

Classic Articles in Colonic and Rectal Surgery

MARVIN L. CORMAN, M.D., *Editor*

Robert Abbe

1851-1928

Robert Abbe was born April 13, 1851, in New York City, the fifth and youngest son of a New York merchant. He was of the seventh generation of Abbes in America, tracing his ancestry to the Salem, Massachusetts, settlement of 1635. His mother was a Colgate, daughter of the founder of the soap company.

Abbe received his undergraduate training at the City College of New York, graduating in 1870. He demonstrated considerable ability in drawing and was an instructor at the college in this subject and in English and geometry for the next two years. He then entered Physicians and Surgeons, receiving his doctorate in medicine in 1874.

Following internship at St. Luke's Hospital, he traveled abroad, touring a number of European medical centers, and returned to become an attending surgeon at St. Luke's Hospital and the New York Hospital.

Abbe was an innovative surgeon and a prolific writer. His contributions were reflected in many areas, most notably intestinal surgery, thyroid surgery, and plastic and reconstructive operations. Eponymous procedures include lateral intestinal anastomosis (the subject for this *Classics* presentation), division of esophageal stricture, and intracranial resection of the fifth nerve for tic douloureux. He was one of the early advocates of radiotherapy in the treatment of malignant conditions. In fact, he developed aplastic anemia, possibly as the result of ineffective protection in the handling of radioactive material.

Abbe died March 7, 1928, at the age of 77.

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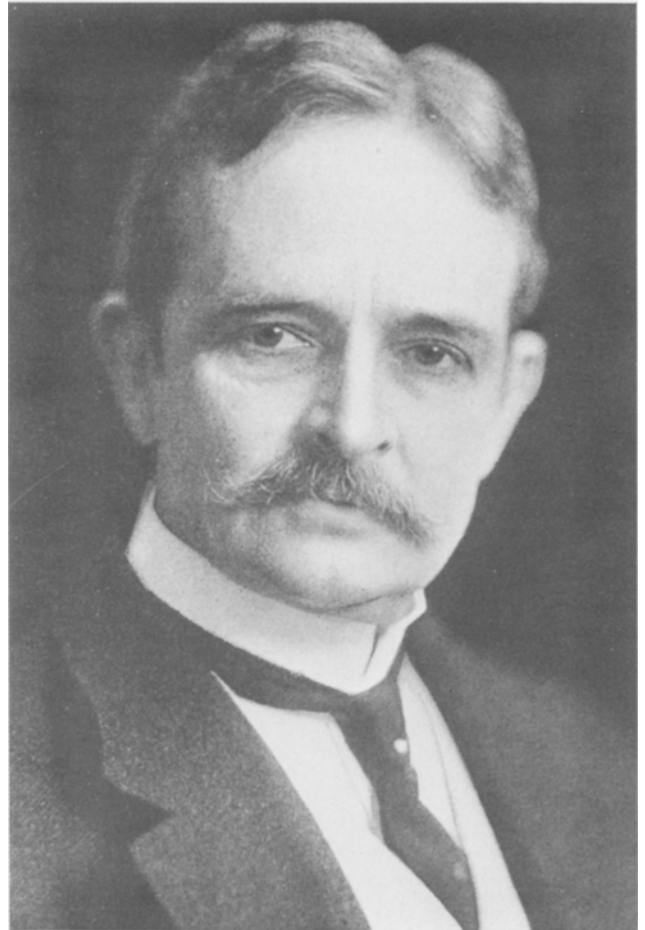
INTESTINAL ANASTOMOSIS AND SUTURING.

BY ROBERT ABBE, M.D.

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THE following cases of recent intestinal surgery form a legitimate basis for practical observations on the comparative merits of various operative measures in this important line of work. There has been so much in recent literature of experimental work upon dogs, from which conclusions have been drawn perhaps too hastily, that recorded cases of practical work may now be considered of the utmost value in drawing legitimate conclusions.

CASE I. *Intractable Fecal Fistula—Resection of Two Inches of the Ileum—Lateral Anastomosis—Recovery.*—C. B——, a fine, large, healthy Swedish girl, twenty-four years of age, was taken, soon after coming to this country, with severe dysmenorrhoeal pains, for which she was treated by gynecologists for uterine displacement during a year and a half before she came under the care of Dr.



Robert Abbe

[Photograph courtesy of JB Lippincott Company]

Currier, of this city, who by laparotomy sutured the uterus to the anterior abdominal wall. Relief not being accomplished, both ovaries were removed later. They were in condition of cystic and papillomatous hypertrophy, one being nearly as large as an egg.

