Staff Meeting Bulletin
Hospitals of the » » »
University of Minnesota

Gastric Achlorhydria

Volume XII Friday, June 6, 1941 Number 23

STAFF MEETING BULLETIN
HOSPITALS OF THE . . .
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Volume XII | Friday, June 6, 1941 | Number 28

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Published for the General Staff Meeting each week during the school year, October to May, inclusive.

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William A. O'Brien, M.D.

I. LAST WEEK

Date: May 23, 1941

Place: Recreation Room
Powell Hall

Time: 12:15 to 1:30 P.M.

Program: Movie: "Tramp"

Laboratory Methods Recently Introduced in the University of Minnesota Hospitals

Gerald T. Evans
Edward B. Flink
Olaf Mickelsen

Present: 131

Gertrude Gunn
Record Librarian

- - -

May 30 - Holiday!

- - -

II. MOVIE

Title: "Fire Chief"

Released by: R-K-O

- - -

III. ANNOUNCEMENTS

1. NEXT WEEK - Final meeting of the series.

2. CENTER FOR CONTINUATION STUDY PROGRAM
1940-41

1940

Clinical Allergy - July 29 - August 3
Anesthesia - - - September 23 - 25
Health Problems of School Children - - - September 26 - 28
Traumatic Surgery - September 30 - October 5
Medical Therapy in General Practice - October 7 - 12
General Surgery - - November 4 - 9
Obstetrics - - - - November 11 - 16
Proctology - - - - November 11 - 16

1941

Problems of Executive Housekeeping - January 2 - 4
Ophthalmology - - January 20 - 25
Hospital Administration - January 27 - February 1
Uterine Bleeding - - February 3 - 5
Medical Social Service - February 13 - 15
Dietetics - - - - - - February 20 - 22
The Anemias - - - - March 3 - 5
Problems of Newborn and Premature Infants - - - - - - March 6 - 8
Obstetric and Pediatric Nursing - March 13 - 15
Obstetrics - - - - April 3 - 5
Roentgen Diagnosis of Nontuberculous Diseases of the Lungs and Pleura - - - - - May 22 - 24
Nutrition in the Public Welfare - May 26 - 28
Diseases of Infancy and Childhood - June 2 - 7
Diseases of Rectum and Colon - June 9- 14
Obstetric and Newborn Nursing - June 12 - 14
Diseases of Heart - - - June 16 - 21
Dermatology and Syphilology - June 23 - 28

- - -

Next year a new series will start with a course on Industrial Health the first week in August. A very busy fall and winter are contemplated, as we go into the fourth year of sponsorship by the Commonwealth Fund.

IV. GASTRIC ACHLORHYDRIA: A CLINICAL AND GASTROSCOPIC STUDY

Macnider Wetherby

This study was made in the medical out-patient department in conjunction with J. B. Carey and R. S. Ylvisaker. It consists of a report of gastroscopic examinations of patients with achlorhydria seen in the past two years and of a clinical study of the incidence of achlorhydria in all patients with examination of gastric contents for the calendar year 1940.

Anacidity or achlorhydria is more likely to be evidence of disease of the stomach than any other variation of gastric secretion. Carlson[1] in 1923 stated that there was no disease known capable of inducing true gastric hyperacidity, that pathological deviations in acid and pepsin concentrations were invariably in the direction of decrease. Faber[2] in 1926 concluded that chronic achylia has an exogenous cause and is produced by external factors acting on the stomach, either by direct irritation of the mucous membrane or through the blood circulation by a toxic action on the gastric parenchyma. By 1935 he[3] had clarified his ideas by postmortem and other histologic study to the extent of considering anacidity to be the result of a disorder of the mucous membrane of the stomach, gastritis in its various forms.

The incidence of achlorhydria increases steadily throughout life. The early figures of Vanzant[4] and associates on the basis of Ewald test meal have been substantiated by more recent work, notably by Polland[5], using histamine. The incidence of achlorhydria has been given for all ages by Bloomfield and Polland[6] (Ewald test) as 16.9%; and by Polland (histamine test) as 12.2%, 14.2% female and 10.8% male. Faber's[3] figures for anacidity are much higher for 1000 cases in Copenhagen, the total for all age groups was 306 cases; the test meal used was not stated. As a generality, all figures show slightly lower acid values for women, and higher figures for achlorhydria percentage. Histamine tests are available on only 63 children, from ages of 6 months to 14 years, and no cases of achlorhydria have been found (7,8,9). Using other test meals, occasional absence of free hydrochloric acid has been noted, but these can not be considered as statistically significant[10,11,12].

