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REPRINTED FROM THE

New York Medical Journal
for November 7, 1896.



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A CASE OF GASTROSTOMY PERFORMED ACCORDING TO KADER'S METHOD.

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IN No. 28 of the *Centralblatt für Chirurgie*, July 11, 1896, Dr. Bronislaw Kader, assistant to the surgical clinic of Professor Mikulicz, of Breslau, published an interesting article, A Contribution to the Technics of Gastrostomy, in which he describes a new method of his own which is a modification of the well-known Witzel's method.*

He states that in January, 1895, he had to establish a gastric fistula in a case of cicatricial stricture of the œsophagus and of the pylorus. The stomach was exceedingly small, and movable to such a slight extent only that most of the formerly tried methods of gastrostomy could not be made use of. Also that of Witzel—which so far had been done by Professor Mikulicz almost exclusively in cases which needed gastrostomy—could not

* *Centralblatt für Chirurgie*, 1891, No. 32, p. 601.

be carried out, because a rather long incision had been made through the anterior wall of the stomach for digital exploration of the interior of the latter and of the region of the pylorus. Kader therefore modified Witzel's method, and found that the functional result in this modification was just as perfect as that of the former, while the technics—which differed rather materially from Witzel's method—presented a number of advantages, viz.: it can be done in all cases, even the most difficult ones; it can be carried out faster and in a simpler manner, and is feasible even in such cases where the character of the disease necessitated, for digital exploration of the interior of the stomach, a primary incision of the anterior gastric wall, and a longer one than we need if for gastrostomy.*

For these reasons Witzel's method has lately been substituted in the Breslau Clinic by that of Kader.

The operation is carried out in the following manner: An incision three by four inches (seven by ten centimetres) long is made, penetrating skin and fascia, and parallel with the border of the left ribs, one and a half by two fingers' width distant from the same. (In a footnote, Kader states that the simpler vertical incision might also be used. I think this should be done in every instance.) A blunt division of the left rectus muscle is made for a distance of about two and a half by three inches (six to eight centimetres). The posterior sheath of the rectus muscle and the peritonæum are incised. As will be seen, this is the way von Hacker proposed for penetrating the abdominal wall.† Now a

* I want to state here that I fail to see any reason why this latter procedure could not be done in Witzel's operation as well.

† *Wien. med. Wochenschr.*, 1886, Nos. 31 and 32.

small fold of the stomach is pulled forward in the usual way, with the help of the fingers or of the forceps, or of two slings of silk which have primarily been put through the serous and muscular coats of its wall, the wound meanwhile being held apart by blunt retractors. If the stomach is movable, the fold is, of course, drawn in front of the abdominal wall, the surrounding field being packed with aseptic gauze in order to do the following steps of the operation extraperitoneally. Then a small incision is primarily made between the two slings, and a drainage-tube of about a pencil's size introduced into the stomach for a distance of about two by two and a half inches (five by six centimetres). The few spurting arteries of the gastric wall are, as usually, ligated with fine silk (or catgut). So far, the procedure is the same as in Witzel's method. The drainage-tube is at once fastened to the side of the stomach wound by a catgut stitch (Fig. 1, *a*).^{*} Then two Lembert sutures (Fig. 1, *b*) are put on either side of the tube in such a way that they catch and unite a portion of the surface of the stomach of about half an inch (one centimetre) width, leaving between a groove of three fourths of an inch (two centimetres) width (see Fig. 1). The two sutures on either side are about half an inch (one by one and a half centimetre) apart. By tying these sutures ("deep occlusion-sutures"), which, of course, catch the serosa and the underlying muscularis, two longitudinal folds are formed (Fig. 1, *c*), which turn inward the wall of the stomach in the immediate neighborhood of the tube and thus surround the latter in the shape of a narrow funnel (Fig. 1, *d*). Thus the drainage-tube is situated in a canal lined by serous mem-

^{*} The cuts reproduce those of Kader's article.

brane which does not pass the gastric wall obliquely, but enters it in a *perpendicular, straight* way. In order to lengthen this canal, two more folds of the stomach

