- level and the thickness of the gastric mucus gel. More studies are needed to confirm this observations.