Our own material shows, out of 1070 gastric analyses done in 1940, 661 patients without apparent gastro-intestinal disease after complete examinations had been made: of these 17.4% of the men and 22.3% of the women had no free hydrochloric acid after histamine stimulation. (Table I).

Table I

Gastric Analysis in Patients Without Apparent Gastro-Intestinal Disease (661 cases)

Age	Male			Female		
	No. Cases Examined	Achlorhydria No.	Achlorhydria %	No. Cases Examined	Achlorhydria No.	Achlorhydria %
16-29	47	1	2.1	56	6	10.7
30-39	61	10	14.0	93	13	14.0
40-49	57	8	14.0	80	14	17.5
50-59	68	16	23.5	77	16	20.8
60-69	51	9	17.6	36	15	41.7
70 & over	26	10	38.6	9	7	77.7
Total	310	54	17.4	351	71	22.3

Of the total number of 1,057, 192 had peptic ulcer, 157 had gall bladder disease, 47 had cancer of the stomach, and 13 had pernicious anemia. As a matter of comparison, 25% of the men with gall bladder disease had achlorhydria and 27.2% of the women, a slightly increased

variation from the expected incidence. (Table II.)

Table II

Gastric Analysis in Patients with Chronic Gallbladder Disease (157 cases)

	Male			Female		
Age	No.Cases Examined	Achlorhydria No.	%	No.Cases Examined	Achlorhydria No.	%
16-19				2	0	0
20-29				6	1	16.6
30-39	5	1	20	17	4	29.4
40-49	5	1	20	33	4	12.1
50-59	8	1	12.5	42	13	39.5
60-69	10	3	30.0	24	12	50.0
70 & over	4	2	50.0	1	0	0
Totals	32	8	25.0	125	34	27.2

Sex ratio M : F = 1 : 4

As would be expected, 70.9% of men with cancer of the stomach had no free acid and 75% of the women (Table III).

Table III

Gastric Analysis in Patients with Carcinoma of the Stomach (47 cases)

	Male			Female		
Age	No.Cases Examined	Achlorhydria No.	%	No.Cases Examined	Achlorhydria No.	%
40-49	3	2	66.6	1	1	100.
50-59	11	10	90.9	4	2	50.
60-69	13	9	69.2	8	7	87.5
70 and over	4	1	25	3	2	66.6
Totals	31	22	70.9	16	12	75

Sex ratio M : F = 2 : 1

Achlorhydria % both sexes = 72.3

To determine whether there was objective change from the normal in the gastric mucosa of the individuals having histamine proved achlorhydria, 233 such patients were studied gastroscopically. 132 were found to have atrophic mucosa, 44 had superficial gastritis, 34 were normal, 3 showed hypertrophic changes and in 20 with carcinoma, details of the mucosa could not be clearly defined because of extent of lesion, retained material, hemorrhage and other causes. The detailed diagnoses are given in Table IV.

Table IV

Gastroscopic Diagnoses in Patients with Gastric Achlorhydria (233 cases)

		%
Atrophic Gastritis (alone)	57	24.5
with Superficial Gastritis	54	23.2
with Polypi (single or few)	8	3.4
with Polypi and Superficial Gastritis	1	0.4
with Polyposis	4	1.7
with Multiple Fibroadenomata	1	0.4
with Carcinoma	6	2.6
with Gastric Ulcer (benign)	1	0.4
	132	56.6
Superficial Gastritis (alone) (3 of hemorrhagic type)	39	16.7
with Polypi	3	1.3
with Carcinoma	1	0.4
with Gastro-enterostomy	1	0.4
	44	18.8
Normal Gastric Mucosa	30	12.9
with Polyp	2	0.9
with Polyposis	1	0.4
with Gastro-enterostomy	1	0.4
	34	14.6
Carcinoma (character mucosa not determined)	19	8.2
with Previous Resection	1	0.4
with Hypertrophic Gastritis and Polyposis	1	0.4
	21	9.0
Hypertrophic Gastritis (alone)	2	0.9

(23 cases of Pernicious Anemia included in the group of those with atrophic gastritis or atrophic and superficial gastritis, atrophy with polypi or atrophy with carcinoma).

Over against these results may be placed percentage occurrence of mucosal changes in approximately 750 gastroscopic examinations done before this special study was undertaken,[13] the above mentioned 233 cases are not included as they were all achlorhydric and therefore would influence the diagnostic figures.

Postoperative	7.0%
Atrophic gastritis	12.5%
Superficial gastritis	9.
Atrophy with cancer	10.
" " pernicious anemia	3.
" " polypi	2.
Negative	22.5
Hypertrophic gastritis	22.5
Gastric ulcer	7.0
Duodenal "	3.5

These results compare with a series of 1000 examinations reported by Schindler[14] in 1939, superficial gastritis 11%, atrophic gastritis 13.6%, polypi 2% and carcinoma 7.7%.