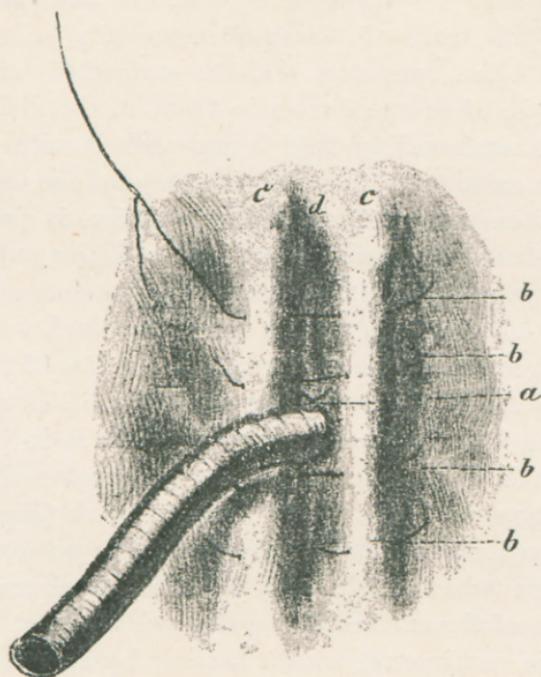


FIG. 1.

wall are stitched on top of the first ones (Fig. 2, c^1), in the same manner and direction as described before, again with the help of four sutures, two on either side of the tube ("superficial occlusion sutures," Fig. 2, b^1). The outer threads of these sutures * are not cut short, but left long in order to have a good hold on the stomach during the further manipulations. (This I learned by personal experience to be an important point.) Now

* I have marked them in the cuts, Fig. 2 and Fig. 3, with X.

the entire area of the stomach is stitched to the edges of the peritoneal wound and that of the posterior sheath of the rectus muscle, thus rendering the operating field extraperitoneal. Then the bluntly divided rectus muscle is drawn together with the help of a few stitches, the anterior sheath of the rectus muscle sutured, and the skin closed on either side of the tube by stitches.

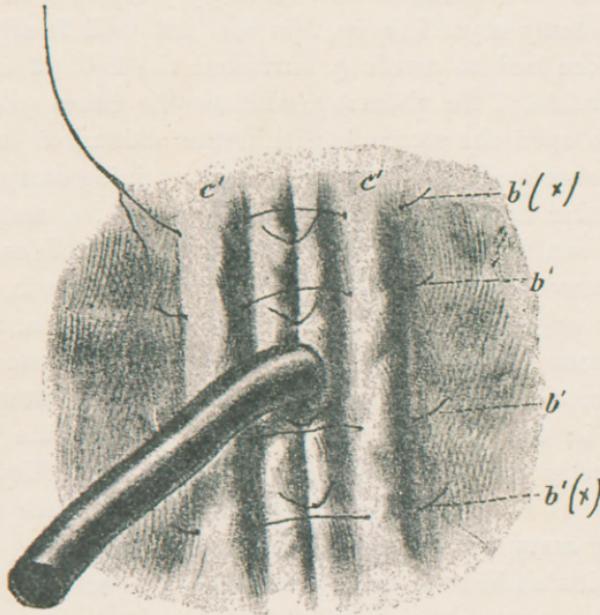


FIG. 2.

If wanted, feeding through the tube may be begun at once.

In establishing the fistula, one has, of course, to look out that those sutures which are put in nearest the drainage-tube are put in neither too far away nor too near to the same. The stomach wall must surround the tube in a rather gentle tension. If the stomach can

not be well pulled forward into the wound, Kader advises that the deep occlusion sutures be put in primarily, and that with the help of these the stomach be drawn up against the abdominal wall in order to close off the peritoneal cavity when the incision into the stomach is made.

In a case of malignant stricture of the œsophagus very near the cardia, in which I lately performed Kader's gastrostomy myself, even this was not well feasible; I therefore had to carefully surround the field of operation, inside of the abdomen, with aseptic gauze sponges, and to open the stomach within the abdominal cavity. As the stomach was entirely empty, no juice escaped.

