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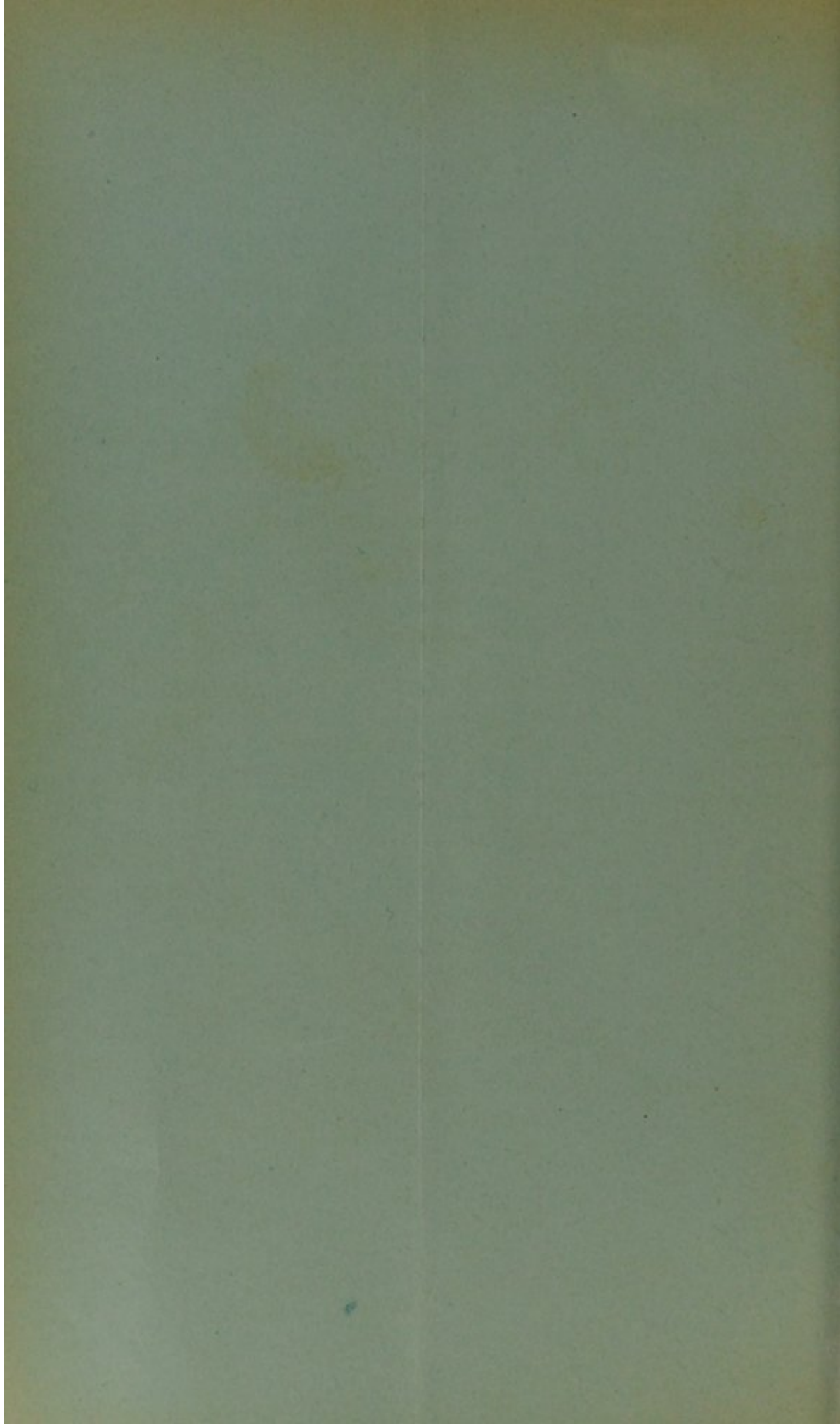
Multiple Stricture of the Small
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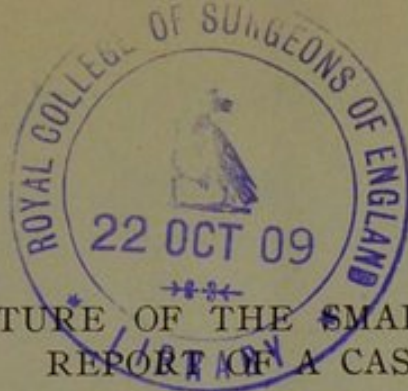
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MULTIPLE STRICTURE OF THE SMALL INTESTINE, WITH REPORT OF A CASE.

MEDICAL ASPECT.

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SURGICAL ASPECT.

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NARROWING of the lumen of the small bowel occurs sufficiently often to be worthy of more serious thought on the part of the physician. The diagnosis may be difficult or impossible, owing to the fact that the contents of the small intestine are normally liquid and may pass through a portion of the bowel considerably diminished in caliber without causing symptoms.

The consideration of the following data dealing with intestinal stenosis, quoted freely from several authorities, it is believed will be helpful before taking up the particular case to be presented at this time.

Modifying the classification of Prof. Carl Bayer* the causes of acquired stenosis may be given as follows:

1. Pressure from without:

- (a) Enteroptosis.
- (b) Pregnancy, tumors from pancreas or retroperitoneal glands. Mesenteric cysts, marked ascites.
- (c) Local pressure, appendix, Gall-bladder. Meckel's diverticula.
- (d) Volvulus and internal hernia.
- (e) Adhesions due to inflammation or operative work resulting in compression or angulation of the bowel.

2. Developing from within:

- (a) After ulcer.
 - Syphilis
 - Tuberculosis
 - Actinomycosis
 - Typhoid.
- Duodenal ulcers
 - Peptic.
 - After burns.
 - After laparotomy.
- Jejunal ulcers, after gastrojejunostomy, in cases with

*Prof. Carl Bayer, *Zur Pathologie und Therapie der Darmstenose*, Würzburger Abhandlungen, Würzburg, 1901-02, p. 151.

excessive hydrochloric acid.

Chronic colitis.

Dysentery.

Gonorrhea.

(b) Carcinoma, sarcoma

(c) Benign intestinal tumors—myomata, lipomata, fibromata, adenomata, angiomata.

(d) Obstruction through foreign bodies, coarse indigestible pieces of food, gall-stones, worms, etc.

(e) Intussusception.

3. Functional or spastic stenosis.

It is to the forms of stenosis due to *stricture* of the *small intestine*, by which is meant those developing in the bowel wall, that attention is especially invited in the present paper.

According to Treves, * there are three classes:

1. Cicatricial or simple stricture due to cicatrization after nonmalignant ulcer of the bowel.

2. Cancerous stricture due to deposits of carcinoma in the bowel wall.

3. Congenital stricture due to defects in development and possibly to other intrauterine changes.

The cicatricial strictures may follow primary ulceration, strangulated hernia, or injury. They occur in the duodenum chiefly after simple ulceration, as in the stomach, or very rarely after tuberculous ulceration in this part of the bowel.

Tuberculous ulcer is met with in all parts of the bowel; but especially in the lower portion of the ileum (Treves, Nikoljski).

The strictures due to tuberculous ulcers are often multiple, as many as five and seven having been found (Treves).

Nikoljski † in his admirable paper on Tuberculous Intestinal Stenosis, in which he has collated 150 cases, concludes that multiple tuberculous stenosis is as frequent if not more frequent than the single. He considers that in half of the cases the bowel involvement is secondary to affections in other parts of the body.

Fleiner ‡ writing on the pathology of tuberculous stricture, states that "the tuberculous ulcers spread preferably in the direction of the vascular division, therefore vertically to the longitudinal axis of the intestine; thus the annular or girdle like ulcers develop." Also that "tuberculous granulation proliferation may terminate in caseation and ulcerous decomposition as well as induration, according to the action of the bacterial toxins and the composition of the base on which they develop, and also perhaps the constitution of the patient (Ziegler). Hence we find in one case extensive and advancing ulceration on the intestine,

*Treves, *Intestinal Obstructions*, p. 202.