In contrast to the results noted in achlorhydria, may be placed the diagnoses recorded in 100 cases showing acid in the fasting content, serially selected from examinations done while the special study was in progress:

Normal	43
Gastric ulcer	20
Superficial gastritis	12
Hypertrophic "	8
Atrophic "	7
Gastritis	
with superficial	3
with cancer	1
Carcinoma	6

In a study similar to ours, Schindler[15] and associates found that in 101 patients with (spontaneous) histamine anacidity, 5% had normal gastric mucosa; 55 had gastritis, 6 of the hypertrophic type, 12 superficial type, 7 superficial gastritis with atrophy and 30 atrophic gastritis. In 16 patients with pernicious anemia, all had superficial gastritis or superficial gastritis with atrophy. In 23 patients with cancer of the stomach, 3 were normal. Gastritis was found in all eight patients who had had operations on the stomach, and also in 11 patients whose stomachs had been irradiated.

Schiff and Goodman[16] reported 22 patients with permanent histamine achlorhydria and without cancer or pernicious anemia, and 3 patients with transient achlorhydria, 15 of whom showed atrophic gastritis, 5 superficial gastritis, 2 hypertrophic gastritis and 3 with normal mucosa. In 32 patients with cancer of the stomach, 22 had gastritis, 3 had none and in 6 the state of the mucosa was not mentioned.

The procedure for obtaining gastric secretion for analysis was as follows: the fasting contents of the stomach were aspirated and examined: if acid was present (Tupfer's reagent) the test was concluded; if there was no acid present in the fasting contents, 0.5 mg. of histamine was injected subcutaneously and gastric contents were aspirated in 20 minutes; if acid was present, again the test was concluded, but if not, another specimen was collected in 40 minutes; if this did not contain acid, the whole test was terminated. Occasionally a 60 minute sample was obtained and for special purposes, a second or third injection of histamine was given after the 20 or 40 minute sample had failed to reveal the presence of free hydrochloric acid.

Single tests should not be relied upon as finally conclusive, as shown by results in a group of 88 patients in which the histamine tests were repeated. In 44 patients acid was present on the initial test, and still present on the second test in 41; three of this group however had no acid after the second histamine test. Of more interest for the present study were 44 patients, none of whom had free acid after initial histamine test, 23 of whom remained achlorhydric after a second histamine test. 21 however showed acid after the repeated test. Thirteen of these had been examined with the gastroscope as being achlorhydric, before the second test was done. Six of these had normal mucosa, 1 had atrophic gastritis, 2 had gastric ulcer, one had hypertrophic gastritis with duodenal ulcer and 2 had cancer of the stomach. These cases are not included in the final report given in Table IV.

Gastric Achlorhydria and Peptic Ulcer

The occurrence of achlorhydria with peptic ulcer has been discussed by numerous authors. Most agree that such instances are very rare. Palmer and Nutter[17] could not find true persistent achlorhydria in over 1000 cases of duodenal or benign gastric ulcers. Ruffin and Dick[18] report 24 instances of histamine achlorhydria in 419 duodenal ulcer patients (5.4%) and 3 instances in 42 gastric ulcer patients (6.7%). Schindler states that atrophic gastritis may occasionally be seen in the ulcer bearing stomach. We observed one gastric ulcer with achlorhydria and with what appeared to be a malignant ulcer gastroscopically and roentgenologically, but which was pronounced benign by the pathologist after it had been resected.

The total experience with ulcer in the dispensary during 1940 comprised 182 cases, distributed according to age and sex as shown in Table V.

Table V

Peptic Ulcer: Distribution by Sex and Age (192 cases)

Age group	Men			Women		
	Duodenal	Gastric	Gastric & Duodenal	Duodenal	Gastric	Gastric & Duodenal
16-19	0	0		1		
20-29	21	0		3		
30-39	25	3		9	1	
40-49	20	3		12	1	
50-59	23	2	1	10	1	1
60-69	18	4	2	4	1	
70 & over	6	4		4	1	1
Totals	113	16	3	43	5	2

Sex ratio Men : Women :: 2.5 : 1

Duodenal ulcer : Gastric Ulcer :: 6 : 1

These were either new patients or old ones not seen for several years and examined as new patients when they returned. In the series of 182 diagnosed as ulcer by fluoroscopy and radiography, 7 had achlorhydria on original gastric analysis. Four demonstrated return of acid on second examination with histamine. One was re-examined roentgenologically because of achlorhydria and the lack of clinical evidence for ulcer; and was then radiologically negative. Two remained achlorhydric to histamine; one of them was a patient thought to have a malignant ulcer by both the radiologist and gastroscopist; the other patient has a duodenal ulcer. The case report of a third patient with duodenal ulcer and achlorhydria is given, altho he has not as yet been gastroscoped.

