

THE MANAGEMENT OF CERTAIN CRITICAL
CASES OF INTESTINAL OBSTRUCTION,
WITH REPORT OF CASES.¹

A. RESECTION FOR CANCEROUS OBSTRUCTION; B. RESECTION
FOR GANGRENOUS INTUSSUSCEPTION; C. RESECTION FOR
GANGRENE DUE TO MESENTERIC THROMBOSIS.

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For several years now, since the perfection of the technique of intestinal anastomosis, surgeons have been much disappointed at the results of resection in certain critical cases of intestinal obstruction, and especially in cases of obstruction due to cancer of the intestine. It is well known that the mortality of these operations under the prevalent method of enterectomy with immediate suture is 50 per cent. at least in the hands of the best surgeons, and in some hospitals is as high as 85 per cent. In cases of resection for gangrene of the intestine the mortality is even higher. The principal cause of death has been septic peritonitis, due sometimes to contamination by intestinal contents at the operation, but more often to the fact that the most perfectly placed sutures or mechanical devices do not hold. It is hardly necessary to say that the giving way of the suture in these cases is due to the diseased condition of the bowel.

The obstruction caused by cancer is gradual, and a diagnosis is often not made for two or three months, when the obstruction becomes complete. The bowel has then become dilated and hypertrophied, the patient has been weakened by malnutrition and has become cachectic. When such an intestine is opened, its walls are œdematous and often three or four times the normal thickness; and the contents are especially septic. When this tissue is included in a stitch it rapidly shrinks, leaving the stitch loose and leaking. If the stitch holds at first the peristalsis may be violent, or sometimes we have complete atony, both conditions may prevent union. In

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short, the whole situation is most unfavorable for the union of the cut ends; moreover, the relief of the obstruction is of more immediate importance than the removal of the disease.

Enterectomy with a temporary artificial anus was advocated by Reichel and urged by Treves in 1883. More recently, Mikulicz and others have operated in two sittings for malignant growths of the large intestine.

We have always believed that the mortality in these cases ought to be nearer 10 per cent. than 50 per cent., and, having found every form of suture and mechanical appliance unreliable, have for several years now been doing these operations in two sittings, with most satisfactory results. Now that the technique has been improved, we think that enterectomy, with a temporary artificial anus, should be the operation of choice in all critical cases of intestinal obstruction where there is an opportunity for resection, whether it be in the large or the small intestine. Treves and others have objected to leaving a fæcal fistula in the small intestine on account of the malnutrition caused by the loss of the undigested discharges from the upper bowel. I have overcome this difficulty in two cases (one here reported, the other in the *ANNALS OF SURGERY*, January, 1895), in which I resected a part of the small intestine, by collecting the discharge from the upper opening and injecting it into the lower opening. I have also improved the technique of the operation by stitching the open ends of the bowel together on the mesenteric side before they are fastened into the parietal wound. This greatly facilitates the closing of the artificial anus. We have never had a death from closing an artificial anus, though it has occasionally required more than one operation. It is a safe operation, and usually hardly disturbs the convalescence.

If the patient is in too critical a condition to risk primary resection, an artificial anus may be made in the distended bowel and the diseased portion resected at a later operation if an opportunity arises. This method is to be condemned except in cases of grave necessity, because at the second operation the peritoneal cavity is opened in the presence of a fæcal fistula; also the disease, perhaps malignant, has been allowed

a longer time to develop, and it is always difficult to get such patients into good condition for a severe second operation. In using this method in an unfortunate case, at the second operation done one month after opening the bowel, we found the bowel for some distance from the malignant growth degenerated and friable, so that the stitches did not hold.

According to Hoehenegg's method, the diseased intestine is freed and the mesenteric glands removed. The coil is then brought out of the abdomen and held in position by a fold of iodoform gauze passed through the mesentery. The abdominal wound is closed around the bowel. A few hours later he opens the distended intestine and inserts a glass tube. At the end of twelve days the diseased intestine is removed and the cut ends united and returned into the abdomen. This method is to be commended in that it effectually insures the peritoneum against contamination; but we can see no advantage in leaving the disease for twelve days in the outer wound. It seems equally safe to resect at once.

McGraw dissects the tumor free with the glands, then the two limbs of the intestine leading to and from the tumor are joined together by Lembert sutures, and an anastomosis made with an elastic ligature. The abdomen is then closed, leaving the anastomosis inside and the tumor protruding outside. The tumor is then cut away, and the afferent portion of the intestine is drained until the elastic ligature makes an anastomosis above the resection. This is certainly a most ingenious operation, but it is open to criticism, that its safety rests in the ability to prevent leaking about the elastic ligature and sutures placed in diseased intestinal wall, which is the same objection we are raising against resection with immediate suture.