Kader mentions that the folds (Fig. 1, *c*, and Fig. 2, *c*¹) can be made in a perpendicular as well as in a transverse direction. The former is preferable in cases where we want to establish a permanent fistula, as in cancerous stricture of the œsophagus; the latter in benign, cicatricial ones. The canal has a greater mobility in the direction toward the cardia if the folds are put in the transverse direction. This mobility will enable us to reach the cardia easier, and thus more readily carry out retrograde dilatation, etc.

If it should have become necessary to open the stomach by a larger incision primarily, in order to explore its interior with the finger, this wound is closed by Lembert's sutures up to the spot where the tube is made to enter. Thence the operation is carried out as described above.

It is of the greatest importance to have the field of operation on the stomach well lined with peritonæum—in other words, to fix the stomach firmly to the parietal peritonæum. Kader seems to do this, according to his

diagram (Fig. 3, e^1), by sutures where the thread passes through the posterior sheath of the rectus muscle and peritonæum on the one side, then through the stomach wall, and again through the peritonæum and the posterior sheath of the rectus on the other side. In the case

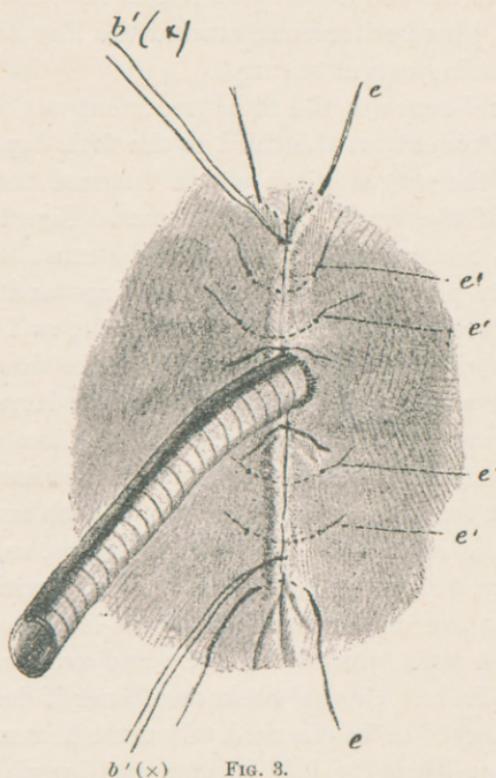


FIG. 3.

in which I lately operated according to Kader's method, I did this act of the operation as I have proposed in my article on Recent Methods of Gastrostomy for Stricture of the Œsophagus (published in the *American Journal of the Medical Sciences*, October, 1894)—viz., by passing

a silkworm-gut suture on either end of the field of operation through the entire abdominal wall, grasping on its way the stomach wall (Fig. 3, *e*). These sutures are tied only at the end of the operation, when the skin wound is closed with silkworm gut. They hold the stomach firmly up to the abdominal parietes. I then also stitched the fascia, plus peritonæum, around the line *ee* (Fig. 3) with a running catgut suture.

With reference to the after-treatment not much can be said. From about the third to the fifth day after the operation the catgut stitch which fastened the tube to the side of the small stomach wound (Fig. 1, *a*) will have been reabsorbed. Then the tube must be pierced by a safety pin in front of the dressings and attached to the latter (Kader), or better, I believe, as I have advised (*loc. cit.*), by slipping over the tube down to the abdominal wall a short piece of the next larger size of tubing armed with two safety pins. A piece of gauze, partially incised, is pushed underneath the pins, another one with a small centre hole on top. Both are held in place by the rubber adhesive plaster straps, as used for laparotomy, or by a square piece of muslin with a small centre hole and one or two long pieces of tape on either side, which pass around the body and are tied by the patient in front. Once a week, or oftener if desired, the tube is changed to be cleansed. It must be remembered that it should not be left out for any length of time. The fistula established according to Kader's method, as well as that of Witzel's, "closes spontaneously," or after superficial cauterization, as soon as the tube is permanently removed.