†A. W. Nikoljski, *Ueber tuberculose Darmstenose, Sammlung Klinischer Vorträge*, Leipzig, 1903-1907, p. 31.

‡W. Fleiner, *Intestinal Tuberculosis, Diseases of the Digestive System. Modern Clinical Medicine*, New York and London, 1906, p. 690.

in another, on the contrary, a conspicuous tendency to cicatrization and induration by connective tissue proliferation. Undoubtedly the cicatrization of a tuberculous ulcer must be regarded as a favorable process and indicative of a cure. This healing tendency may, however, in one sense be a disadvantage to the organism, for, as pyloric stenosis may develop in consequence of the cicatrization of a gastric ulcer at the pylorus, so by the cicatrization of an annular tuberculous ulcer of the intestine constriction of the intestine and severe disturbances in function may be brought about. Such cicatricial stenoses in the intestine occur simultaneously with tuberculous ulcers; I have repeatedly seen them multiple in the same case."

Typhoid ulcers rarely produce stricture (Treves*). Syphilitic ulcers, often multiple, may produce strictures, but these are rare except in the rectum.

Nikoljski states that sarcoma seldom causes stricture; that carcinoma is rare in the small intestine and stenosis rapidly develops; that benign neoplasms seldom cause stenosis (quoting Nothnagel), and that the most frequent cause of chronic stricture of the small intestine is tuberculosis.

Nothnagel * formulates the following law:

When there is an unquestioned stenosis of the ileum and absolutely no point by which we may recognize its anatomical nature, we should primarily think of cicatricial stricture following tuberculous ulcers of the ileum, even although no other evidence of tuberculosis can be determined.

Practically, then, we rarely have to deal with more than two forms of chronic *stricture* in the small bowel. These are, first, those following simple ulcer in the *duodenum* and, second, those due to tuberculous ulceration, usually in the *ileum*.

The *symptoms* of duodenal stricture are practically the same as those in cases of pyloric stricture, causing—when the narrowing is pronounced—belching, gastric distention and dilatation, stagnation, or retention of food pain, nausea, vomiting, and loss of weight and strength. If the stricture be below the orifices of the biliary and pancreatic ducts bile and pancreatic juice are mixed with the gastric contents and marked bilious vomiting may occur.

Nikoljski† gives three clinical varieties of tuberculous stricture of small intestine with symptoms as follows:

1. Cases with acute sudden onset.
2. Cases with gradual slowly developing illness.
3. Latent cases.

The last may give no symptoms, or may be hidden under the picture of dyspepsia or diarrhea *without* evidence of stenosis.

*Treves, *Loc. cit.*, p. 209.

†H. Nothnagel, Intestinal Constriction, Diseases of the Digestive System, *Modern Clinical Medicine*, New York and London, 1906, p. 762.

‡Über tuberkulose Darmstenose von A. W. Nikoljski, *Loc. cit.*, p. 39.

Symptoms in first class, *i.e.*, those with acute onset, are sudden illness, sometimes at night, without discoverable cause; severe cramp-like pain in abdomen; distention, vomiting, constipation or diarrhea. In case patient lives, periodic attacks, which recur with increasing frequency.

Symptoms in second class slowly developing; begin with diarrhea, constipation, or abdominal pain. Later belching, nausea, vomiting, tympanites, peristaltic movements, emaciation, and anemia. Alternately better and worse. May continue twelve to twenty years. (In addition to the above-mentioned physical signs there may be localized gurgling sounds and the "organ pipe" distention mentioned by Treves.)

The colicky pains usually last but a few minutes at a time; whereas in renal and biliary colic the pain may persist for hours. Splashing present in chronic forms (Shlodowskis). Fever seldom present.

The prognosis in these cases is unfavorable unless the condition is corrected surgically at the earliest possible period.

REPORT OF CASE.

Miss W. Age thirty-one years. Born in Ireland.

Family History.—Grandmother died of cancer. Father died at seventy of heart and liver trouble. Mother living. No consumption in family.

Previous History.—Was healthy and rosy-cheeked as a small girl, but never as strong as her brothers and sisters. Headache and vomiting occasionally. Never had typhoid, specific disease, or any serious illness prior to present trouble. Attack of grip confining her to bed one week when eighteen years old. Rarely caught cold. It is possible that illness originated from infected milk supply.

Present Trouble.—At the age of sixteen patient, after two years of very hard work and heavy lifting, was attacked with distention of abdomen; felt as if a "stone were in stomach" a sense of intense pressure, and then vomiting which relieved the symptoms. Patient thought something was growing in abdomen. No diarrhea. Attack at first lasted three or four days, and returned at intervals of about a week. The pain was aggravated by stooping. Sometimes felt "chilly all over" during attacks. Able to take nothing at these times except eggs, bread, and hot drinks. Could not digest milk. Cold drinks increased the "pain and rolling."

For several years prior to leaving home regularly had pain and vomiting immediately following meals.

After coming to America six years ago patient was better for a year or more, when the pain and rumbling became more marked.

Constipated almost from onset. Some regurgitation during winter just passed. Rumbling and pain nearly constant in lower abdomen. At times distress so acute that the patient felt she could scarcely live. Pain only partially relieved by vomiting, which is now less frequent.

Physical Examination.—Fairly well nourished and reasonably strong. Heart and lungs normal. Abdomen much distended. At times faint peristaltic waves are observed below the umbilicus. Stomach bloated with gas. Greater curvature apparently extends to umbilicus. Below umbilicus is another much distended area which it is thought may possibly be connected with the stomach. Condition is suggestive of unusual hour-glass contraction. Percussion note has a different quality over the stomach proper and the lower tympanitic area. Marked splashing present below umbilicus, especially toward the right side. The accompanying photograph will give a clearer idea of the condition found on physical examination. The bowels distended with gas. Liver and spleen normal. Glands are not enlarged. Fever absent.

Blood.—Hemoglobin percentage 100. Red blood-cells about normal.

Urine.—Specific gravity, 1010; sugar, absent; albumin, absent; indican, slight excess; microscope: epithelium, few leukocytes and phosphates, no casts.

Functional Examination.—One hour after the Ewald-Boas test breakfast, October 22, 1907, the gastric contents gave the following results:

Consistency, one-fourth solid.

Mucus, absent.

Free hydrochloric acid, 45.

Total acidity, 100.

Starch digestion, fairly good.

Gastric digestion prolonged. Stomach wall atonic.

From ordinary physical examination the condition of stomach and bowels could not be satisfactorily determined and x-ray pictures were taken by Dr. Cole. These showed stomach to be in approximately normal position, although there was slight gastropexy and moderate relaxation of gastric wall. It was now thought that the distended splashing viscus below might possibly be a portion of the transverse colon, but the x-ray picture showed the error of this assumption, the colon lying rather higher than its normal position, doubtless crowded up by the distended small bowel below. By exclusion it was concluded that the distended bowel must be a portion of the small intestine.

An operation was recommended and the patient assented. Dr. Bainbridge operated March 13.

April 22, 1908, patient now has no pain. Bloating and rumbling are diminished. Feels well, but is still weak.

Physical Examination.—Tympanites over bowels present, but much diminished. Weight 98 $\frac{7}{8}$ pounds.

Functional examination of stomach one and one-fourth hours after E.-B. test breakfast.

Expressed quantity, 85.

Remaining quantity, 120.

Mucus, slight excess.

Appearance, yellowish.

Consistency, 1/2 solid, fine.