The simplest method seems to us to be the best. Enucleate the tumor and remove the glands. When the tumor is free, draw the loop of intestine out through the abdominal wound. Wall off the peritoneal cavity with gauze. Clamp the lower efferent bowel and cut it off. Unite the mesenteric sides of the afferent and efferent bowel to facilitate the closing of the artificial anus. Stitch the upper and lower bowel to the peri-

toneal surface. Close the wound about the ends of the intestines as much as possible, then clamp the upper distended bowel and cut away the tumor. Pack the wound with gauze. The clamp on the upper distended bowel can then be removed with certainty that the peritoneal cavity will not be infected by the fecal discharge; or, still better, if the symptoms are not urgent, the clamp may be left in place for several hours, until the newly adjusted surfaces have been settled into place and have possibly begun to glue together, as in the first case here reported. The important point is not to open the upper distended bowel until the peritoneal cavity is closed.

In all these cases it is important to wash out the stomach before the operation and leave it empty, as there is great danger of regurgitation in the trachea under ether, due to handling the distended intestine.

CASE I.—*Cancerous Obstruction*.—Patient was seen June 26, 1904, in consultation with Dr. Baklwin, of Brookline. A very robust man, thirty-five years old, apparently in perfect health, who had not been able to have a movement of the bowels for six days. He had been constipated for the past six months, but had never seen blood or pus in the stools. There was no pain or vomiting except from cathartics. There was slight tenderness near the umbilicus. No distention, no rise in temperature. During the 26th, 27th, and 28th we tried opium, castor oil, calomel, and enemata without avail, little or no food being given. Only about a quart of water could be forced into the rectum. Operation, June 29. A median incision revealed a hard, puckering, annular growth constricting the sigmoid flexure. The adjacent bowel was freed from its attachments, taking as much mesentery as possible, and raised into the abdominal wound. No affected glands were found. The peritoneal cavity was walled off with gauze, and a ligature placed around the bowel just below the growth. The bowel was then cut above the ligature, and the lower (efferent) gut stitched into the lower part of the wound. The growth, wrapped in gauze to avoid peritoneal contamination, was raised to facilitate further dissection. The mesenteries of the efferent and afferent intestines being stitched together (to facilitate the later closing of the artificial anus) and the abdominal wound completely closed about the intestinal ends, a ligature was then put

around the distended afferent gut, the wound surface completely covered with gauze, and the tumor cut away. This ligature was not removed from the distended gut until several hours later, when the gauze dressing had become well glued to the entire wound surface. The patient was much relieved by the operation, and having no bad symptoms soon recovered his normal appetite. The gauze in the wound was constantly stained with feces, and was gradually cut away as fast as it loosened, leaving a bright granulating wound. Some of the last pieces of gauze removed from the region near the fecal fistula were seen to be white on the surface next to wound, showing that the fecal discharge had been effectually kept from the deeper part of wound surface by the gauze dressing.

The granulations were bright after the gauze was removed, and the wound healed rapidly. In September the open ends of the bowel had become perfectly united to the skin, no granulations remaining.

Dr. Whitney, pathologist, reported as follows: "The specimen consisted of a piece of intestine about 6 centimetres in length, the greater part of which was occupied by a deeply ulcerated infiltrating new growth, leaving only a small margin of sound tissue at each end.

"Microscopic examination showed a new growth of irregular tubular glands infiltrating the entire thickness of the muscular coats at the central part and on the ends, with a growth into the submucous tissue only.

"*Diagnosis*—Adenocarcinoma."

Second operation, September 30. The ends of the gut were freed from the sear and united by an end-to-end anastomosis. Recovery was uneventful except for a small infarction which took place in the right lung on about the eighth day. The patient is now (more than a year after the operation) perfectly well and working as usual.

CASE II.—*Gangrenous Intussusception*.—The patient, a man thirty-eight years old, entered the accident room of the Massachusetts General Hospital on May 20, 1904. He had been perfectly well until two weeks before entrance, then he began to have ten or twelve movements of the bowels per day, with constant pain in the left side of abdomen. At times the pain would disappear for a few moments, only to reappear. Vomited considerably during this period and retained but little food; lost weight. Had not vomited blood or passed it per rectum.