In the way just described, the operation has been carried out in Mikulicz's clinic ten times (eight times

by Dr. Kader and twice by Professor Mikulicz), in five patients for cancerous and in four for cicatricial stricture of the œsophagus; in one patient the latter was compressed and impassable in consequence of a perichondritis laryngis due to specific disease. The youngest patients were five and six years old. Three times the operation was done, on account of the low condition of the patient, under local cocaine anæsthesia, after Schleich's method. All ten patients recovered without any annoying accident. The elder were allowed to get up on the second, and even on the first day after the operation. One can rely absolutely on the fixation sutures which hold the stomach firmly attached to the anterior abdominal wall.

The functional result was ideal in every case. Even when the tube was removed there was no leakage whatever, no matter how the patients turned or what position they assumed. Kader thinks that a number of causes combine to produce this satisfactory result. The serous surfaces, which are sutured together, rapidly become adherent to each other and grasp the rubber tube pretty snugly. Furthermore, the position of the inner opening of the fistula, at the tip of a compressible funnel, and the pronounced folds of the mucous membrane which run toward the entrance of this funnel (see Fig. 4) prevent regurgitation of the gastric contents. Also the sphincterlike action of the rectus muscle, surrounding the tube on its way to the surface of the abdomen, deserves mention as an agent in rendering the fistula water-tight. At last, it is most probable that the fibres of the muscularis of the stomach, which surround the fistula in Kader's method in a double layer, act like a sphincter. Kader emphasizes that these same causes

are underlying the good functional results obtained by Witzel's method; in other words, that it is not the oblique penetration of the fistula through the gastric wall,

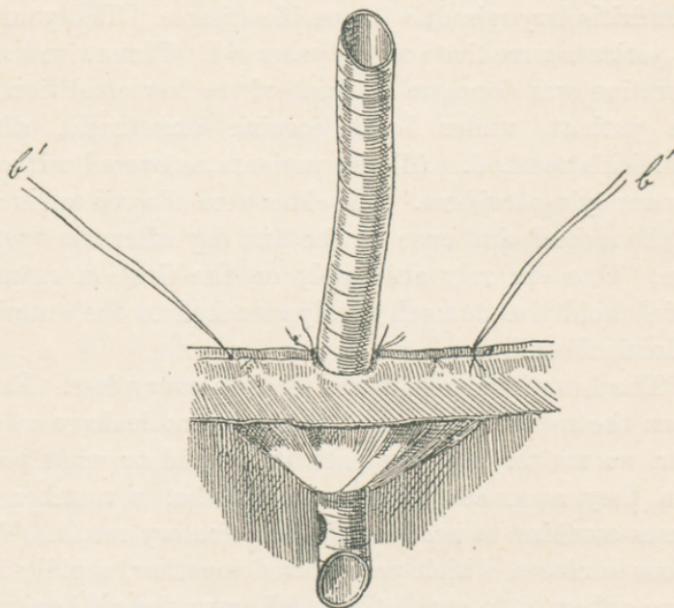


FIG. 4.

which makes it water-tight. As frequently observed in Mikulicz's clinic, the oblique canal later assumes a straighter direction, sometimes as early as three weeks after the operation. Yet the patency of the fistula has always remained perfect.*

On reading Kader's article I was struck by the simplicity of the procedure, and at once resolved to carry

* The same phenomenon was seen in one of my patients operated upon according to Witzel's method (*American Journal of the Medical Sciences, loc. cit.*).

it out in a patient, Mr. J. W., aged fifty-four years, on whom I had to do gastrostomy the following day for increasing cancerous stricture of the œsophagus, from which he had been suffering since November, 1895. The operation was performed on July 21st in the presence of Dr. A. Hadden of this city, who had, together with Dr. Max Einhorn, treated the patient before. It was carried out strictly in accordance with Kader's directions, with the exceptions mentioned above—namely, that the stomach was held up to the abdominal parietes on either end of the field of operation by a silkworm-gut stitch which penetrated the entire abdominal wall, and that the field of operation was lined by peritonæum and fascia by means of a running suture. The external wound was entirely closed by stitches, layer by layer, up to the tube. The wound healed by primary union throughout and has been water-tight from the beginning. The patient was up on the fourth day after the tube had been inserted, and left the private hospital just one week after the operation. To-day, two weeks later, the fistula proves to be just as water-tight as it was on the first day after the operation; not a drop regurgitates alongside the tube or through the canal when the tube is removed. The patient is gaining in weight.*