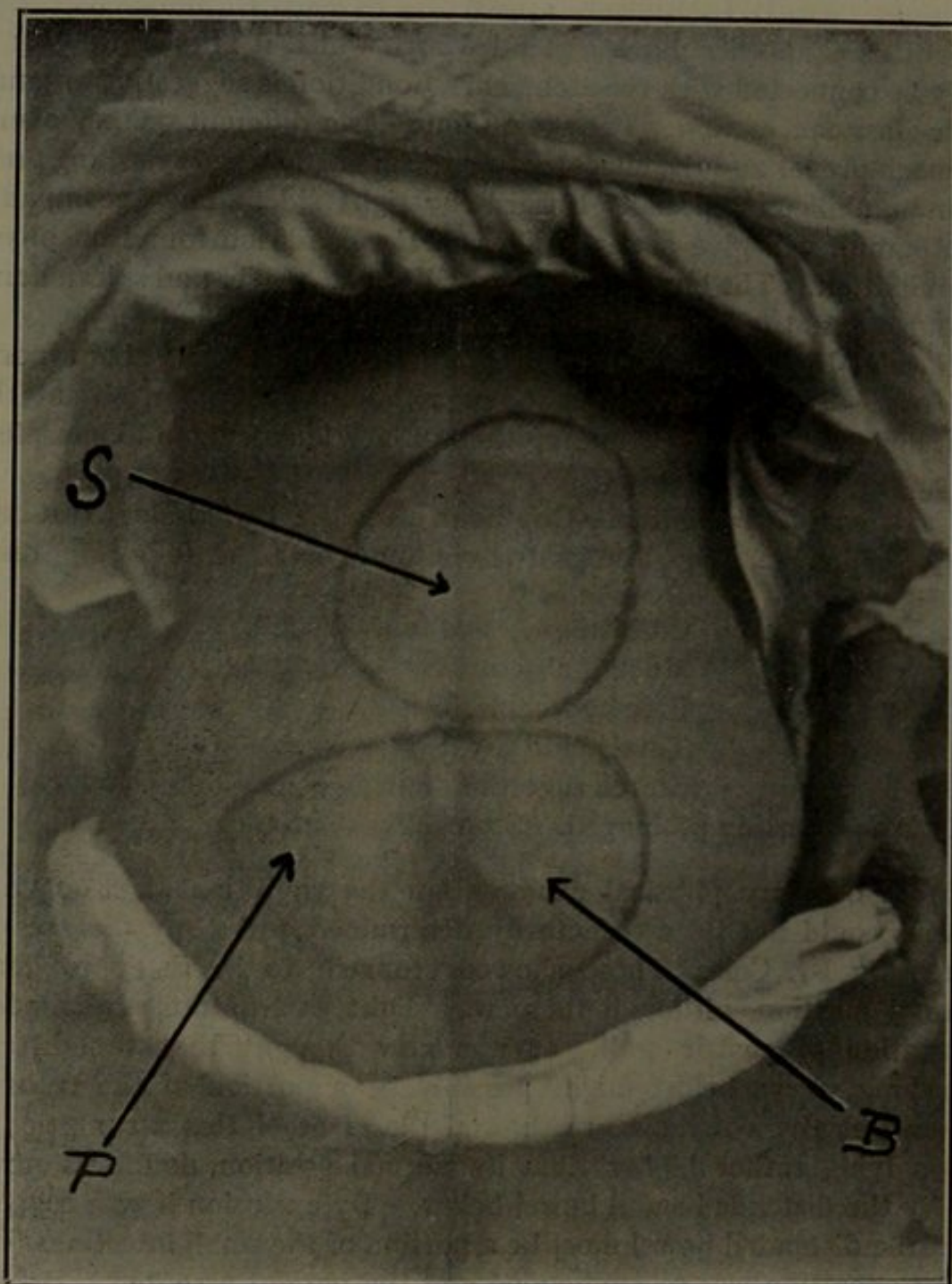


FIG. 1.

S.—Stomach Fundus at 6th rib. Greater curvature slightly above navel.

B.—Pouch of bowel. This splashes freely, and when markedly distended is practically in apposition with gastric wall; its lower border 10 c. m. below umbilicus.

P.—Point at which peristaltic waves are noticed and where a gurgling sound seems to indicate the exit of contents from the pouch.

Free hydrochloric acid, 32.

Total acidity, 80.

Lugol, brown-red.

Fehling, plus.

Organic acids, butyric acid odor.
 Blood, absent.
 Ferments, present in normal amount.
 Mother ferments, present.
 Microscope, starch granules, mucus, epithelium.

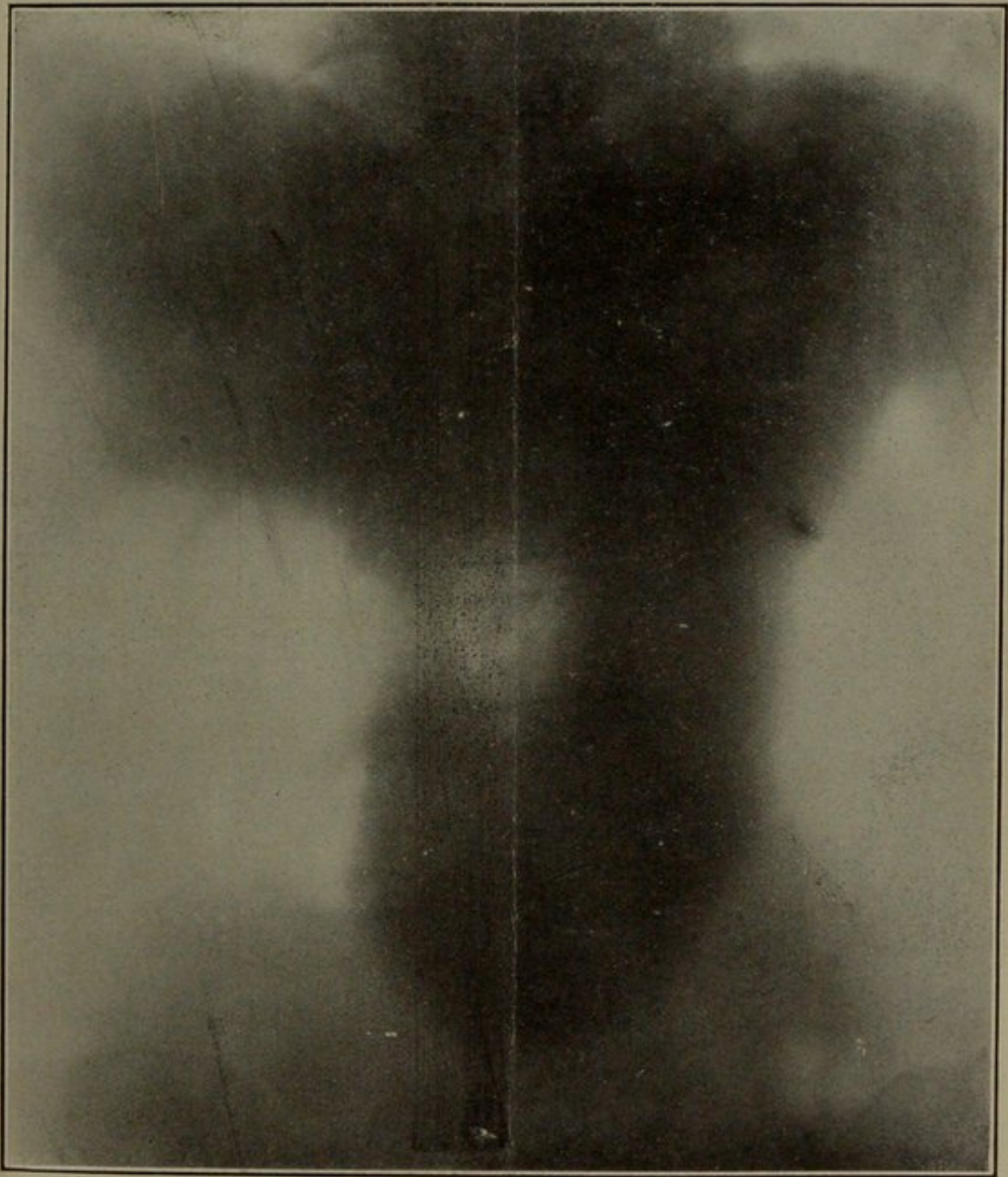


FIG. 2.