A large amount of pus was evacuated from the pelvis three weeks later, and a rubber drainage tube inserted. The discharge was very free, and intestinal contents were found in it after a little while. A long rubber drainage-

tube was inserted, but disappeared one day into the abdomen—being sucked in by peristalsis. Dr. Currier again did laparotomy and found the tube in the intestine, some distance from the fistula. He incised the bowel, removed the tube, and sutured the incision. The adjacent adherent bowel was loosened, but the fistula was left for nature to heal. Some weeks later she had arrived at a deplorable state, reduced in flesh and suffering constant pain from the surface of the abdomen, whose skin was excoriated for some inches about the fistula. On examination a fistulous opening was seen in the median laparotomy scar—less than two inches above the pubis. This admitted the index-finger to pass its entire length into the bowel. Through the opening there was a constant flow of turbid intestinal fluid, sometimes containing bile, and after eating, bringing up with it considerable portions of partly digested food. The peristalsis caused an intermittent welling out of this acrid secretion, which had digested the superficial layer of the skin of the abdomen, so as to produce a red, excoriated, and extremely painful surface over the entire lower abdomen. Ordinary strapping and plugging were ineffectual in holding back the fluid. This condition added misery to the patient's increasing emaciation, and led her to despair.

The nature of the secretion left no doubt that the portion of destroyed intestine was high up in the ileum. The injury had apparently taken place during separation of adherent bowel at the former operation, and a portion had sloughed.

A few days were allowed for the excoriation of the abdomen to heal, by plugging effectually with a section of rubber ball, to the centre of which a string was attached, and fastened to a roll of gauze laid on the abdomen across the fistula, while the rubber pad was slipped into the bowel and drawn tightly up against its inner surface. This method I have found most effectual in closing fecal fistulae temporarily. It worked well here, and in a few days the abdomen was nearly healed. One day it was tied too loosely and peristalsis swept it quickly into the bowel, and it could not be withdrawn, until at operation it was found nearly a foot away and drawn back by the string, which was caught at the wound.

On May 29, 1891, I did a laparotomy and found a loop of small intestine, quite high up, bound tightly to the abdominal wall around the fistula, and to neighboring intestine also. Careful dissection showed that two-thirds of the lumen of the gut at the site of the fistula had been destroyed, and resection was the only resort to restore it. I therefore dissected the entire mass of adherent bowel from the abdominal wall and from the bladder, to which it was intimately adherent, so that in the dissection a small opening was torn into the latter. This I immediately sewed up and tested by forcing Thiersch's solution into the bladder to prove its perfect closure.

The matted bowels were then separated from each other. In doing so I found a silk pedicle ligature at the site of one ovary, with some drop or two of pus about it. This I cleaned away. Two inches of the injured gut were then resected, including the fistula. Each severed end was inverted and closed by a double row of continuous fine black silk suture. The mesentery having been sufficiently divided, there was no trouble in drawing the ends past each other so as to overlap for six inches. In this position they were sutured together by a double row of continuous silk suture, and an incision four inches long made in each opposing bowel; a quick overhand, running suture of the cut edges, and the continuation of the double row of sutures about the opening completed the anastomosis. The parts were now washed with boiled water and replaced. The abdomen was closed without drainage. Primary union occurred. Convalescence was uninterrupted. The temperature remained below 100° F. A seidlitz powder was given daily after the second day. On the third a large movement occurred, repeated daily. Her appetite became enormous, and flesh was rapidly gained.

She is now in perfect health and the abdominal scar is strong. (The patient was exhibited).

CASE II. Double Intestinal Obstruction—Resection of Cancer of Sigmoid Flexure—Lateral Anastomosis—Complete Recovery.—Miss E. R——, aged forty-one, was referred to me, April 5, 1891, by Dr. W. H. Draper, with the following history of obstruction: Ten days previously she had observed increasing constipation, and began to take physic without effect for four days, when her physician was called, who, after exhausting all expedients without more effect than emptying the lower bowel of scybali, diagnosed obstruction requiring surgical interference. She was unable to void flatus per anum, but had considerable in the intestine. She had little abdominal pain. Four days previous to her admission to St. Luke's Hospital she had stercoraceous vomiting, as reported by her physician, which was repeated on the following day.

Examination showed a distended abdomen with some tympanites, though dull in the right half and across the upper abdomen. No certain indication could be found of the seat of obstruction. After consultation I decided to explore the left ileo-hypogastric region through an incision as for inguinal colotomy, and make a temporary relief if found desirable, inasmuch as she was not in good condition to do any extensive surgical procedure. I was surprised to find the descending colon empty, and the ascending and transverse colon enormously distended. The distention terminated in an abrupt rounded bowel in the left hypochondrium. Without searching for the cause of the obstruction under these difficulties, I decided to make a temporary right inguinal colotomy and stitch the caput coli in the wound. This I did, and on the following

day opened the caput coli and evacuated a great accumulation. She made a quick convalescence, and on the ninth day I did a laparotomy on the outer side of the left rectus, at its upper part, in order to relieve the supposed obstruction of the splenic flexure of the colon found previously. On reaching the colon it was found sound and empty from the caput coli to the sigmoid flexure. Search for the cause of obstruction revealed an anomalous double mesocolon from the splenic flexure downward, a finger's-length on the outer side of the normal one, forming at its lower edge an inverted pocket into which the colon had formed a hernia, which had been spontaneously corrected after the bowel had been evacuated by colotomy. This, it was thought, had completely explained the former trouble, and the abdomen was closed. Subsequent efforts, however, failed to bring fecal evacuations from the colotomy wound to the rectum, nor would colored fluid injections find their way in the opposite direction. The distended rectum could be made to hold but a small pint. No tumor could be felt by palpation.

