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INTESTINAL OBSTRUCTION FOLLOWING OPERATIONS IN WHICH THE PERITONEAL CAVITY IS OPENED.

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INTRODUCTION.

PERMIT me here to express formally my appreciation of the honor conferred upon me in electing me to the distinguished position of your presiding officer. I am not conscious of having done anything to merit this high distinction, and can only attribute your action to personal friendship. For the honor I give you my heartfelt thanks.

I may congratulate the Association upon the excellent prospects of the present meeting. The rich and varied program before you shows that our indefatigable Secretary has not allowed the Fellows to rest upon laurels achieved in the past, but has stimulated them to continued work. The entertainments offered by our generous hosts are sufficiently numerous and diversified to satisfy the tastes even of those who might come for diversion only. Happily, however, we have none such in our Association. Our resident Fellows in this beautiful city had prepared such an elaborate festival program that the Executive Council, in the interest of science, was compelled to cut it down to a point which would leave *some* time for the reading of papers and the discussions.

Early in the present year an invitation was received through our Honorary Fellow, Dr. August Martin, Secretary of the Berlin Obstetrical and Gynecological Society, requesting the attendance of

an official delegate from this Association at the celebration of the fiftieth anniversary of the founding of the Berlin Society. By a vote of the Executive Council the President was appointed as your representative to attend the meeting in Berlin in May last. The courtesies extended by the Berlin Society were extremely cordial and graceful, and the action of this Association in accepting the invitation was warmly appreciated. I was highly gratified to find that the work and the workers of this Association are fully recognized and admired by our European colleagues.

While we have reason for gratification at the constant accessions to our ranks, we have to mourn this year the passing of one of our Founders, Dr. Hampton Eugene Hill, of Maine, and of two of our most distinguished Honorary Fellows, Dr. Alexander Dunlap, of Springfield, Ohio, and Dr. Arthur Wellesley Edis, of London.

Dr. Dunlap was a veteran abdominal surgeon. Those who at our Cincinnati meeting had the privilege of hearing his own account of his first ovariectomy, done just fifty-one years ago,¹ can appreciate what courage was necessary in those days to open the abdomen.

Dr. Edis was well known to us all through his admirable manual on the *Diseases of Women* and other publications on gynecological subjects. He also held at one time the distinguished position of President of the British Gynecological Society.

Dr. Hill was a Founder and enthusiastic Fellow of this Association. He was a modest gentleman and a fearless and ready surgeon, fulfilling the demand of Dr. Dunlap that a surgeon must be a man who can always "keep himself perfectly calm and his mind free from excitement under all circumstances." Those who have heard Dr. Hill relate his experiences in abdominal surgery realize that he was such a man. His record, perhaps unique, of twenty-five recoveries in a first series of twenty-six operations, is one that all of us who are less gifted and less successful may well envy.

The temptation is strong to linger over the details of these noble lives and draw from them lessons to guide and uplift us who remain, but this is a duty that must be left to others more competent.

The choice of a subject upon which to address you from the chair has been difficult. Not, indeed, from a paucity of topics demanding discussion, but from a feeling that any attempt on my part to offer

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ex cathedra opinions would be presumptuous. I may be pardoned, however, for briefly drawing your attention to the frequent occurrence of

INTESTINAL OBSTRUCTION FOLLOWING OPERATIONS IN WHICH
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Obstruction of the bowels causes between 1 and 2 per cent. of the deaths following ovariectomy and other operations involving opening of the peritoneal cavity. Sir Spencer Wells lost 11 out of his first series of 1000 cases of ovariectomy from this cause (1.1 per cent.). Fritsch¹ places his mortality from ileus post laparotomiam at 1.6 per cent. Klotz² has reported 31 cases of intestinal obstruction with 5 deaths due to this complication in a series of 421 abdominal sections and 148 vaginal extirpations of the uterus. I have been able to collect in the literature and from personal communications no fewer than 75 deaths from this cause. While this number seems large, it probably represents less than half of the deaths properly attributable to this accident, for there can be no doubt that not a few fatal cases of peritonitis and intractable vomiting after laparotomy are really cases of obstruction of the bowels.