X-ray photograph. Patient standing. Stomach filled with bismuth and starch suspension.
 Shows slight gastropnoxis.

Urine.—Albumin, absent.
 Sugar, absent.
 Phosphates, abundant.
 Indican, small amount.

Blood, 100 per cent.

Red blood-cells, about normal.

April 28. Still has the "bloating," sufficient to have caused pain recently. Moderate tympanites most marked over former area of dilation.

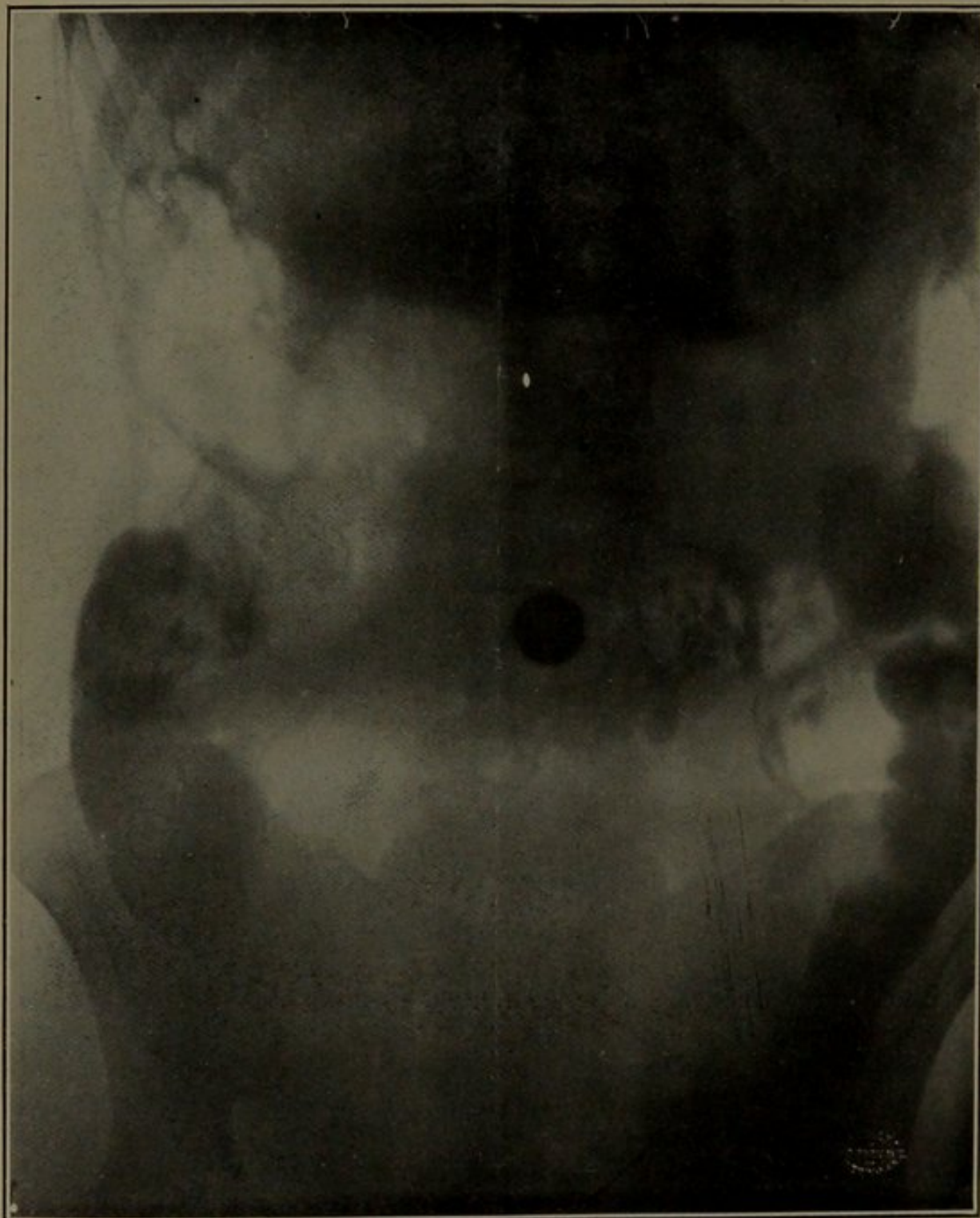


FIG. 3.

X-ray photograph of Colon. Transverse portion pushed upward by distended small bowel.

May 6. Patient gaining strength, but feels bloated. Physical examination shows moderate tympanites, especially on right side. There is splashing to the right of umbilicus and below its level.

Urine.—Specific gravity, 1011.

Albumin, absent.

Sugar, absent.

Indican, slight excess.

Microscope: epithelium; a few leukocytes; phosphates; no casts.

May 14. Doing splendidly. Very little tympanites.

June 25. Patient at work. Seldom notices any rumbling or bloating and digestion is good. Slight tendency to diarrhea at times.

The patient continued under treatment with steady improvement.

Examination in December, 1908, showed that the dilated small bowel had contracted, giving a tympanitic note differing from the surrounding organs over a space to the right of and below the navel measuring 10 by 6 cm.

January 9, 1909. Patient is occasionally annoyed by flatulent distention, but is stronger and feels better. Functional examination one hour after E.-B. test breakfast gave the following results:

Expressed quantity, 25.

Mucus, slight excess.

Appearance, normal.

Consistency, 1/2 solid.

Free hydrochloric acid, 5.

Total acidity, 42.

Starch digestion, normal.

Organic acids, absent.

March 26, 1909. Slight splashing over former area. Patient weighs 117 pounds, a gain of 18 pounds since she was first seen and practically all of this since her operation a year ago.

It is interesting to note that the gastric acidity has fallen from a great excess to less than the normal.

April 15, 1909. Patient in good health, no distinct dilatation of small bowel perceptible. Splashing has disappeared.

SURGICAL ASPECT.

Careful examination, medical as well as with x-ray, having led to the conclusion that there was some obstruction in the small intestine, I was called in consultation by Dr. Hayes. The condition of the patient was growing steadily worse, despite the skillful attention of her medical adviser, and an exploratory operation was deemed necessary. She was admitted to my service at the New York Polyclinic Medical School and Hospital, March 10, 1908. March 11, a high saline enema was given, the abdomen scrubbed and shaved, and soap poultice applied. March 12, the bowels were thoroughly cleared with saline enemata. The abdomen was scrubbed with alcohol and ether and bichlorid dressing

applied. On March 13, under ethyl chlorid, followed by ether and chloroform anesthesia, the operation was performed before the class of the above institution.

The surgeon who is called upon to explore the abdomen in every case such as this approaches more or less of a mystery. However careful the examination, the diagnosis is somewhat uncertain until the abdomen is explored. It is important, therefore, that the operator bear in mind that rare conditions may be found where commonplaces are expected, and that he be able to cope with whatever state of affairs may be encountered. This involves certain considerations, to which attention is briefly directed.

1. *Possible Causes of Obstruction in the Small Intestine.*—This phase of the subject has been considered by Dr. Hayes, and needs no further attention here, other than emphasis upon the complexity of possibilities and the necessity for careful selection of the method of approach and procedure.