May 13, 1891.—She was again subjected to search of the left iliac region through a wound on outer side of the rectus, low down. The empty descending colon was traced down to a very small, knotty cylindrical stricture of malignant origin, which was found, on distending the rectum, to allow no fluid to pass. It was located twelve inches above the anus. Resection of this, and three-quarters of an inch of sound bowel on either end, with a portion of the mesentery adjacent, was done with considerable hemorrhage, readily controlled. The ends of the divided bowel were completely closed by continuous suture, and the two free parts overlapped to their utmost, which proved to be four inches. After suturing them in position, opposing incisions were made in the bowel three inches long. This was carefully measured in view of future estimate of stenosis. The anastomosis was quickly completed and the cleansed parts dropped back. The time of the anastomosis was forty minutes, but inasmuch as the entire operation, including search, separation of old adhesions, resection, etc., with concluding closure of the abdominal wall, occupied over three hours. I am free to confess that, to my mind, it makes little or no difference whether the time given to the act of uniting the bowel was thirty minutes or forty. It was in this case much more important that the union should be absolutely perfect. The use of artificial rings and plates was in my mind throughout the operation, and I had several sizes and varieties prepared and at hand, and could but feel that I would not only have been hampered at every step of suturing around them, but would have been wholly uncertain of exact apposition by any method other than the simple suturing, which worked like a charm in this case, for the parts could not be brought out of the wound. The patient endured the operation very well. On each day

she passed flatus. On the second day the colotomy wound was plugged. On the third day a large-formed movement passed per rectum, and from that day her convalescence was uninterrupted. Daily evacuations occurred, either from medicine or naturally. The colotomy wound closed to a sinus which leaked a little, but was perfectly controlled by a strap.

During the summer she got back her flesh and health, and continued to have normal movements, enjoying a happy summer in the country. Six months after operation she came to me, looking in perfect health, but complaining of fulness in the pelvis. Examination revealed a small growth of the right ovary, the side opposite to the diseased sigmoid. In one month this had undergone a very rapid growth and was as large as a child's head. For my accommodation, Dr. Robert F. Weir very kindly took the patient into the New York Hospital and removed a large carcinomatous right ovary, which had formed many adhesions, and grown intimately to neighboring parts; but she did not recover.

I had the satisfaction of examining the anastomosed parts of the colon *in situ* during this operation, and found absolute freedom from cancer anywhere about that side of the abdomen, except a speck of suspicious growth, the size of a mustard-seed, in the wall of the bowel, two inches above the anastomosis. This specimen, removed from the patient after death, and prepared by Dr. Ferguson, pathologist of the New York Hospital, I have the satisfaction of showing you now. The restoration of the lumen of the bowel is perfect.

The oval aperture between the two portions is, as you see, large enough to admit two fingers side by side up to the first joint, and ably demonstrates the perfect union and freedom of a proper channel produced thereby of a lateral anastomosis by suture.

With regard to the possibility of an end-to-end suture of the bowel in this case, I would say that I had here to deal with bowel of two unequal diameters, as happens so commonly in stricture with dilatation above it; and after resection of the diseased part and its infiltrated mesentery I feared to unite the ill-matched ends.

CASE III. *Intestinal Obstruction from Incarcerated Hernia—Resection—Lateral Anastomosis—Recovery.*—P——, aged thirty five, Plattsburg. Five years ago was caught between two cars and sustained a crush of the body that caused a traumatic hernia of the abdominal wall, just below the ribs, on the outer side of the left rectus muscle. This hernial tumor was as large as a flattened goose egg, and gave him no serious trouble. Three weeks ago he had an injury of the part by the thrust of a stick, and began to have symptoms of obstruction—loss of appetite, some vomiting, pain in the upper part of the abdomen but not in the hernia, constipation, loss of flesh, and jaundice.

Examination showed a flaccid hernial mass at the side

described, and some dulness of the hypochondrium.

