

light, however. Some days it will not be there; but there are many things possible with it that make it worth while to have the patient come again and again, especially in cases of suspected tumor of the fundus. It certainly does penetrate through a hazy lens far better than artificial light. It is absolutely safe. I have been making use of it for twenty years and most of my work has been done without any attempt to filter out the heat rays, and by avoiding long exposure I have not had the slightest trouble. An alum filter will render the light just as safe as regards heat as any artificial source of light.

ACHYLIA GASTRICA *

JOSEPH SAILER, M.D.
PHILADELPHIA

Achylia gastrica was first described by Fenwick¹ in 1877. He then reported four cases that were undoubtedly progressive pernicious anemia characterized by a yellow discoloration of the skin, the absence of free hydrochloric acid in the gastric contents, the probable absence of ferments in the gastric contents as indicated by the undigested condition of the food, and a rapidly progressive and fatal course. He called these cases atrophy of the gastric mucous membrane. Quincke, Jaworski² and others studied the condition at the same time. The literature is considerable; but, on the whole, it cannot be said that achylia gastrica has excited any great degree of attention on the part of the medical profession. This has been largely due to the fact that it is often merely a complication of certain other conditions, such as carcinoma, progressive pernicious anemia and amyloid disease, and that very often it may exist without attracting the attention of the patient or, if its existence does cause symptoms, the patient nevertheless may be well nourished and in no particular danger from the defect in the gastric secretion.

Probably the best definition is that it is a persistent failure of free hydrochloric acid in the gastric contents and the absence of gastric ferments. If we accept Fenwick's original statement that the total acidity should not exceed 4 or 5, this would exclude nearly all of the cases, because there are few that will not, at times, show a total acidity in excess of this amount.

On the other hand, there are frequently cases in which the total acidity is comparatively high and yet free hydrochloric acid and the ferments are absent. It seems to me that this is a matter of comparatively little importance.

I have endeavored to determine the hydrochloric acid deficit and to draw some conclusion from it regarding the nature or degree of the case, but I have been unable to do so. When there is any considerable deficit, however, the ferments are invariably absent, so that it is qualitatively of some value, apparently, in making the diagnosis.

In 1888 and later in 1892, Einhorn³ called attention to a very important clinical distinction between those forms of achylia gastrica which are associated with some other condition and those in which apparently the defect in the gastric secretion is the principal lesion. He noted particularly that in many of these cases the

patients manifested symptoms associated with a condition known at that time as neurasthenia. This appears to have been recognized as a correct observation, but to my mind the attention that it deserves has not been accorded to it. It was about this time that some American physicians, Henry, Kitticott, Osler and Stockton, emphasized the association of achylia gastrica with anemia.

I have recently gone over some of my more typical cases of achylia. The results are summarized in the accompanying tabulation.

They indicate that achylia gastrica is more common in women than in men, almost two to one; that it is much more common between the ages of 30 and 60 years than at either of the extremes, and that during the thirty years of middle life, it is about equally common in all the decades; that in about half the cases the nutrition is from fair to very good and in about half it is from poor to very poor. Contrary to my belief when I started the investigation, constipation is twice as common as diarrhea, and in about one third

FINDINGS IN TYPICAL CASES OF ACHYLIA

	Male	Female	Total
Patients	21	37	58
Age:			
From 20 to 30.....	4	2	6
From 30 to 40.....	5	10	15
From 40 to 50.....	5	8	13
From 50 to 60.....	4	12	16
From 60 to 70.....	4	3	7
Duodenal contents:			
Trypsin and amylopsin.....	..	..	4
Nutrition:			
Very good	5	6	11
Good .....	..	3	3
Fair	4	4	8
Poor	4	12	16
Very poor	2	11	13
Bowels:			
Constipation .....	..	..	31
Diarrhea .....	..	..	12
Normal .....	..	..	14
Tongue:			
Normal .....	..	..	29
Sore .....	..	..	4
Pale .....	..	..	13
Red .....	..	..	3
Glossy .....	..	..	2
Gallbladder:			
Normal .....	..	..	43
Infected (?) .....	..	..	8
Infected (certain) .....	..	..	3
Jaundice .....	..	..	1
Mental:			
Anxiety .....	..	..	12
Depressed .....	..	..	8
Vasomotor .....	..	..	1
Normal .....	..	..	34
Pulse:			
From 60 to 70.....	..	..	10
From 70 to 80.....	..	..	20
From 80 to 90.....	..	..	11
From 90 to 100.....	..	..	8
100 plus .....	..	..	3