2. *Selection of the Best Incision to be Employed for Purposes of Abdominal Exploration.*—Too much emphasis cannot be laid upon this subject for, as Moynihan has so clearly shown, "the circumstances connected with the incision are among the most important in the whole range of abdominal surgery."

The text books on surgery describe a number of incisions for purposes of abdominal exploration, many of which are known by the names of the surgeons who first suggested them. Whether the incision goes through muscle or not, and whether the muscle fibers be separated longitudinally, or even cut across, depends upon individual preference. It is also a matter of opinion whether it be median or paramedian, and whether the rectus be divided or left intact and drawn to either side.

The requirements for an abdominal exploratory incision are: 1, free access to the field to be explored; 2, a minimum of injury to nerves, vessels and other structures; 3, leaving the abdominal wall as strong as before, in order to lessen the chance of hernia; 4, the possibility of lengthening the incision upward or downward, as occasion may demand, without undue injury to the nerve supply.

In order to meet these requirements certain points must be borne in mind. It should be remembered that above the umbilicus the linea alba is more distinct, whereas below it is not so clearly marked, and indeed its existence is questioned by some authors. The recti muscles are therefore much closer together below than above the umbilicus, and an incision in the median line in the lower portion of the abdomen necessitates the separation of these structures. Once the muscles are separated it is more difficult to reunite them without weakening the wall, and hence, in the absence of direct indication, the median vertical incision below the umbilicus is considered by some authorities as less satisfactory than other procedures which it is feasible to employ in this locality. If resorted to it should be followed by careful closure. Where there has

been internal pressure from tumors, from pregnancy or other cause, or where there is a large amount of fat in the abdomen, the recti muscles below the umbilicus as well as above tend to separate, leaving an open space between them. To make a median incision in such a case is to invite subsequent hernia.

Many surgeons prefer to make an exploratory incision along the outer border of the rectus, or midway between its outer and inner borders, down to but not through the muscle, pulling it either toward the outer side or toward the median line of the body. The deep incision in such case is made in line with the skin incision, or to either side at varying distances, with regard to the position of the nerves and vessels.

Incision Employed.—For a number of years, in exploratory laparotomies, where there was reason to believe that the seat of the trouble was below the umbilicus, and where there was a possibility of having to lengthen the primary cut, it has been my custom to make a paramedian incision two to four inches long, about one inch to the right or left of the median line of the body, through the aponeurosis, down to the rectus. Such an incision was employed in the case under discussion. The muscle is dissected free and drawn to the outer side, as shown in Fig. 1. The one inch of the free edge of the aponeurosis is lifted toward the median line of the body. The peritoneum is opened in line with the skin incision, as shown by the dotted line in Fig. 1. Such an incision can be continued as far as conditions demand, without injury to the nerves and vessels. The only danger of damage to these structures results from the too hasty or too vigorous lifting of the muscle to the outer side, an objection easily overcome by care.

When the peritoneal cavity is opened a loop of silk is passed through the peritoneum on either side and the loops clamped. These stay-strings take up much less space, and do less injury to tissue than do clamps, which are frequently used for the purpose. They also enable one at all stages of the operation to know the situation of the severed edges of the peritoneum, and facilitate quick closure of the cavity in case of sudden collapse, or for any other reason where the time limit is important.

A systematic and careful search for the obstruction is now instituted, beginning below and proceeding upward. In the case under consideration six points of constriction were found, one fifteen inches from the ileocecal valve, and the others at various intervals in the ileum, as shown in Fig. 2, and diagrammatically in Fig. 5.

Careful examination led to the belief that these strictures resulted from cicatrization following ulceration. The various more uncommon kinds of ulceration mentioned by Dr. Hayes could be eliminated, narrowing the possibilities down to the two more common varieties, viz., tuberculous and typhoid.

Typhoid ulcers run longitudinally with the gut and are situated in the free or convex surface of the intestine. Tuberculous ulcers, on the other hand, are so situated that their long diameter is transverse to the long

axis of the gut. They are usually wedge-shaped, and are thicker at the attached margin, extending away from the mesenteric border.

The cicatrization in this case was marked at the mesenteric border, and the strictures were believed to be due to a healed tuberculous process. There was no other evidence of this disease. A small gland in the mesentery, as shown in Fig. 2, was removed and examined, proving to be simple inflammatory tissue, with no evidence of tuberculosis or malignancy.

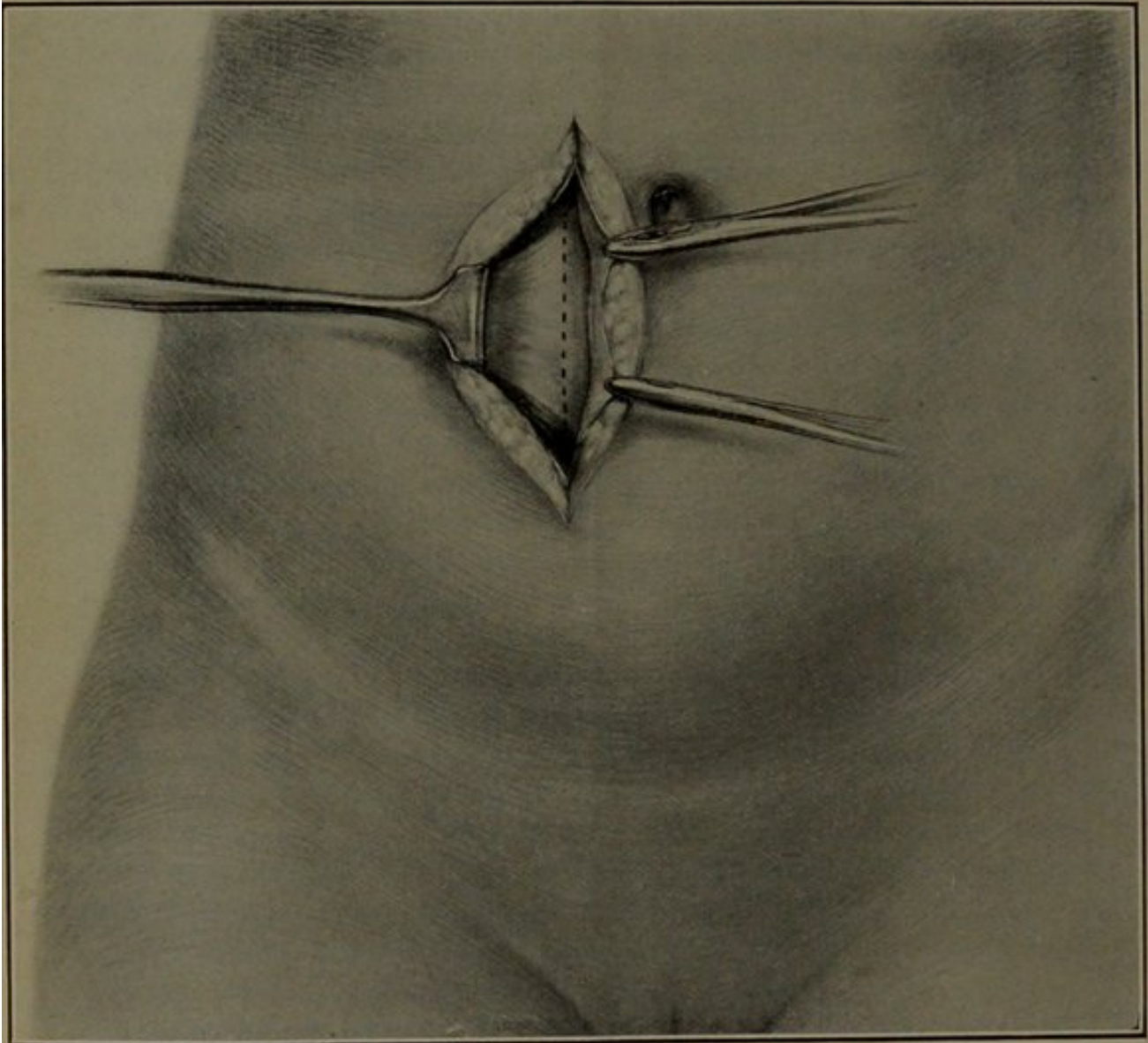


FIG. 1.—Para median Incision, showing rectus muscle drawn to the outer side. Dotted line indicates incision in peritoneum