Case 1.

Male, age 53, first seen in the Out-patient department January 22, 1940. His presenting complaint was pain in the epigastrium and left upper quadrant of the abdomen, which had been noted for five months and which was worse about three to four hours after eating. He had lost eight pounds in weight during this period. There was nothing notable about his physical condition except that the blood pressure was slightly elevated, 160/96. There was no free hydrochloric acid in the gastric secretion after histamine stimulation. Blood was normal. Radiographic report: ulceration of the posterior wall of the stomach near the lesser curvature, with evidence of soft tissue mass pressing into the lumen at this point. The stomach wall is rigid in this region. The findings are characteristic of carcinoma of the cardiac end of the stomach. Gastroscopic examination was done Feb. 1, 1940; the antrum and pylorus were normal. On the anterior wall blood vessels can be seen, suggesting diffuse atrophy of the mucosa. On the posterior wall, high up near the cardia, there is an area where the mucosa is stiff, thick and protruding into the lumen of the stomach. The thickening and induration is confined to a rather small area seen tangentially. Impression: atrophic gastric mucosa, anterior wall; infiltrating process posterior wall, near cardia, probably carcinoma. A gastric

resection was done on Feb. 27, 1940. A craterous tumor was found in the upper end of the stomach, which had perforated and become adherent to the pancreas. Grossly it could not certainly be determined whether it was malignant or benign. Pathological examination resulted in a report of benign ulcer. This patient recovered from the operation, and two subsequent studies of gastric secretion after histamine show a persistent absence of free hydrochloric acid. This patient is included under the classification of cancer in the gastroscopic data, inasmuch as the final pathological diagnosis was not at hand when the figures were compiled.

Case 2.

Male, aged 59, was first seen in the Out-patient department April 17, 1939. His complaint was that of pain in the upper abdomen present for about a year and relieved by the taking of food. Three days before admission to the dispensary he had vomited bloody material and passed tarry stools. There was nothing notable in the physical condition except a blood pressure of 180/125. The hemoglobin was 71%. There was a large amount of blood in the stool. There was no free hydrochloric acid in the gastric contents after histamine stimulation. An active duodenal ulcer was demonstrated by radiographic examination, a definite crater on the posterior wall and considerable spasm of the cap being seen. Gastroscopy was done: the gastric mucosa was seen to be diffusely atrophic, of a patchy character. There was redness around the pylorus. Study of the gall bladder by cholecystography showed a non-functioning organ with probable stones. The patient has improved on ulcer type of management and use of bile salts. The hemoglobin had increased to 91% in June 1939.

Case 3.

Male, aged 48. This patient was first seen in the dispensary in May 1936. At that time he had had pain in the epigastrium, most notable at night, relieved by soda and food, and a roentgenographic diagnosis of duodenal ulcer had been made. Gastric acidity of 34° free hydrochloric acid and 48° total was recorded. Treatment in the hospital by usual ulcer procedure for six weeks resulted in freedom from symptoms and disappearance of the niche from the radiogram. In 1937, during an exacerbation of the trouble, 4° of free acid and 14° of total acidity was demonstrated in the fasting gastric contents. Radiograms taken in May, 1938 and June, 1939 showed a persistent deformity of the duodenal bulb. In February, 1941 the patient reported to the dispensary complaining of pain coming two to three hours after meal time, relieved by food. The pain was very intense at times and occurred at night. He was occasionally nauseated, but did not vomit. A radiogram of February 7, 1941 showed a very much deformed duodenal bulb; there was no demonstrable gastric retention. At this time there was no free hydrochloric acid in the fasting stomach contents; none appeared 20 minutes after histamine stimulation, and in this case, another injection of 0.5 mg of histamine was given, which also failed to produce acid secretion in 40 minutes. The test was repeated five days later (2-11-41) using three injections of 0.5 mg histamine at thirty minute intervals, collecting samples each time, with no acid resulting up to 2½ hours. This man has not yet been examined gastroscopically.

The Gastroscopic Examination of Achlorhydric Mucosa after Gastric Surgery

There were but three patients in this series who had anachlorhydria after surgical procedures.

