INTESTINAL OBSTRUCTION FROM MECKEL'S DIVERTICULUM.

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C. L., aged twenty-five years, was admitted to the Cook County Hospital August 10, 1901. Shortly after admission, the following history was obtained: Family history, negative; past history, has had the usual diseases of childhood. At the age of four was confined to the bed for several days by an illness that was called inflammation of the bowels, and that was attributed, by the family physician, to a fall upon the abdomen. At this time the intestines were said to have been injured. Since the age of four years he has had several attacks of severe abdominal pain associated with obstinate constipation and vomiting. The last attack, which occurred about two and one-half years ago, was the most severe. At this time he was confined to the house for one week.

Present Illness.—This began two days before admission. While at breakfast, he was suddenly seized with intense abdominal pain, colicky in character, and distributed over the whole abdomen. Shortly after the onset of the attack, he vomited. The pain has since that time increased in severity. The abdomen has become more and more distended and more sensitive to pressure. All efforts towards securing a movement of the bowels have been unsuccessful. No gas has escaped from the bowels. The vomiting has continued at intervals of about two hours since the beginning of the attack. The matter vomited has not changed in character, remaining free from fæcal odor and consisting of a semitransparent, slightly bile-stained fluid.

Examination shows a well-nourished, vigorous appearing young man, with no evidence of congenital deformity. The face

is rather drawn and has an anxious expression. Lungs and heart negative. The abdomen is distended somewhat more above the umbilicus than in the lower half, and perhaps a trifle more in the right than in the left side. On percussion, there is a uniform, tympanitic note. No dulness in any part. Liver dulness present, but displaced slightly upward. Palpation shows the abdomen to be somewhat sensitive to pressure, the most painful part being the right side, just above the anterior superior spine of the ilium. No peristaltic movements visible, no evidences of external hernia. Rectal examination negative.

During the afternoon of the day of admission, the patient continued to vomit and his pain increased. High rectal enemata were given, but failed to bring away any gas or fæcal matter. When admitted at 10 o'clock A.M., his pulse was 102 and his temperature 100° F. At 8 P.M., the pulse was 114 and the temperature 101.2° F. At 11 P.M., the pulse was 120 and the temperature 103° F. The vomiting had become more frequent and the pain had steadily increased in severity.

Operation at 12, midnight. After taking into consideration a history of repeated attacks and the character of the symptoms, a diagnosis was made of obstruction, either from a congenital band or from adhesions resulting from an old appendicitis. An incision was accordingly made to the outer edge of the right rectus muscle, about on a level with the umbilicus. As soon as the peritoneal cavity was opened, a loop of distended intestine was seen. This was pulled out and traced downward for about eighteen inches, when there was found a constricting ring. Immediately below this the intestine was collapsed. On close inspection, the ring was found to be made up of a Meckel's diverticulum, to the distal end of which was attached a fibrous cord. The diverticulum was somewhat larger than the ileum, from which it originated, and was about two and a quarter inches in length. The terminal ligament measured about three inches, and was continuous with the root of the mesentery, a short distance below the point of origin of the diverticulum. The diverticular ligament contained a blood-vessel, apparently a vein, which was filled with blood, and which seemed to communicate with the mesenteric vein. The diverticulum and ligament together formed a ring through which a loop of intestine had passed and was strangulated. No volvulus. The diverticulum was given off about fifty

centimetres from the ileocæcal valve. The part of the intestine forming the loop which passed through the ring was the ileum, below the point of origin of the diverticulum. The terminal ligament was ligated close to the mesentery and divided; gas immediately passed into the collapsed gut, and through the ileocæcal valve. The diverticulum was amputated close to the margin of the gut, leaving a longitudinal opening two inches in length in its convex side. This was closed by the Connell through-and-through suture of silk. The bowel was restored to the abdominal cavity and the abdomen closed. There was no fluid in the peritoneal cavity. The intestine was red, injected, and œdematous, but the peritoneal gloss was not lost, and there was no evidence of any serious nutritional change in the bowel. The day following the operation the bowels moved freely, and recovery was uninterrupted. The patient was discharged recovered on September 7, 1901.

The malformation generally known as Meckel's diverticulum was described first by Ruysch.[1] Its congenital nature was also considered by him. The origin of this structure from the vitelline duct was pointed out by Morgagni.[2] Meckel,[3] although crediting the early writers with possessing a knowledge of this diverticulum, claimed to be first to explain its origin and to call attention to its presence as a frequent cause of disease. The origin of Meckel's diverticulum may be briefly explained as follows:

About the end of the third week of fœtal life in the human embryo, the primitive intestine communicates with the umbilical vesical by means of a tube, the omphalomesenteric duct. During the process of closure of the abdominal parietes, which takes place during the fourth and fifth week, this disappears, excepting a thread-like remnant, which passes from the convex border of the loop of the ileum nearest the umbilicus to the umbilicus or the abdominal wall near by. This thread-like structure usually disappears as the development of the intestine progresses. Most of the growth takes place above the attachment of this cord. This forms the greater part of the small intestine. The portion below forms the remaining part of the

small intestine and the large intestine. When the developmental change in the vitelline duct is not completed, there remains a tube or cord, more or less permanently attached to the umbilicus. When a diverticulum exists in its most perfect form, it consists of a tube similar in structure to the small intestine, of varying length, and attached to the umbilicus. In these cases a congenital, umbilical, fæcal fistula usually exists. This may or may not close spontaneously after birth. In a case cited by Treves,[4] the umbilical fistula appeared first when the child was three weeks old, and persisted for seven years, and then closed spontaneously. In other cases, the tube ends in a blind extremity, and either hangs free in the abdominal cavity or is attached to the umbilicus or mesentery, or some other abdominal organ, by a fibrous band called the terminal ligament. In many cases the cord breaks from its attachment to the umbilicus and hangs free in the peritoneal cavity. It seldom attaches itself to other structures. The origin of this terminal ligament is the persistence in a varying state of atrophy of the vessels that accompany the vitelline duct. These are the omphalomesenteric artery and vein. During the atrophy of the vitelline duct, these arteries and veins usually disappear, but atrophy of the duct is not necessarily accompanied by disappearance of these vessels. The existence of the omphalomesenteric vascular remains was well known to Meckel,[3] and their transformation into a fibrous band which might prove a serious menace to life was likewise appreciated by him. In his classification of internal hernia, he mentions, as one of the causes of strangulation, the "presence at the summit of a loop, a diverticulum of the ileum, with a filament, the remains of the omphalomesenteric vessels, which may become attached and be the cause of obstruction." For many years, explanation of the origin of the terminal ligament, as given by Meckel, was apparently not accepted or not known. In most of the earlier cases reported, and, in fact, up to the time that Fitz [5] published his paper on "Persistent Omphalomesenteric Remains," the fibrous cord, either hanging free from the distal end of the diverticulum or attached, was gen-