December 28, 1891, I operated, making first a median incision above the navel to introduce two fingers for exploration. The fingers entered a sharp-edged hernial pouch, two inches in vertical diameter at the site mentioned, to the edges of which omentum was adherent. A vertical incision was now made directly over the hernia, and a loop of small intestine found embedded by firm old adhesions in the tissues of the abdominal wall. This was with much difficulty dissected out; at its upper part it was so matted to the sharp edge of the ring that a rent occurred during its removal. Its complete removal being accomplished, and sound intestine being drawn out of the abdomen, it was found that the intestine, under pressure, where the rent occurred, was atrophied to a fibrous tube, the size of one's little finger, for an inch and a half, and without a mesentery to nourish it. The intestine above it was the jejunum, thickened and distended by chronic obstruction. The damaged portion, about an inch and a half, was therefore resected, and the ends of the sound gut sutured. Protecting the abdominal cavity, and drawing the two adjacent portions of sound intestine out of the abdomen, they proved to be of wholly unequal size and not adapted to end-to-end anastomosis. I therefore laid their two ends together and did a lateral anastomosis, after the manner followed in other cases, using sutures only of fine black silk around an incision of full four inches in each bowel. The entire anastomosis occupied thirty-six minutes, and was most satisfactory. The parts were washed in hot water and replaced, and the abdominal wounds closed without drainage. Uninterrupted convalescence occurred. The bowels moved by enema on the third day, and afterward by salines. The sulphate of magnesia, a drachm, repeated once or twice.

Tonight, the fourteenth day, the man presents himself for your inspection in restored health. The jaundice disappeared directly after operation, and I can only explain it by believing the over-distended duodenum allowed the bile to be retained.

CASE IV. Resection of Six Inches of the Rectum by Kraske's Method—Circular Suture—Recovery.—M. K——, aged twenty-nine. One year and a half ago this patient began to notice growing constipation, requiring medicine. Later she had occasional colicky pains in the abdomen, with nausea and vomiting, progressive weakness, with bowel relief only in watery movements through medicine, and increasing nausea led her to seek advice.

February 14, 1891, when I first saw her, she had had no movement for a month. She was in a serious condition of exhaustion from vomiting, pain, and distention. She had retained no food for a number of days, and was very thirsty. Her stomach was twice washed out, and a pint of warm milk injected, which was retained but a few hours. A little gas and considerable blood passed the bowel. The

abdomen was tympanitic and the colon distended.

Examination per rectum revealed an empty lower rectum, but at the extreme point reached by my finger, which is rather a long one, a cancerous growth could be detected as large at its lower end as an egg. This could also be felt above the pubis by palpation.

February 15th.—Left inguinal colotomy was done, and immediately relief afforded to the distended colon.

March 13th.—The patient had made a very excellent recovery, since nourishment had been well retained, and evacuations had been thorough through the colotomy. Today, with the assistance of Drs. Murray and Curtis, I removed the lower portion of the sacrum, through an eight-inch vertical incision in the median line, from the base of the sacrum nearly to the anal margin. The portion of the rectum uncovered was quite sound, but was dissected out so as to drag it down, and with it the cancerous mass, which was six inches from the anus. At that part the attachment to the pelvis was firm, and it was only after entering two fingers into the peritoneal cavity anterior to the rectum to handle it the better, and after ligaturing and cutting free the meso rectum, that the mass was brought down into the wound. This being done, it was found easy enough to drag down more of the rectum. This was done, and sound gut above the disease was readily brought down to meet the sound bowel above the anus, where it was cut off, because the intermediate rectum was much bruised in the handling. The peritoneal cavity was closed by a few sutures, uniting it to the anterior rectal wall, and the cut edges of the bowel united by a double row of sutures of fine catgut. There was no tension on these edges, owing to the free drawing down of the sigmoid flexure, and it was evident I could have resected more of the latter if it had been needed. The gut was completely closed and laid back in the pelvis. A light packing of iodoform gauze was laid upon it, and the superficial wound closed. The operation throughout had been comparatively free from hemorrhage.

On the second day fecal matter was evacuated per anum. On the third day the posterior wound was opened on account of a little foul pus, and a small opening was found to have taken place between the posterior sutures of the gut. When she left the hospital some weeks after, in good condition, there was still a small fistula in the centre of the sacral cicatrix, but an adhesive strap controlled the discharge. The rectal movements were perfect. During the summer she became robust and well, attending to her household duties, and having comfortable daily evacuation. The sacral fistula healed entirely.

In November, however, the old symptoms recurred, and when I saw her, nine months after the Kraske resection, there was a recurrence of the malignant growth in the pelvis about the cicatrix. This underwent a rather rapid development, though the patient looked well and

continued about her home duties. The obstruction now became troublesome, and the sacral cicatrix showed cancer infiltration, and discharged faeces through a re-opening of the fistula.

The left inguinal colotomy has required reopening, and she will undoubtedly have her life prolonged somewhat thereby, from arresting the fecal irritation of the rectum.

