Gastric Microflora in Gastroduodenal Disease

Pages with reference to book, From 282 To 284

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Abstract

Gastric juice cultures were positive in all patients with gastric disorders and 44% with duodenal ulcers. A positive correlation was observed between pH and positivity of gastric cultures (JPMA 32:282, 1982).

Introduction

Variations in the pattern of gastric secretary activity and gastric pH in various gastroduodenal diseases is well recognized (Samad et al., 1978; Wormsley and Grossman, 1965). Gastric pH controls the growth and survival of several ingested microorganisms (Schonebeck, 1968; Franklin and Skoryna, 1971). The effect of variation of gastric acidity on microflora in gastric and duodenal disorders is reported in this study.

Material and Methods

Samples of gastric juice were collected from 90 fasting healthy adults and 34 patients with clinically suspected and endoscopically proven gastroduodenal disease. Aspiration of gastric juice was done, with Ryle's tube. The first portion was discarded and the second aspiration collected in a sterile bottle.
Determination of pH.
pH of gastric juice was measured by the surface contact method using glass electrode pH meter.
Serial ten fold dilutions of gastric juice in sterile saline were streaked on blood Agar for Streptococci, Rcgosa S.L. agar for Lactobacilli, Mac'Conkey Agar for coliforms, Mannitol Salt agar for Staphylococci, Veillone-11a medium for Veillonella, and Sabouraud's agar for Candida. Plates were incubated aerobically and anaerobically for 24 to 96 hours. For Candida, incubation was performed at 28°C for 48-96 hours. After incubation the microorganisms were subcultured to obtain the isolates in pure culture. The organisms were identified on the basis of colony characteristics, gram staining and biochemical reactions.

Results

Table I Gastric pH in Gastroduodenal Diseases

	1–2.9	3–4.9	5–6.9	7–8.9	*Total specimen with growth*	*Percent*
Healthy adults (90)	41	16	30	3	67	74
Duodenal ulcer (18)	11	3	4	—	8	44
Gastric ulcer (3)	2	—	1	—	3	100
Gastric Carcinoma (5)	—	—	4	1	5	100
Misc. related diseases (8)	3	3	1	1	5	62.5

Table I shows the variations in pH and microbial growth in the gastric juice of healthy adults and patients. pH of gastric juice among healthy subjects varied mostly between 1-2.9 and 5-6.9. Positive gastric cultures were found in 74% of subjects. Among the patients, the pH of gastric juice from duodenal ulcer cases varied between 1-2.9, and in gastric carcinoma between 5-6.9. Bacterial growth was positive in 44% patients with duodena] ulcer and in 100% with gastric ulcer and carcinoma. A positive correlation was found between pH of gastric juice and positive gastric cultures both in healthy adults and patients as shown in the accompanying figure.