erally regarded as of inflammatory origin. It may be said that the existence of inflammatory adhesions between the diverticulum or its ligament and the neighboring organs rarely occurs, and but few authentic cases are found in the literature. Those in which it is said to have been attached to the mesentery by inflammatory adhesions are probably remains of omphalomesenteric vessels which retain their mesenteric attachment. The original points of attachment of these vessels were the intestines, the mesentery, and the umbilicus. Any one or two of these may be severed. Usually, we find the cord attached to the intestine or diverticulum, and, by its distal end, to the umbilicus or mesentery. In a case reported to the author by Dr. Henrotin, the terminal ligament of a diverticulum had become adherent to an inflammatory exudate about the stump of the appendix and caused obstruction about eight days after an operation for appendicitis. It is a well recognized fact that attached diverticula are more often the cause of obstruction than those that are free or unattached. The relative frequency of the points of attachment of the distal end of a Meckel's diverticulum or its terminal ligament is of interest as bearing upon the treatment of this form of obstruction. Treves [4] quotes Cazin's statistics in twenty-three reported cases in which he found the distal end attached to the umbilicus in three, to the small intestine in six, to the mesentery in ten, to the cæcum in two, to the inguinal ring in one, and the colon in one. In twenty cases collected by himself, he found diverticula attached near the umbilicus in seven, to the mesentery in seven, to the bladder in one, the femoral ring in one, the small intestine and cæcum in one. Kammerer,[6] taking the cases of Neumann [7] and those of Boldt [8] not included in Neumann's list, together with ten cases that he collected, found that of the sixty-six cases, thirty-three were attached to the mesentery, thirteen to the umbilicus, and twelve were attached to some part of the intestinal tract or to other abdominal viscera.

Of the sixty-nine cases reviewed by the author, there are forty-eight in which the attachment was noted. Of these, twenty-three were attached to the mesentery and fifteen to the

umbilicus. The attachment to other abdominal organs was, to the small intestine, three; to the omentum, one; to the transverse mesocolon, one; to mesorectum, one; to peri-appendicular exudate, one. In three the exact point of attachment could not be determined. The attachment to points other than the mesentery and umbilicus is of slight importance to the surgeon, because it is probably due to inflammatory adhesions, and therefore accidental, and for this reason no estimate can be made of the relative frequency with which it may occur.

It is generally stated that Meckel's diverticulum, or at least some omphalomesenteric remains, are found in from 1.25 to 2.5 per cent. of all bodies examined. The latest statistics relative to the frequency of this anomaly are those of Kelynack.[9] He found it present eighteen times in 1446 post-mortem examinations. Of these, eleven were males and seven females. In none did its presence bear any causal relation to death. He therefore concludes that it is of slight practical importance. In 3400 examinations in St. Bartholomew's Hospital, there were twenty-seven in which Meckel's diverticulum was found, making about one in every 126 bodies.

The frequency of intestinal obstruction from Meckel's diverticulum is difficult to state, as the statistics bearing on this point are of comparatively little value. In many of the recorded cases, accurate examination of the exact anatomical conditions have not been made, so that in not a few there is doubt as to the existence of a true Meckel's diverticulum. Most of the reports show that there is a general lack of knowledge concerning this important developmental defect.

The older statistics are particularly misleading, in that the appendix was frequently confused with the true Meckel's diverticulum. Bands, undoubtedly remains of omphalomesenteric structures, were even up to recent years generally regarded as inflammatory in origin. Taking the cases reviewed by Leichterstern,[10] we find that in 1134 cases of intestinal obstruction, 39 per cent. were due to intussusception, 9 per cent. to bands and adhesions, and 6 per cent. to diverticula. Of the combined cases collected by Haven,[11] Duchanssoy,[12] and Brin-

ton,[13] making in all 991, in about 6 per cent. Meckel's diverticulum was the cause of obstruction. These figures, though far from accurate, undoubtedly show that obstruction from Meckel's diverticulum is relatively common, and probably occupies the place next to intussusception as the cause of intestinal obstruction.

The manner in which the intestine may become obstructed in a Meckel's diverticulum is of great importance to the surgeon. A thorough knowledge of the possibilities in any individual case will often permit him to give prompt relief by directing him at once to the seat of obstruction, which might, under the opposite conditions, be overlooked. In reviewing the reports of cases operated upon, we often find that, after the abdomen has been opened, the cause of obstruction could not be found, and was only discovered at the autopsy. The post-mortem reports of these cases fully demonstrate, in many instances, that the operator lacked knowledge of the anatomical peculiarities of this region.

In considering the ways in which Meckel's diverticulum may cause obstruction, we can separate the cases into two groups: (1) Those in which the obstruction is produced by a free or unattached diverticulum, that is, having only one attachment to the intestine; (2) those in which the diverticulum or its terminal ligament is attached to the abdominal wall or to some viscus.

Intestinal obstruction from a non-attached Meckel's diverticulum is comparatively rare. When it occurs, the obstruction is brought about in one of the following ways:

First. The gut, usually the ileum, is snared by a noose, or a knot of more or less complicated structure is tied about a loop of the gut. In some cases the free diverticulum in reality forms a volvulus with the loop of gut inside the twist. Adhesions commonly form, binding the two arms of the twisted and inflamed diverticulum together, and thus constrict the bowel. Such a mode of strangulation is pictured by Treves in his work on intestinal obstruction. (Fig. 14, p. 48.) In other cases, a complete knot is tied in the diverticulum, about a loop

of intestine. In order that such a knot may be tied, Nothnagel [14] finds that certain peculiarities of the diverticulum must exist. (1) It must be of unusual length; (2) it must be pear-shaped, or, at least, have a knob-like distal extremity; (3) it must possess a great range of mobility. Such a case is reported by Hohlbeck.[15] In this case the diverticulum was twenty-three centimetres long, and was considerably larger at the distal end than at its base. A loop of eighty centimetres of intestine was strangulated inside of a complete knot of the diverticulum. The gut was resected, and an end-to-end union by Murphy's button was followed by recovery. Double knots have also been found, according to Treves. None of these have been described in any of the cases reviewed by the author.

