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THE DIAGNOSIS OF CHANGES IN THE SIZE, POSITION, AND MOTILITY OF THE STOMACH IN CASES WHERE INTRAGASTRIC INSTRUMENTS CANNOT BE USED.

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IT was only twenty years ago, in 1875, that Ewald[1] by accident discovered that a soft, flexible tube could be introduced into the stomach without a stylet. Since then the use of this instrument has been very widely extended. When in 1885 the writer took his first lessons in lavage under Oser, in Vienna, it seemed almost a novelty there, and was very rarely employed in the United States; but it has been more and more popularized, until now in some quarters it has possibly come to be abused, especially by patients who have learned to wash out their own stomachs.

There are many cases of gastric disease in which, for one reason or another, we cannot employ even the soft tube, and still less the sound, or any of its ingenious modifications and amplifications, such as Einhorn's gastrodiaphane or Turck's gyromele. The contraindications are given by the leading authorities, and include especially all cases of acute illness, recent hemorrhages from any part, gastric ulcer as

a rule, most serious diseases in their last stages, congestion of the brain, and advanced age. It needs to be remembered, however, that age for this purpose should be reckoned by the condition of the heart and bloodvessels, rather than by years. I have had patients eighty years of age who took the tube with less inconvenience than many do at forty.

Then, besides the contraindications, we are obliged to take into account the foolish dread which many nervous patients have of this trifling procedure, amounting sometimes to an insuperable obstacle. In my long experience with chronic invalids in Atlantic City, the most frequented health-resort in America, I have found that only a small proportion of patients of the better class who need special treatment will consent to the use of a stomach-tube, at least until their diseases have progressed to a serious stage.

Therefore, in order to reach as accurate a diagnosis as possible in such cases, I have been obliged to make the most of the various methods which do not include the employment of any instrument inside the stomach. Trusting that the mode of systematizing such methods which has proved useful in my own work may be helpful to others, I venture to submit a description of it.

In thus pointing out what can be done when necessary without the tube, there is no thought of underestimating the enormous advantages which that little instrument affords in the diagnosis and treatment of gastric disease. In studying the chemical functions of the stomach the tube is virtually indispensable, though occasionally accidental vomiting at the right

time gives an opportunity for making the necessary chemical tests; and the Einhorn bucket may sometimes serve us a good turn.

It would require too much space to go into a discussion of symptomatology and the now somewhat promising results of the chemical and microscopical examination of the urine and blood. That these latter researches are capable of throwing much light upon the affections of the stomach as well as of those of the intestines there is no longer any question.

We come then at once to the examination of the abdomen externally. Not stopping here to consider what can be learned from inspection and palpation, as to the usefulness and great value of which no question has ever been raised, we pass on to a study of clapotement and percussion. It is to the value of the combined employment of these two procedures, according to a certain order, that I desire to call attention especially. Both are separately well described in the works of Ewald,[2] Boas,[3] and other standard treatises on diseases of the stomach, and during recent years there have been numerous contributions to current medical literature on abdominal percussion. The most notable of these is a paper by Dehio,[4] in which he gives directions for percussing with the patient lying on the back, as well as standing, after drinking various portions of water. He states that the normal empty stomach is entirely within the thorax, and not accessible to percussion, but that the drinking of one-quarter of a litre of water produces in the erect position a dull area, which extends 11½ cm. below the lower

end of the corpus sterni; then by drinking the same quantity a second time, the dulness is extended 2.7 cm. further downward, and so on until after the person has taken a whole litre he finds in the majority of cases the lower border of stomach-dulness a few centimetres above the level of the umbilicus. He points out also that from the different degrees of distensibility thus indicated we may infer much as to the motility of the stomach.

On the other hand, Jaschtschenko,[5] at about the same time, took quite the opposite view of the matter. He sharply criticises Traube, whose conclusions were similar to those of Dehio above cited, and declares that the empty stomach is percussible, and that filling it gradually with water causes an extension of the dulness upward but not downward. Neither of these two writers makes any mention of clapotement.

Obrastrow,[6] of Kiel, writing on this subject in 1888 an elaborate and valuable paper which I had not seen till the present article had been nearly finished, gave a full exposition of clapotement, but had not at that time as much faith in the accuracy of the information to be obtained by a delicate percussion as he has evidently since acquired, judging by an able contribution which has just appeared from his pen.[7]

Rose,[8] an American physician, has also recently written on the subject of the splash.

Certain it is that even the normally small healthy stomach under usual conditions, when empty as well as full, presents a portion of its anterior surface in contact with the front wall of the thorax, and to a small extent with the front wall of the

abdomen; and except in conditions of marked obesity it is not generally very difficult to determine both the upper and lower borders of that portion in contact. But stomachs which are thus almost entirely covered by the ribs are rare, at least in civilized communities, and physicians are seldom called upon to prescribe for them.