The abdomen was moderately distended, and there was considerable muscular spasm. On the left side, running into the flank, an oval tumor was visible about on level of umbilicus, which seemed to move up and down with peristalsis. The tumor was firm but indentable, with an indefinite outline. Rectal examination negative.

May 21. Under free catharsis and enemata, the distended abdomen came down considerably. Stools not remarkable. Mass situated between umbilicus and tip of ninth rib on left side. When the large intestine was distended with water, the position of the mass was not changed. No gurgling through intestine or under the tumor. Intestinal peristalsis distinctly visible.

Operation.—Six-inch incision through left rectus about on level with umbilicus revealed the colon much swollen, red, and œdematous, forming a sausage-shaped tumor of elastic consistency eight inches long. The colon was opened by a longitudinal cut, and a large gangrenous intussusception removed from the inside of the colon, the mesenteric vessels being tied inside the colon. As the opening into the upper colon where the intussusception had been cut away seemed too small, the cut ends of the gut were pulled apart and stitched into the parietal wound, the longitudinal opening in the descending colon having been closed with a running suture. A glass drainage-tube was tied into the proximal opening to carry away the feces. The patient made a slow but uneventful recovery. The tube sloughed out in the second day and the bowel retracted into the wound.

The artificial anus was almost closed at an operation done three weeks after the first. A very small opening still remaining was closed by Dr. Scudder, who had charge of the wards at that time, a month later. The patient was in good health a year later.

Resection of a gangrenous intussusception with immediate suture is extremely dangerous, the mortality being about 85 per cent. Mikulicz has done a very ingenious operation for this condition. He first stitches the enlarged distended colon into the parietal wound, thus completely excluding the exposed colon from the peritoneal cavity. He then opens the anterior wall of the colon thus excluded, and removes the gangrenous intussusception thus exposed by cutting away the outer and inner layers of the intussusception and closing the cut edges by deep catgut sutures, so that the peritoneal cavity is not opened when it is

cut away. He then leaves the opening in the colon as an artificial anus, which is closed several weeks later.

Mikulicz has done two cases by this method with good results. So I think we have in Mikulicz's operation perhaps the best operation for the removal of a gangrenous intussusception. But when this operation is unadvisable, stitching the cut ends of intestine into the wound is the safest method.

CASE III.—Resection for Gangrene due to Thrombosis of the Mesenteric Artery.—The patient, a man twenty-two years old, entered the Massachusetts General Hospital, April 7, 1904, with the diagnosis of a duodenal or peptic ulcer. He had had gonorrhoea and syphilis, but no secondary symptoms. He had felt perfectly well until three weeks before entrance, when he began to have pain in epigastrium and vomiting. He had a good appetite, but vomited three or four times a day; the vomitus often had a "coffee-grounds" appearance, but he had never vomited fresh blood. He had lost eighteen pounds in weight.

While in the hospital his symptoms and distress increased, and he finally vomited some fresh blood.

Operation.—On April 14, an anterior gastrojejunostomy was made with a bone hobbin. There was no evidence of disease of the stomach or pylorus. The stomach was not dilated. The small intestine was noted to be thin and friable when stitched and rather dark in color. The patient did well, and got early relief from the operation. He had a good appetite, retained and digested his food. On May 2 he complained of a pain in his abdomen, which soon passed away. May 3 he was seized with more severe abdominal cramp-like pain, with nausea and vomiting. The abdomen was soft, and a rounded mass was distinctly felt opposite the umbilicus on the left side. No result from the enemata. May 4 pain more severe; pulse, 120; abdomen swollen and tympanitic, so that tumor could scarcely be detected.

Operation.—Incision in linea semilunaris; small amount of cloudy fluid. A coil of distended and almost black small intestine lay directly beneath incision, with neighboring coils slightly adhering to each other, and a little fibrin on them. The mesentery was black almost to its root. A careful examination showed no constricting band and no sign that the coil had been twisted. The coil was delivered while the peritoneal cavity was "walled off" with gauze, and fourteen inches found to be gangrenous with a foul odor. About an inch beyond the gangrenous area, on an

otherwise healthy part of the gut, was a small dark spot showing another centre of the same process. The affected coil was cut away between two clamps. No faecal discharge was visible. The open ends of the intestine were now sutured to the parietal peritoneum, and the mesenteric borders were stitched together, thus keeping the ends together in order to facilitate a subsequent operation for closing the necessarily resulting artificial anus.

The patient made a prompt recovery. In a few days the skin became irritated by the acrid discharge from the artificial anus, and he began to show the want of proper nutrition. We judged from this that the excised coil must have been high up in the small intestine, a fact not accurately determined at the operation on account of the critical condition of the patient.

