

case of cholelithiasis, 1 of nephritis (signs present one day, absent the next; patient later died of uremia), and 1 of right-sided pneumonia, with pain in the right iliac fossa.

Of the negative cases, 7 had appendices chronically inflamed and bound down by adhesions and 5 were suffering with acute appendicitis.

Salpingitis, in our experience, does not give typical pain in the right side. It is true that pain is complained of, but it is low down in the abdomen and not in the region of McBurney's point. We have felt that the sign may have some value in distinguishing between this condition and appendicitis.

CONCLUSIONS. 1. Inflation of the colon is an equivocal means of diagnosing chronic appendicitis. Some cases have negative tests and some have positive; there seems to be no constancy in the result obtained.

2. In acute appendicitis the method should not be employed. It is rarely necessary as a diagnostic aid, as the results are uncertain and the risk of injuring the intestine is too great.

3. The method should not be considered useless, however, for at times the diagnosis has been materially strengthened by its employment, and operation has later shown the wisdom of our faith in the result obtained. Inflation of the colon, however, should be regarded merely as an aid in the diagnosis, history and physical examination being far more valuable.

4. We have seen no positive reactions in normal individuals.

5. The test is in no sense pathognomonic of chronic appendicitis.

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## DUODENAL ALIMENTATIONS.<sup>1</sup>

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PERHAPS the best of the many excellent things which Einhorn has contributed to the science and practice of medicine is the duodenal tube and its practical application to the relief of certain disorders of the alimentary tract. Duodenal alimentation has been practised during the past four years by an increasing number of medical men throughout the United States, Canada, and Europe, and wherever it has been intelligently carried out it has gained a permanent place in the treatment of suitable cases. Whenever duodenal alimentation has failed it has been due, in my opinion,

<sup>1</sup> Read by invitation before the Pittsburgh College of Physicians, February 26, 1914.

to one of two causes, which have ever in the past operated to bring into temporary discredit many excellent methods of instrumentation, namely, inappropriate application or faulty technique.

The demands which duodenal alimentation satisfy and which give it the right to a permanent place in medical means and measures are the almost complete rest of the stomach, with lessened activity of the duodenum, and the supplying of sufficient calories for maintaining the individual's nitrogen balance and body weight. No other method, except feeding into the stomach itself, is capable of sustaining life for more than short periods of time. I have often fed patients continuously and exclusively for four weeks by this method, and in one instance the patient was so fed for five weeks without during this period, once removing the tube, and with a gain of five pounds in weight. This patient had had recurrent symptoms of duodenal ulcer during several years previously, and had been treated with more or less temporary benefit in several of the large cities of Europe before coming to America. She had had, now and then, quite pronounced hemorrhages from the bowel, accompanied by some symptoms of collapse. Her other symptoms were also more or less typical. After the removal of the duodenal tube she quite rapidly resumed her normal diet and accustomed round of duties, and has remained in good health during the two years which have elapsed since the termination of the treatment.

This case is only one from a large number of similar cases, and is cited to answer two oft-repeated questions, to wit: whether this method is suitable in duodenal ulcer cases, and whether there is danger in leaving the tube *in situ* over long periods of time.

The principal field of usefulness for duodenal feeding is in the treatment of gastric and duodenal ulcers, but it may be and is used with equal benefit in pylorospasm from any cause, provided the bucket can be gotten through the pylorus. The relief from pain afforded some of these patients is almost as marked as that afforded by hypodermic medication.

There is another class of very trying cases in which this method of feeding acts most happily—namely, gastroptosis and gastrectasis with or without isochymia, in which, owing to the low position of the stomach or to atony of its musculature, the stomach is incapable of propelling the food on into the duodenum with sufficient rapidity to supply the body needs. These patients rarely fail to respond promptly to duodenal feeding if properly carried out.

I am treating duodenal catarrh by inserting the duodenal tube, and after washing the mucosa with water I allow 500 c.c. of a 1 to 500 solution of argyrol to flow in more or less rapidly so as to distend the gut. Two or three such treatments repeated at intervals of three or four days rarely fail to relieve these patients.

In several cases of inoperable cancer of either the cardia or the pylorus, accompanied by increased pain during and after meals,

I have been able to pass the tube into the bowel and institute duodenal feeding, with marked relief, for some time. In such cases we must be careful not to leave the tube *in situ* until the stenosis reaches a degree where it becomes impossible to withdraw it on account of the size of the gold bulb.