The next important question involved in such a case had now to be considered:

3. *The Best Method of Dealing with the Condition Found.*—Inasmuch as the pathological process was quiescent, we had only the mechanical feature of the obstruction to consider so far as the strictures were concerned. The following possibilities offered themselves:

(a) *Enterectomy*, removal of the entire portion of the intestine involved

and end-to-end anastomosis by one of the various methods in vogue. The extent of the gut involved in this case was very great, and removal of the entire portion would have meant the loss of a number of feet of intestine, with a very considerable part of the mesentery. The patient's condition did not warrant so radical a procedure so long as there were other more conservative alternates to be considered.

In this connection it should be emphasized that such surgical procedure

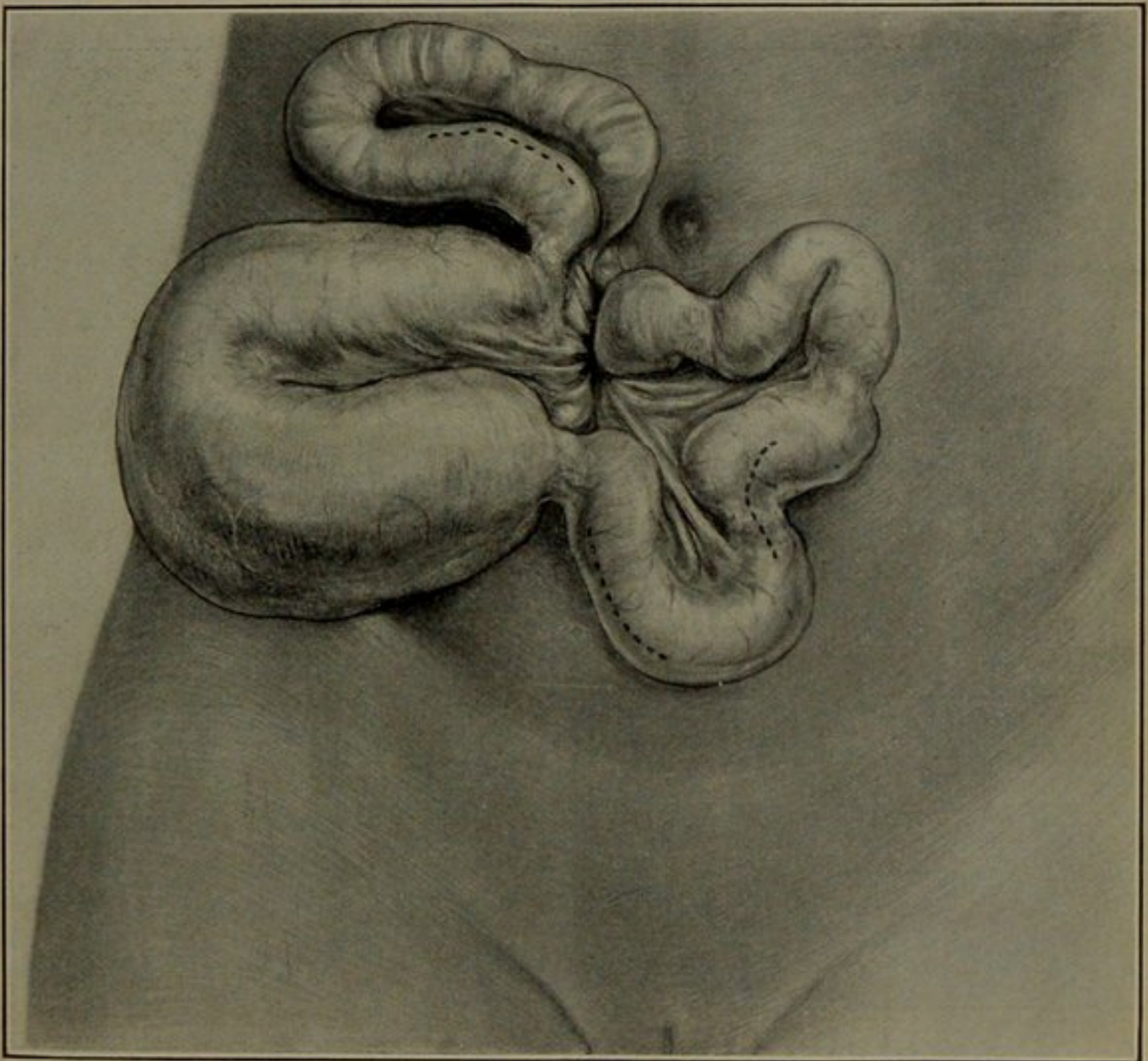


FIG. 2.—Condition found at time of operation. Dotted lines show the lines of incision in the gut.

should be selected as will accomplish the end in view with the least mutilation of the tissues and with a minimum of danger to the patient from shock or other undesirable consequences.

(b) *Excision of the Three Marked Strictured Portions*, with end-to-end anastomosis in each. This would have involved three enterectomies, and was, I believed, unwarranted on account of the patient's condition, and because a more conservative method could be employed with less risk.

(c) *Lateral anastomosis* of the portion above and below the most marked strictures (4 and 5 at either end of the very much dilated portion of gut A, as shown in sections *a* and *b* of Fig. 5), with a longitudinal incision and transverse suture of the third point of greatest constriction (3 of sections *a* and *b*, Fig. 5). The three lesser constrictions were not considered sufficiently marked to warrant surgical interference.

The last named possibility was adopted in the case under consideration. The various methods of performing lateral anastomosis were next con-