of the patients the bowels are normal. In 18 per cent., the tongue can be described as abnormal. These abnormalities consist of either persistent soreness or a sour or bitter taste, and a red or glossy appearance of the tongue. In 60 per cent., the tongue appears to be normal.

Stress has been laid on the relation of gallbladder disease to achylia gastrica. In three, or 6 per cent., of the cases, operation either had been performed before I saw the patient or was performed afterward and gallstones were found. In eight, or 16 per cent., of the cases, there was an examination of the duodenal contents that indicated the presence of some pathologic condition in the gallbladder, and one patient reported having had jaundice. This is rather a larger proportion of gallbladder cases than would ordinarily be found.

* Read before the Section on Gastro-Enterology and Proctology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

1. Fenwick, Samuel: *Lancet* 2:1 (July 7) 1877.
2. Jaworski, W.: *München. med. Wchnschr.*, 1887, pp. 117, 634.
3. Einhorn, M.: *M. Rec.*, June 11, 1892.

I noted particularly in all these cases the mental condition. All together, fifty-five cases were studied from this standpoint, and twelve had a typical anxiety neurosis, if I may be permitted to use this term. Eight suffered from more or less profound depression that sometimes interfered with their work. One complained of various vasomotor disturbances, which were not associated with the climacterium or sexual involution. In thirty-four, no definite mental disturbance could be observed.

The pulse rate yielded nothing of significance. There was a slight tendency to tachycardia, and twenty-two had a pulse that was persistently over 80; but in only three of these was it over 100.

For various reasons, complete examinations of the duodenal contents were not made as frequently as I desired. In only four cases were careful and repeated examinations of the duodenal contents for the pancreatic ferments made, and in all of these only trypsin and amylopsin were tested. Schoppe⁴ remarks that the findings are monotonous. They all show that the pancreas is functioning actively. It would seem as if this must be the case, because it is hardly conceivable that a person with combined achylia gastrica and pancreatica would survive. I am not aware that any such case has been recorded, but I have not by any means exhausted the literature. It is idle to speculate as to the way in which this occurs. It would seem as if the nervous supply to the gastric glands should be stimulated as is the nervous supply to the pancreas, but this is evidently not the case. We must also assume that the substance that excites the secretion of the pancreas is very different from that which excites the secretion of the glands of the stomach.

There is also adequate proof in this finding that the gastric secretion is one of the dispensable functions of the body, for many of our patients not only are well nourished, but may improve nutrition without the return of the gastric secretion.

Achylia gastrica is probably in large part a functional disease. At least, our clinical experience would lead to this supposition, for in two cases that I have been able to examine frequently over periods of years, there have been occasionally spontaneous returns of the gastric juice, in one case twice and in the other once. In both cases it was found only on single examination; that is, there was no persistence in the return; but it is a fair presumption that there were probably many occasions on which secretion was temporarily restored, and occurred when no observations were being made. The fractional test meal seems undoubtedly the only satisfactory method of testing for achylia gastrica. Not infrequently during the first hour no free hydrochloric acid appears, and after that it is secreted in considerable quantities. These, of course, are not cases of achylia. Less frequently one observes that secretion at first fairly abundant disappears entirely before the end of the test; but whether the glands start slowly to secrete or become early exhausted, there can be no question that these cases do not belong in the group of achylia gastrica.