Another class of cases in which duodenal feeding may often prove of benefit is the severe vomiting of pregnancy. This method should at least be tried before resorting to more extreme measures. The only difference in applying this treatment in these cases is that the duodenal tube should be somewhat longer and so be introduced far down in the jejunum. I have tried this in only one case, and it proved successful to the extent that we were able to tide the patient along until the fetus was viable, thus enabling the mother to give birth to a living child.

Einhorn is using duodenal feeding in cirrhosis of the liver and has noted some striking results therefrom, a report of which he gave in an excellent paper which he read before the sixteenth annual meeting of the American Gastro-enterological Association. I quote the summary with which Einhorn closed his paper: "During duodenal alimentation in all the six patients the liver became markedly smaller (already after two or three days), assuming a size almost normal. In four patients the result was lasting. In one, however, a few days after the termination of feeding the liver began to grow larger, while in another patient with pure cirrhosis and dilated heart the size of the liver quickly assumed its original large proportions. The influence of duodenal feeding was in this case very marked but not lasting.

"My experience thus far justifies me in the conclusion that duodenal alimentation contributes greatly toward diminution of the functional work of the liver. This rest treatment for the latter organ is of benefit, whenever it is considerably impaired. The cirrhosis of the liver and allied conditions accompanied principally by swelling of the hepatic tissues form a field in which duodenal alimentation may be applied apparently to a great advantage."

In idiopathic hyperchlorhydria, which resists all other measures, duodenal feeding usually affords relief by reducing the hypersensitiveness of the gastric mucosa. In these cases the treatment should be prolonged for three or four weeks to secure permanent results.

Another important use I have made of the duodenal tube is in the treatment of amebic dysentery. For a long time ipecacuanha has been recognized as the most powerful medicament in the treatment of amebic dysentery. It has, however, always been difficult to administer this drug in sufficient amounts to effect a cure on account of its emetic action. By introducing the tube well down into the gut and forcing an emulsion of ipecacuanha through it a sufficient dosage may be administered to check the action of the

ameba coli in the gut, and thus in some cases cure the disease. It is often necessary to repeat the dose several times at intervals covering a period of several weeks to finally control the disease. Rarely, if ever, has vomiting been induced by the ipecacuanha when given through the duodenal tube. It is necessary to prepare the patient for this treatment by giving a sharp purge the day before and limiting the food to liquids. After administering the ipecacuanha it is wise to have the patient remain in bed for the ensuing twenty-four hours. After considerable experience with this method, and with emetin given hypodermically, I feel that perhaps the duodenal tube method is as reliable as the hypodermic method, and the duration of treatment is likely to be shorter. Another point in favor of the duodenal tube is that the patient can readily be taught to give it to himself should the case prove stubborn, necessitating several repetitions of the procedure.

In the light of maturer experience in the treatment of amebic dysentery by emetin which Dr. Vedder, of the United States Army, has had, the results of which are set forth in his splendid article,<sup>2</sup> the following conclusions may be drawn: Emetin has the power to kill the vegetable ameba in the tissues, but has no effect on the entameba hystolytica, since they still persist in the stools of individuals who have had a thorough course of treatment with emetin; whereas the ipecacuanha given through the duodenal tube destroys the entameba hystolytica in the intestinal tract, but has very little effect on the ameba in the tissues. Therefore, it would seem that the best results might be secured by the use of the combined methods, to wit: giving the emetin hypodermically in small daily doses and giving the ipecacuanha through the duodenal tube once or twice a week for several doses.

As I have already mentioned the fundamental indication calling for the use of the duodenal tube is rest for the stomach and duodenum. Therefore all those bodily conditions which are benefited by putting this part of the alimentary tract in splints call for this method of treatment. The second indication for the use of the duodenal tube is for the administration of foods or medicine in such amounts as would otherwise be rejected by the stomach. The third indication is to secure duodenal contents for examination to aid in diagnosing certain disorders of the digestive system beyond the stomach.

As to the limits of usefulness of duodenal alimentations, it may briefly be said that they will be determined by the dictates of the rules which apply to other methods used in such cases.