Second. Obstruction from kinking of the intestine at the point of attachment of a diverticulum may result from dragging of a loop of the intestine, by an unattached, distended, or cystic diverticulum, without any structural change occurring in the intestinal wall. If this traction and kinking are continued for any considerable time, necrosis of the gut at the acute angle formed usually occurs. An instance of this kind of obstruction is reported by Walzberge.[16] In his case, necrosis of the gut at the point of attachment of the diverticulum had already taken place. Acute flexion of the intestine occurs more frequently when the distal end of the diverticulum or its ligament is attached. When a free diverticulum is caused by kinking of the gut, it must be of good size and of considerable weight. Usually, it is found filled with fæcal matter or concretion, or its lumen is obliterated at the point of attachment to the intestine, and its distal end has undergone cystic degeneration.

Third. Twisting of the bowel on its long axis at the point of origin of the diverticulum itself is a frequent cause of obstruction. In these cases, as in the preceding form, the diverticulum is usually large and distended, and necrosis of the bowel is common. In a second case reported by Walzberge [16] this mode of obstruction was found post-mortem. The cause of obstruction was not determined at the time of operation. At the autopsy, a cystic diverticulum was found, the base of

which was twisted until the lumen was completely obliterated. A portion of the wall of the intestine close to the insertion of the diverticulum was twisted and necrotic. A case of volvulus of the small intestine, caused by twisting of the diverticulum, which hung free in the pelvis, is reported by Good.[17] Another interesting case of obstruction, resulting from twisting and kinking of the intestine from an unattached diverticulum, has recently been reported by Taylor.[18] In this case the diverticulum was enormously distended and twisted three times at its base. The twisting and traction had caused obstruction at the point of origin of the diverticulum.

Fourth. Chronic inflammation of the diverticulum and of the adjacent portion of the intestine, with cicatricial narrowing of the gut just above the diverticulum, can be the cause of obstruction. This may happen in free and in attached diverticula. The diverticulum becomes filled with fæcal matter or concretions, and the resulting inflammation extends to the intestine, ulceration and cicatrization follow, and obstruction finally develops. In some cases, congenital narrowing of the gut at this point may be the cause of obstruction. Some writers consider that in cases of stenosis of the bowel, at or near a diverticulum, the condition is always congenital. Cases are on record, however, where the bowel was found in an ulcerated state at the time of death. In most of the cases where there is stenosis of the bowel, either congenital or inflammatory, the symptoms of chronic obstruction antedate the acute strangulation. The latter develops when the bowel becomes occluded by fæcal matter lodging at the constricted point.

Fifth. Inversion of the mucous membrane alone, or of the entire diverticulum, with or without invagination of the segment of the gut just below the diverticulum, is an occasional cause of obstruction. An interesting case is reported by Hohlbeck,[15] where, with an invagination of one-half foot in length of the ileum, the mucous membrane of the diverticulum was found completely separated from its muscular wall, excepting where it was continuous with the intestinal mucous membrane, and inverted into the lumen of the gut. This evidently had

been the chief factor in the production of the intussusception. Treves [4] describes a specimen of invagination of a diverticulum of the ileum which is in the Guy's Hospital Museum. Küttner [19] collected seven cases from the literature, and reported one of his own. Stubenrauch [20] reports one, as does also de Quervain.[21] It may also be mentioned that inversion of the diverticulum may occur without producing any symptoms during life. Heller [22] found one post-mortem, which hung freely in the lumen of the gut without causing any disturbance. Obstruction from inversion of the diverticulum may be the result of mechanical hinderance to the fæcal currents by the presence in the lumen of the gut, of the inverted diverticulum, or by the diverticulum being drawn down the intestinal canal by the fæcal current, and by this traction causing an intussusception. Of the twelve cases reported belonging to this group, in eight intussusception was associated with inversion of the diverticulum; in four, inversion of the diverticulum alone was present.

The conditions essential in the development of an inversion or invagination of the diverticulum are that it must be of considerable size circumferentially, and that it must be free. Probably the starting-point of an invagination is when a concretion or a fæcal mass is emptied from its lumen into the intestine. Separation of the mucous membrane, as in Hohlbeck's case, can also best be explained in this way.

Strangulation from an adherent diverticulum is more common than from one that hangs free in the abdominal cavity. The methods by which an attached diverticulum may produce strangulation of the gut are as follows:

First. By the diverticulum acting as a band, in the same manner as an adventitious band or a peritoneal adhesion would produce obstruction by constricting the lumen and interfering with the circulation in a loop of intestine that had passed underneath it. Treves considers it impossible for a diverticulum that is attached to the abdominal wall at the umbilicus, and thus stretched across the cavity, to produce obstruction in this way. Many cases of this kind are reported. The intestine is probably

twisted around the diverticulum in some way, so that the twist constricts the gut rather than the band itself. When adherent to the mesentery, as is so frequently the case, it is easy to see how the gut may be obstructed by pressure of the diverticulum acting as a band. The same is true when, by secondary adhesions, it becomes attached to the same intra-abdominal organ close to the posterior abdominal wall. An interesting illustration of the diverticulum acting as a band is a case reported by Dr. McArthur,[23] where the Meckel's diverticulum attached to the root of the mesentery, close to the ileocæcal valve, constricted the appendix, causing necrosis of the appendix and obstruction of the intestine.

Second. Obstruction from an adherent diverticulum may occur by a loop of gut passing under it and becoming twisted on itself, and thus forming a volvulus. A case is reported by McKenzie[24] where a loop of gut five feet in length had passed beneath an adherent diverticulum and become twisted and strangulated. Symmonds[25] also reports a case of volvulus occurring under a diverticulum of large size which was adherent. The point of attachment was not determined.

Third. Volvulus of the attached diverticulum itself occasionally occurs, and is the cause of obstruction of the intestine. Carwardine[26] reports a case of volvulus of a Meckel's diverticulum which caused the death of a child three days old. The operation being unsuccessful in relieving strangulation, post-mortem examination revealed a diverticulum filled with meconium and twisted upon itself. The intestine was occluded at the point of origin of the diverticulum.

Fourth. Strangulation over a tensely-drawn diverticular band may under certain conditions take place. Treves illustrates this mode of strangulation of the intestine by comparing it to a coil of soft rubber tubing thrown over a tightly-drawn wire and allowing it to become dependent. The weight of the tube will cause acute flexion and consequent obstruction of the ileum. Treves refers to a case of Lasseau where a diverticular band extending from the intestine to the umbilicus caused obstruction in this way. The symptoms developed very rapidly,

and death occurred in ten hours. The loop of intestine suspended from the diverticulum was necrotic.

Fifth. Occlusion by kinking due to traction happens much more frequently in attached diverticula than where the diverticulum is free. In most cases of this form of obstruction, the diverticulum is attached to the umbilicus. The intestine, by becoming over-distended either with fluids or gas, may so pull upon the anchored loop as to cause acute flexion and ultimate obstruction. Reignier,[27] experimenting with a loop of gut having a diverticulum seven centimetres in length, obtained from the body of an infant, found that, by gradually over-distending the gut with water, obstruction to the flow of water through the lumen occurred just below the diverticulum. In moderate distention, no obstruction was present. Obstruction from over-distention was due to the diverticulum becoming enormously dilated, and so pressing upon the gut just below as to produce acute flexion and, finally, complete obstruction.