CASE V. Strangulated Hernia—Gangrenous Gut incision—Longitudinal Suture—Recovery.—On May 13, 1891, I was called by Dr. Strong, of Long Island City, to see Mrs. K. C.—, an elderly lady of fifty-five years, who had had pain and vomiting from an incarcerated right inguinal hernia for ten days. During the three latter days she had had grave changes in symptoms, with vomiting almost constantly, and for one day of a most offensive yellow fluid fecal matter. She had fallen into the usual shocked and apathetic state, with foul tongue and breath, thirst, weak pulse, 126, and inability to retain anything. The abdomen was distended, no movement had taken place for ten days. I operated at once under ether. The hernial sac was the size of a hen's egg, thickened, filled with fluid and a knuckle of very dark adherent gut. On being released and drawn down, a circle of gangrene less than a half-inch in diameter was seen where the ring had pressed upon it. It was so far sloughed as to be just ready to fall out. It was evident that either resection or artificial anus, or some form of suturing would be needed to repair it. I chose the suture. If I had sutured the bowel surface on opposite sides of this slough one way, it would have narrowed the lumen to such a degree as to cause stricture. If in the opposite way, it would have made an elbow that would have made obstruction. I therefore made a longitudinal cut of the bowel-wall, two inches long, with the slough as its centre, and sutured the edges of the cut in such a way as to make an elbowed bend of the gut with the cut splitting up the flexure crease. Two rows of silk sutures were placed round this cut and the parts washed and dropped back. The sac of the hernia was dissected out and the ring closed. Primary union occurred and an uninterrupted convalescence ensued. A large fluid fecal movement took place a few hours after the operation. The patient has never had a bad symptom and is now in good health, the functional action of the bowel being perfect.

CASE VI. Cancer of the Stomach—Gastro-enterostomy.—Mr. G.—, aged sixty-three. For two years has had symptoms of gastric trouble. During the first year had dyspepsia, frequent vomiting, but no pain or tumor. During the past eight months has had more vomiting, moderate pain, and a perceptible tumor, which he unwisely concealed. Two weeks before I saw him he again consulted his physician, Dr. Shufelt, of this city, having emaciated rapidly, though having strength to be about his house and conduct his business. His vomiting

now consisted in large accumulations of what he had eaten and drunk for a day previously, none of which seemed to have left the stomach. The bowels were quite empty. Occasional gnawing and crampy pains occurred at the pit of the stomach, and a tumor was found in the epigastrium.

I saw him December 4th. Dr. Schufelt's diagnosis was confirmed. The man's cachexia, emaciation, continued emesis, and the tumor were in evidence. The latter was unusually low down, being a hard flat mass the size of one's fist, with its centre at the right of the navel. The stomach-tube brought away a quart of sour, undigested food and milk, and the organ was washed out with an alkaline liquid.

The patient's pulse was thready, and condition wholly unpromising. Yet his energy and will were so strong that I decided, after endeavoring for three days of preparation by stimulants, nutritive enemata, and stomach washing once daily, followed by introduction of warm, soft nutriment into the stomach, to fit him for exploration and possible gastro-enterostomy.

December 7th, at his urgent request I operated, under ether, assisted by Drs. Shufelt, Fisk, and Dunham. The stomach was found greatly dilated and pouched in the left hypochondrium. The pylorus and anterior wall for a space of four or five inches was a solid, flat, malignant mass, distorted and dragged below the level of the navel. Extensive cancer infiltration stretched into the mesentery. Displacing the transverse colon and omentum, I seized the nearest coil of small intestine below and behind the stomach, and drawing it into the wound applied Senn's method of determining the location of the duodenum. Holding the loop first seized, I drew out a foot and a half of the bowel and found it appreciably thinner in the texture of its walls, showing that it led toward the distal part. Replacing it, I then drew in the opposite direction and found, in less than a foot, that it could be dragged no farther and that its walls were perceptibly thicker. For further corroboration I slipped my fingers down the face of the gut into the abdomen, and found it secure in the duodenal region. I now quickly dragged up the most convenient sound portion of the anterior wall of the stomach, and applied two parallel rows of continuous fine silk suture to unite the wall of the bowel and stomach for full three inches. Having previously secured the abdomen against the entrance of fluid by packing with flat sponges, around and within the lips of the wound, but not putting them wholly into the cavity, I opened the bowel and stomach by free incision two and a half inches long, and half an inch from the line of sutures, and secured the apposition as detailed elsewhere.

Repeated flusing of the exposed parts with hot water maintained cleanliness. The united portion being dried, were dropped back and the abdomen closed. The entire

anastomosis occupied but twenty minutes. Fine black silk and straight needles alone were used.

The latter part of the operation was done with the patient's head lowered to maintain heart action. After operation he rallied well for two hours, but then failed, and, in spite of saline infusion of more than a pint into a vein at his elbow, as well as stimulating enemata and hypodermics, he failed and died.

CASE VII. *Lateral Anastomosis by Catgut Rings for Chronic Obstruction—Death.*—December, 1889, Charlotte B——, aged forty-four, was transferred to my care in an exhausted state from symptoms of chronic intestinal obstruction, with continuous vomiting of yellow and offensive fluid, persistent cramps, and intense thirst, and emaciation which had been progressive for two months, but which had existed in moderate degree for the previous year. A large tumor of the abdomen was observed, containing fluid and gas. December 22d, I did laparotomy, discovered a small malignant stenosis of the ileum, with enormous dilatation above it resembling a stomach. The conditions seeming favorable, I did an immediate lateral anastomosis, uniting the intestine above and below the stenosis by aid of catgut rings. The patient's condition was not warranting resection of the malignant portion. The time of anastomosis was twenty minutes. The patient survived six hours, dying from the exhaustion incident to her grave condition.