Contra-indications to the use of duodenal tube are few: for instance those cases where the degree of stenosis is such that the bulb does not readily pass the obstruction, and in those rare cases

<sup>2</sup> Jour. Amer. Med. Assoc., February 14, 1914.

where there is such hypersensitiveness of the mucosa of the throat as to induce constant retching and pain. Now and then we find an individual whose duodenal mucosa is so hypersensitive that each feeding causes purging regardless of the kind of food administered. Happily these cases are rarely met.

In those cases where the pylorospasm, from whatever cause, has persisted so long as to impair the patient's general health to a degree demanding immediate relief of the stenosis, we should advise operative interference.

In this connection I wish to say that moderate hemorrhage from the esophagus, the stomach, or the duodenum is no contra-indication to the employment of the duodenal tube.

Einhorn's apparatus consists of a small gold bucket perforated by several small openings, and capable of being taken apart for the purpose of cleaning: a rubber tube of small caliber leading to the bucket; a rubber pet-cock and a feeding table, an ingenious arrangement which rests over the glass of nourishment so that the food may be drawn up through one tube into a glass syringe, and by manipulation of the pet-cocks be forced slowly into the tube connecting with the duodenal tube, without disconnecting the syringe.

The technique is as follows: At night the patient with the aid of water swallows the duodenal tube. During the night the bucket will usually pass into the duodenum. I have found it is well to give one-half grain of codein one hour before the tube is introduced, to allay the spasm of the throat and to insure a quiet night's rest. The second line on the tube is supposed to be at the incisor teeth, the bucket is at the pylorus, and when the third mark has reached the teeth the end of the tube is probably *in situ*, well down in the duodenum. When this is accomplished the tube is allowed to remain in place during the entire course of treatment. During the first twenty-four hours some of the patients have been somewhat uncomfortable from sore throat, due to the presence of the tube in the throat; but this has never been severe enough to occasion the withdrawal of the tube on this account, and usually in from twenty-four to forty-eight hours they have become accustomed to it and do not mind it.

How can we tell that the tube is through the pylorus? By slight traction a resistance is felt if the tube is in the duodenum; aspirations through the tube with a glass syringe bring typical, golden-yellow, duodenal juice of neutral or feebly alkaline reaction and not acid gastric juice; lastly, if the patient is given a glassful of milk and water to drink, and if aspiration is immediately performed, the milky solution will not be returned through the tube if the end is in the duodenum, as it would were it still in the stomach.

The feedings are given at two-hour intervals during the day. The food which has been most satisfactory is a mixture of milk,

raw eggs, and sugar of milk. Not infrequently individuals are met in whom eggs are not tolerated; in these patients eggs produce distress after the feeding, and if persisted in give symptoms of acute ptomain poisoning. The amount of food which should be given at a feeding is from 150 c.c. to 300 c.c. of milk, one raw egg, and 15 gm. of sugar of milk. It is wise, however, to begin with smaller quantities, 100 c.c., and work up to the full amount as soon as possible.

It is important that the feedings simulate nature's method as nearly as possible, and to this end the food must be heated and strained and then given slowly through the tube. Under ordinary circumstances the stomach performs, among its other duties, the function of withholding food from the duodenum until of a correct temperature. Too hot foods are cooled and cold foods are not propelled from the stomach until they are warmed to the body temperature. It is important to bear this in mind in undertaking duodenal feeding, as the duodenum is most sensitive to variations in temperature, reacting to each shock, as well as to too rapid administration of food, by causing a feeling of nausea, discomfort, restlessness, clammy perspiration, etc. After each feeding the duodenal tube must be carefully cleaned by forcing a syringeful of water through it, followed by a syringeful of air, after which the pet-cock is closed before the syringe is disconnected. Failure to keep the tube clean will result in its becoming entirely blocked by a tough coagulum of milk and egg, which will necessitate frequent and annoying withdrawal of the tube.

As previously reported, the first two cases which I treated by the duodenal method of feeding were unable to take a sufficient quantity of nourishment at a feeding without producing untoward symptoms of nausea and distress, and therefore I modified the method in the following manner: Instead of the syringe I make use of the gravity and drop method, as in giving salt solution by the Murphy method. The duodenal tube is connected to a tube leading from a pint irrigating jar, and the flow regulated so that the 300 c.c. used at a feeding takes about twenty-five minutes to pass through. The milk may be kept warm by having the conducting tube pass through hot water or under a hot-water bag, etc.