One patient, a female, aged 64, had had a gastric resection for carcinoma of the stomach six years previously and returned with ascites and palpable abdominal masses indicative of abdominal carcinomatosis. Roentgenographic study of the stomach showed no evidence of intrinsic gastric involvement. Gastroscopic study revealed a large stoma with injection and edema indicative of a superficial gastritis throughout but without evidence of local recurrence.

The other two patients had had gastro-

enterostomies performed 10 and 14 years previously, presumably for duodenal ulcer. Both had large posterior gastric-enterostomy openings, and one showed an entirely normal gastric mucosa, while the other had only a few hemorrhagic streaks. These are in contrast to the rather marked gastritis often seen in the mucosa of persons who have had various types of gastric surgery.

The Gastric Mucosa in Pernicious Anemia

Pernicious anemia is the outstanding clinical example of a disease with complete and permanent gastric achlorhydria. While there have been a number of reports of patients with free hydrochloric acid in the gastric contents and macrocytic anemia, there is general reluctance in accepting such cases as pernicious anemia. We have seen no patient without achlorhydria that could be designated as a true pernicious anemia. Gastroscopic examination of pernicious anemia patients has always revealed gastritis. The early gastroscopic report of Benedict[20] in 1935 of 5 cases showed variations in the gastric mucosa but three had polypi and 2 had cancer. Schindler[21] has reported four pernicious anemia patients with normal mucosa after treatment with liver, but these patients were not examined before treatment was started. In 3 patients seen both before and after treatment, all atrophic, one became normal. Of 15 patients with pernicious anemia not included in this report, noted by Carey[22,23] in 1940, all showed atrophic mucosa; some had been and were under treatment at the time the examinations were done. Six were re-examined after treatment, one was worse, 2 were improved although the mucosa was still atrophic, and 3 were unchanged.

In the present series of achlorhydric patients, 23 had pernicious anemia, and all showed greater or less degrees of atrophic gastritis. There was atrophy alone in 11, atrophy with superficial gastritis in 7, atrophy with polypi in 3 and atrophy with cancer in 2. One patient had superficial gastritis of hemorrhagic type, with a minimal amount of atrophic change (Case 4). In all instances, the mucosal changes were of the body of the stomach; the antrum region was not perceptibly involved. This finding does not seem consistent with Meulengracht's[24] work on the pyloric gland organ in pernicious anemia. We have not seen any appreciable change in the mucosa of those patients with pernicious anemia who have had adequate treatment with liver; that is to say, we have so far, in a total of 38 patients, not seen a complete restoration to normal of the gastric mucosa. We have discussed this before.[22] The two patients with pernicious anemia and carcinoma had been under observation and treatment for pernicious anemia for some time; one treated for six years in whom the history indicated the presence of pernicious anemia for eight years, developed extensive malignant change of the lower two thirds of the stomach, the upper 1/3 still showing complete atrophy. The second case had been diagnosed as pernicious anemia and treated for one year before coming in to the dispensary with a cancer. Several other patients have had a diagnosis of pernicious anemia and cancer, but we have hesitated to designate them as primary pernicious anemia unless the evidence was clear that the pernicious anemia antedated the occurrence of cancer. There is no doubt that the incidence of cancer of the stomach is higher in pernicious anemia patients than that expected for the general population. Jenner[25] gives his experience in Amsterdam as 4.42% of cancer of the stomach in 181 patients with pernicious anemia. From his analysis of the situation, and our own experience with both diseases, it would seem that gastritis conditions the individual for either cancer or pernicious anemia or both. Jenner diagrams his idea thus:

not; pernicious anemia---------→cancer
but; chronic gastritis---------→cancer
↓ mucosal atrophy
pernicious anemia

The patient with superficial gastritis and very slight atrophy is of special interest. In spite of the age at which the anemia obviously began, it must be considered as an early case,

arrested by prompt, adequate liver therapy and in whom the atrophic gastritic changes have not so far progressed to the extent ordinarily seen in a well developed, long standing case.

Case 4.