Sixth. Obstruction from torsion of the diverticulum may occur when the diverticulum is attached, in the same way as when it hangs free. The same may be said of obstruction from chronic inflammation, or from congenital stenosis at the base of the diverticulum. Acute inflammation of the diverticulum —diverticulitis—may also act as a cause of obstruction in both attached and free diverticula.

Although in the majority of cases, when obstruction is caused by Meckel's diverticulum, the onset is sudden, yet in a few, chronic obstruction exists for a long time before the acute forms develop. This is particularly true where stenosis of the bowel above the diverticulum exists. Traction of the bowel at the point of attachment of the diverticulum also favors narrowing of the lumen at that point. This finally leads to chronic obstruction.

Prolapse of the small intestine through an umbilical fæcal fistula is at times the cause of obstruction. Alsberge[28] refers to a case of Hüttenhemer, where at the end of the third month fæcal fistula was established during an attack of whooping-

cough. The ileum prolapsed through the fistula, and death from obstruction followed. In the cases reviewed by the author, obstruction from prolapse of the intestine through an umbilical fistula, as well as those where obstruction from a Meckel's diverticulum was present in a hernial sac, have not been considered.

The importance of attempting in each case of obstruction to make a diagnosis of the variety of obstruction that exists, in order to facilitate intelligent operative treatment, cannot be overestimated. In any case of acute obstruction, the failure to determine with relative certainty the essential cause should not be considered a contraindication to prompt operative treatment, nor should such failure be used as an excuse for delaying the operation. Every case of obstruction is a case for operation. Of all forms of acute obstruction, none demand more energetic treatment than does that from a Meckel's diverticulum. In the great majority of cases the onset is sudden, and the symptoms are so characteristic of an acute obstruction that there can be no excuse for not offering prompt relief. It is true that only in a few cases, however, can we with any degree of certainty positively identify this form of obstruction before operation.

We have, as evidence of obstruction from a diverticulum, (1) The age of the patient; it usually occurs in children or in young adults; (2) the history of preceding minor attacks; (3) the configuration of the abdomen, which is that of an inverted cone; this being due to obstruction of the upper part of the intestinal tract. The absence of distention of the flanks is conspicuous during the early hours of the attack. (4) Local meteorism, especially upon the right side of the abdomen, under the costal arch, with in the early stage, in a few cases, visible peristalsis, prevails. (5) Fæcal vomiting, as a rule, comes on early; Cazin lays particular stress on its late appearance. The time when it appears depends, of course, upon the acuteness of the obstruction and the part of the gut strangulated. (6) Tenderness in the right side on a level, or just below the umbilicus. In looking over the cases reported in the

last ten years, one is impressed with the frequency with which this form of obstruction has been mistaken for appendicitis. This is unavoidable where the diverticulum forms a cyst and is lodged in the right side of the abdomen, as in Taylor's case. In McArthur's case, the diverticulum was not only the cause of obstruction of the bowel, but also constricted the appendix and produced gangrenous appendicitis. When the diverticulum is attached to the umbilicus, Berard [29] lays great stress on the exquisite sensitiveness of the umbilical region. (7) The coincident occurrence of other malformations, such as club-foot, harelip, exstrophy of the bladder, is mentioned by nearly all writers as of importance in the diagnosis of obstruction from Meckel's diverticulum. In sixty-nine cases reviewed by the author, harelip was present in one case; in no other was congenital malformation present. From this we may conclude that the absence of these deformities constitutes but slight evidence that the diverticulum does not exist.

Concerning the mortality of obstruction from Meckel's diverticulum, we have the statistics of Boldt,[30] fifty-five cases reported, fifteen operated upon with three recoveries. In a very comprehensive summary of this subject, Berard and Delore have tabulated thirty-two cases operated upon, with nine recoveries and twenty-three deaths, giving a mortality of about 72.3 per cent. Of the sixty-nine cases collected by the author, in sixty-six the termination is mentioned. Of these, forty-five died and twenty-one recovered, a mortality of 68.1 per cent. Of the sixty-nine cases, fifty-seven were operated upon, and of these the result is given in fifty-four, with twenty-two recoveries and thirty-two deaths, giving a mortality of 59 per cent. in the cases subjected to operative treatment.

No. 1.—*Operator,* Taylor: Johns Hopkins Bull., 1901. *Age and Sex,* six, female. *Character of Symptoms,* several minor attacks; last, very sudden onset of classical symptoms of acute obstruction. *Mode of Strangulation,* cystic free; diverticulum twisted three times at base; traction produced acute flexion at point of attachment of diverticulum. *Treatment,* diverticulum removed. *Termination,* recovery.

No. 2.—*Operator,* Morton: The Lancet, Vol. ii, 1900. *Age and Sex,*

nine, female. *Character of Symptoms,* symptoms similar to those of acute appendicitis. *Mode of Strangulation,* kink in loop of ileum, which was caught under a diverticulum that was attached to umbilicus and acted as a band. *Treatment,* diverticulum removed; no resection of intestine. *Termination,* recovery.

No. 3.—*Operator,* Hall: The Lancet (London), Vol. i, 1900. *Age and Sex,* three, male. *Character of Symptoms,* symptoms of obstruction lasting for four days; vomiting occasionally; abdominal distention; some pain; collapse on fourth day. *Mode of Strangulation,* diverticulum attached to mesentery; constriction of loop of ileum under this band. *Treatment,* diverticulum removed. *Termination*(?).

No. 4.—*Operator,* Hall: The Lancet (London), Vol. i, 1900. *Age and Sex,* five, male. *Character of Symptoms,* symptoms of acute obstruction by band. *Mode of Strangulation,* diverticulum attached to mesentery acted as band; loop of gut strangulated under this band. *Treatment,* diverticulum removed. *Termination,* recovery.

No. 5.—*Operator,* Sellers: The Lancet (London), 1900, Vol. i, p. 383. *Age and Sex,* thirty-two, male. *Character of Symptoms,* symptoms of acute obstruction; vomiting, pain, and abdominal distention of five days' duration. *Mode of Strangulation,* diverticulum attached by terminal ligament to umbilicus; loop of ileum compressed by diverticulum and obstructed. *Treatment,* laparotomy. *Termination,* death twelve hours after operation.