Observations.—It has been with uninterrupted interest that the surgical world has for several years watched the reported researchers in the field of intestinal surgery for the development of additional resources to enable it to cope with the complex accidents in this field. Experimental work has shown that the use of artificial aids in restoring the intestinal canal by anastomosis is feasible by such means as bone plates, catgut rings, segmented rubber rings, or vegetable plates. Their use has largely been confined to experiments upon dogs, and their boasted advantage has been that there will be a reduction of time at operations. While not denying the utility of experiments upon dogs (for I am myself indebted largely to this work for valuable lessons), I would emphasize the contrast that exists between operative work in dogs and in the human subject, on account of the relative quality and reparative action in the two species. It is extremely easy to accomplish satisfactory recoveries in surgery of dogs' intestines by almost any method.

Accumulating evidence of the methods applied to the human body may now be weighed by those of experience in this field. From evidence of published and unpublished cases, it can be shown that in the hands of even competent men, using any of the artificial aids to accelerate the operation, the accidents may occur of having leakage, or suppuration, or hemorrhage, or obstruction from plates, or irritation of the canal from so considerable

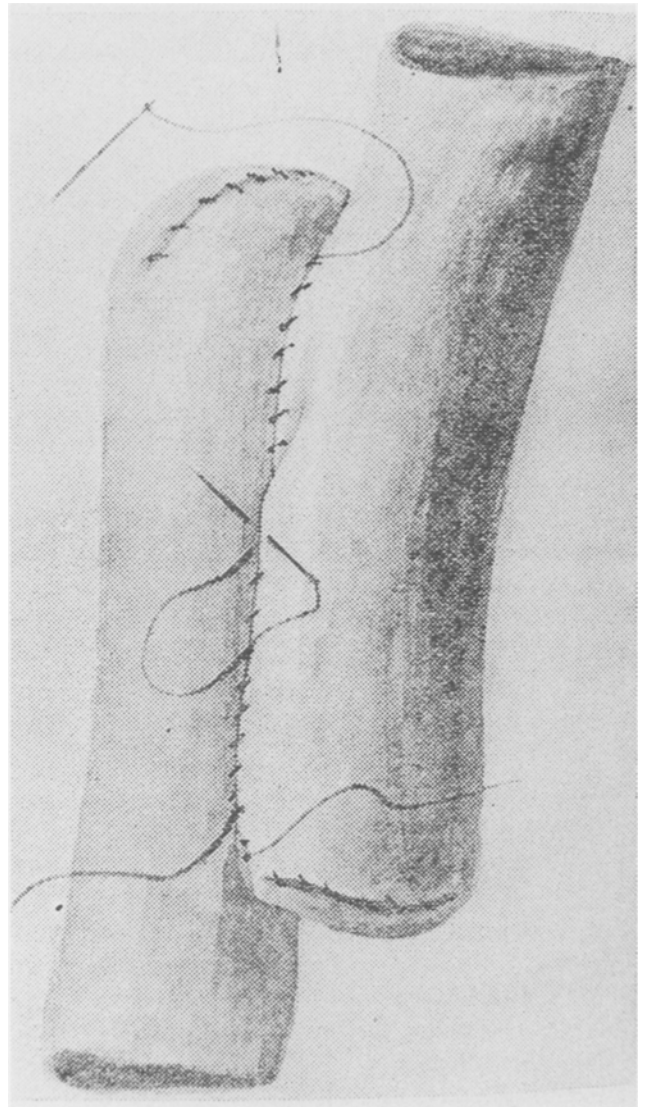


FIG. 1.—Suturing Intestines in Apposition before Incision.

a foreign body. The question of time gained during what is usually a prolonged operation, perhaps at most five or ten minutes, in the face of the uncertain advantage of bone plates, etc., is one that in my opinion is greatly outweighed by the superior advantage of having absolute security against leakage, blocking, etc., by the method of simple suturing. The technique of the latter procedure is a matter of easier accomplishment and far greater satisfaction in its results than that of the newer methods. The fifteen recently reported cases of gastro-enterostomy by Senn, seem to me to give results inferior to the older method by suturing.

