

nosis. The patient should be seen at short intervals. If the symptoms increase, if the pulse grows worse, and there are signs of collapse, operation should not be postponed beyond the following day. The probability is that a loop of small intestine will be found about the side of the vertebral column or near the uterus. If such is the case, operation will almost certainly save the life of the patient, while if the symptoms are due, for example, to a ureteral calculus, operation will not seriously lessen the patient's chance for recovery.

FIG. 87.

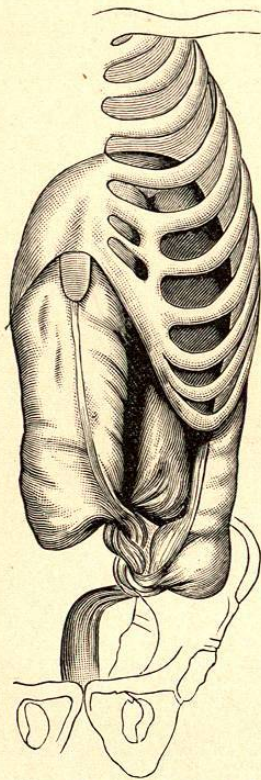


Diagram of volvulus of the sigmoid flexure, as shown in Fig. 86. (Küttner.)

If the symptoms of the first day have somewhat decreased on the following day, if the pain is less and the pulse better, and the shock has nearly disappeared, each surgeon must decide for himself whether he will operate or wait until the third day to see if symptoms of strangulation persist or increase. Sometimes a moderately distended loop of small intestine will be found arising out of the pelvis which is easily appreciable but cannot be pushed upward in the abdomen since it seems fixed by its lower end in the pelvis. Such a condition is comparable to many cases of external strangulated hernia in which the

FIG. 88.



Distention of colon due to fecal impaction. Reduced by colostomy. Death from asthenia. No mechanical obstruction. (Griffith.)

incarceration may exist for three or four days without gangrene because the strangulation at the ring is only moderate. Under such circumstances one should not postpone until the general condition of the patient is less favorable an operation certain to be necessary.

The illustrations given above show the symptoms of strangulation as they appear at an early stage. Unfortunately a surgeon rarely has the opportunity to treat the patient at all so early in the attack. With each succeeding day the condition of the patient changes. The whole abdomen distends with more or less rapidity, and the distention gradually obscures the particular loop which is strangulated. Any peristaltic action or tonic contraction of the intestine which may have been present at an early stage soon disappears. The intestine has passed into a paralytic condition as a result of infection and peritonitis, or as a result of the long-continued overdistention. If a patient is seen for the first time in this advanced stage of the trouble, the original cause of the intestinal paralysis is scarcely to be made out, while the treatment of the same by laparotomy is generally a useless procedure.

If the patient when first seen has a much distended abdomen in which certain loops of intestine may still be recognized by careful palpation, and if light or strong percussion is still capable of causing some peristaltic action which can be recognized if one listens for the resulting gurgle, the diagnosis of diffuse peritonitis with intestinal paralysis may be excluded. A diagnosis of circumscribed peritonitis confined for example to the pelvis is not so easily ruled out. If the history shows that a patient in full health was suddenly seized with abdominal pain, and if the examination does not point to disease of the appendix, the diagnosis of internal strangulation is probable, and if the condition of the patient warrants it, laparotomy is indicated. If he is too weak for radical operation, enterotomy should be performed, since the shock of this operation is slight and it may save the patient from death by gangrene if this change has not already taken place. The strangulated intestine may then be freed at a later period, when the patient is in a condition to withstand the effects of operation.

Diagnosis of Ileus due to Obstruction.—Ileus due to obstruction like that due to strangulation has certain fairly well-marked characteristics:

1. The intense initial continuous pain is wanting.
2. The symptoms of collapse are wanting.
3. There are present clearly marked dilated loops of intestine showing more or less peristaltic action.
4. There will have been before the symptoms of ileus symptoms of abdominal trouble, especially of the intestine.

Usually these characteristics of obstructive ileus will enable one to diagnose it from ileus due to peritonitis, and from ileus due to strangulation. It may or may not be possible to determine the exact cause of this form of mechanical difficulty. Take, for example, the case of a patient suffering from chronic intestinal stricture the result of a resection. The patient returned home apparently well, but later began to suffer from indigestion and meteorism, with alternating diar-

rhœa and constipation. He was, however, able to continue his work. Some months later his abdomen suddenly swelled and became painful. Nothing passed from his bowels even after the administration of strong cathartics. He became nauseated and vomited, and later vomited fecal matter. These acute symptoms gradually increased in intensity until at the end of a week the abdomen was fully distended and palpation was very unsatisfactory. Individual loops of intestine could still be made out in different places showing that they were not completely paralyzed. This fact, together with the relatively good pulse, was sufficient to exclude the diagnosis of peritonitis. Could the patient be suffering with strangulation of some small loop of intestine deep in the abdominal cavity? It is true the attack began suddenly, but with only moderate pain and without collapse, and at the end of a week thereafter his condition is fairly good. Strangulation is therefore improbable. In such a case the diagnosis of obstructive ileus rests upon the persistence of peristaltic action and the development of acute symptoms after a long period of chronic intestinal stenosis. The seat of the obstruction in the case mentioned was found to be at the point of previous resection, where the intestine was much narrowed. The acute symptoms were due to a partial twist of the overfull intestine immediately above the stricture.