Secondary or post-operative intestinal obstruction may be roughly divided into two classes of cases, one due to mechanical causes—adhesions, peritoneal bands, volvulus, accidental fixation by sutures, etc., and perhaps compression in exudation masses—and another due to paralysis of peristaltic movement of the intestines following sepsis or injury to the nerve supply of the muscular coat. The obstruction may be acute—*i. e.*, occur immediately after or within a few weeks subsequently to the operation—or it may develop gradually and not become complete until months or years afterward.

The majority of cases in which the cause of the obstruction was ascertained by operation *intra vitam*, or by necropsy, have been found to be due to abnormal fixation of the intestines by adhesions or to compression by peritoneal cords or bands inflammatory in origin. The statement is attributed to Olshausen, that obstruction after ovariectomy is always due to adhesions between the bowel and the pedicle. A striking instance of this form is related by Sir Spencer Wells.³ I have, however, observed a case in the practice of the late Prof. Erich, of Baltimore, where the small intestine was doubled

upon itself and so firmly adherent that the gut was entirely impervious. Similar cases have been reported by Skutsch and G. M. Tuttle⁴ after the removal of the uterine appendages. Adhesions of a knuckle of bowel to the abdominal incision or to other portions of the abdominal wall have frequently been found to be the cause of the obstruction, the abnormal fixation causing acute flexure of the intestinal tube. Any hindrance to the passage of the contents of the bowel at the point of flexure causes dilatation above and consequent increase of the degree of flexion. When this occurs there is at first increased peristalsis, but if the obstruction is not soon overcome the circulation is interfered with, dilatation of the bowel with paralysis of its walls follows, and the anatomical picture of the obstruction is complete.

Sir Spencer Wells⁵ illustrates another form of obstruction in which a coil of small intestine slips into Douglas's cul-de-sac and becomes fixed there by adhesions. Krüg has reported a case in which the descending colon was found glued fast at an angle to the posterior surface of the uterus.⁶ Our distinguished fellow, J. F. W. Ross, has reported a case where obstruction occurred five weeks after a complete abdominal hysterectomy. After death it was found that a small portion of intestine had become adherent to the abdominal incision behind the edge of the omentum, and that another loop had slipped through above this adhesion between the bowel behind and the abdominal wall in front, and had thus become obstructed." Secondary operation, which would doubtless have given relief, was advised, but was rejected by the friends of the patient.

Fritsch mentions a case where a fold of the bowel was caught under a suture, and another in which the bowel was found in the incision between two sutures. He thinks the bowel was forced between the separated edges of the incision during retching and vomiting. I should not have believed this possible had I not seen how widely apart sutures are placed by some of our European colleagues. Sir Spencer Wells "heard of a case where a coil of intestine slipped through one of the loops of wire used as sutures for the wound, and was tightly compressed when the wire was fastened." Our Fellow, Joseph Price,⁷ quotes an interesting case from Louis, where an adherent ovarian cyst, emptied by the trocar, so dragged upon the bowel as to cause obstruction. The opinion is expressed by Price that some cases of obstruction, post laparotomiam,

are due to leaving old bowel adhesions undisturbed at the time of operation. Fritsch seems to lean to a similar view. My friend, Professor B. B. Browne, of Baltimore, has recently given me the particulars of a case occurring in his practice in which death ultimately resulted from an obstruction undoubtedly present before operation. The symptoms in this case pointed to bowel obstruction, but an acute inflammatory condition of the uterine appendages was found which was believed to account for the symptoms. Some days after the section evidences of obstruction presented themselves and led to a secondary laparotomy. Some adhesions were found, which were released, and the patient improved. She subsequently died, however, and on post-mortem examination a knuckle of bowel was found in a peritoneal slit, causing sufficient obstruction to obliterate the lumen of the gut. I. S. Stone, Fellow of this Association, has quite lately reported a similar case.⁸ Lauenstein⁹ has described in an interesting manner the varied and curious forms assumed by intestinal and omental bands and adhesions, and has indicated the only rational method of treating them.

Among the cases of constriction by peritoneal bands, one related to me by Dr. Charles Jacobs, of Brussels, deserves to be mentioned. Here the constricting band consisted of the elongated adhesion between the uterus and anterior abdominal wall following ventrofixation.

Some cases have been observed in which the obstruction was due to an internal hernia through an opening in the omentum, as in Browne's case above related. Skene Keith reports a somewhat apocryphal case in which obstruction was produced by an epiploic appendix passing through one of the side holes of a drainage-tube. After removing the tube the obstruction was relieved.