There is one feature of the operation of anastomosis which has heretofore received no special attention, but which I believe to be of the very greatest moment in determining the lasting benefit of the operation, that is,

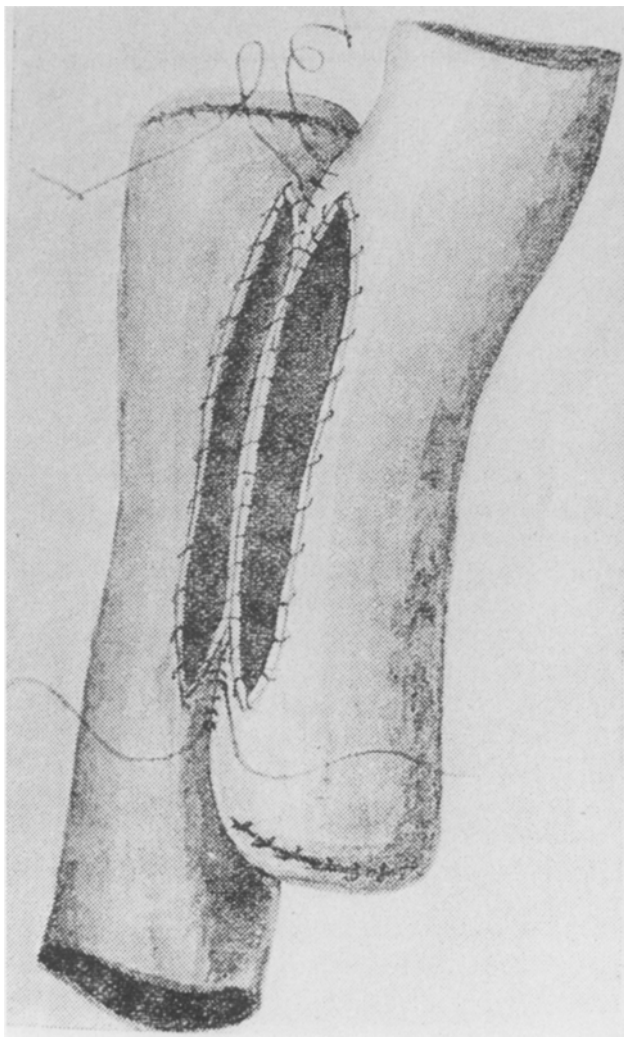


FIG. 2.—After Four-inch Incision and Sewing the Edges.

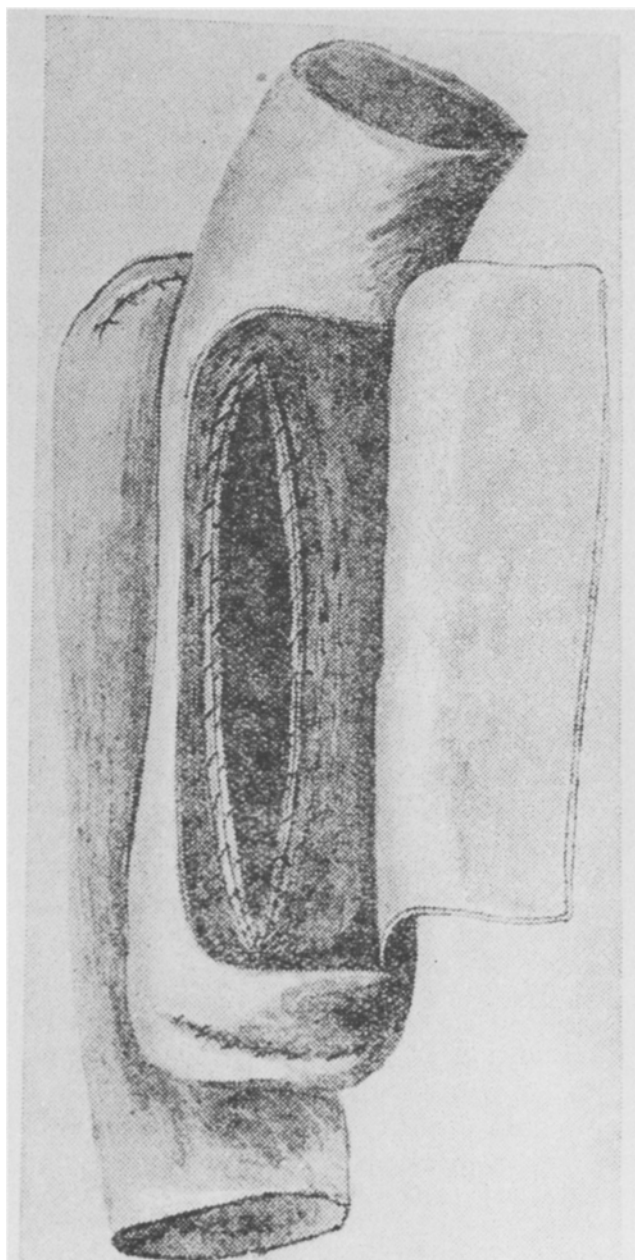


FIG. 3.—Complete Anastomosis. Window cut out to show interior.