Physicians are most interested in abnormal stomachs, which nearly always extend far enough below the ribs to afford us the opportunity of testing their condition by all the usual methods of physical exploration.

My own experience has convinced me that stomachs, like noses, may vary considerably in size, and yet be within normal limits, but that when they extend, in the empty condition, much lower than a point midway between the sternum and umbilicus, they are generally pathological. That experience includes the examination of about 300 persons by the methods now under consideration. Two hundred and twenty-five of these were examined in the course of my practice in Atlantic City and the remainder in the Polyclinic of the Augusta Hospital in Berlin during the present winter, through the courtesy of Professor Ewald and his chief assistant, Dr. L. Kuttner. By the kindness also of Dr. Oesterreicher, pathologist at the same hospital, I have been permitted to witness numerous autopsies in the cases of persons who had had various forms of gastric disease as well as a few whose stomachs were normal as to their size and position.

At some future time I may summarize the results of these observations and of others yet to be made

in a more general way, and deduce from them some of the lessons which they teach; but it is sufficient for the object of this article to show that they confirm the value of clapotement and percussion.

In a number of the cases in Ewald's clinic in which, by external examination, I had diagnosticated and designated by chalk-lines on the abdomen, gross departures from the normal in the way of displacement, dilatation, or both, the stomach was afterward inflated by air, and in some instances illuminated by the electric lamp from within, with a substantial verification of the results previously obtained. In two noteworthy instances while by percussion the boundaries were correctly determined, the splash obtained by clapotement told an entirely different story, and thus led at first to some doubt. But as exceptions are said to "prove the rule," so these two exceptional cases have been unusually instructive. Both were cases of downward displacement and dilatation. In one of them the entire stomach had fallen until the fundus rested firmly upon the pelvic organs; in the other the pyloric end, greatly dilated, occupied the same position, while the cardiac portion was still in its normal place. Percussion in various positions with the stomach first empty and afterward partly filled, gave the above results, and distending the organ with air was fully confirmatory; but the splash, even after one or two glasses of water had been drunk, could not be heard at any point below the navel in either case. Usually with the patient lying on the back the splash is heard at the nethermost part of the stomach when obtainable at all.

The practical inference to be drawn from this observation is, that if in any case clapotement and percussion do not agree in their testimony, we should be guided by the latter rather than the former, as being less likely to deceive, though until this recent experience I was inclined to the contrary view. When clapotement and the results of intelligent, careful percussion agree, we need have no doubt. When, as rarely happens, they disagree and the case is important, it will be well to inflate either the stomach or colon to settle the point. Experiments were made by me in a series of six cases of gastrectasia in Ewald's clinic with a view to ascertain whether by clapotement and percussion together it is possible to determine positively when the stomach has emptied itself. The patients reported in the morning fasting. In each of these cases when the splash was obtainable and percussion in the erect position demonstrated dulness in the lower segment of the stomach, I was able afterward by means of the tube to bring up a considerable quantity of the undigested remnants of a previous meal. Then after carefully emptying the stomach by aspiration the former tests were again employed, and this time with negative results.

In a number of other (doubtful) cases that were required to present themselves in the morning fasting the presence of fluid in the stomach was suspected, and to determine the question I practised clapotement and percussion, but failed to obtain a splash, or to detect dulness over the lower part of the gastric area in the erect position. The tube was then used, but nothing obtained, except three

or four grammes of a pale, thin solution, consisting mostly of saliva.

In this simple manner, therefore, we may test the motility of any given stomach frequently, at various intervals after various kinds of meals, with very little difficulty or inconvenience to the patient, especially after the boundaries have once been accurately determined.

Numerous experiments have also been made by me to determine whether the stomach fills upward or sinks lower after the taking of food or drink in successive portions. The results have been somewhat various, as might be expected, according to the muscular energy of the stomach tested. In the cases of gastrectasia and all cases of weak motility, there has been a depression of the lower border after each glass of water, except when it was already at the lowest point attainable, and then there was a demonstrable widening of the organ on either side. Since beginning this particular investigation I have unfortunately not been able to find many normal stomachs, but the few presumably healthy ones examined filled upward without the lower border as a rule showing any noticeable depression after drinking several successive glasses of water, thus confirming the observation of Jaschtschenko rather than those of Dehio and Taube. In some cases, however, in which there were no other signs of weakness, the area of dulness increased both upward and downward after drinking.