ILLUSTRATIVE CASES

I wish to report particularly as examples two cases with the anxiety neurosis that I mentioned. This seems to be so similar in all the cases, although different

in degree, that I believe it characterizes one of the peculiar types of achylia gastrica.

CASE 1.—Mrs. S. E. L., aged about 50, was referred to me by Dr. Charles K. Mills of Philadelphia, who believed that she had some mental disturbances. She had constant mucous diarrhea. The previous history was unimportant. The climacterium had occurred four years previously and without special incident. She complained of a sense of crawling in the stomach. She would eructate several hours after eating, and there was sometimes some burning in the rectum. She vomited only occasionally. Her weight was 138 pounds (62 kg.). The laboratory examination indicated a true achylia gastrica, and with two exceptions at long intervals in a period of fourteen years during which she has been under observation, the achylia gastrica has persisted. Her mental condition was very interesting. She was extremely anxious about her health. She seemed to fear death without any particular reason, and required constant assurance. She cried very easily, suspected her friends, and was afraid to go anywhere alone. Indeed, she feared to be alone at all, and for a number of years required the constant services of a trained nurse. At times she would sleep poorly. She worried continuously about the diet and about the amount of exercise she should take, but apparently was perfectly normal mentally, and managed her estate shrewdly and successfully. She was a tall woman with a large frame, and regarded herself as much underweight.

On treatment she steadily improved, until at the end of about ten years her weight had increased to more than 200 pounds (91 kg.). Her condition had returned to normal. The diarrhea was almost completely controlled, although there were occasional attacks when she would have a number of movements in twenty-four hours for a few days, and the achylia gastrica has remained unaltered.

CASE 2.—W. J. P., aged 48, a salesman, has been under treatment a little more than a year. He complained of chronic diarrhea and mental depression. Although he was greatly worried about himself and feared he would be obliged to give up his work, which was fairly lucrative, and that his wife and children would suffer in consequence, his depression was much less than his curious state of anxiety. His anxiety about his health and his diet was great, much greater than his fear in regard to his financial condition. He particularly dreaded to be alone, fearing that something might happen to him. The result of this was that although he felt great anxiety about his children, he insisted on his wife traveling with him whenever he left the city, leaving the children home in some one else's care.

The physical examination disclosed only the achylia gastrica. This has been persistent in a number of fractional tests that were taken. During the fourteen months he has been under observation his weight has increased from 136 to 148 pounds (from 62 to 67 kg.). His neurosis has practically disappeared. He takes his trips alone and apparently has entire confidence in himself. Nevertheless, the achylia remains unchanged.

TREATMENT

It is of no advantage to multiply these histories. It cannot be as interesting to those who read them as to the one who observes the patients, nor is it possible to impress upon a hearer the extreme state of anxiety these patients manifested, which at times was almost painful. Nevertheless, none of my patients have had hallucinations or delusions. All have been able to attend to their business or other work successfully. None have done anything ridiculous or foolish.

There is little to say about the treatment. Martius,⁵ a quarter of a century ago, called attention to the impossibility of replacing the deficient hydrochloric acid. Apparently no patient can endure in the stomach the same amount of hydrochloric acid that would be secreted by the glands. Nevertheless, in these cases hydrochloric acid has always done good, and we can

4. Schoppe: Arch. f. Verdauungskr., October, 1921, p. 289.

5. Martius, F.: Achylia Gastrica, 1897.

only assume that, as the hydrochloric acid stimulates the formation of secretion when applied to the duodenal mucous membrane and in that manner the secretion of the pancreatic juice, so, in the same way, it serves some useful purpose when introduced into the stomach. Jaworski was able to cause the secretion of pepsin in these cases by using a hydrochloric test meal, a fact that I have been able to confirm not only in functional achylia but also in the achylia associated with carcinoma. Consequently, it should be given, and in my opinion the dose is limited only by the capacity of the patient to take it. In one case it was possible for a patient to take 4 c.c. of the dilute hydrochloric acid further diluted after each meal, and in other cases 1 c.c. seems to be all that can be borne. In one case of complete achylia gastrica, associated with pernicious anemia, the patient's tongue always became very sore after he had taken hydrochloric acid for two or three days, whether the hydrochloric acid was administered in water or administered, according to the suggestion of Jacobi, in milk. As a rule, however, the administration in milk is well borne, and enough should be added just to fail of giving a reaction of free acid, which in an ordinary glass of milk is about 2 c.c. of dilute hydrochloric acid.