Volvulus sometimes occurs after abdominal section, but probably only after some previous adhesion or constriction of the bowel. Two cases reported by Nieberding¹⁰ illustrate this. In one case a fatal volvulus of the small intestine occurred after an ovariectomy. During the operation a portion of adherent omentum was excised, and at the post-mortem examination it was found that the raw surface of the omental stump had become adherent to a loop of the small intestine, and that a volvulus existed above the point of fixation. In another case, in which the omentum was very short, symptoms of acute obstruction set in on the second day. Ordinary treatment

being of no avail, the incision was reopened and a coil of intestine found adherent to the margin of the wound. After separating this a volvulus was found, which was untwisted. The patient subsequently died of peritonitis, which the reporter attributed to the obstruction.

There seems no question that by far the larger proportion of cases of post-operative intestinal obstruction are due to adhesions of the intestines to each other, to the abdominal walls, or to other viscera. This being so, it becomes necessary to inquire what causes the adhesions and if these can be prevented. Sepsis, destruction or separation of the peritoneum, the use of strong chemical antiseptics in the abdominal cavity, rough handling of the visceral or parietal peritoneum by sponges, hands, or instruments, prolonged exposure of the peritoneum to the air, and the use of certain suture materials have all in turn been accused of producing adhesions. Experiments and clinical observation have, however, shown that not one of these conditions is sufficient to account for all cases. It is well known that intestinal or omental adhesions to the margins of the incision are found in nearly every case in which the abdomen is opened subsequently to laparotomy, and that they occur in cases in which all the above-mentioned conditions can be excluded. On the other hand, Küstner has reported a case showing strikingly that adhesions sometimes do not occur where they might reasonably be expected. He removed a very large tumor having firm adhesions to parietal peritoneum, omentum, bladder, fundus uteri, broad ligament, and sigmoid flexure. The adhesions were separated by the fingers and by the thermo-cautery. The coils of intestine were adherent and matted together. These were all carefully separated. Fourteen months later a secondary laparotomy for ventral hernia showed an absence of adhesions, either of the intestines to each other, to the parietes, or to the other abdominal viscera.

The symptoms of intestinal obstruction post laparotomiam are essentially the same as those of primary obstruction. They are, however, often masked by pain, vomiting, and tympanites—so frequently present after abdominal operations without being significant of obstruction. Unless the obstruction is due to some untoward occurrence in the technique, the significant symptoms are not likely to be present for several days subsequent to the operation. If a patient does well for three or four days, or longer, after an abdomi-

nal section or vaginal extirpation, and is then suddenly attacked by pain followed by vomiting, tympanites, and inability to pass feces and flatus, the diagnosis of intestinal obstruction is probable. If the vomiting becomes fecal, the pulse rapid, the urine scanty, and symptoms of collapse set in, the diagnosis becomes reasonably certain. Unfortunately, however, all these symptoms are not uniformly present in obstruction. When the obstruction is high up in the small intestine fecal vomiting is usually absent, and distention is likewise less marked. In these cases, also, the bowels may move several times after the pain begins, so that the diagnosis may be more or less uncertain.

Recent observations have furnished additional data upon which to base an opinion. The late Prof. Von Wahl,¹¹ of Dorpat, first called attention to the occurrence of local distention of the bowel above the point of occlusion in mechanical obstruction. This distention begins at the point of obstruction and extends upward along the course of the bowel. In mechanical obstruction, therefore, if the case can be observed from the beginning, there will be found an elastic swelling localized at a point of the abdomen and gradually enlarging, the direction of increase in size being along the course of the constricted bowel above the constriction. The distention is attributed to rapid decomposition of the arrested intestinal contents. Coincident with this local meteorism is an increased peristaltic movement of the bowel, also above the obstruction, especially insisted upon by Obalinski¹² and Schlange.¹³ The observations of Von Wahl have been experimentally confirmed by Von Zoega-Manteuffel¹⁴ and Kader.¹⁵ Obalinski and James Israel¹⁶ have also proven the clinical value of Von Wahl's sign. Obalinski lays great stress upon the accurate observation of these symptoms especially early in the course of the trouble. In the later stages, particularly if septic peritonitis with paresis of the intestinal walls has occurred, these distinguishing signs are no longer available. In cases of obstruction due to paralysis of the intestine from the beginning (probably always a consequence of septic peritonitis) these symptoms are not present. Here there is a uniform globular distention of the abdomen without movement of the intestines, and without noticeable contours of the bowels through the abdominal walls.

