General Lectures (II)

(101) THE EFFECT OF CALCIUM ON HUMAN GASTRIC SECRETION
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The effect of calcium on gastric secretion was studied in 10 duodenal ulcer patients, 6 gastric ulcer patients and 1 case of Z-E syndrome. After the overnight fasting, the patients' gastric contents were evacuated by gastric tube and the saline was administered intravenously at the rate of 5.5 ml/min. The gastric juice was collected through the tube every one hour. After the 2 basal collections, calcium-gluconate containing 15 mg/kg of calcium ion was added to the saline solution and it was infused over following 4 hours. During calcium infusion the gastric juice was collected every hour, and venous blood was also drawn at the same time.

For the samples of gastric juice, the acid and peptic activity were estimated, and for blood samples, serum gastrin level was assayed by the radioimmunological method.

The followings were the results of this investigation:

Before calcium infusion, serum calcium level was 4.48±.06 mEq/l and it rised to 4.41±.56, 5.23±.08, 5.53±.11 and 5.73±.37 mEq/l, respectively at 1st, 2nd, 3rd and 4th hour of calcium infusion.

Gastric secretory volume per hour was 63.00±8.64, 40.92±8.51 ml respectively for 1st and 2nd basal collection and it was 45.28±5.64, 78.71±12.56, 72.64±10.02 and 86.64±11.49 ml respectively for calcium induced collection. The acid output per hour was 3.49±.01 and 1.87±.47 at the time of 1st and 2nd basal collection and it was 2.17±.53, 5.50±1.39, 5.29±1.10 and 7.01 ±1.31 Emq respectively at the time of 1st, 2nd, 3rd and 4th calcium-induced collection.

Peptic activity assayed for 1st and 2nd basal collection and for 1st, 2nd, 3rd and 4th calcium induced sample were respectively 5.77±1.20, 5.73±.93, 7.67±.02, 9.81±2.09, 11.67±4.00 and 12.84±4.34 tyr. mg/ml. Serum gastrin level was assayed for the smples before calcium infusion and 1,2,3 and 4 hours after calcium infusion. Ist level was respectively 43.56±7.92, 31.52±6.85, 61.93±12.43, 65.85±9.94 and 74.25±17.12 pg/ml.

The mean value of calcium stimulated acid output was 4.83±.93 mEq/h. This was equal to 37±8% of tetragastrin-induced acid output. To the contrary its rate in Z-E syndrome was 73%.

Summary: calcium infusion test could be carried out without any side effect. Through this test we knew that calcium retains the ability of gastric acid secretion, peptic secretion and gastrin release.

(102) STUDIES ON THE PH VALUES IN THE REMNANT STOMACH—WITH SPECIAL REFERENCE TO THE STOMAL ULCER CASES—
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Easy and dependable accessment of the gastric acidity using telemetering capsule has developed new field of gastric junction tests.

The gastric acidity was measured by the pH capsule, gastric secretion was stimulated by subcutaneous use of tetragastrin 4r/kg and potassium bicarbonate was loaded for neutralization.

The results obtained were as follows:
1) During immediate postoperative periods, pH of the remnant stomach fell into two groups, pH below 3.0 and pH over 5.0.
But it gradually shifted into individual proper pH and stabilized 6 months after the surgery.
2) In the good gastrin responsive groups, most of the patients with post-operative complaints had basal pH value lower than 3.0.
3) The acid content of the gastric remnant is approximated by measuring amount of potassium bicarbonate required to raise pH over 4.0, 45 minutes after gastrin load.
acid in the remnant stomach was below 0.25 mEq in the non-stomal ulcer group, while it was high between 0.5 and 4.0 mEq in the stomal group.

4) All 24 cases of stomal ulcer but one had basal pH below 2.0 and symptomatic. The ulcer was solitary and Ul III to IV in nature.

Majority of the ulcers were located in the efferent loops. Only one patient had the ulcer in the remnant stomach.

Operation was performed on 11 cases with good results.

(103) INTRA-GASTRIC PRESSURE BY A RADIO-TELEMETERING CAPSULE (II):
INTRA-GASTRIC PRESSURE CHANGE UNDER DIFFERENT CONDITIONS BY A RADIO-TELEMETERING CAPSULE AND CORRELATION OF INTRAGASTRIC PRESSURE AND PH
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a) Intra-gastric pressure change was noted in various conditions as follows:
1) Stand up and sit down 2) Speaking 3) Cough 4) Deep Breathing 5) Laughing 6) Belching 7) Hiation 8) Borborygmus
b) The acceleration of intra-gastric pressure change was obtained after taking whisky and tea, but not appeared after taking milk.

c) After injection of Prifinium promide, the decline of intragastric pressure was observed in a subject whose pressure fluctuation was accelerated, on the other hand the acceleration of the pressure fluctuation observed in cases of declined intra-gastric pressure.

d) The acceleration of intra-gastric pressure was obtained following the administration of Bethanechol Chloride and Metoclopramide.

e) Any correlation was not recognized between intra-gastric pressure and pH by 2 channel method after the administration of Tetragastrine and Sodium Bicarbonate.

(104) ON THE ARTERIO-VENOUS ANASTOMOSES IN EXPERIMENTAL STOMACH ULCER
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In experimental stomach ulcers in rats, their vascular changes have been investigated by means of a plastic model of the blood vessels. Because of the pressure in injecting acryl ester, the diameter of the plastic model of the vessels underwent some artificial changes. We think the artificial changes can be prevented if a fixing solution is injected into the vessels with constant pressure for a period. At present, we consider that it is preferable to inject 10% formalin solution for two minutes, with a pressure of 120 mm Hg. We produced reserpine ulcer, gastrin ulcer and curling’s ulcer in rats. Their plastic models were produced. In case of reserpine ulcer, around the ulcers anastomoses between arterioles and venules were seen on the muscularis mucosa. On the other hand, in cases of gastrin ulcer and curling’s ulcer, the arterio-venous anastomoses were seen in the submucosa but not on the muscularis mucosa.

(105) STUDY ON THE DISTRIBUTION OF MUCOSAL CAPILLARIES OF CANINE STOMACH
2nd Dept. of Surg., Jikei Univ. Sch. of Med. (Director: Prof. F. Nagao)

We studied on the distribution of mucosal capillaries of canine stomach by photolucency method using Olympus F.M.M. type II photoelectric cell.

The less the number of mucosal capillaries is, the greater is the photolucency, because