Original Articles

HISTALOG GASTRIC ANALYSIS

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Abstract

A histalog gastric analysis was done in 20 patients with gastroduodenal disorders and 12 subjects with non-ulcer dyspepsia who were used as controls. Due to overlap of secretory responses its use as a diagnostic tool is limited. About 46% patients with doudenal ulcer exceeded the upper limit of acid secretion of control subjects. Values for stimulated secretion in controls and the patients with gastric ulcer were the same. Endoscopy if possible is the investigation of choice for the diagnosis of gastroduodenal disorders and the secretory studies should be limited to patients under-going surgery for peptic ulceration.

Introduction

The purpose of a gastric secretory test is to provide a stable estimate of the functional capacity of the stomach (Makhlouf 1968). Histamine has been used for the study of maximal gastric secretion (Laudano 1966; Abernethy 1967). Histalog, a synthetic analogue of histamine stimulates gastric secretion without its undesirable side effects (Breuer and Kirsner, 1967; Zatkera and Neves, 1964). The purpose of this study was to determine the pattern of gastric secretory response in subjects with non-ulcer dyspepsia and patients with gastro-duodenal disorders.

Material and Method

A total of 32 patients were studied which included 12 patients with non-ulcer dyspepsia (patients with dyspeptic symptoms with negative radiological and endoscopic findings) who were used as controls, 13 with duodenal ulcer, 4 with gastritis and 1 each with gastric ulcer, duodenitis and duodenal cancer. Diagnosis of a case of duodenal ulcer and the case with doudenal cancer were confirmed at surgery. Gastroduodenoscopy was done in all the patients using olympus duodenofiberscope.

After an overnight fast a nasogastric tube was passed into the most dependent part of the stomach and the patient was made to sit upright and asked to expectorate all the saliva into a kidney tray throughout the procedure. The residual secretion was collected for 30 minutes by continuous suction and hand suction to ensure the patency of the tube. Basal secretion was collected for one hour after which Histalog in a dose of 1.5 mg/kg body weight was administered subcutaneously following which 15 minutes samples were obtained for 120 minutes.

All samples were analysed for volume, pH using pH meter and the acid content was determined using the method of Moore et al. (1966). The acid output was calculated by multiplying the H mEq/L by the volume, peak acid output was calculated using the highest two consecutive 15 minutes samples. The calculated maximal secretory capacity (Vmax) was obtained by plotting graphically the acid secretory response curve (Moore et al., 1966).

Results

Of 32 patients there were 20 males and 12 females. Their ages varied from 18 to 66 years. The sex distribution in various groups is shown in Table I.

Table 1: Sex Distribution

Groups	*Male*	*Female*
Control	7	5
Duodenal Ulcer	9	4
Duodenitis	0	1
Duodenal Cancer	1	0
Gastritis	2	2
Gastric Ulcer	1	0
Total	20	12

Acid secretion was more in the control males than females while females with gastritis secreted more acid than males (Table II).

Table II: Maximal Acid Secretion

Groups	*Sex*	*Maximal acid secretion Mean ± S.E. (No of Patients)*
Control	Male	53.31 ± 4.36 (7)
	Female	30.0 ± 7.59 (5)
Duodenal Ulcer	Male	66.2 ± 7.78 (9)
	Female	68.1 ± 14.2 (4)
Gastritis	Male	38.6 ± 0.6 (2)
	Female	63.45 ± 0.15 (2)