Whether pepsin should be administered or not, I do not know. The ordinary scale pepsin of commerce has a very definite digestive power. This is less than the digestive power of normal gastric juice, but it may be of use, and I have yet to see any disturbance which pepsin could reasonably be supposed to have caused. It is therefore my custom to combine it with the hydrochloric acid, and in the majority of cases this has been the only treatment employed.

Diet may be briefly dismissed. All foods apparently can be well digested; but in cases of achylia gastrica, foods that are likely to spoil should be excluded from the diet, particularly in hot weather, for undoubtedly these patients are more susceptible to food infection than are ordinary persons well supplied with hydrochloric acid.

DIAGNOSIS

I have of late made some effort to establish a basis for the differentiation between cases of achylia gastrica, early cases of progressive pernicious anemia and cases of achylia gastrica associated with carcinoma. There are no sharp differential features. The following, however, in a small series of cases seem to have been of some use:

The sugar tolerance is lower in nearly all cases of carcinoma. I have tested it in my wards at the Philadelphia and Presbyterian hospitals in all cases of carcinoma, including carcinoma of the head of the pancreas and of the other organs in the abdomen and with or without achylia gastrica. In practically all these cases, sugar tolerance was lower; so considerably lower that it attracted attention. In our cases of achylia this has not been the case. I should hesitate to make a positive differentiation on the basis of this sign alone, but it may be of value in adding weight to other evidence.

In cases of progressive pernicious anemia in which the diagnosis is not definitely established by the blood or other conditions, I have found, even in the early stages, that the vibratory sensation in the bones of the lower extremities is distinctly diminished. Indeed, even fairly early in the course of the disease, it may be completely lost, as it is in tabes. This has not been the case in any patient with the so-called functional

or neurasthenic type of achylia. Moreover, in some of the cases of pernicious progressive anemia, we find a pulse that suggests a Corrigan type, and in these cases the blood pressure is higher in the lower extremities than it is in the upper.

Again, the number of cases that I have observed is too small to permit sweeping conclusions. At least the results hitherto have been uniform.

ABSTRACT OF DISCUSSION

DR. FRANK SMITHIES, Chicago: It is very necessary to impress on clinicians generally the advisability of proving that an achylia is an achylia. There is variation in the velocity of secretion, a difference in the rate at which a stomach becomes aroused to excretion after food has been put into it. Not only when test meals have been given, but also in the case of ordinary meals, it is quite likely that in some cases the stimulus to the gastric lining has not been present sufficiently long to arouse the stomach to the production of acid. In other words, the material has left the stomach before it had opportunity to bring about the local reflex. There is a great difference in velocity rates of secretion in the stomach; consequently, when judging a case by the results of the test meals, we sometimes erroneously conclude that the patient is harboring an achylia. It seems necessary to test this patient frequently under the stimulus of a meal which leaves the stomach very slowly, a dry meal. When this is done I think it can readily be shown that many cases of supposed achylia are simply cases of diminished secretion with a decreased velocity. We have never found a subject past the age of 40, when proved in this fashion to have bone achylia gastrica, in whom the acid secretion was later restored. We have had a number of patients below 30 in whom we were not able to secure at one time or another an acid secretion, and yet later there was partial or complete return of the normal acid curve. It is quite likely that during certain stages of disease, especially infectious disease either acute or chronic, there is a diminution or total absence of gastric secretion. In this type of case, the prognosis, of course, is more favorable than in those persons over 40 who have been proved to have a permanent absence of secretion. I agree with Dr. Sailer as to the associated physical upsets in these patients. Some of them have absence of the usual textbook concomitants of achylia gastrica. It seems to me, however, that those patients who have had what might be called a "primary achylia," an achylia due to disappearance or destruction primarily of the secretive mechanism of their glands, do suffer from these classic symptoms, whereas the group of patients who have what might be called a secondary type of achylia, concomitant with systemic disease generally, are persons who do not suffer from the so-called classic symptoms of absence of hydrochloric acid. I have not noted, except as a temporary influence, that a psychic state of the patient bore much relationship to the permanency of an achylia gastrica. But I have been particularly struck by the association of biliary tract affections. Twenty per cent. of cases of gallbladder disease showed permanent achylia gastrica. These patients were usually over 40. One should examine the same patient at different times. I cannot too strongly emphasize this. Having once found that the patient has achylia, one should examine him at intervals to see whether he maintains this condition. Furthermore, do not get into the habit of thinking that merely because a man has a persistent achylia he cannot have such disease as duodenal or gastric ulcer.

