THE INHIBITION OF GASTRIN INDUCED DUODENAL ULCER BY FAT OR ACID IN SMALL INTESTINE.

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Summary

To study the intestinal phase of ulcer inhibition, olive oil or hydrochloric acid was infused into small intestine in white male rats weighing 200–250 gr. The animals were fasted before study. Tetragastrin was administered continuously through the tail vein using the infusion pump. The ulcer formation by gastrin at the rate of 60% was decreased by the oil or hydrochloric acid infused into small intestine as well as by secretin administered intravenously (8 U/kg-h). The acid output and the rate of secretory volume were also inhibited by oil, HCl and secretin. Peptic output by gastrin was decreased by infusing the hydrochloric acid into small intestine, however olive oil in small intestine neither decreased nor augmented the peptic putout. Through these results the important role of small intestine in the inhibitory system of ulcerogenesis became obvious. To make clear the hyperacidity as one of the ethiological factors of peptic ulcer, the intestinal phase of gastric acid secretion should be investigated especially by the study of gastrointestinal hormone.

Key Words: gastrin, secretin, duodenal ulcer, gastro-intestinal hormone, gastric secretion,

The former paper from our laboratory reported the production of peptic ulcer with synthetic tetragastrin in rats.1 To investigate the factors concerning the ulcerogenesis of gastrin, the effects of tetragastrin on acid secreton, gastroduodenal motility and parietal cell mass were studied in its report. It was evidenced that there was intimate relationship between gastric acid secretion and ulcerogenesis. Secretin2 which inhibited the function of gastrin also reduced the ulcer formation by gastrin. Secretin is kind of the entero-gastrone which was named by Kosaka and Limm.3 They extracted the substance from the small intestine in dog.

It has the function of gastric acid inhibition. This substance is thought to be not a simple one but composed of several gastrointestinal hormones4,5, some of which are known as secretin, cholecystokinin-pancreozymin and enteroglucagon.

In this report the authors describe the investigatory results on the inhibitory effects of olive oil and hydrochloric acid on the gastrin ulcerogenesis comparing them with the effect of secretin to make clear the ethiology of peptic ulcer.

Materials and Methods

The ulcer was made following the
method previously reported from our laboratory. The albino rats of male weighing 200–250 gr were fasted overnight before study, water were being allowed ad lib. Tetragastrin was administered intravenously at the rate of 1cc/h with normal saline solution for twelve hours by the infusion pump (Natsume Seisakusho, Tokyo). Because the highest rate of ulceration was obtained in the former study by the dosis of 100 mcg/kg-h, where the greatest acid output was observed, this dosis was applied also in this study.

The gastric juice was collected through the polyethylene tube inserted into the stomach through the duodenum, using the automatic gastric juice collector device by Shinozaki.6) The interval of collection was one hour. After the four basal collections the administration of tetra gastrin was started. The collected gastric juice samples were titrated for acid concentration using 1/50N NaOH with Töpfer-Michaelis reagent and were assayed for peptic activity after the method of Hunt,7) a variation of Anson-Mirsky’s method, which had been described by Odori8) of our laboratory. The dessicated human plasma was used as substrate and incubation time was thirty minutes.

The olive oil or 1/10 N HCl was infused at the point just anal of Treiz ligament. 8 U/kg-h of secretin (Eisai, Tokyo) was administered intravenously with gastrin and the inhibitory effects of olive oil, hydrochloric acid or exogenous secretin were compared.

Results

The ulcer formation (Photo I), (Fig. I) By the intravenous administration of gastrin the duodenal ulcer was produced at the rate of 60%. Its histologic appearance as shown in photo I denoted acute ulcer. The mucous membrane was eroded from surface toward the bottom with neutrophilic infiltration, not accompanied by fibrosis. The capillary vessels were not destruct-

Photo 1

The peptic ulcer induced by the administration of tetra gastrin. The macroscopic appearance (left) and the magnified section.