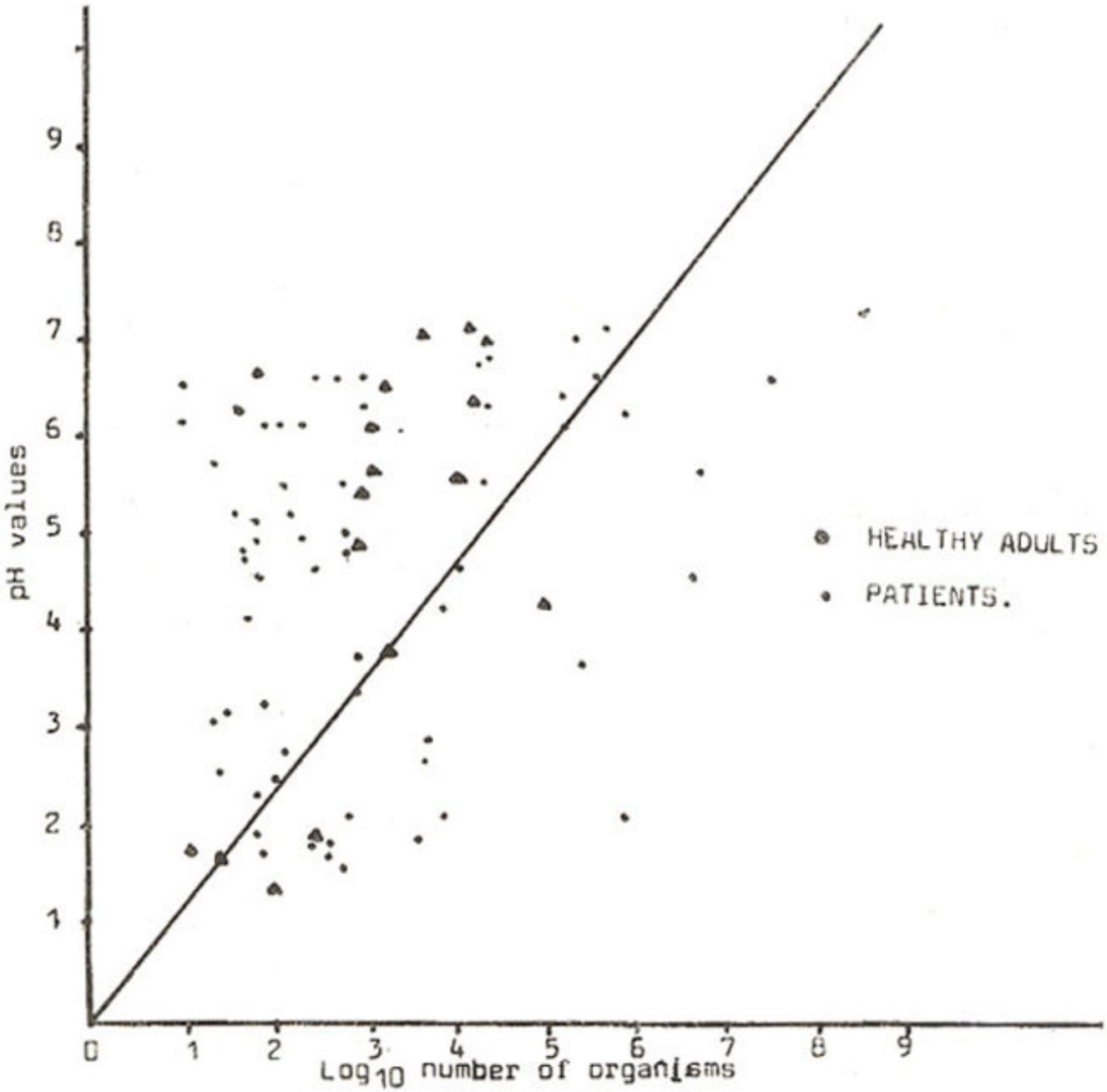

Fig. Corelation of pH with gastric flora.

Similar types of microorganisms were isolated in both the groups (Table II).

Table II

Bacterial Flora of Gastric Juice

Microorganisms	*Controls*	*Gastric Ulcer*	*Gastric Carcinoma*	*Duodenal ulcer*	*Misc related diseases*
Neisseria spp	5.3		6.7	—	—
Streptococci	3.8	6.8	4.6	1.7	1.7
Lactobacilli	2.8	2.6	2.6	3.6	—
Staphylococci	2.6	—	4.4	2.4	—
Coliforms	2.2	—	2.3	—	2.8
Candida	2.2	1.6	2.8	1.7	3.0
Diptheroids	—	—	3.6	—	—

The values are expressed as $-\log^{10}$ number of organisms per ml of gastric juice.

Gastric juice from duodenal ulcer patients showed the presence of only acid resistant organisms while in gastric carcinoma the higher pH permitted the growth of a large variety of bacteria.

Discussion

The major factor preventing the establishment of resident gastric flora is the extreme pH (Drasar et al., 1969). Consequently in patients with anacidity the growth of gastric flora is more profuse and varied (Bordello et al., 1978; Gray and Shiner, 1967). In the present study gastric pH in patients with duodenal ulcer was mostly acidic resulting in a lower number of positive gastric cultures while in carcinoma patients decreased acidity permitted bacterial growth in all cases. pH of gastric juice regulates the type of microorganisms in the stomach therefore only the growth of acid resistant microorganisms was obtained in patients with duodenal ulcer. Growth of coliforms was only found in patients with gastric carcinoma. The establishment of a metabolically active gastric flora rich in faecal organisms is of greater concern as it increases the risk of developing gastric carcinoma (Mosbech and Videback, 1950). Hypochlor-hvdria favours the growth of a large variety of microorganism. Their metabolic activity results in the intragastric production of nitroso compound and gastric neoplasia (Ruddel et al., 1976; Ruddel et al., 1978).

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