DR. SEALE HARRIS, Birmingham, Ala.: One very important point in diagnosing an achylia is not to depend too much on one examination. There should be repeated examinations, made, of course, at different times. By using the fractional tests we shall find some cases in which we would not detect hydrochloric acid by the Ewald method, but after one and a quarter or one and a half hours, hydrochloric acid is found. In a number of cases I have been interested to note that in thirty or forty-five minutes the patient would show

a secretion of hydrochloric acid, in an hour no hydrochloric acid, and then in an hour and a quarter or an hour and a half it would again be found. Dr. Sailer states that the majority of his patients with achylia were constipated. I am not quite sure that that is true in my cases, because I see many cases of diarrhea in which achylia is present, and in that type I frequently find intestinal parasites, particularly *Trichomonas intestinalis*; and in some cases of achylia I find constipation with those parasites present. I have felt that in some cases the administration of hydrochloric acid helped in removing or reducing the intestinal parasites found in the stools. As to the association of achylia and pernicious anemia, I have seen one such case.

DR. A. L. LEVIN, New Orleans: Achylia gastrica is a very puzzling problem in gastric pathology. We often see persons with achylia who get along nicely without any discomfort whatever; then, again, another victim of this disease will suffer greatly. I feel that the lack of hydrochloric acid in the gastric juice is probably due to some disturbing influence, whether faulty metabolism causing disturbance in the sodium chlorid content of the body, a diminution or otherwise, or something else. Luckhardt injected gastrin hypodermically; and by taking the reading of the hydrochloric acid before and after injecting it, he showed conclusively that by this means he had doubled the quantity of hydrochloric acid in the animal. I question whether this would not be of value in cases of achylia gastrica. I agree with Dr. Smithies as to the association of biliary tract disease with this condition. My observations lead me to believe that in a large number of cases of gallbladder disease we find disturbance of hydrochloric acid secretion. In 1916 Fravel conducted some experiments on dogs, obtaining the hydrochloric acid reading before he removed the gallbladder, and again studied the hydrochloric acid in the stomach. In all of the sixteen dogs on which the experiment was made he found that either the amount of hydrochloric acid was diminished or there was an achylia. This would serve as a caution to the surgeon to practice conservatism in gallbladder surgery because this organ has some bearing on the amount of hydrochloric acid secreted in the stomach.

DR. ARNO B. LUCKHARDT, Chicago: I have no experimental evidence relative to the cause of achylia gastrica. So far as I know, that condition cannot be produced experimentally in the animal. I shall leave the question of pancreatic and gastric secretion without comment, but should like to ask Dr. Sailer this: If the pancreatic secretion is formed as he stated, under the influence of free acid in the duodenum or because of the presence in the duodenum of free hydrogen ions, how can he expect to get increased secretion of pancreatic juice by the administration of hydrochloric acid whose free acidity he has neutralized by mixing it with proteins such as are contained in milk?