No. 6.—*Operator,* Fawcett: The Lancet (London), Vol. i, 1900, p. 1585. *Age and Sex,* eleven, female. *Character of Symptoms,* sudden onset of symptoms of acute obstruction; operation on third day. *Mode of Strangulation,* diverticulum one and a half inches long, with terminal ligament attached to "bowel;" coils of small intestine had slipped through ring thus formed. *Treatment,* laparotomy; diverticulum removed. *Termination,* recovery; no bowel resection.

No. 7.—*Operator,* Snow: Archives of Pædiatrics, 1900, Vol. xvii, p. 501. *Age and Sex,* three, male. *Character of Symptoms,* acute complete obstruction lasting four days; collapse. *Mode of Strangulation* (autopsy), diverticulum with ligament attached to mesentery close to ileocæcal valve; loop of ileum below diverticulum compressed by diverticulum acting as band. *Treatment,* no operation. *Termination,* death.

No. 8.—*Operator,* Mackay: The Lancet (London), 1900, p. 1068. *Sex,* young female. *Character of Symptoms,* complete obstruction; severe pain; fæcal vomiting; visible peristalsis; temperature normal. *Mode of Strangulation,* fibrous cord extending from ileum a short distance above ileocæcal valve to transverse mesocolon on left side; knuckle of small gut compressed under this band. *Treatment,* immediate laparotomy; cord divided. *Termination,* recovery.

No. 9.—*Operator,* Hohlbeck: Arch. für klin. Chir., Band lxi, 1900. *Age and Sex,* four and a half, male. *Character of Symptoms,* repeated attacks of pain and constipation; last attack accompanied by complete obstruction lasting four days; on fifth day gas and fæcal matter passed by bowels; tumor could be outlined at umbilicus. *Mode of Strangulation,*

diverticulum attached to omentum; twisted on itself; intestine occluded at point of origin of diverticulum; necrosis of gut at point of strangulation. *Treatment,* resection of twenty-seven centimetres of small intestine. *Termination,* death.

No. 10.—*Operator,* Hohlbeck: Arch. für klin. Chir., Band lxi, 1900. *Age and Sex,* thirty-nine, female. *Character of Symptoms,* complete obstruction lasting three days; abdominal distention, particularly on right side; fæcal vomit. *Mode of Strangulation,* diverticulum twenty-three centimetres long; free at distal end; knotted about a loop of ileum; intestine gangrenous. *Treatment,* resection of eighty centimetres; union by Murphy's button. *Termination,* recovery.

No. 11.—*Operator,* Hohlbeck: Arch. für klin. Chir., Band lxi, 1900. *Age and Sex,* eighteen, ?. *Character of Symptoms,* sudden attack of severe abdominal pain; fæcal vomiting, early; operation on second day. *Mode of Strangulation,* inversion of mucous membrane of Meckel's diverticulum; invagination of six inches of ileum. *Treatment,* invagination dislodged; diverticulum removed. *Termination,* death.

No. 12.—*Operator,* Robinson: British Medical Journal, 1899, Vol. ii, p. 1416. *Age and Sex,* five, male. *Character of Symptoms,* acute pain referred to umbilicus; abdominal distention, with tumor in right side of abdomen; diagnosis, intussusception. *Mode of Strangulation,* inversion of diverticulum with invagination of ileum above diverticulum. *Treatment,* resection. *Termination,* death two hours after operation.

No. 13.—*Operator,* Symmonds: British Medical Journal, November 18, 1899. *Age and Sex,* ?, male. *Character of Symptoms,* pain; vomiting; abdominal distention with complete obstruction. *Mode of Strangulation.* "adherent diverticulum with gangrenous intestines." *Treatment,* laparotomy. *Termination,* death.

No. 14.—*Operator,* Symmonds: British Medical Journal, November 18, 1899. *Age and Sex,* twenty-six, male. *Character of Symptoms,* complete obstruction lasting five days. *Mode of Strangulation,* "gut folded around a very wide diverticulum." *Treatment,* laparotomy. *Termination,* death.

No. 15.—*Operator,* Schmidt: Deutsche Zeitschrift für klin. Chir., 1899. *Age and Sex,* fifteen, female. *Character of Symptoms,* chronic obstruction of four weeks' duration. *Mode of Strangulation,* diverticulum attached to umbilicus, producing obstruction by kinking from traction. *Treatment,* laparotomy. *Termination,* death.

No. 16.—*Operator,* Berard et Delore: Lyon Méd., 1899, Vol. i, p. 90. *Age and Sex,* twenty, male. *Character of Symptoms,* acute obstruction, with fæcal vomiting and severe pain at umbilicus; diagnosis of internal hernia. *Mode of Strangulation,* diverticulum attached to umbilicus; obstruction of ileum and adhesion of loops. *Treatment,* laparotomy; diverticulum removed. *Termination,* recovery.

No. 17.—*Operator,* Malgagne et Blanc: Bull. de Soc. Anat. de Paris, 1899, p. 427. *Age and Sex,* ?, male. *Character of Symptoms,* at first, symptoms of subacute appendicitis; incomplete obstruction and low fever. *Mode of Strangulation,* symptoms of acute obstruction from rupture of

diverticulum and pressure of abscess on loop of gut. *Treatment,* laparotomy; removal of diverticulum and drainage of cavity. *Termination* (?).

No. 18.—*Operator,* Bell: Montreal Medical Journal, 1898. *Age and Sex,* sixteen, female. *Character of Symptoms,* acute abdominal pain and abdominal distention. *Mode of Strangulation,* diverticulum given off three feet above the ileocæcal valve with ligament attached to right of umbilicus; obstruction by kinking just above the ileocæcal valve. *Treatment,* laparotomy. *Termination,* recovery.

No. 19.—*Operator,* Nedivill: The Lancet (London), 1898, Vol. i, p. 1465. *Age and Sex,* sixteen, female. *Character of Symptoms,* abdominal pain; vomiting and constipation. *Mode of Strangulation,* cord-like band stretched across from umbilicus to right side of abdomen; loop of gut compressed under band. *Treatment,* laparotomy; division of band. *Termination,* recovery.

No. 20.—*Operator,* Küttner, Beiträge zur klin. Chir., Band xxi, 1898. *Age and Sex,* forty-nine, female. *Character of Symptoms,* classical symptoms of acute obstruction. *Mode of Strangulation,* cause not determined at operation; autopsy showed intussusception of diverticulum. *Treatment,* laparotomy; drainage of abdominal cavity. *Termination,* death.

No. 21.—*Operator,* Stubenrauch: Centralblatt für Chir., 1898, No. 26. *Age and Sex,* five and a half, female. *Character of Symptoms,* sudden abdominal point; rectal tenesmus; bloody stool; vomiting and collapse. *Mode of Strangulation,* intussusception of ileum, starting at point of origin of diverticulum. *Treatment,* abdominal section. *Termination,* death.

