Mucosal Secretin of the Duodenum in Peptic Ulcer Disease

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KOIZUMI, F., ISHIMORI, A., NAKANOME, C., MITA, M., TAIMA, T. and TSUDA, K. *Mucosal Secretin of the Duodenum in Peptic Ulcer Disease*. Tohoku J. exp. Med., 1981, 133 (3), 301-305 — Mucosal secretin content of the duodenum was measured using bioptic specimen in healthy controls and patients of peptic ulcer. Immunoreactive secretin in the duodenal mucosa was found greater in healthy controls (7.73 ± 2.71 ng/mg dry wt., mean $\pm$ S.D.) than in gastric ulcer patients (5.76 ± 3.51 ng/mg dry wt.) and duodenal ulcer patients (5.54 ± 2.48 ng/mg dry wt.), but the difference was not significant. There was no significant relationship between mucosal secretin and acid output in these patients. ——— mucosal secretin; gastric ulcer; duodenal ulcer; acid secretion

It has been pointed out repeatedly that gastric acid secretion and gastric emptying time in gastric ulcer patients are different from those in duodenal ulcer patients. To explain acid hypersecretion found in duodenal ulcer, an abnormality in secretin metabolism was reported often. But most of the works done to date were based on the observation of pancreatic exocrine secretion (Dreiling 1953; Banks et al. 1967; Wormsley and Mahoney 1967; Peterson 1970; Wormsley 1970) or blood secretin level (Bloom and Ward 1975; Isenberg et al. 1977). There are few studies to attack this problem from mucosal secretin level. In the present study, the mucosal secretin content was measured by radioimmunoassay technique and compared with gastric secretion.

MATERIALS AND METHODS

Four healthy subjects (3 men and 1 woman, mean age of 48) who were examined for screening of gastrointestinal malignancy, 10 gastric ulcer patients (8 men and 2 women, mean age of 44) and 16 duodenal ulcer patients (13 men and 3 women, mean age of 32) were included in this study. All subjects including 4 healthy controls had been informed beforehand of the purpose and outline of the study and their consent had been obtained. After an overnight fast, 6 to 8 specimens of duodenal mucosa were obtained from the anterior

and posterior wall at the level of Vater's papilla under the scopic control using duodenofiberscope of JFB type (Olympus Co. Tokyo) in the early morning.

Specimens were treated and immunoreactive secretin in duodenal mucosa were measured according to the method previously described (Koizumi et al. 1980a). In order to minimize interassay variations, all specimens were subjected together to a single radioimmunoassay trial.

In 9 out of 10 gastric ulcer patients and 10 out of 16 duodenal ulcer patients, gastric analysis was carried out. AOC-tetragastrin in a dose of $4 \mu\text{g}$ per kg body weight was used for maximum stimulation of acid secretion (Yamagata et al. 1970). The gastric acid concentration was determined by automatic titration to pH 7.0, and basal acid output (BAO) during 1 hr and maximal acid output (MAO) during 1 hr were calculated.

RESULTS

Although mucosal secretin content was found greater in healthy subjects (7.73 ± 2.71 ng/mg dry wt., mean $\pm$ S.D.) than in gastric ulcer patients (5.76 ± 3.51 ng/mg dry wt.) and in duodenal ulcer patients (5.54 ± 2.48 ng/mg dry wt.), the difference was not statistically significant (Fig. 1). No correlation was noted between mucosal secretin content and age or sex of the cases studied. Basal acid output averaged 4.5 ± 4.9 mEq/hr in gastric ulcer patients and 5.5 ± 5.4 mEq/hr in duodenal ulcer patients, while maximal acid output averaged 15.1 ± 8.8 mEq/hr in gastric ulcer patients, 21.0 ± 8.8 mEq/hr in duodenal ulcer patients. Both BAO and MAO were greater in duodenal ulcer patients than in gastric ulcer patients, but this difference was not statistically significant in the present study. In both clinical entities, there was no significant linear relation between mucosal secretin content and acid output (Fig. 2).

Fig. 1. Immunoreactive secretin concentration of extracts from duodenal mucosal biopsies.

Fig. 2. The relationship between duodenal secretin concentration and acid output.

DISCUSSION

It has been reported that the resting and postprandial intraduodenal pH tends to be lower in duodenal ulcer patients than in healthy subjects (Rhodes and Prestwich 1966; Archambault et al. 1967; Rune 1972). Furthermore, it has been also pointed out that patients with duodenal ulcer secreted relatively more gastric acid than pancreatic bicarbonate (Bank et al. 1967; Wormsley and Mahoney 1967). Wormsley (1970) observed in duodenal ulcer that, when exogenous secretin was administered, secretory response of the pancreas was completely normal (Dreiling 1953; Bank et al. 1967; Wormsley and Mahoney 1967; Peterson 1970); on the other hand, when HCl was administered into the duodenum, it was impaired. From these findings, deficient endogenous secretin release from the duodenal mucosa into blood circulation has been suspected in this clinical entity characterized by acid hypersecretion. This concept was supported by the recent work of Bloom and Ward (1975), who showed using radioimmunoassay that secretin release on intraduodenal acid loading was less in duodenal ulcer patients than in controls. But, contradictory results were reported thereafter on both resting and stimulated

blood secretin level in duodenal ulcer (Isenberg et al. 1977). In the present study, no difference of mucosal secretin content between gastric ulcer and duodenal ulcer was detected, although both clinical entities showed the tendency of lower mucosal secretin content than healthy controls. It could not be concluded in the present study, therefore, whether secretin release or production is impaired in peptic ulcer, particularly in duodenal ulcer patients.

In our earlier reports (Ishimori et al. 1975), the secretin-like bioactivity in the duodenal mucosa tended to be increased in duodenal ulcer patients in comparison with gastric ulcer patients. The discrepancy between our bioassay and radioimmunoassay studies may be due to the fact that bioassay technique is nonspecific for secretin measurement and reflects partly other gastrointestinal hormones such as CCK-PZ which is known to stimulate the pancreatic exocrine secretion as well as secretin in the rat.

We reported recently that endogenous hyperacidity is associated with hypersecretinemia using dogs treated by antrocolic transposition (Koizumi et al. 1980b). But, it could not be confirmed in the present study since no correlation was observed between acid output and mucosal secretin content.

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