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THE DECREASE OF GASTRIC SECRETION WITH ADVANCING YEARS: FURTHER OBSERVATIONS

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In previous papers we (1) and others (2) have shown that gastric secretion decreases with advancing years. This finding, however, has been based on averages of many examinations in different people and no accurate information is available as to what happens in the individual. Does a gradual decline of secretion take place in everyone or do some people undergo an abrupt deflection, while others preserve their gastric juice unchanged into old age? In the attempt to answer these questions we previously reported the results of standard histamine tests repeated in the same individuals after an interval of five years (3). The findings were of interest but, unfortunately, the five-year period appears to have been too brief to yield conclusive results. Recently it has been possible to re-examine five essentially normal people whose gastric secretions were explored over ten years ago. The data from these tests, which seem much more significant than those of the previous series, are herewith presented.

PROCEDURE

The procedure was as far as possible a duplication of the original examination. The subjects were in the ward overnight and were under basal conditions. The standard histamine test used by us for many years was employed. The dose of histamine was the same on successive tests and all examinations were made by the writer. The total secretions were collected over successive ten-minute periods by continuous aspiration, and in the charts "volume" refers to the amount of such ten-minute yields. "Acidity" refers to the "total" acidity of successive specimens measured in the usual way.

RESULTS

Case 1. (Number 167640) Pi, male, age 40, had been operated on for gall stones. His gastro-intestinal tract showed no lesion. At the time of our first test he felt well and has been well ever since. The first examination was made on November 22, 1927, and the second on

March 5, 1939, after an interval of over eleven years (age 52). The results are shown in Figure 1. The successive curves both for acid and volume are practically identical.

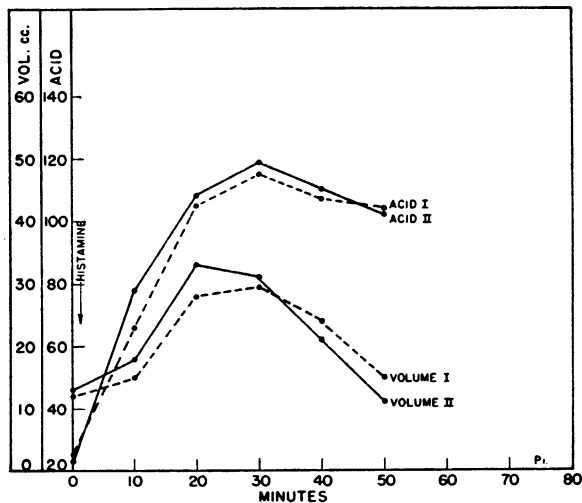


FIG. 1. OBSERVATIONS IN CASE 1

Case 2. (Number 175600) Ha, a 27-year-old male, was originally examined as a normal control. The first test was made on May 14, 1928, the second on February 23, 1939, after an interval of practically eleven years (age 38). He was perfectly well. The results (Figure 2) show practically identical curves on the first and second examinations. Of special interest is the sudden rise in the volume curve on both occasions. Cases 1 and 2 illustrate how constant the gastric secretory response may be if successive tests are done under similar conditions.

Case 3. (Number 175711) Sc, a 32-year-old male, had no medical disease. He was examined on May 18, 1928, and again on February 10, 1939, after an interval of eleven years (age 44). On the first test he showed somewhat unusual findings, namely relatively low acidity with very large volumes of gastric secretion, and it was interesting that we obtained practically the same results eleven years later. There is a slight difference in the shape of the volume curves but the maximum secretion during a ten-minute period is practically the same (32 cc., 30 cc.).