Male, aged 72, came to the dispensary May 23, 1939 complaining of paresthesia of hands and feet and progressive weakness of the lower extremities noticeable for two years. He was unable to walk. He had had osteomyelitis of the left femur since the age of 15, and consequently had been lame in the left leg all his adult life. His left knee was stiff. There was loss of vibratory sensation in the lower extremities from the level of the first lumbar vertebra downward, and also in the hands. There was loss of position sense of the great toes. The neurological consultant considered that the patient had subacute combined degeneration of the spinal cord. May 24, 1939 hemoglobin was 75% (Sahli), erythrocytes 2,680,000, white blood cells, 3,250. There was no free hydrochloric acid in the gastric secretion after histamine stimulation, even with twice repeated injections of histamine. Gastroscopic examination was done June 14, 1939: the antrum and pylorus were normal. There were a few streaks of submucosal hemorrhage beginning at the region of the angulus, this hemorrhagic appearance becoming more extreme in the upper parts of the stomach, where the entire gastric mucosa was involved with large patches of submucosal hemorrhage. There were some older areas of pigmented hemorrhage just below the cardiac orifice. The cardiac opening seemed somewhat stiff. A few small erosions were seen in this upper region. The possibility of malignant change was considered. Large doses of liver extract were given, beginning with 5 cc of reticulogen, and continuing with doses of 2.5 cc. The patient rapidly improved. July 27, 1939 the hemoglobin was 86% (Sahli), erythrocytes, 4,040,000. Gastroscopic examination was repeated on July 26, 1939, at which time the hemorrhagic appearance was much less, some atrophic change of the anterior wall of the body of the stomach could be distinguished. One area high up just below the cardia still looked about as before, very hemorrhagic, and with numerous erosions. The patient continued to improve, was now able to walk. On Oct. 25, 1939, he was examined again. The appearance of the stomach was about as it had been in July, there were still hemorrhagic areas, a few erosions, and very slight atrophy of the anterior wall. The appearance was not characteristic of pernicious anemia, and it was still felt that malignant infiltrative process of the proper part of the stomach should be considered. Radiographic studies had been repeatedly negative. The patient was maintained on liver therapy, the blood values remained elevated to normal levels, and he continued to feel well. On December 20, 1940, the hemoglobin was 104% and the red blood cells numbered 5,780,000. Gastroscopic examination was done March 5, 1941; the gastric mucosa looked much improved; there were numerous tiny hemorrhagic spots scattered throughout, but no large patches of hemorrhage as were seen before; there was an area of atrophy on the anterior wall of the body of the stomach. High up, just under the cardiac orifice, on the anterior wall of the stomach, there was an area where the mucosa appeared thick, edematous, mottled and with mucus adherent to it; there were a few small hemorrhagic spots around this region. Hemoglobin at this time was 98% and the erythrocytes were 4,900,000.

Another patient has been under observation for over a year, with achlorhydria, histamine refractive, subacute combined cord degeneration and blood picture of pernicious anemia with response to liver in whom on three occasions radiograms have shown a definite deformity of the duodenal bulb, considered to be caused by an old duodenal ulcer. This patient has not had any gastrointestinal symptoms except occasional attacks of vomiting without pain. Gastroscopic examination shows an atrophic condition of the mucosa.

Hypochromic Anemia and Gastric Achlorhydria

We do not know how many of the patients

in this series could be called hypochromic, achylic anemias, as the gastroscopic work was done in many instances, and the results tabulated, before final clinical diagnoses were made. In 170 cases, there were 9 with hemoglobin values of 70% or below. Patients with cancer, pernicious anemia, polypi and other sources of bleeding, such as hemorrhoids, hematuria, cervical polypi were excluded. Two patients received the diagnosis of hypochromic anemia; one with hemoglobin of 46% and red blood cells of 4,880,000 had diffuse atrophy of the gastric mucosa; another patient with hemoglobin of 55% and red blood cells numbering 3,700,000 had superficial gastritis with atrophic change. In one patient with a diagnosis of Plummer-Vinson syndrome, the mucosa was normal; the hemoglobin was 58% and the red blood cell count 4,260,000. Six other patients might be called hypochromic anemia; the findings in them were as follows:

Hgb. 69; RBC 3,180,000, atrophic gastric mucosa
Hgb. 61; RBC 3,300,000, atrophic gastric mucosa
Hgb. 70; RBC 3,530,000, superficial gastritis
Hgb. 70; RBC 3,660,000; atrophic gastric mucosa
Hgb. 70; RBC 3,820,000, normal gastric mucosa
Hgb. 70; RBC not done, normal gastric mucosa

Morrison, Swalm and Jackson[26] report nine cases of hypochromic anemia, achlorhydria and atrophic gastritis, and two cases of anemia and atrophic gastritis in which free hydrochloric acid was present. Witts[27] has mentioned achylia with this form of anemia, and Moutier[28,29] has noted anemia and atrophic gastritis.