No. 22.—*Operator,* Carle et Chavet: Prov. Méd., 1898. *Character of Symptoms,* sudden onset; obstruction, acute pain, vomiting, etc. *Mode of Strangulation,* diverticulum twelve centimetres long attached to mesentery, completely encircling a loop of small intestine.

No. 23.—*Operator,* Guinard: Bull. et Mém. Soc. de Chir. de Paris, 1898. *Sex,* young boy. *Character of Symptoms,* acute obstruction, with severe abdominal pain lasting two days. *Mode of Strangulation,* diverticulum attached to mesorectum; loop of small intestine constricted by pressure from this band. *Treatment,* laparotomy; removal of diverticulum. *Termination,* recovery.

No. 24.—*Operator,* De Quervain: Centralblatt für Chir., 1898. *Age and Sex,* sixteen, male. *Character of Symptoms,* acute pain, fæcal vomiting; complete obstruction. *Mode of Strangulation,* invagination of diverticulum. *Treatment,* resection. *Termination,* death.

No. 25.—*Operator,* Kramer: Centralblatt für Chir., 1898. *Age and Sex,* eighteen, male. *Character of Symptoms,* sudden pain, vomiting, and complete obstruction; painful tumor found in ileocæcal region; visible peristalsis. *Mode of Strangulation,* pear-shaped diverticulum adherent to root of mesentery; small intestine strangulated by twisting at point of attachment. *Treatment,* laparotomy; removal of diverticulum. *Termination,* recovery.

No. 26.—*Operator,* Kramer: Centralblatt für Chir., 1898. *Age and Sex,* forty, male. *Character of Symptoms,* pain and tenderness of abdomen, with some dulness in right side, following kick of a horse; partial

obstruction. *Mode of Strangulation,* first operation; pus cavity opened; urgent symptoms relieved; fæcal fistula persisted. Second operation four months later; fistula found to lead to diverticulum, which was removed. *Treatment,* laparotomy. *Termination,* recovery.

No. 27.—*Operator,* Gildersleeve: Medical News (New York), 1898, Vol. lxii. *Age and Sex,* twenty-one, male. *Character of Symptoms,* acute sudden pain and vomiting; diagnosis of appendicitis; collapse. *Mode of Strangulation,* diverticulum with its terminal ligament formed complete ring, through which a loop of gut passed. *Treatment,* no operation. *Termination,* death.

No. 28.—*Operator,* Thompson: ANNALS OF SURGERY, 1898, Vol. xxvii. *Age and Sex,* twenty-nine, male. *Character of Symptoms,* sudden onset, some griping pains referred to umbilical region. *Mode of Strangulation,* diverticulum with terminal ligament attached to base of mesentery; strangulation of loop near ileocæcal valve under this band. *Treatment,* operation five days after onset. *Termination,* death.

No. 29.—*Operator,* Fox: Transactions of the Pathological Society, London, 1897-8. *Age and Sex,* five, male. *Character of Symptoms,* acute abdominal pain; nausea and vomiting; temperature of a pyæmic type. *Mode of Strangulation* (autopsy), child with cleft palate; "diverticulum wound around gut at point of attachment;" diverticulum ruptured; obstruction of the root of diverticulum. *Treatment,* no operation. *Termination,* death.

No. 30.—*Operator,* Gally et Jeannel: Arch. Prov. de Chir., 1898. *Age and Sex,* forty-seven, male. *Character of Symptoms,* acute abdominal pains, vomiting, and obstruction. *Mode of Strangulation,* twisting of gut with acute flexion at point of origin of diverticulum. *Treatment,* laparotomy; resection of gangrenous intestine. *Termination,* death.

No. 31.—*Operator,* Ewald: Berliner klin. Woch., 1897, No. 8. *Age and Sex,* forty-two, female. *Character of Symptoms,* recurrent attacks of partial obstruction; sudden onset; in last attack, with complete obstruction. *Mode of Strangulation* (autopsy), inflammatory stenosis above attachment of diverticulum; invagination of diverticulum; perforations of intestine. *Treatment,* no operation. *Termination,* death.

No. 32.—*Operator,* Heresco: Bull. de la Soc. Anat. de Paris, 1897, lxi. *Age and Sex,* ?, ?. *Character of Symptoms,* sudden violent pain; fæcal vomit; profuse perspiration. *Mode of Strangulation* (autopsy), diverticulum twenty-five centimetres long with ligament attached to mesentery; loop of ileum constricted under this band. *Treatment,* laparotomy; cause of obstruction not found at operation. *Termination,* death.

No. 33.—*Operator,* Kammerer: ANNALS OF SURGERY, Vol. xxvi. *Age and Sex,* twenty, male. *Character of Symptoms,* acute pain in right side of abdomen; vomiting; greater distention on right side than on left. *Mode of Strangulation,* diverticulum six inches above ileocæcal valve attached to mesentery; encircled a loop of ileum immediately above the diverticulum. *Treatment,* anastomosis with Murphy's button; no resection. *Termination,* death.

No. 34.—*Operator,* Kammerer: ANNALS OF SURGERY, Vol. xxvi.

Age and Sex, forty-four, male. *Character of Symptoms,* diarrhœa and abdominal pain for one year; terminating in attack of severe abdominal pain, referred to umbilical region. *Mode of Strangulation,* diverticulum attached to umbilicus; part of sigmoid flexure compressed between diverticulum and anterior abdominal wall. *Treatment,* three operations. *Termination,* recovery; with artificial anus.

No. 35.—*Operator,* Kammerer: ANNALS OF SURGERY, Vol. xxvi. *Age and Sex,* eighteen, female. *Character of Symptoms,* cramps, with constipation lasting three weeks; finally complete obstruction with fæcal vomit, some pain, and marked peristalsis; no flatus. *Mode of Strangulation,* diverticulum with terminal ligament attached, but torn loose during operation; point of attachment not determined; gut strangulated under band; exact mechanism obstruction not determined. *Treatment,* operation; diverticulum not removed. *Termination,* recovery.

No. 36.—*Operator,* Jordan: Berliner klin. Woch., 1896. *Age and Sex,* nineteen, male. *Character of Symptoms,* acute obstruction with pain lasting four days. *Mode of Strangulation,* diverticulum attached to umbilicus; obstruction by acute flexion at point of origin of diverticulum; intestine gangrenous. *Treatment,* laparotomy; lateral anastomosis. *Termination,* death.