An additional diagnostic sign, according to Rosenbach, Rosin,

and others,¹⁷ is furnished by the urinary reaction. It is claimed that in complete obstruction of the ileum there is always indican in the urine. In obstruction of the colon, or high up in the small intestine, this reaction is usually not present. The reaction is obtained by boiling a small quantity of the urine in a test-tube and adding nitric acid *guttatim*. The urine turns to a Burgundy-red color, and a similarly-colored precipitate is thrown down. This has been shown by Rosin to be a mixture of the urinary coloring-matters known as indigo-blue, indigo-red, and indigo-brown. If urine yielding this reaction is shaken, a violet-colored foam is produced. Rosenbach attributes great prognostic significance to this reaction. So long as it remains the case is a grave one. If, after operation for relief of the obstruction the reaction persists, the obstruction has not been removed. In cases where the obstruction is relieved the reaction disappears within twenty-four hours. Our Fellow, J. H. Branham,¹⁸ has recently confirmed Rosenbach's assertion. While this sign must be regarded as a very important one, it is not absolutely pathognomonic, as a similar reaction occurs in some other morbid conditions.

The prognosis of primary intestinal obstruction is sufficiently grave. Following closely upon an operation so serious in itself as abdominal section or vaginal extirpation of the uterus, this gravity is enormously increased. The abdominal surgeon should, therefore, be prepared to recognize promptly and appropriately treat this unwelcome complication.

Fitz¹⁹ expresses the result of much unfortunate experience when he says: "In the light of exact knowledge nearly all cases of acute mechanical intestinal obstruction die unless relieved by surgical interference." And as a corollary may be quoted the opinion of Senn:²⁰ "Intestinal obstruction is a surgical lesion in every sense of the word, and should be treated from the very beginning upon common-sense surgical principles." This does not mean, of course, that the knife should be resorted to at once in the treatment of this condition, but that when other means fail to give relief the surgeon should not hesitate to operate, as delay, in cases not otherwise curable, always increases the danger of operative measures. Bearing upon this point Senn says: "An abdominal section in the treatment of intestinal obstruction is always necessarily attended by severe shock, and it is therefore of the utmost importance to per-

form the operation at a time when the organs of circulation and the nervous system are still in a condition to resist successfully the immediate effects of the operation."

However, the boldest surgeon hesitates to resort to such a serious operation as abdominal section for intestinal obstruction unless the diagnosis of mechanical obstruction is perfectly clear. Some cases are so plain in their indications that the only honest choice is to operate or do nothing, and to a surgeon the latter would hardly seem a creditable alternative. But cases occur where the nature of the obstruction is not entirely clear. The symptoms may point to obstruction by means of adhesions, peritoneal bands, or volvulus, and yet there is a possibility that there may be simply functional obstruction. In such cases other means may be tried until it is found that they are ineffective.

Little need be said here of the so-called "medical treatment" of intestinal obstruction. If any one chooses to treat such cases with opium or drastic purgatives, I do not envy him the results. But there are certain procedures, not strictly surgical, which are frequently indicated, and, though they are not often curative, certainly give temporary relief. Such measures are stomach-washing, rectal inflation of gas or air, and injection of fluids.

Stomach-washing was first recommended in intestinal obstruction by Kussmaul to relieve the distressing vomiting. Some mild antiseptic lotion containing boric acid should be used. The lavage may be repeated every four to six hours as the vomiting or distention demands. It has been found that considerable gas is removed with the fluid contents of the stomach. Some of the matters in the upper portion of the intestinal tube are likewise siphoned out, and in this way relief always follows the washing out. At the same time it must be remembered that stomach lavage is only palliative and not curative in established mechanical obstruction.

Klotz²¹ has had much success in treating acute obstruction following abdominal section by the following method. As soon as symptoms indicating obstruction appear he washes out the stomach with from four to six quarts of warm salt solution. Should this fail to relieve the symptoms he repeats it, and then passes into the stomach through the tube a large dose (one and a half to two ounces) of castor oil. In all cases so treated the active peristaltic movements set up caused passage of flatus and feces within ten hours. Evi-

dently it is only in cases of fresh and friable adhesions that this method can be successful.