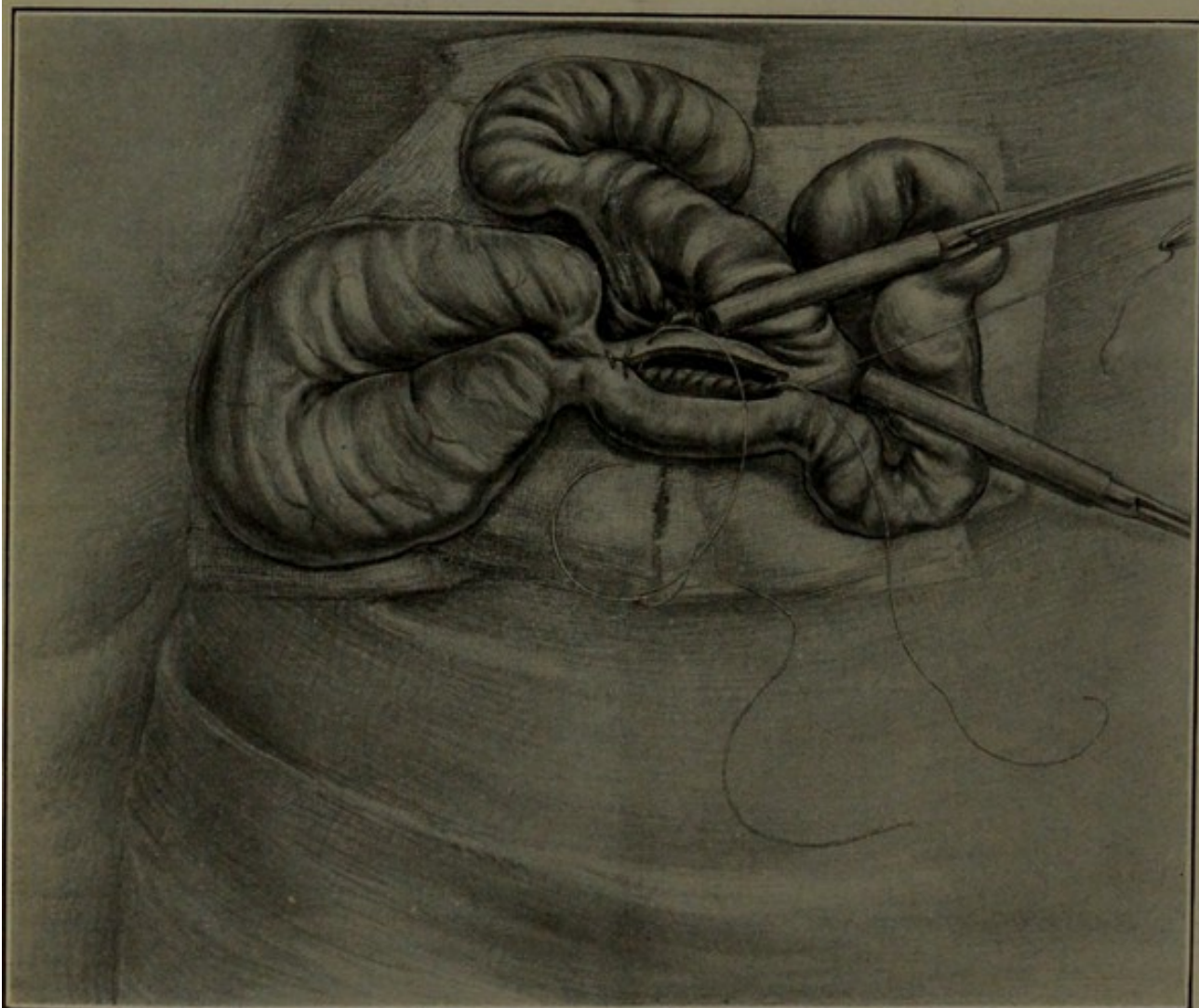


FIG. 3.—Intestine largely emptied of contents; compression clamps in place; anastomosis of gut just above and below widely dilated sac in process of formation.

sidered. The McGraw ligature, the unusual methods of suturing the gut, the use of the Murphy button and the different mechanical devices, absorbable plates, etc., were ruled out in favor of the simple suture, which is preferable where sufficient time is allowable.

Technic Employed.—The portions of the intestine to be anastomosed were drawn out of the abdomen and protected from the skin by pads wet in warm saline solution. No matter how careful the cleansing process may have been, it is of the utmost importance that the gut be not allowed to touch the patient's skin. The pads can be arranged so as to avoid this.

For the same purpose I usually employ Moynihan's tetra-clamps in cases where there is little abdominal fat, or Doyen's skin clips where the adipose tissue is considerable.

It is important to control the circulation of material within the lumen of the intestine. For this purpose, after milking out the contents, a tape may be passed through the mesentery around the gut above and below the point where the anastomosis is to be made. I prefer rubber-covered intestinal clamps to tape. These may be placed longitudinally, or across

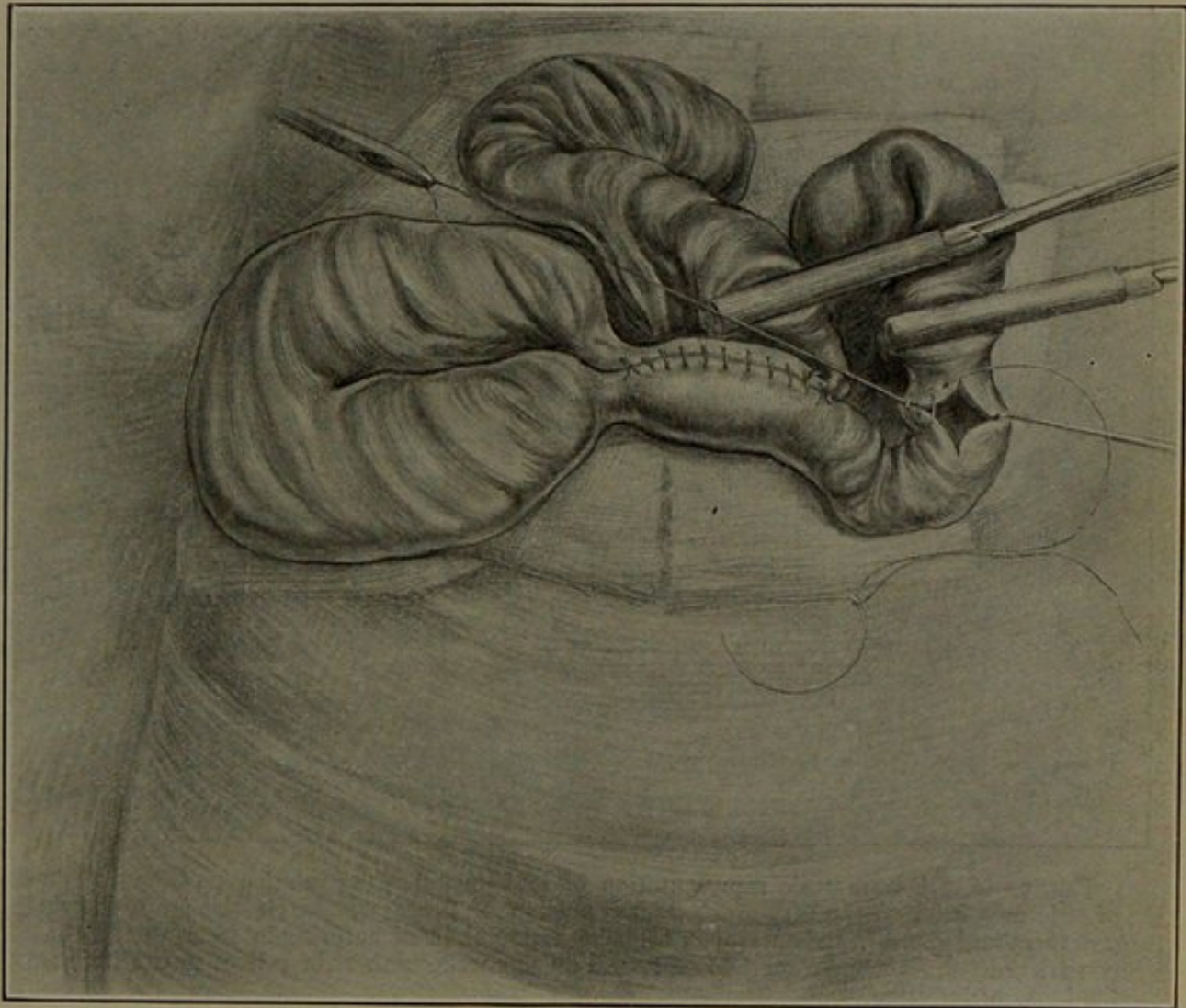


FIG. 4.—Anastomosis complete. Third stricture in process of treatment by longitudinal incision and transverse suture.

the gut, as they were in the present case, as shown in Fig. 3. Between the two loops to be anastomosed a thin roll of gauze was placed, in a manner similar to that shown in section *d* of Fig. 5.

The five-eighths Moynihan intestinal needle was employed for the suturing. This has the advantage that it may be used without a needle holder and be more quickly introduced than the straight intestinal needle ordinarily employed.

The Pagenstecher celluloid thread was used for suturing the gut. It has the advantage of being easily sterilized, has longer endurance *in situ*,

presents a smoother surface, and possesses greater strength in proportion to its size than other materials.