No. 37.—*Operator,* Dugan: Pædiatrics, 1896, Vol. ii, p. 71. *Age and Sex,* eleven, male. *Character of Symptoms,* sudden onset, complete obstruction; diagnosis of appendicitis. *Mode of Strangulation,* twisting of base of diverticulum; constriction by twisting of gut at point of origin of diverticulum. *Treatment,* diverticulum excised; gut sutured. *Termination,* recovery.

No. 38.—*Operator,* Latz: Medical Review, 1895. *Age and Sex,* twelve, female. *Character of Symptoms,* acute abdominal pain; fæcal vomiting; no flatus. *Mode of Strangulation,* diverticulum with terminal ligament attached to mesentery; underneath was a loop of gut that was strangulated. *Treatment,* operation. *Termination,* death.

No. 39.—*Operator,* Latz: Medical Review, 1895. *Age and Sex,* four, male. *Character of Symptoms,* sudden colicky pain; early fæcal vomit; rapid pulse and high temperature. *Mode of Strangulation,* diverticulum with terminal ligament attached to mesentery (secondary); loop of gut constricted under band. *Treatment,* operation; gut sutured. *Termination,* recovery.

No. 40.—*Operator,* Broca: Bull. Soc. de Anat. de Paris, 1895. *Age and Sex,* seven weeks, male. *Character of Symptoms,* sudden onset of typical acute obstruction of intestine. *Mode of Strangulation,* diverticulum adherent to mesentery, forming band; small intestine strangulated under this band. *Treatment,* operation; gut released. *Termination,* death.

No. 41.—*Operator,* Elliott: Boston Medical and Surgical Journal, 1894. *Age and Sex,* thirty, male. *Character of Symptoms,* sudden onset of vomiting, chills, and severe pain; pulse, 160; diagnosis of acute appendicitis. *Mode of Strangulation,* diverticulum seven inches long, of size of ileum, attached to umbilicus; diverticulum twisted at point of attachment

to intestine. *Treatment,* laparotomy; diverticulum removed; intestine sutured. *Termination,* death.

No. 42.—*Operator,* Councilman: Boston Medical and Surgical Journal, 1894. *Character of Symptoms,* sudden onset; death in sixteen hours from acute obstruction. *Mode of Strangulation* (autopsy), diverticulum attached to mesentery, formed a ring which completely surrounded a loop of gangrenous intestine. *Treatment,* none mentioned. *Termination,* death.

No. 43.—*Operator,* Boyle: Arch. de Méd. et de Pharm. Militeres, 1894. *Character of Symptoms,* symptoms of obstruction developed gradually; not complete until ninth day. *Mode of Strangulation,* diverticulum attached to umbilicus; loop of small intestine constricted under tensely drawn band. *Treatment,* operation; constriction removed. *Termination,* death.

No. 44.—*Operator,* Cazin: Soc. de Anat. de Paris, 1893. *Age and Sex,* eleven, male. *Character of Symptoms,* acute onset. *Mode of Strangulation,* unattached diverticulum snared a loop of small intestine. *Treatment,* resection of diverticulum. *Termination,* death.

No. 45.—*Operator,* Makins: British Medical Journal, 1893, Vol. i, p. 147. *Character of Symptoms,* acute obstruction of the intestine. *Mode of Strangulation,* diverticulum twisted, gangrenous, perforated. *Treatment,* operation. *Termination,* death.

No. 46.—*Operator,* Ochsner, A. J.: Journal of the American Medical Association, July 29, 1893. *Age and Sex,* eighty-one, male. *Character of Symptoms,* sudden onset of symptoms of acute obstruction. *Mode of Strangulation,* diverticulum with ligament attached to mesentery, formed loop through which small intestine had become strangulated. *Treatment,* loop disengaged; no resection. *Termination,* death.

No. 47.—*Operator,* Prince: Medical News (Philadelphia), 1893. *Age and Sex,* four, female. *Character of Symptoms,* acute onset complete obstruction lasting six days. *Mode of Strangulation,* diverticulum with ligament one inch in length, attached to mesentery, forming ring; loop of small intestine strangulated in ring. *Treatment,* resection; end-to-end union with Murphy's button. *Termination,* death.

No. 48.—*Operator,* Oderfeld: Gaz. Sekarska, January, 1892. *Character of Symptoms,* acute obstruction; diagnosis of obstruction by Meckel's diverticulum. *Mode of Strangulation,* diverticulum attached to mesentery, forming loop; knuckle of small intestine caught in loop and strangulated. *Treatment,* laparotomy; diverticulum removed. *Termination,* recovery.

No. 49.—*Operator,* Zurnrinkle: Arch. für klin. Chir., Band xl, 1892. *Age and Sex,* nineteen, male. *Character of Symptoms,* acute onset of obstruction lasting two and a half days. *Mode of Strangulation,* diverticulum with ligament ninety-five centimetres above ileocæcal valve; ligament attached to mesentery forming ring; loop of gut caught under ligament. *Treatment,* laparotomy; removal of diverticulum. *Termination,* death ten hours after operation.

No. 50.—*Operator,* Allen: Medical News, 1892, Vol. lxi. *Age and Sex,* thirty-four, male. *Character of Symptoms,* sudden onset, complete obstruction. *Mode of Strangulation,* diverticulum four inches long, from

region of cæcum to the abdominal wall near umbilicus; intestine twisted about this band. *Treatment,* laparotomy. *Termination* (?).

No. 51.—*Operator,* Adams: St. Bartholomew's Hospital Reports, 1891. *Age and Sex,* forty-two, male. *Character of Symptoms,* obscure, rather chronic; evidence of obstruction lasting two weeks. *Mode of Strangulation* (autopsy), invagination of diverticulum and ileocolic intussusception. *Treatment,* no operation. *Termination,* death.

No. 52.—*Operator,* Adams: St. Bartholomew's Hospital Reports, 1891. *Age and Sex,* ?, male. *Character of Symptoms,* no clinical history. *Mode of Strangulation* (autopsy), intussusception of diverticulum. *Termination,* death.

No. 53.—*Operator,* Mackenzie: Transactions of the Pathological Society, London, 1889-90, p. 127. *Age and Sex,* thirty-seven, male. *Character of Symptoms,* acute obstruction; vomiting; abdominal distention and pain. *Mode of Strangulation,* diverticulum attached to umbilicus; volvulus of five feet of ileum above origin of diverticulum. *Treatment,* no operation. *Termination,* death.

No. 54.—*Operator,* Chassevant: Bull. de la Soc. de Anat. de Paris, 1890. *Character of Symptoms,* classical symptoms of acute intestinal obstruction. *Mode of Strangulation* (autopsy), diverticulum fifty centimetres above ileocæcal valve, attached to umbilicus; obstruction by torsion of diverticulum. *Treatment,* no operation. *Termination,* death.