During the period of duodenal feeding, in order to increase the amount of fluids supplied to the body, normal salt solution may be given every day by the drop method through the rectum.

CASE I.—Aaron S., aged forty-nine years; night watchman. Family history negative. No history of venereal disease. Healthy up to six years ago, when the symptoms for which he later came to me made their appearance. At that time a diagnosis of biliary colic was made by another physician and the gall-bladder was opened and drained. No gall-stones or other disease was found. Later on, the symptoms still persisting, appendectomy was done,

with no relief. He first came to me in the early part of January, complaining of burning pain in the stomach, coming on three or four hours after meals, and which was relieved by the taking of food or alkalis. He had also acid regurgitation. The physical examination was negative except for a spot of tenderness on pressure over the lower right-hand quadrant of the epigastrium. The thread test was positive for gastric ulcer, showing a blood-stain 50 cm. from the incisors. The *x*-ray report was as follows: "There is a deformity of the duodenal cap which is probably spasmodic in origin. A six-hour residue, which is due to pylorospasm. These findings are confirmatory of ulcer of the stomach."

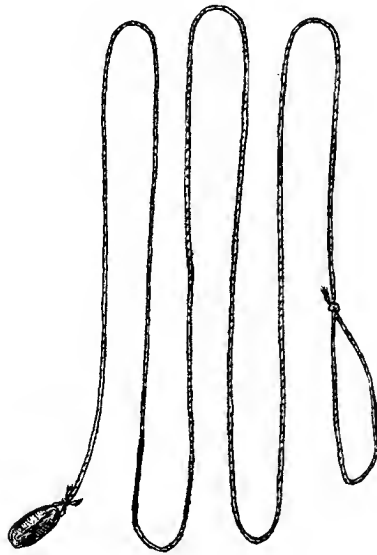


FIG. 1.—Case I. Mr. A. S.

On January 15 the patient was put upon duodenal feeding, which was maintained continuously for eighteen days. At the end of the first twenty-four hours all the gastric symptoms had disappeared; a few days after the withdrawal of the tube he was able to resume a practically normal diet, excluding only the more irritating articles of food. At the present time he is entirely free from symptoms.

CASE II.—Herbert H., aged twenty-five years; single; private secretary. Family history negative. No venereal history. Had an attack of jaundice six years ago lasting one month. When he came under my observation he had been suffering for two months from an acute severe pain beneath the inner half of the right costal border, which extended through to the right scapula, coming on about two hours after lunch. The chest organs were normal, so also were the liver and kidneys. There was a tender point on

pressure beneath the inner half of the right costal arch. The thread test was positive for duodenal ulcer, showing a stain 57 cm. from the incisors. The *x*-ray report was as follows:

"The absence of a well-defined cap in three sets of radiograms and the rapid emptying of the stomach are confirmatory of duodenal ulcer." The patient was put on duodenal feeding for two weeks, at the end of which time all symptoms had disappeared. Two weeks after the withdrawal of the tube he was eating a liberal, though soft diet, and has remained well.

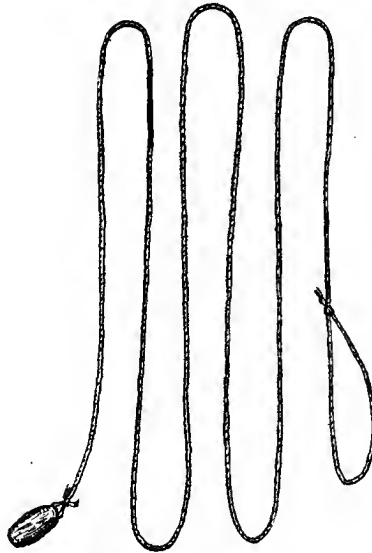


FIG. 2.—Case II. Mr. H. R. P.

CASE III.—Timothy T. A., aged forty-one years; married; Congressman. Family and venereal history negative. Had been healthy up to nine years ago. During the past seven years had had increasing digestive disorders. In August, 1912, had severe hemorrhage from the bowels, at which time a diagnosis of duodenal ulcer was made, for which he was operated upon. The diagnosis was confirmed at the operation. The ulcer was not excised, but a purse-string suture was used and the ulcer turned in.