Case 4. (Number 114604) Ka, a 42-year-old male with vague psychoneurotic symptoms, was examined on November 11, 1927, January 17, 1935, and December 2, 1937

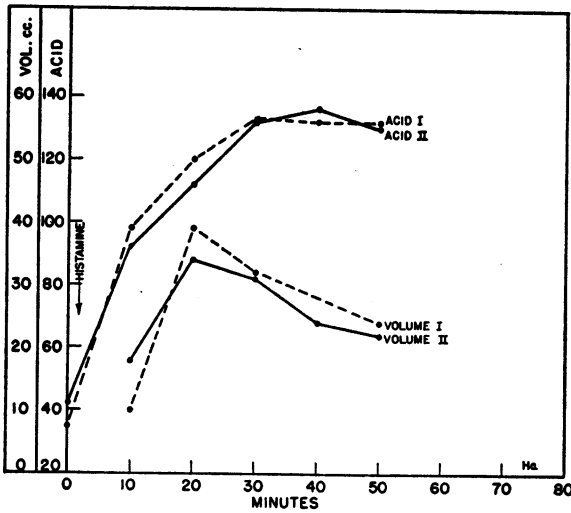


FIG. 2. OBSERVATIONS IN CASE 2

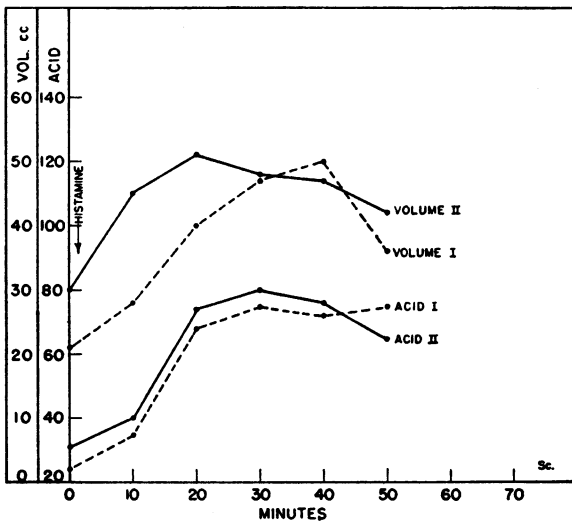


FIG. 3. OBSERVATIONS IN CASE 3

(age 52). The three tests are shown in Figure 4. The curves for volumes of secretion are practically unchanged but there is a distinct fall in the degree of acidity, the highest total acidity attained in the three tests being 150, 139, and 125. The man's health has been good throughout the ten-year period and there are no digestive symptoms.

Case 5. (Number 180899) Mo, a 41-year-old male with thoroughly treated latent syphilis never had evidence of disease of the stomach. He was tested on October 15, 1927, October 5, 1933, and April 21, 1939. Careful re-examination at the time of the last test (age 52) again showed no signs of stomach disease. The results of the three examinations (Figure 5) make it clear that a decline in gastric secretion has taken place, especially in the last five years. Evidence may be summarized as follows:

	Highest 10-minute volume	Highest total acid	Total volume of secretion (50 minutes)
	cubic centimeters		cubic centimeters
Test 1.....	27	131	96.5
Test 2.....	17	134	53.0
Test 3.....	11	60	32.5

As far as we know this is the first case in the literature in which a decline of gastric secretion over a long period has been accurately measured.