Rectal injections of water or air may at times be curative when the obstruction is due to intussusception, volvulus, or to soft adhesions of the lower portion of the intestine, but where the obstruction is due to cords or bands they can manifestly be of no avail. They should therefore not be pushed beyond a reasonable trial. Care must be taken not to use too much pressure in making rectal injections, for fear of rupturing the bowel. Attempts to force the ileo-cecal valve must be regarded always as ill-advised, in spite of the claim sometimes made that fluids can be made to pass this gateway between the large and small intestine in the reverse direction. Too much care cannot be used in passing a rectal tube high up into the colon. I have seen one instance of perforation of the sigmoid flexure where this was attempted.

The rational treatment of intestinal obstruction following abdominal section is to reopen the abdomen either in the line of the first incision or at some other point, seek for the place of obstruction, relieve the same by separating adhesions, dividing constricting or restraining bands, or untwisting a volvulus. If the gut be much distended, an incision to let out the gas and fluid feces may be made and the bowel afterward carefully sutured. Gangrenous intestine must be resected and the ends joined by suture or Murphy's button. At times it may be advisable to do colotomy, but the readiness with which the ends of resected intestine can be joined with Murphy's excellent device will probably render the operation of colotomy for this condition much less frequent than formerly. If the obstruction is due to a volvulus, it would probably be always advisable to resect the twisted portion of the gut, as the volvulus is extremely likely to recur. Keith advises that the long mesentery, always present in volvulus, be shortened by folding it upon itself parallel to the gut, and keeping it in place by a few stitches. A case has been reported by A. H. Cordier,²² a Fellow of this Association, in which there was constriction of intestine by a peritoneal band, followed by rupture of the gut. Abdominal section was done, the stricture relieved, and an anastomosis made with Murphy's button. The patient recovered.

When practicable, it is probably always better to make the incision in the middle line, as it permits more thorough and ready

exploration. Branham advises that when the abdomen is opened search should first be made for the obstruction in the iliac regions, as here obstruction is most likely to occur. If not found in either of the iliac fossæ, and if it cannot be located by local distention, the entire length of the intestine must be passed through the fingers until the constriction is found. As it not infrequently happens that there is more than one point of constriction, the examination should be thorough.

The distention and congestion of the intestine above, and its pale, empty, and flaccid condition below the constriction will often enable one to find the obstruction readily. Eventration of the intestines should be avoided, if possible, although if the obstruction cannot be otherwise discovered this becomes necessary.

It goes without saying in this audience that the most scrupulous attention must be paid to asepsis during the operation, and that the peritoneal cavity should be thoroughly flushed and drained after relieving the obstruction.

The question naturally presents itself whether anything can be done to prevent the frequent occurrence of intestinal obstruction post laparatomiam. As the obstruction is so often dependent upon adhesions, attempts have been made to prevent these. Robert T. Morris,²³ one of our Fellows, proposes to accomplish this by covering denuded peritoneal surfaces with a film of aristol powder, which he claims prevents subsequent adhesions. The evidence hitherto furnished that aristol accomplishes this seems to me insufficient, but should stimulate to further experiment. August Martin wipes out the pelvic cavity with a sponge saturated with sterilized olive-oil just before closing the incision after a laparotomy. I have not been able to learn whether adhesions are prevented by this procedure. To me it seems a doubtful practice. Obalinski produced purulent peritonitis in a rabbit in which he had used the sterilized oil.

Cases of so-called paralytic obstruction are usually due to septic peritonitis. Here operation is rarely of service, although a case reported by W. W. Keen indicates that even in these cases one need not give up all hope. Keen did a laparotomy, incised the greatly-distended large intestine and emptied it of its contents, flushed and drained the abdomen, and gave strychnine. The patient recovered.

In conclusion, permit me to quote the apt remark of Fritsch:²⁴ "Fixed rules governing the treatment of intestinal obstruction

following peritoneal operations cannot yet be established. But the greater our experience in these cases the more readily do we lean toward operation. Not, it must be said, that the results have been favorable hitherto, but because no other treatment is of any value in cases of severe obstruction."

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