Parietal Cell Responsiveness in Duodenal Ulcer

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One of the hypotheses advanced to explain the excessive acid secretion of patients with duodenal ulcer is that the acid-secreting cells are abnormally sensitive to stimulation. We have studied the gastric response of normal individuals and of patients with duodenal ulcer to increasing amounts of a gastrin-like pentapeptide given by continuous intravenous infusion and have found no difference between the responsiveness of the stomachs of these two groups of subjects.

Present Investigation

Methods.—The subjects of this study comprised 13 normal medical students and 23 patients with duodenal ulcer. The

pentapeptide (I.C.I. 50,123) was given by intravenous infusion at constant rate in a dose range of 0.001 to 0.3 $\mu\text{g.}/\text{kg.}$ body weight per minute. The response to 0.001 and 0.01 $\mu\text{g.}/\text{kg.}$ was expressed as a percentage of the maximal response to pentapeptide of each subject, the maximal response being defined as

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that level of acid output which could not be increased by increasing the dose rate of pentapeptide. The statistical significance of the difference in distribution of the percentage values in the two groups was determined by means of the Mann-Whitney U test.

Results.—The responses to 0.001 $\mu\text{g.}$ of pentapeptide/kg./minute ranged from 49 to 83% of maximal in the normal subjects and from 47 to 74% of maximal in patients with duodenal ulcer, while the responses to 0.01 $\mu\text{g.}/\text{kg.}/\text{minute}$ ranged from 70 to 107% of maximal in both groups of subjects (see Chart). The distribution of the ratios of submaximal to maximal gastric responses of normal individuals did not differ significantly from patients with duodenal ulcer ($P > 0.09$).

Discussion and Conclusions

Indirect evidence, induced from the ratios of basal to stimulated acid output, together with evidence from dose-response curves to histamine, prompted Hunt and Kay (1954) to conclude that gastric hyperexcitability was not the cause of hypersecretion in duodenal ulcer. This conclusion was reaffirmed in a later, more detailed analysis of the same data (Hunt, Kay, Card, and Sircus, 1963).

Our results show that the acid-secreting cells of patients with duodenal ulcer are not more sensitive to lower dose rates of pentapeptide infusion and are not stimulated maximally more easily than the parietal cells of normal subjects.

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