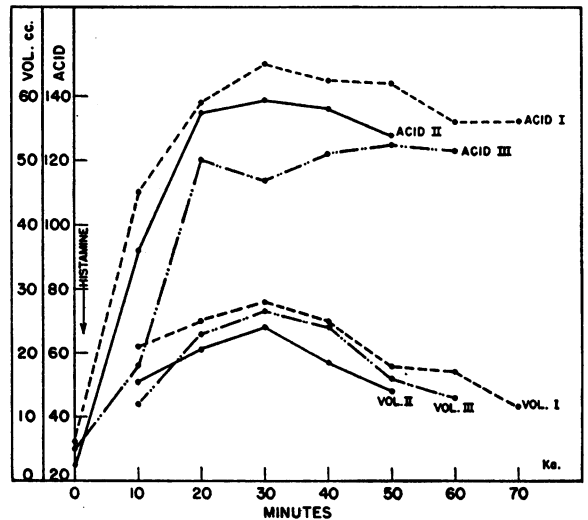


FIG. 4. OBSERVATIONS IN CASE 4

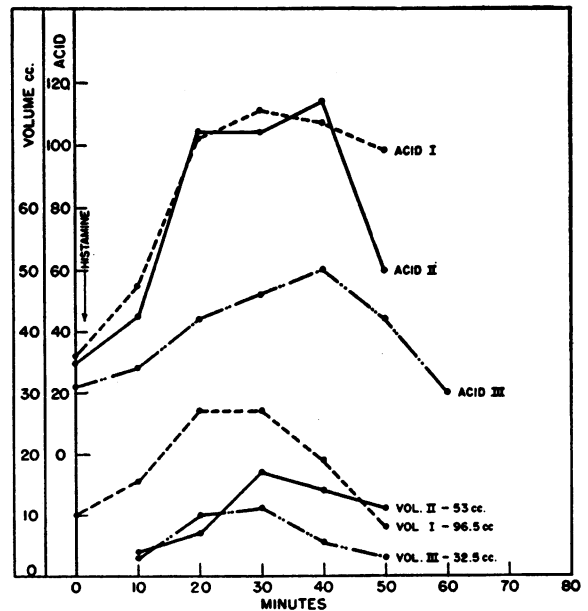


FIG. 5. OBSERVATIONS IN CASE 5

In summary, then, among five subjects re-examined after intervals of over ten years, three showed practically identical gastric secretion, one showed slight decline of acidity but not of volume of secretion, and in one there had been a definite decline both of volume and of acid. The average fall in secretion of large groups of people must then be the resultant of various types of change in different individuals. Just why some normal people preserve their gastric secretion unaltered over many years while others show a rapid decline is entirely obscure. The problem can perhaps be solved by long-time studies such as ours controlled by gastroscopic observations. It would be important to know whether any visible changes in the mucosa which can be correlated with alterations in secretion take place.

Heretofore all of the studies on fall of secretion with advancing years have been made by means of histamine tests or with a test meal. It seems of importance to know also if there is a decline of spontaneous basal secretion, since the older find-

ings might be due simply to lessened ability to react to secretory stimuli. Recently we have studied the continuous basal secretion of some 75 essentially normal people. The procedure consists in passing a small tube, without any test meal or other stimulus, and collecting the secretions over successive ten-minute periods until the rate is constant. The secretion at this point is considered to represent the continuous basal activity of the stomach, and with gastric juice of this sort a decline in acidity is also manifest in the older group (Figure 6). The average values for total acidity at ages 20 to 40, 40 to 60, and over 60 were 54, 46, and 34. No cases of true anacidity were included in this series. This fall in basal secretion seems of particular interest since it shows that a disturbance more profound than a mere flagging of response to artificial stimuli underlies defection of secretion.

SUMMARY

Histamine tests repeated in the same individuals after periods of ten or more years show little or no change in some people, whereas in others there is a marked fall in gastric secretion. The average curve of decline of gastric secretion with advancing years obtained by examination of large groups of people is a resultant of various findings of this sort. A decline of *basal* gastric secretion with advancing years has also been demonstrated.

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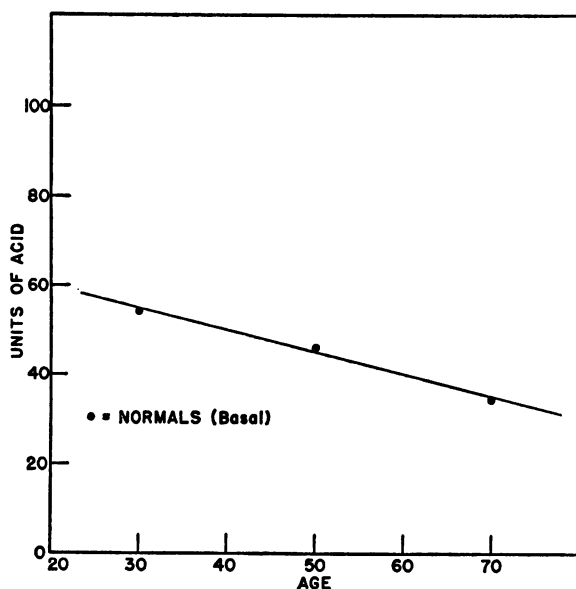


FIG. 6. DECREASE IN BASAL SECRETION OF NORMAL PEOPLE WITH ADVANCING YEARS