DR. H. W. SOPER, St. Louis: A differential diagnosis between true achylia gastrica and an acid gastritis is of extreme importance, and study of the cytology of the fasting stomach contents will usually establish the diagnosis. The progress of a case of achylia largely depends on the integrity of the mucosa of the small intestine. Therefore dietetic measures are always of importance in achylia in order to protect the small intestine. The patients with achylia that do not do well usually show a catarrhal condition of the small intestine, which can be demonstrated by frequent analyses of the feces.

DR. A. J. CARLSON, Chicago: I should like Dr. Sailer to speak more to the point on "pepsin achylia." I understood him to say that the decrease of pepsin runs parallel with the decrease of hydrochloric acid. On the experimental side there is evidence that the secretion of pepsin is largely independent of the secretion of hydrochloric acid. We can obtain gastric juice that has no free and little or no combined acid, but is higher in pepsin than is the normal gastric juice. It is supposed that some cases of achylia are congenital. There are probably some that have an organic cause, namely, atrophy of the gastric mucosa. I understand that he was inclined to classify all of them as functional. I hope Dr. Sailer is taking steps to follow his persistent achylia to post-

mortem. These people do not die of achylia. But chemical and histologic studies of the gastric mucosa would help to decide the question of functional or organic etiology.

DR. JOSEPH SAILER, Philadelphia: I do not think the diagnosis of achylia can be based on a single examination or on a single test meal. I have taken the gastric contents in cases in which the gallbladder has been removed, and found no evidence of achylia. I do not believe that the administration of hydrochloric acid, either alone or in milk, was the cause of the secretion of the pancreas. It is a problem for the physiologist, for the duodenal contents removed before the patient has taken hydrochloric acid contain pancreatic ferments. The only way I know of whereby we can demonstrate the existence of pepsin is the evidence of digestive activity in an acid solution. And in none of the cases I have chosen to use in my study of achylia gastrica has there been any evidence of digestive activity. On the other hand, it is sometimes possible to obtain digestive activity in these cases by acid test meals. Achylia gastrica probably has nothing whatever to do with what one might possibly call a paroxysmal suspension of gastric juice, which I am sure occurs rather frequently. The diagnosis of achylia gastrica does not include the cases first described by Fenwick, which were undoubtedly cases of pernicious anemia. Achylia gastrica, as far as we know, is not itself a fatal disease. Referring to Dr. Smithies' remarks, a patient whom I have examined at frequent intervals for a period of fourteen years, and in whom on two occasions hydrochloric acid and pepsin were found in the gastric secretion on examination, now has no hydrochloric acid. I see her only infrequently because she feels perfectly well. She is now about 54, well above the age that has been mentioned. Therefore, if that patient could on two occasions secrete hydrochloric acid, it seems reasonable to suppose that total functional absence of secretion of hydrochloric acid can be present in such cases.

SOME OPHTHALMOLOGIC MANIFESTATIONS OF DISEASES OF THE NERVOUS SYSTEM *

JOSEPH P. ISRAEL, M.D.
HOUSTON, TEXAS

The ophthalmologic manifestations of diseases of the nervous system have long occupied a conspicuous place, and have been studied with great interest by the neurologist and the ophthalmologist.

Realizing the close relation existing between the eye and the brain, the retina being an outgrowth from the rudimentary brain of the primary optic vesicle, and the optic nerves being portions of the lobes of the brain,¹ and admitting that these anatomic and embryologic facts are true, one readily realizes how the early manifestations of diseases of the brain may reveal themselves through the medium of the eye, which is the principal means we have of noting the changes resulting from disease of this organ. On examining the eye, we are able, in many cases, to see these changes in their incipiency, and thus make an intelligent diagnosis of the workings of this great machine (consisting of 600 million cells) before the disease has progressed to a point beyond all hope of medical or surgical intervention.

Assuming that the eye is a portion of the brain, then diseases of this complex machine will, in many instances, reveal early changes in the visual organs by alteration in the normal physiologic functions which

* Read before the Section on Ophthalmology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

1. Church and Peterson: Textbook of Nervous and Mental Diseases, 4: 95, 1910.