Carcinoma of the Stomach and Gastric Achlorhydria

During the past year a diagnosis of carcinoma of the stomach was made in 39 patients examined at the Out-patient clinic. Twenty-seven were men and twelve were women. In this group, 28 (72%) had achlorhydria, histamine refractive, an experience comparable to that of others. Most of these patients were operated upon. Twenty eight patients with gastric carcinoma and achlorhydria were gastroscoped. There were a number of other patients with cancer of the stomach that were not so examined, due to extreme weakness, the extensive nature of the lesion, or involvement of the cardiac orifice. An obvious, extensive cancer of the stomach, clearly identified by roentgenography has been one of the most frequent reasons for foregoing gastroscopic study in the series of patients with achlorhydria. One of the pertinent speculations relative to carcinoma of the stomach is the probability that such a lesion may occur more often in individuals with a pre-existing atrophy of the gastric mucosa. The development of cancer of the stomach in patients with pernicious anemia, previously mentioned, is a notable example of this possibility. Atrophy was observed in six patients with achlorhydria and cancer of the stomach. In 20 patients no observations of the mucosa in general were possible because the lesion itself obliterated all other findings, or because of presence of hemorrhage, retained debris and secretion, and other technical reasons. One patient showed a hypertrophic type of mucosa, with polyposis which in one area seemed to have undergone malignant degeneration.

Gastric Achlorhydria after Histamine in Patients without Carcinoma, Pernicious Anemia, Gallbladder Disease or Peptic Ulcer

The incidence of achlorhydria in such patients has been previously considered in Table I. Gastroscopic studies were made in 130 patients with achlorhydria and without evidence of general or gastrointestinal disease by other methods of examination.

The diagnoses in this group were as follows:

Atrophy alone	35
Atrophy with superficial gastritis	34
Atrophy with superficial gastritis and polyps	1
Atrophy with polyps	3
Atrophy with polyposis	1
Superficial gastritis alone	26
Superficial gastritis with polyps	2
Polyposis	1
Hypertrophic gastritis	1
Normal mucosa	25
Normal mucosa with polyp	1
	130

It is of significance that gastric atrophy was present in 84 cases (64.6per cent) of this entire group. There is a significant difference in the incidence with which atrophy is found comparing this group and a group of those gastroscoped with free hydrochloric acid present; although it is obvious that such a study does not give an entirely fair basis for statistical comparison. Atrophic changes in the gastric mucosa while seen frequently in patients with free hydrochloric acid in the gastric contents, do seem to be much more frequent in those with histamine achlorhydria. The atrophy present has been found largely in the body and fundus with relatively little in the antrum and pylorus. In but one patient in this series was there an atrophic process confined largely to the antrum and pylorus. The atrophic changes in the body and fundus could not be distinguished from those found in patients with pernicious anemia, and varied from moderate patchy involvement to diffuse atrophic changes.

Superficial gastritis was also present in a high percentage of the patients in this group (47.4 per cent). We are able to subscribe to the opinion of Schindler and others that in a great majority of cases, atrophic gastritis seems to have developed upon the foundation of a pre-existent superficial gastritis. This is evidenced by the fact that in many instances the two conditions are seen at the same time. It is likely that those patients showing atrophic gastritis only at the time of examination may have already gone through experiences with attacks of superficial gastritis. Careful history taken of these patients usually indicates dyspeptic stomach trouble off and on for many years. Faber's histological examinations of young children lends support to the idea that atrophy may result from attacks of gastritis associated with contagious diseases of childhood.

Polypi were found in 6 patients and diffuse polyposis in 2, a total of 8 in 130 cases. This seems a rather frequent finding, although no conclusions are justified as to the relative frequency in the presence and absence of free hydrochloric acid.

Twenty-six (20 per cent) of those in this group had an apparent normal gastric mucosa from gastroscopic examination. It is not unlikely that a number of these may show free acid on repeated tests, although some have had repeated achlorhydria after histamine.

An attempt was made to study the clinical symptoms of patients with histamine achlorhydria who had no other obvious gastrointestinal disease. This is indeed a difficult matter, as it is not possible to rule out gallbladder and other diseases entirely and the factors of environment, diet, and emotional stress often influence gastro-intestinal symptoms as much or more than achlorhydria or the condition of the gastric mucosa.

In this series of 130 there were 18 with the complaint of glossitis, none of whom could be classified as having pernicious anemia. One had Plummer-Vinson syndrome with hypochromic anemia and with an apparently normal gastric mucosa. Nausea was a relatively frequent complaint being present in 45 patients, usually intermittently. Vomiting was present at times in 31 patients. In some of these nausea and vomiting seemed associated with a migraine syndrome. Diarrhea was a complaint in 18 instances, frequently being associated with alternate predominant constipation. There were a few instances of rather persistent diarrhea which may have been associated with the achlorhydric condition and in some instances there was apparent satisfactory clinical response to the administration of dilute hydrochloric acid with

meals. Constipation was the most frequent complaint being present either constantly or intermittently in 75 of 130 patients (57.7 per cent). Considering the age range of the patients this is probably not much more frequent than in a general group.