No. 55.—*Operator,* Prendelsberge: Wiener klin. Woch., 1901. *Age and Sex,* fifty-one, male. *Character of Symptoms,* acute onset; vomiting; abdominal distention and severe pain. *Mode of Strangulation* (autopsy), unusually long diverticulum, which had become attached to mesentery; acted as band. *Treatment,* laparotomy; cause of obstruction not found at operation. *Termination,* death.

No. 56.—*Operator,* Taylor: British Medical Journal, 1901. *Age and Sex,* twenty-two, male. *Character of Symptoms,* symptoms of acute ileus. *Mode of Strangulation,* diverticulum given off one inch above ileocæcal valve; terminal ligament adherent to small intestine about one and a half feet above origin of diverticulum; intestine constricted under band. *Treatment,* laparotomy; strangulated loop withdrawn. *Termination,* death.

No. 57.—*Operator,* Campbell: British Medical Journal, 1901, Vol. i, p. 1263. *Age and Sex,* seventy-one, male. *Character of Symptoms,* acute obstruction; death on third day. *Mode of Strangulation* (autopsy), "diverticulum had established a pathological relationship, but had no normal attachment of distal end;" acted as band. *Treatment,* no operation. *Termination,* death.

No. 58.—*Operator,* Walzberge: Verhand. deutsche Gesellschaft für Chir., 1898. *Age and Sex,* twenty-five, male. *Character of Symptoms,* those of acute ileus, lasting three days. *Mode of Strangulation,* diverticulum free; both ends obliterated; obstruction from kinking of intestine at point of origin of diverticulum; diverticulum formed cyst; intestine necrotic. *Treatment,* diverticulum removed; necrotic patch in gut inverted. *Termination,* death.

No. 59.—*Operator,* Walzberge: Verhand. deutsche Gesellschaft für Chir., 1898. *Age and Sex,* fourteen, male. *Character of Symptoms,* acute obstruction, lasting three days. *Mode of Strangulation* (autopsy), distended diverticulum attached to umbilicus; torsion of diverticulum with sharp twist in gut, at point of origin of diverticulum; intestine necrotic. *Treatment,* operation; artificial anus established; diverticulum not removed. *Termination,* death.

No. 60.—*Operator,* Mintz: Deutsche Zeitschr. für Chir., Band xliii. *Age and Sex,* twenty-four, male. *Character of Symptoms,* acute ileus; great distention of upper zone of abdomen; tenderness near umbilicus; death on fifth day. *Mode of Strangulation,* diverticulum attached to mesentery, forming a ring; within this a loop of ileum was strangulated. *Treatment,* no operation. *Termination,* death.

No. 61.—*Operator,* Weill et Frankel: Bull. de la Soc. de Anat. de Paris, 1896. *Age and Sex,* four, female. *Character of Symptoms,* acute ileus, one day's duration. *Mode of Strangulation,* invagination of diverticulum and ileum. *Treatment,* resection of intestine; suture. *Termination,* death.

No. 62.—*Operator,* Williams, D. H., Chicago: Personal communication. *Age and Sex,* twenty-five, male. *Character of Symptoms,* acute ileus. *Mode of Strangulation,* diverticulum with ligament adherent to mesentery; strangulation under band. *Treatment,* laparotomy. *Termination,* death.

No. 63.—*Operator,* Morgan, W. E., Chicago: Personal communication. *Age and Sex,* thirty-eight, male. *Character of Symptoms,* acute ileus, complete obstruction. *Mode of Strangulation,* diverticulum with ligament attached to mesentery. *Treatment,* amputation of diverticulum. *Termination,* recovery.

No. 64.—*Operator,* McArthur, L. L., Chicago: Personal communication. *Age and Sex,* forty, male. *Character of Symptoms,* acute obstruction. *Mode of Strangulation,* diverticular cord, with ligament attached to mesentery and umbilicus, constricted appendix under tightly drawn band; gangrenous appendicitis and rupture with peritonitis. *Treatment,* operation; removed appendix and diverticulum. *Termination,* death.

No. 65.—*Operator,* Henrotin, F., Chicago: Personal communication. *Character of Symptoms,* acute ileus eight days after operation for appendicitis, excessive tympany, pain, vomiting, etc. *Mode of Strangulation,* diverticulum five and a half inches long, attached by inflammatory adhesions to exudate about stump of appendix; small intestine twisted and obstructed. *Treatment,* operation; strangulation relieved. *Termination,* Recovery.

No. 66.—*Operator,* Davison, Chas., Chicago: Personal communication. *Age and Sex,* seven, male. *Character of Symptoms,* acute obstruction; subnormal temperature; tympany; collapse on fourth day. *Mode of Strangulation,* diverticulum two and a half feet from cæcum; terminal ligature apparently attached to another loop of small intestine. *Treatment,* operation; strangulation relieved. *Termination,* death.

No. 67.—*Operator,* Bevan, A. D., Chicago: Personal communication.

Age and Sex, thirty-five, male. *Character of Symptoms,* sudden onset; complete obstruction. *Mode of Strangulation,* diverticulum with ligament attached to umbilicus; acted as band. *Treatment,* removed diverticulum. *Termination,* recovery.

No. 68.—*Operator,* Bevan, A. D., Chicago: Personal communication. *Age and Sex,* twenty-two, female. *Character of Symptoms,* acute ileus. *Mode of Strangulation,* diverticulum with ligament formed loop. *Treatment,* operation; diverticulum removed. *Termination,* recovered.

No. 69.—*Operator,* Halstead, A. E., August, 1901. (Not reported.) *Age and Sex,* twenty-six, male. *Character of Symptoms,* several previous attacks; sudden onset; vomiting, pain, and abdominal distention; no flatus. *Mode of Strangulation,* diverticulum one and a half inches, with ligament two and a half inches, attached to mesentery forming ring; ileum constricted by this ring. *Treatment,* laparotomy; removal of diverticulum. *Termination,* recovery.

SUMMARY.

Number of cases reviewed	69
Males, 44; females, 16. (Sex recorded)	60
Result noted in	66
Deaths	45
Recoveries	21
Percentage of mortality	68.1
Cases operated upon	57
Result in cases operated upon mentioned in	54
Death in cases operated upon	32
No operation in	12
Percentages of death in cases operated	59.1
Attachment or non-attachment of diverticulum or diverticular ligament recorded in	63
Not mentioned	6
Attached	48
Free	15
To mesentery in	23
To umbilicus in	15
Not determined in	3
To mesocolon in	1
To mesorectum	1
To small intestine	3
To omentum	1
To peri-appendicular exudate	1

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