It is best to examine the patient at a time when the stomach should be entirely empty—that is, in the morning fasting or six hours at least after the

last meal. But this is not always practicable, and after a light breakfast or a very moderate lunch a healthy stomach will usually be found by the tests of clapotement and percussion to have voided its contents into the intestine at the end of two hours. Even when these tests show that gastric digestion is still incomplete, we may in many cases nevertheless satisfy ourselves with sufficient accuracy as to the size, position, and motility of the organ; but in cases of difficulty or obscurity it is safest to examine a second time under the best possible conditions.

If upon examining a patient six hours at least after his last meal we obtain the splash by clapotement, we can infer deficient motility. Noting at the same time the lowest point where the splash can be distinctly heard, we may infer as a rule that the lower boundary extends to about that level.

We should then percuss the abdomen with the patient in various positions to verify the results of clapotement and map out the boundaries.

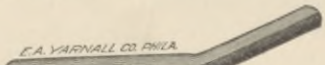
If no splash should be obtained, before proceeding to administer water it is well to percuss with the patient first recumbent, and afterward in the erect posture, to determine the apparent stomach-boundaries while the viscus is still empty. Note these mentally or mark them on the body.

Then have the patient drink ⅛ to ¼ litre of water, and try again to obtain the splash. If it is obtained distinctly after the smaller amount of water mentioned, it raises a question as to the motility, and will also show where to percuss with especial care and delicacy for the lower border.

For the adept in percussion the fingers may suffice to bring out the finer differences in tone, but with a good percussor and pleximeter the task is greatly simplified.

The cut of a new pleximeter devised by myself will be found below. It is wholly made of rubber of medium hardness and is very easily carried in the pocket. The smaller end serves ordinarily as the handle, but in mapping out spaces very accurately or in percussing in narrow spaces, as between the ribs or over the clavicle, especially in children, it is better to reverse the ends and percuss over the smaller part.

Any one of the rubber-tipped percussors usually found in the instrument-stores can be used satisfactorily with this pleximeter.*



Having already made out the apparent boundaries with the stomach empty, we percuss again with it partly filled while the patient stands, or, in the case of persons who are in bed or very weak, sitting upright will usually suffice to bring the fluid contents in contact with the front wall of the abdomen and thus develop a zone of dulness. In going over a new case in this way it is best to give one glass of water at a time, when, if the stomach is atonic, the

* The above cut was published in THE MEDICAL NEWS of July 13, 1895, with a few lines descriptive of it, but is reproduced here because of its importance in connection with the subject-matter of this paper.—B. R.

area of dulness usually extends downward with each successive glass; but if entirely strong, it extends upward only or mainly.

One can begin either above or below, and should then percuss carefully in the median, left parasternal, and mammillary lines from the level of the nipple to the pubes in any doubtful case. Having determined the highest and lowest points of the anterior thoracic and abdominal surface with which the stomach is in contact, we should percuss perpendicularly across the oblique curved line joining these points and forming the left lateral boundary of this epigastric area. Then the right lateral boundary separating the stomach from the ascending colon should be made out in like manner. With the patient erect and the stomach well filled, this is usually a simple matter, the ascending and descending colons and their flexures nearly always emitting a more or less tympanitic note, even when partly filled. If the precaution has been taken to have the colon previously emptied, the contrast with the dull note over the full stomach will be, of course, still more marked. Having the patient lie first on one side and then on the other during the percussion may help to clear up a doubtful question. Filling the colon with air by the double-bulb rubber syringe in the usual manner will emphasize strongly the contrast with the dull stomach-area in the erect position, and filling the colon with tepid water while the patient is recumbent reverses the contrast in a very striking manner, though this is not a feasible undertaking with all patients, since some cannot retain the liquid long enough.

The determination of the upper border or stomach-lung boundary is the most difficult part of the procedure. Usually, however, by trying alternately light and strong percussion, there will be obtained a marked difference in the two qualities of the resonant tone, that over the stomach being more tympanitic. Still it requires much practice to make this out quickly and positively. Occasionally in exceptional cases where the stomach contains very little gas, we may fail at one examination and succeed readily at a second one. This line is sometimes more easily determined after a meal, since then such gases as are present are forced to the upper part and produce more tympany. One needs to bear in mind such possible disturbing factors as a greatly enlarged spleen or enlarged left lobe of the liver; also left-sided pleurisy filling up the half-moon-shaped space of Traube with exudation.

However, there is only one condition at all frequent which is likely to prevent us entirely from determining the boundaries of the stomach by the combination of procedures we have been describing, and that is extreme obesity with great thickening of the anterior abdominal wall. Fortunately, however, this is a condition which does not often coexist with any serious form of gastric disease.