the question of stenosis of the newly made orifice. The law of cicatricial contraction, that operates so effectually in closing accidentally made fistulae into the intestinal tract, or comparatively large ulcerations between the gall bladder and the intestines, is here the direct antagonist of the surgeon in his endeavor to create a permanent and adequate anastomotic opening. The incised opening made for the use of Senn's plates is about one inch and a half in length, and the contraction of such an opening sometimes with great rapidity, has in some cases rendered it entirely inadequate to its service. Not many autopsies remote from the date of operation are as yet recorded. Three of my cases of lateral anastomosis illustrate the subject admirably. In the first done in 1888, between the ascending and transverse colon, where I had used Senn's plates, the patient dying six months after operation, the aperture, which was one inch and a half in length, had contracted to three fourths of an inch, and was sufficient

for its purpose only when laxative medicine was constantly given. In the second case, the patient dying six months after anastomosis, with catgut rings, the opening had contracted from one inch and a half down to a half-inch. In the third case, eight months after lateral anastomosis of the sigmoid by suturing, the aperture contracted from three inches to one and a half. This was perfectly competent to do the functional work of the bowel.

These results were relatively good, but not so perfect as that which so far has been brilliantly demonstrated in two of the other cases just reported, where lateral anastomosis

by suturing around a four-inch opening was done with instant and absolute functional restoration.

I believe the future utility of lateral anastomosis lies in making openings four inches in length in the sides of adjacent bowel. This, I contend, is almost impossible with bone plates, and only to be done by very long catgut rings or vegetable plates, with less security and as much consumption of time as by suturing. The contrast is enormous between dropping back into the abdominal cavity a beautifully sutured, absolutely tight and flexible anastomosed end of intestine to any position in the abdomen which its natural surroundings demand, and the returning a huge bunch of bowel, inside which there is a pair of five-inch plates of bone or raw potato, to remain as irritating foreign bodies stimulating peristalsis, and tugging at the wound until they are softened enough to be swept on by the current, or, as in one of Senn's cases, to be vomited up after dangerous retching.

As regards time, even were it proved that a hand equally expert at each method could do that by plates a few minutes quicker, the relative advantage of the two procedures for safety still lies with suturing.

But, as a matter of fact, I have found that to do thoroughly a lateral operation in the living subject, by either plates or rings, takes twenty or twenty five minutes, and the same operation by simple suturing, done with the greatest nicety and perfect security, has taken me twenty minutes.

The six cases of lateral anastomosis of bowel to bowel, as well as the gastro-enterostomy and other intestinal suturings, which I have reported (*Philadelphia Medical News*, June 1, 1889), speak strongly in favor of the uniform use of suturing alone. The one fatal one of the six lateral cases was where I made immediate apposition of an enormously distended bowel above an obstruction to a collapsed portion below it, the patient already in a deplorably bad condition.

Since that and other experiences with great fecal accumulations, I have strongly advocated the uniform practice of first creating an artificial anus, allowing a few days for recuperation, and avoiding the fecal toxæmia, which I believe is a serious factor when the stagnant flood of fluid faeces flows freely into the unused and receptive bowel eager for absorption.

The perfect technique of suturing will be found in the following method:

Bring the two surfaces that it is proposed to unite well up in the wound, and surround them by small compresses

of gauze or towels or flat sponges wrung out of hot water.

Have at hand a half-dozen fine cambric needles threaded with ordinary finest black embroidery silk that has been well boiled and kept in alcohol. Cut in lengths of not more than twenty-four inches and tie with a single knot at the eye of the needle, with one end cut to within two inches. Apply two parallel rows of continuous Lembert suture, a quarter of an inch apart, and an inch longer than the proposed cut (Fig. 1.). Leave each thread with its needle attached at the end of its row. Now open the bowel by scissors, cutting a quarter of an inch from the sutures, both rows of which are to remain on one side of the cut. Make the bowel opening four inches long. Apply clamps temporarily to several bleeding points, pinching the entire thickness of the cut edge without hesitation. Apply no ligatures. Treat the opposing bowel in the same manner. The clamps remaining *in situ*, the parts are quickly rinsed with water. Another silk suture is now started at one corner of the openings and unites by a quick overhand the two cut edges lying next the first rows of sutures (Fig. 2). The needle pierces both mucous and serous coats, and thus secures the bleeding vessels, from which the clamps are removed as the needle reaches them. This suturing is then continued round each free edge in turn, and all bleeding points are thus secured more quickly than by ligature. The serous surfaces around these button-holes are then rapidly secured by a continuation of the sutures first applied, the same threads being used, the one nearest the cut edge first. The united parts are again rinsed with water and dropped into the abdomen.

In conclusion I would reiterate my conviction: 1. That the attempt to simplify the technique of lateral anastomosis by bone plates and other devices has not improved it. 2. That lateral anastomosis properly done is eminently the safest and best method of restoring the canal in most cases. 3. That simple and thorough suturing with a fine silk continuous suture, applied after the manner detailed, is most satisfactory. 4. That in order to allow for the inevitable tendency to stenosis an aperture four inches long should be made between bowels. 5. That scarifying opposing surfaces is entirely unnecessary to quick and solid repair.

Bibliography

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