Since publishing my article on Recent Methods of Gastrostomy for Stricture of the Œsophagus (*loc. cit.*), where I reported fourteen cases of this operation, done by myself, in all (*viz.*, two according to the old Fen-

* The patient was presented to the Scientific Society of German Physicians on September 25th. The functional result of the operation is perfect. It was interesting to me to watch the canal immediately after the removal of the tube. If the patient had been fed just before, a certain amount of the contents of the stomach oozed out. Meanwhile the canal in its deeper portion slowly contracted (by active contraction of the muscular layer of the gastric wall?) until the opposite walls came into contact. Then all leakage ceased, no matter whether the patient coughed or pressed or took any desired posture.

ger's, six to von Hacker's, and three to Witzel's and Ssabanejew-Frank's method each), I have done gastrostomy in nine more patients—four times according to von Hacker and five times according to Ssabanejew-Frank—twenty-three times in all. None of the last nine patients died in consequence of the operation as such. Twice the operation (von Hacker) had to be done under cocaine, as the patient's condition did not permit of general anæsthesia.

So far as the functional result of the operation is concerned, von Hacker's method has given me a uniformly good one. Only now and then the fistula commenced leaking slightly in the course of time. Then the tube had to be replaced by one of a larger size. I should still recommend von Hacker's operation as the one which can be carried out in the easiest way, taxes the patient's strength the least, and promises, if done properly, a lasting good functional result.

I should have resorted to Witzel's operation oftener—the safest and best one so far as the question of avoiding subsequent leakage is concerned—if one could, in this method, enter the abdominal cavity by bluntly dividing the left rectus muscle. I greatly like this latter procedure when establishing a gastric fistula. Wherever, during this first part of the operation, the handle of the scalpel finds a resistance in separating the muscular fibres, a transversely running blood-vessel is met with. Two clamps are applied, and the vessel divided between them. Thus the posterior sheath of this muscle and the peritonæum are rapidly reached, without any blood having been lost, and that in a most easy and convenient way, which besides proves to be of great value to the patient in the future. For these reasons I have lately com-

bined von Hacker's and Ssabanejew-Frank's methods. But I experienced, especially in my last case of this kind, done on July 13, 1896, that the fistula leaked in the beginning, especially right after feeding. Here a comparatively short cone of the anterior wall of the stomach could be raised only, so that the small second wound had to be made below, instead of above, the border of the left ribs. In my next case I shall twist the cone for one hundred and eighty degrees—according to Gersuny's procedure on the female urethra for incontinence of the bladder—and then, after having pulled it underneath the bluntly undermined bridge of skin, stitch the opening of the stomach to the borders of the second small wound. Helferich, of Greifswald, has lately done this with a most satisfactory result. I should do it even if no difficulty was encountered in raising a sufficiently long cone of the anterior stomach wall.

Witzel's operation requires a more or less oblique incision and the blunt division of at least the external and internal oblique muscles. In very muscular patients, the rectus and transversalis muscles may be encountered only; in others, a layer of three muscles may have to be separated and held apart. This sometimes proves to be a rather tedious work—certainly more tedious than to divide bluntly the left rectus muscle alone—and may require the help of an additional assistant. The lining of the operating field on the stomach with peritonæum is sometimes in Witzel's operation also not a very handy procedure, especially in robust individuals.

Kader's operation, however, combines the advantages of von Hacker's and of Witzel's method in a most convenient and ingenious way, and makes the gastric

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fistula water-tight by entering the stomach in a direct perpendicular line, whereas Witzel tried to obtain the same result in a rather roundabout (oblique) way.

I therefore believe that Kader's method of gastrotomy for stricture of the cesophagus will be much liked by surgeons and be rapidly introduced into the surgery of the stomach everywhere.

The New York Medical Journal.

A WEEKLY REVIEW OF MEDICINE.

EDITED BY

FRANK P. FOSTER, M.D.

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Subscription price, \$5.00 per annum. Volumes begin in January and July.

PUBLISHED BY

D. APPLETON & CO., 72 Fifth Avenue, New York.