He came to me the following January with a history of having passed blood from the bowel almost daily since the operation. He was pale, almost chalky. The conjunctivæ and lips were bloodless. The hemoglobin was 33 per cent.; red-blood cells, 3,000,000; leukocytes, 5200. The chest organs were normal, so also were the liver and kidneys. Examination of the feces showed them to contain a large percentage of coagulated blood. The thread test was positive for duodenal ulcer, showing a blood



stain 68 cm. from the incisor teeth. No  $x$ -ray examination was made in this case, as the diagnosis was so obvious and immediate treatment urgent. He was put at once upon duodenal alimentation, and within five days the macroscopic blood had disappeared from the stool, and within three weeks the feces were negative for occult blood, and have remained negative since that time. The tube was left *in situ* for twenty-eight days. On withdrawing it his diet was gradually increased to solid but bland foods, on which he remained until the latter part of the summer, since which time he has been eating his normal diet. The condition of the blood gradually improved until it is practically normal, the hemoglobin being now 81 per cent.

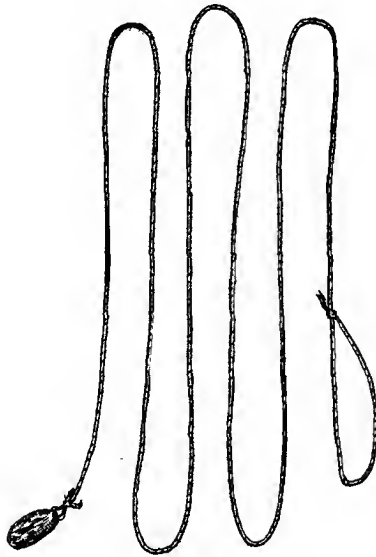


FIG. 3.—Case III. Mr. T. T. A.

In a former paper I called attention to an interesting case of tic douloureux, which appeared to be almost entirely cured by a course of duodenal alimentation. In this case the patient had already previously determined that there was a distinct connection between her attacks and the condition of her stomach. She could often foretell the appearance of an attack. This case proved to be one of extreme gastropptosis with gastrectasis, and with a marked degree of hyperacidity of the gastric juice. Duodenal alimentation was carried out for four weeks and brought about an almost complete cure. During the years which have elapsed since that treatment the patient has suffered only momentary "jabs" of pain in the affected area, and these occurred only after some dietetic indiscretion. It is interesting in this connection to note that the lower

border of her stomach has gradually come up from the upper border of the symphysis pubis to practically the normal position. This result may be expected in a large majority of cases of gastrectasis, provided a suitable line of treatment is carried out in addition to the duodenal feeding.

The cases cited above are merely to illustrate what may be accomplished with duodenal alimentation.

## TUBERCULOSIS OF THE BRONCHIAL GLANDS AND LUNG HILUS: A CLINICAL AND RADIOGRAPHIC STUDY.<sup>1</sup>

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**FREQUENCY OF THE CONDITION.** By whatsoever route tubercle bacilli enter the body, be it through the alveolar wall, the bronchial mucous membrane, or by way of the gastro-intestinal tract, they ultimately reach the bronchial glands in the great majority of instances.

In a series of 569 cases of tuberculosis, Comby<sup>2</sup> found the bronchial glands involved in all, and Hamburger and Sluka observed a like condition in 110 cases. Haushalter and Fruhinsholz<sup>3</sup> found the bronchial glands tuberculous in 74 out of 78 infants dying of acute tuberculosis, or tuberculous meningitis.

As commonly used, the term bronchial glands includes the glands at the sides of the trachea and the group just below its bifurcation, as well as the glands surrounding the bronchi.

The largest ones are usually found below the right bronchus. The tracheal group are in relation to the superior vena cava and the vagus and recurrent laryngeal nerves. Owing to the lower origin of the left recurrent nerve, it is in contact with the trachea for a longer distance than the right one, and more often shows the effect of pressure by paralysis of the left vocal cord. When the glands attain a large size, they may press upon the arch of the aorta and its branches, the innominate veins, and the phrenic nerves.

The pericardium is anterior to the infratracheal group, and the

<sup>1</sup> Read before the Hartford Medical Society, June 15, 1914.

<sup>2</sup> Quoted by Grenet, *Anal. d. Méd. et Chirg. Infant*, Paris, 1911, xv, 497.

<sup>3</sup> *Archiv. d. Méd. d. Enfant*, 1902; quoted by Grenet, *op. cit.*