This study has further substantiated opinions concering symptomatology of superficial and atrophic gastritis reported by Carey[30] in 1938. Discomfort or pain of some type was present at times with the majority of these patients. This was variable and very difficult to correlate with the gastroscopic findings. Some complained of hunger and night pain with food relief although this was not a frequent history. In a few such instances superficial erosions were found in the gastric mucosa as a part of a superficial gastritis, and some of these patients were benefitted clinically following increased rest and a modified ulcer regime without alkali. A number of patients also complained of distress after large meals and fatty foods even though the roentgenogram of the gall bloadder was negative, although this does not entirely rule out a diseased gall bladder.

The therapy for such patients seems to be an individual problem, and it is doubtful if there is any single preferred method of procedure. In many instances rest and attention to dietary bowel management without catharsis has seemed of value. In those with marked superficial gastritis, rest and frequent small feedings have seemed of some value at times. The use of iron, liver, and stomach extracts are advocated in some instances of atrophic gastritis with reports of regeneration of gastric mucosa in some cases.[31,16] We are unable to draw any conclusions as to such regeneration from our experience at this time.

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V. GOSSIP

Chief Cecil J. Watson of the Division of Internal Medicine has been elected to the Association of American Physicians. As membership is very limited (125?), this is indeed an honor for Dr. Watson and our group....In a recent issue of Life there was a picture of a gentleman named William Peyton with unusual foreign policy views who is not in any way connected with our William Peyton. The shoes, however, bore a striking resemblance to a certain pair which were suitably buried at one of the hospital picnics some years ago.....Internist Wesley Spink is looking relieved these days, as the copy for his new book on Chemotherapy has finally been received by the publisher. It will be published by the Yearbook Company, and his many followers are anxiously awaiting the edition... ..Pathologist Elexious T. Bell is a proud grandfather these days, although he has been deprived of the privilege of taking care of the infant because the youngster is now located in Philadelphia....Associate Professor Emeritus of Pharmacology Edgar B. Brown makes his home in Paynesville, Minnesota. Ed, whose hobby is repairing clocks, has developed such a reputation for putting antiques in order that they are now brought to him from miles around for adjustment and missing parts. A second hobby is raising flowers, and a third, collecting shells which he did while visiting his daughter and son-in-law Arnold Anderson of St. Petersburg, Florida....Pediatrician Chester A. Stewart is making final arrangements to leave Minneapolis for New Orleans to take over the headship in pediatrics at Louisiana State University. Many dinners and other affairs are being given in his honor. For the past twenty years, Chester has advocated the cause of breast feeding with the early addition of solids which have included sardines. His association with the late Dr. Sedgwick undoubtedly accounts for his interest in the subject. Another breast feeder is Larry Richdorf. Dr. Sedgwick's son, Frederick, is one of our interns.....At the Nutrition in the Public Welfare Course at the Center last week there was much discussion about a group of women called "housekeeping aides." These women are trained to go into an upside down, poverty stricken home where the mother is disabled and put the home in order. Those in charge of the training of these workers were much in evidence at the course. One of their stunts in getting their workers to see the job ahead is to turn them loose in a laboratory kitchen in which everything is upside down or broken. Their first job is to find where the surplus commodities have been forgotten. It is strange that people unaccustomed to eating much will not immediately start to eat more even though food is available. Another stunt which lifted these ladies out of their surroundings was to put them in neat uniforms. It would seem that this country has at last decided to feed its people. As with medical care, many have thought that if it was made available to people they would use it, but better nutrition is equally complicated. The people must be taught to use the foods and made to like them. It will not be long before practically every school will have a lunch program, and through this medium many children will be given a varied diet and taught to like it. It is estimated that if everyone would start eating properly dairy product consumption would go up 20% and many vegetables would rise 100%. Nearly 75 representatives of various agencies sponsoring better nutrition in Minnesota attended the three-day course....A group studying Diseases of Infancy and Childhood are in this week. They are mainly North and South Dakota physicians and interest in the subject is stimulating. This is most noticeable in the premature care program....Next week fifty rural nurses from Minnesota will study obstetric and newborn problems at the invitation of the Minnesota Department of Health. Many nurses practice modified midwifery today. This is commonly called "looking after the mother before the doctor arrives." In certain sections of the South, negro nurses are being trained for this purpose in order that they may replace midwives. They will follow their illustrious white sisters of Kentucky who have been visiting their patients on horseback these many years. Another interest which obstetric and newborn nurses have is instructing the mothers. In some places this program is carried on while the women are getting their baths. This replaces the usual gossip carried on at that time.....