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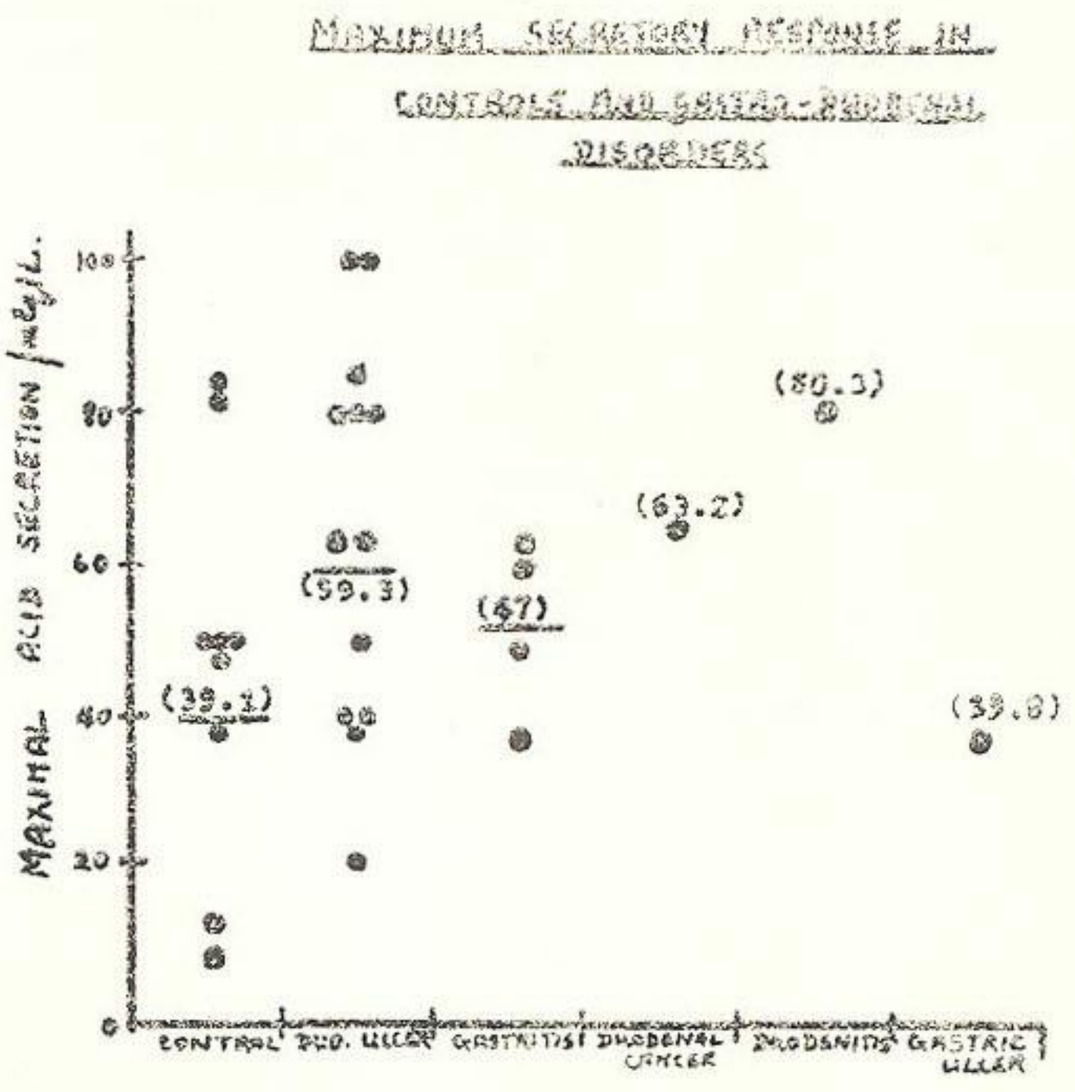
The acid secretion in patients with duodenal ulcer was higher than in any other group as shown in the accompanying figure.



The mean basal acid output was highest in patients with doudenal ulcer and none of the 13 patients showed the absence of acid in basal secretion. Three control subjects and the one with gastritis had basal achlorhydria (Table III).

Table III: Basal and Peak Acid Output

Group (No. of patients)	*Mean Basal Acid output meq/hour (Range)*	*Mean peak acid output meq/1/2 hour (Range)*
Control (12)	0.2 (0.0—1.27)	5.2 (1.04—8.64)
Duodenal Ulcer (13)	2.05 (0.01—4.39)	10.78 (3.98—25.74)
Gastritis (4)	0.23 (0.0—0.78)	5.94 (2.9—9.1)
Duodenitis (1)	0.03	9.15
Duodenal Cancer (1)	0.32	6.06
Gastric Ulcer (1)	0.29	5.01

The peak acid output was 10.78 mEq/30 minutes in patients with duodenal ulcer and 9.15 mEq/30 minutes in the patient with duodenitis. There was very little difference in the secretory pattern of controls and patients with gastritis and gastric ulcer (Table III).

The maximal secretory response was observed in the 60-90 minutes interval, in controls and in patients with duodenal ulcer and in the 30-60 minutes interval in patients with gastritis (Table IV).

Side effects of Histalog included flushing in 23 of 32 and headache in 11 cases. Other side effects were palpitation and drowsiness (Table V).