To recapitulate, the following nine different kinds of stomachs can usually be differentiated by this combination of methods:

1. Stomach of normal size, in normal position, and having sufficient motor power.

2. Stomach normal as to size and position, but weak in motility. Gastric atony.

3. Stomach enlarged, but motor power strong. Megalogastrie of Ewald.[9]

4. Stomach enlarged and motility weak. Dilatation or gastrectasia.

5. Stomach wholly displaced downward, but otherwise normal. Not enlarged. Gastroptosis of Glenard.

6. Stomach both enlarged and displaced downward as a whole, but not dilated. Motility good. Megal ogastrie with gastroptosis.

7. Stomach wholly displaced downward and dilated. Weak motility. Gastroptosis with gastrectasia.

8. Pyloric end of the stomach displaced downward and swung around to the left, but without dilatation. Often the pylorus is carried down almost, if not quite, into the long axis of the fundus, producing what has been called by Meinert[10], Kellogg,[11] and others the vertical or subvertical stomach, according to the degree of the displacement. This form may be appropriately called pyloroptosis.

9. Pyloric end of the stomach displaced as in No. 8, and also dilated. Pyloroptosis with dilatation.

These several varieties of stomachs may be recognized as follows:

1. Normal stomach. If empty, no splash will be obtainable until after the viscus has been partly filled, and then either none or a feeble one heard, not lower, as a rule, than midway between the lower end of the sternum and the umbilicus—exceptionally to within three cm. of the umbilicus. Percussion, especially with the patient stand-

ing after drinking water, will demonstrate the boundaries in normal place.

2. Atonic stomach. The findings will be the same, except that a splash may possibly be heard four to six hours or longer after a full meal, or, if not, the drinking of a very small quantity of water will develop it decidedly. Percussion will show delayed emptying of the organ.

3. Megalogastrie. Upper border will be found in the normal situation. Lower border may be at the level of the umbilicus or even below, but motility good. No splash obtainable six hours or longer after a full meal.

4. Gastrectasia. Splash usually obtainable six hours or longer after a meal and in bad cases at any time during the twenty-four hours. Percussion shows enlargement of the organ and delay in emptying itself.

5. Gastroptosis. Splash usually rather more easily obtainable than in the normal condition and at a lower level, often at the navel or even considerably below it. Percussion shows descent of both upper and lower boundaries, but no enlargement.

6. Megalogastrie with gastroptosis. Same as in No. 5, except that percussion shows the upper boundary not so much displaced, or if so, then the lower border still further below its normal line. Percussion shows enlargement.

7. Gastroptosis with gastrectasia. Same as No. 6, except that the splash is obtainable too long after taking food or drink. Clapotement and percussion show abnormal delay also in emptying the stomach.

8. Pyloroptosis. Splash obtained usually far below the level of the normal lower border. Percussion reveals the peculiar outlines of the vertical stomach with the pyloric end low in the abdominal cavity.

9. Pyloroptosis with dilatation. Same as in No. 8, except that the splash is usually more pronounced and may be found too long after food or drink. Percussion shows also a widening of the pyloric end of the stomach.

In any of the foregoing cases it may be necessary to inflate the stomach with carbonic acid gas, supposing it to be impracticable to use the tube, or to inflate the colon with air from below.

BIBLIOGRAPHY.

1. Diseases of the Stomach, by Professor C. A. Ewald, M.D., New York, 1893.

2. Ibid.

3. Diagnostik u. Ther. der Magenkrankheiten, by Dr. I. Boas, 1894.

4. Zur Physikalischen Diagnostik der Mechanischen Insufficienz des Magens, by Dr. Dehio. Separat Abdruck aus den Verhandlungen des Congresses f. Innere Medicin.

5. Die Grenzen des Magens und des Darmcanals, by Dr. P. Jaschtschenko. St. Petersburger med. Woch., 1888, No. 29.

6. Zur phys. Untersuchung des Magens und Darms, von Dr. Obrastzow. Deutsches Archiv. f. klinische Medicin, December 7, 1888.

7. Ueber die phys. Untersuchung des Darms, von Dr. Obrastzow. Archiv. f. Verdauung's Krankheiten, 1895, B. i. Heft 3.

8. What is the Significance of the Splashing Sound of the Stomach? by Dr. A. Rose. New York Medical Journal, June 15, 1895.

9. Ewald, loc. cit.

10. Zur Aetiologie der Chlorose, von Dr. E. Meinert, Wiesbaden, 1894.

11. The Relation of Static Disturbances of the Abdominal Viscera to Displacements of the Pelvic Organs, by Dr. J. H. Kellogg. Modern Med. Pub. Co., Battle Creek, Mich., 1894.