The skin around the artificial anus was protected with ointment and nutritious materials were injected into the open bowel; finally, we devised a system of collecting the partially digested material discharged from the upper bowel and injecting it into the lower end with a soft catheter. The patient was slightly inclined on one side, and the discharge was caught in a glass pus basin. The discharge was periodic and often quite thick. It was injected into the lower gut about five minutes after it came from the upper opening when the intestine became quiet. It was forced through a soft catheter with a hard rubber syringe. It had to be given very slowly to be retained, one-half ounce or so at a time, with brief intervals, until the whole discharge had been returned. In this way his nutrition was greatly improved.

The artificial anus was closed by Dr. Scudder on June 9, as my term of service had expired at that time. He was discharged July 14, having gained sixteen pounds, and is perfectly well to-day, more than a year after the operation.

The following is a quotation from the pathological report of Dr. G. H. Wright:

"It is of a black-red color, and at least twice as wide in diameter as normal, the peritoneal surface showing some fibrous thickening. On section the entire wall of the intestine is densely infiltrated with blackish, opaque, thick fluid. The same fluid is found in abundance in the lumen of the intestine. The mucous membrane in general is of a blackish, moist appearance, with no definite ulcerations. The portion of the mesentery adherent to the intestine is markedly infiltrated with black, thick fluid." . . .

"Microscopic examination of pieces of the mesentery attached to the intestine show thrombosis of good-sized veins, but none of the arteries."

In this case I have not been able to understand why the thrombosis of the mesenteric vessels followed the operation of gastro-enterostomy, but I feel certain that the gangrene was due to the thrombosis.

In the *ANNALS OF SURGERY*, January, 1895, I reported a case of resection of four feet of gangrenous intestine due to thrombosis of the mesenteric veins. In this case I stitched the open ends of the intestine into the wound as described above. This was the first successful case ever recorded of resection for gangrene due to mesenteric thrombosis. Since then, according to Jackson, Porter, and Quimby, who have collected all the cases up to 1904, there have been three other successful cases. They are as follows:

GORDON. Resection of two feet of intestine and end-to-end suture over a bobbin. Intestine leaked into dressing five days after operation. Wound opened and packed, and in two days a slough came away, representing the entire suture line. Resulting fæcal fistula closed in two weeks. Recovery.

KÖBLING. Intestine resected and lower end of duodenum sewed up (because it was too short for anastomosis), and upper end of jejunum joined to stomach by anterior gastro-enterostomy. Much distention and vomiting followed with right parotitis, fever, and œdema; but patient finally recovered.

SPRENGEL. Ten centimetres of small intestine gangrenous, and was excised and ends left in the wound. Peritoneal cavity drained. Good convalescence. Fæcal fistula closed five weeks later with end-to-end suture. Recovery.

From this we see that five cases have recovered, one by Gordon, one by Kölbinger, one by Sprengel, the other two done by myself; a mortality of 97 per cent. according to Jackson, Porter, and Quimby. Of these, three uninterrupted recoveries were operated on in two sittings, the resected ends being left open at the first operation; while Gordon's case, where end-to-end suture was used, only recovered after the sloughing out of the entire suture line. This leaves Kölbinger's case the

only one in which immediate suture has acted even fairly well. We think it is therefore evident that resection in two sittings has so far proved the most satisfactory method in resections of gangrenous intestine due to thrombosis of the mesenteric artery.

Summary.—1. We find the prevalent method of enterectomy with immediate suture in cases of intestinal obstruction attended with a high mortality due to the changed condition of the distended bowel.

2. Enterostomy with later enterectomy is to be reserved for the cases unable to bear primary enterectomy.

3. Enterectomy with a temporary artificial anus should be the operation of choice in all critical cases of intestinal obstruction, where there is an opportunity for resection, whether it involves the large or the small intestine.

4. The suggested improvements in the technique are as follows:

The upper distended bowel should not be opened until the peritoneal cavity is completely closed. (This is already the practice of several surgeons.)

The open ends of the bowel should be stitched together on their mesenteric side before they are fastened into the parietal wound. This will greatly facilitate the later closing of the artificial anus.

When the artificial anus is in the small intestine, the partially digested discharge from the upper opening should be collected and injected into the efferent opening.

5. The closing of the artificial anus is a safe operation, and hardly disturbs the convalescence.

6. Up to the present time not enough cases have been done by this method to estimate its relative mortality, but the cases here reported, with those referred to, suggest the probability of better results than have been obtained by enterectomy with immediate suture.