Table V: Side Effects of Histalog

Category	*No of cases*	*Flushing*	*Head-ache*	*Palpita-tion*	*Drow-siness*
Controls	12	9	6	2	—
Duodenal ulcer	13	9	5	4	1
Gastritis	4	3	—	—	—
Duodenal cancer	1	—	—	—	—
Duodenitis	1	1	—	1	—
Gastric ulcer	1	1	—	—	1

Discussion

The techniques for evaluation of gastric secretory capacity have been revised in recent years (Castell et al., 1967). Any test for gastric secretory function should be safe, simple and reproducible (Wormsley and Grossman, 1965). There are various terms for expressing the results. The term peak acid output representing the highest values in two consecutive 15-minutes specimens following stimulation was introduced by Baron (1963) as the most repeatable and diagnostically discriminating measurement of gastric secretion. The peak acid output has been shown to give remarkably consistent results when repeated in the same individual (Breuer and Kirsner, 1967; Zatkera and Neves, 1964).

Table IV: Mean and Standard Error of Basal and Post Histalog Gastric Acid secretion in Pakistani Controls and Patients with Gastro Duodenal Disorders

Groups	*Basal*	*POST HISTALOG*			
		0—30 *min* *Mean± S.E.* (*No of patients*)	30—60 *min* *Mean± S.E.* (*No of patients*)	60—90 *min* *Mean± S.E.* (*No of patients*)	90—120 *min* *Mean± S.E.* (*No of patients*)
Controls	5.36—2.44 (9)	15.27±2.74 (12)	33.66±3.3 (12)	39.16±3.80 (12)	30.74±4.07 (12)
Duodenal Ulcer	22.5—4.5 (12)	40.16±3.5 (12)	55.22±4.38 (12)	59.32±4.9 (12)	49.07±4.27 (11)
Gastritis	9.17—4.6 (3)	28.97±4.63 (3)	47.0±4.24 (4)	43.5±5.79 (4)	26.92±4.47 (4)

Moore et al. (1966) have developed a mathematical equation by means of which they calculated the maximal capacity to secrete (Vmax). They estimated the maximum by plotting a graph of time versus hydrogen ion secretory rate/min. The highest observed secretory response to Histalog was some 15% less than the calculated maximum.

This study shows that gastric secretory studies are not diagnostic for duodenal ulcer. The acid secretion in only 46% of ulcer patients exceeded the upper limit for controls. Similar findings have been reported by Sparberg and Kirsner (1964) and Abernethy (1967). Basal hypersecretion was more frequent in patients with duodenal ulcer and those with large basal volumes responded most to Histalog stimulation. Similar findings have been reported earlier by Wormsley and Grossman (1965).

An acid output of more than 15 mEq/hour is strongly suggestive of duodenal ulcer and this value represents a threshold for peptic ulceration. The acid output in this study was 10.78 mEq/30 minutes.

The advent of endoscopy has displaced the use of routine gastric analysis in patients with dyspepsia even if radiology is negative (Baron 1977) as it allows direct visualization of any pathological process. Main role for gastric secretion tests would seem to be after ulcer operations (Baron 1977; Abernethy 1967; Scobie and Rovelstad, 1965). Every patient with duodenal ulcer undergoing surgery should have his basal and peak acid output measured (Baron 1977). An output of more than 15 mEq/hour postoperatively in the presence of symptoms is strongly suggestive of anastomotic ulcer (Scobie and Rovelstad, 1965) and that exceeding 25 mEq/hour is virtually pathognomonic of stomal ulceration (Sparberg and Kirsner, 1964).

In the solitary gastric ulcer patient values similar to those for controls were obtained. Patients with gastric ulcer have been reported to secrete less acid than normals (Wormsley and Grossman, 1965). Davenport (1965) believes that gastric ulcer patients secrete large volumes of juice containing little acid, and this low acid content is due to diffusion of H ions into the gastric mucosa which in turn is due to a genetically determined abnormal permeability of the mucosa to hydrogen ions.

Gastric analysis though not diagnostic for peptic ulceration does have its uses. If gastric analysis were never performed occult pernicious anaemia or an 'early' zollinger Ellison syndrome in which the basal acid output is 48-60% of the maximal acid output would probably not have been recognized (Sparberg and Kirsner, 1964).

Histalog has provided a safe means for eliciting maximal gastric secretion but due to overlap of secretory responses its use as a diagnostic tool is limited. Endoscopy if possible is a more superior test. Gastric secretory studies should be carried out in patients undergoing surgery for peptic ulceration.

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