Through all stages of the operation the utmost care was observed to prevent contamination of the peritoneum.

The loop of gut above and the one below the two constrictions which marked off the very much dilated portion of the gut were approximated in such manner that they were isoperistaltic (Fig. 3). A continuous seromuscular suture, the first portion of which was knotted and the end

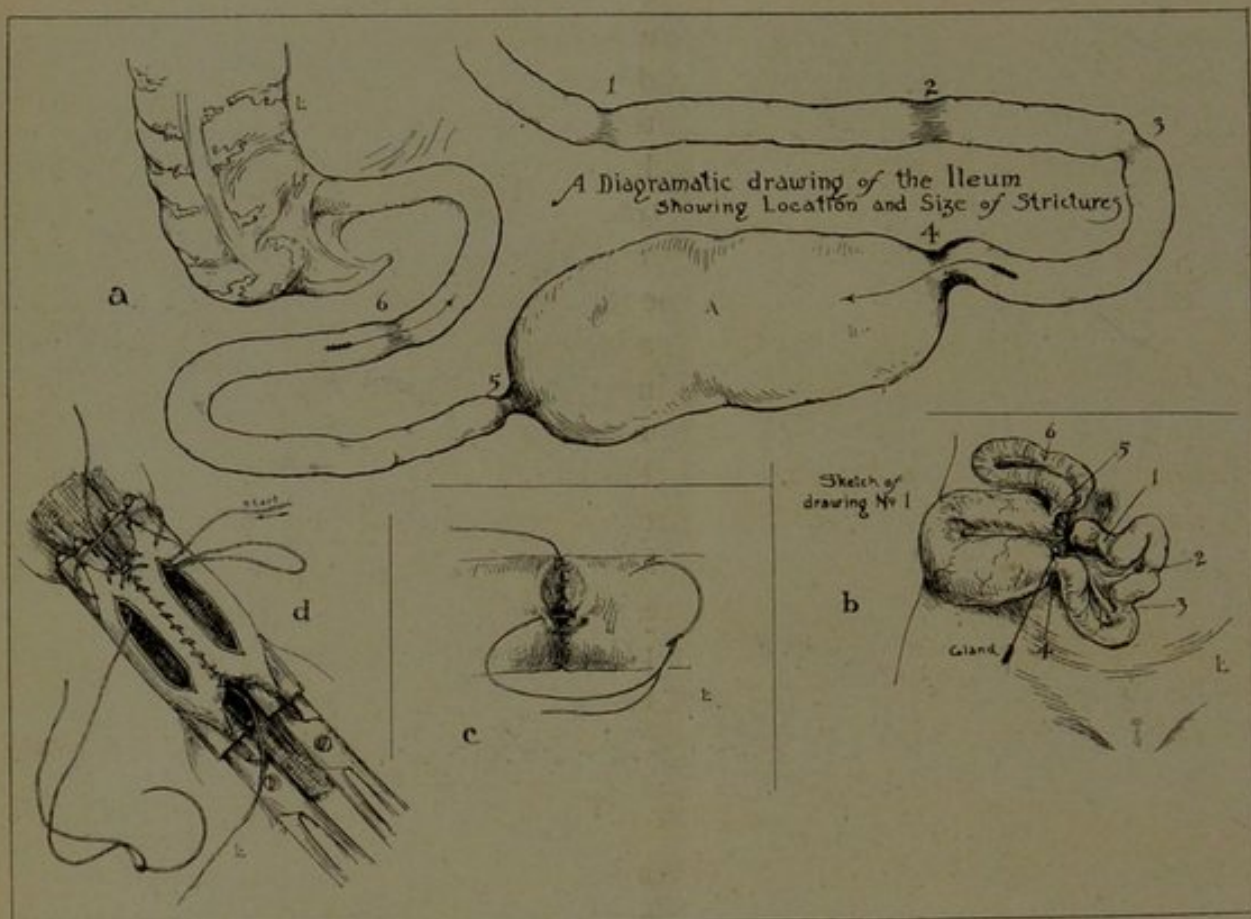


FIG. 5.—*a*, Diagrammatic representation of intestine, showing relative position and size of strictures, with *A*, the very much dilated portion of ileum; *b*, Sketch of Fig. 1, showing strictures and gland in mesentery; *c*, Showing the method of suturing in treating the third constriction; *d*, Showing a method of lateral anastomosis, with thin roll of gauze between the loops of intestine.

left long, was then introduced, along a line four inches in length, or half an inch longer at each end than the incision which it was proposed to make.

A straight incision, three inches long, was then made in each loop, dividing all the coats down to the mucosa. The ellipse or mucosa which was revealed as the cut edges retracted was then incised, and cut around with the scissors. The inner suture was then introduced, Pagenstecher thread and the five-eighths needle being used. All coats of the gut were embraced. The thread was knotted after the first stitch and the end left long. The suture was then continued along the posterior margin of the incisions to the distal end of the wound, and then around the

anterior margins until the starting point was reached. The end originally left long was tied with the one in the needle, and the threads cut short. Care was taken to infold the mucosa, a point which should not be overlooked. The stitch was drawn sufficiently tight to secure the vessels in the cut edges, and at the same time to make a water-tight apposition. The needle which carried the first or seromuscular suture was again taken up and the stitch continued round in front of and about a quarter of an inch from the inner stitch, until its beginning was reached. The two ends of this suture were then tied and cut short. The anastomosis was thus completed, one seromuscular suture and one through all the coats of the gut having been introduced.

After the suturing was completed one or two interrupted stitches of Pagenstecher were placed at each end of the suture line, in order to prevent any possibility of undue traction upon the wound.

Two points of constriction were thus overcome by this procedure. The third point was handled in the following manner:

A longitudinal incision was made at the convexity of the gut and sutured transversely, as shown in Fig. 4. With a suture at one side and a hook at the other, retraction was made and the narrowed portion obliterated. A running suture through all the coats was then introduced, followed by a Lembert stitch, a layer of peritoneal stitches covering in the first row, as shown in section *c* of Fig. 5. This done, the clamps were removed and the intestinal operation completed.

The great omentum was next placed in front of the small intestine. In this connection it is important to note that the great omentum should not be forcibly pulled down, as it is many times, to such a degree that great sagging of the colon results. If the omentum is large, as it was in this instance, and can be easily placed over the line of suture, this should be done, but care must be taken not to overdo the matter.

This point attended to, the peritoneum was next brought forward by the silk loops, and quickly closed by a continuous stitch of plain catgut No. 1. The rectus muscle was then dropped back into its bed and its mesial edge attached to the under surface of the linea alba by a few interrupted stitches. Fine chromicized catgut was used to close the aponeurosis. Interrupted retention stitches of silkworm gut were employed in the skin and fine black silk for the approximation of the skin edges. The usual dry dressing was applied, over which a thick pad of gauze was placed and held in position by strong adhesive straps. A tight abdominal bandage was adjusted. The patient was returned to the ward with some shock, from which she promptly rallied.

After-treatment.—When the nausea from the anesthetic subsided the patient was allowed to hold a lump of ice in the mouth and to swallow a few sips of water. On account of her lowered vitality she was given nutrient enemata for the first few days. She was then given liquid nourishment by mouth. The first solid food was taken on the eleventh day. No purgative medication was given at any time, the bowels being

cleared by saline or soap-and-water enemata given every twenty-four hours. The retention stitches were removed on the seventh day and the skin stitches on the tenth. The patient made an uneventful recovery, and was discharged from the hospital April 10, 1908. The subsequent history has been given by Dr. Hayes. In the year since the operation a gain of eighteen pounds in weight, physical signs showing the probable atrophy from disuse of the large abnormal sac of intestine, and the restored health of the patient are certainly very gratifying results.