The diagnosis is equally plain if ileus develops in a patient known to have carcinoma of the large intestine or some tumor of the pelvis. If the history does not throw light on the cause of the trouble and the distention makes satisfactory palpation impossible, the prognosis may be obscure. Rectal or vaginal examination will show the presence of a pelvic tumor, if such exists; but carcinoma of the colon and sigmoid flexure will not be palpable by any method of examination. The presence of mucous masses in the rectum suggests a carcinoma of the large intestine, and it is well to remember that in obstruction of the large intestine below the descending colon the rectum will contain only from $\frac{1}{2}$ to 1 litre of water (1 pint to 1 quart). In making this test the water should be injected very slowly at the temperature of the body; otherwise if the patient is sensitive only a small quantity will be retained even though there is no obstruction in the large intestine.

If the abdomen is much distended, it is better not to waste too much time in determining the exact situation of obstruction, since the indication is sufficiently clear that the dilatation of the intestine should be relieved at once.

There is a variety of ileus due to gall-stone, or due to a biliary calculus of a large size that has perforated from the gall-bladder into the intestine. Inflammatory symptoms which accompany such a perforation ought to suggest the correct diagnosis. There will be no jaundice if the process is confined to the gall-bladder, although the colicky pains may closely resemble those produced by the passage of a gall-stone through the common duct. If ileus develops after attacks of colic in women of middle age, the possibility of a gall-stone should

be considered. If the stone perforates into the colon, it causes few or no symptoms. If it perforates into the small intestine, characteristic attacks of ileus are produced with bilious vomiting. If the ileus is situated high up, there may also be vomiting of blood. In such a case the attack of ileus may subside, the gas may escape from the intestine and then the attack recur. Pain is a prominent symptom, as is peristalsis. The symptoms may last months before they are relieved by the passage of a stone into the large intestine, or ulceration and perforation of the small intestine may be the result.

FIG. 89.



Ileocecal intussusception of minor degree. Appendix to the right not yet involved. (Hutchinson.)

The symptoms of invagination are sufficiently characteristic to establish a correct diagnosis. This form of intestinal obstruction is usually found in children. (Fig. 89.) It develops suddenly with intense pain in the abdomen, nausea, vomiting, and tenesmus, with evacuation of blood, or blood and mucus. Afterward nothing passes from the rectum and the abdomen becomes tympanitic. If the patient is seen before the abdominal distention is very great, the cylindrical invaginated intestine may be felt. If so, an exact diagnosis can be made, otherwise the diagnosis will be a probable one.

Treatment of Ileus due to Strangulation.—Laparotomy for strangulation should be performed with good assistance and in circumstances which permit of an aseptic operation. It is particularly useful to wash out the stomach before administering the anæsthetic, since in not a few instances the patient has vomited with fatal inhalation at the beginning or close of the anæsthesia. A general anæsthetic is necessary in order to relax the abdominal walls.

If the place of strangulation is evident, the incision should be made over it. This applies especially to strangulation in connection with some hernial opening; for example, strangulation which continues after the reduction of an external hernia, or chronic or marked intestinal symptoms which continue after the reduction of a hernia and suddenly become acute. Usually, however, the incision is made in the median line from the level of the umbilicus to the symphysis. Before the peritoneum is opened sterile hot cloths should be at hand in order to catch the small intestines since they sometimes pop out

suddenly. The peritoneal cavity is widely opened, and the affected loop of intestine if recognized is carefully brought forward and the constricting band if such exists is divided. This manipulation is easy if the rest of the intestine is empty. If the affected loop of intestine is not seriously damaged, it is replaced in the abdomen and the wound quickly sutured. If the intestine is seriously damaged, the affected portion should be resected. (See page 468.) Schlange has removed 135 cm. (52 inches) of the small intestine on account of strangulation.

If there is volvulus of the sigmoid flexure, it should be untwisted. Since a recurrence of this trouble is rather common, it is well to stitch the untwisted loop to the parietal peritoneum, or to perform resection if necessary.

If a short loop of intestine is strangulated, it usually lies close to the posterior wall of the abdomen, or perhaps in the pelvis, and is often hidden by other distended loops of intestine. In these circumstances much time may be saved by bringing the affected loops of intestine out of the abdominal cavity and wrapping them about with hot moist cloths. When this is done, the source and cause of strangulation are quickly found. Moreover, this manœuvre facilitates inspection of the deeper portions of the peritoneal cavity.

In the treatment of strangulation it is desirable to avoid any tension upon the affected loop of intestine. Its wall may already be gangrenous at the point of strangulation and a careless pull upon it may produce rupture. When a constriction has been divided, the circulation of the affected loop is to be carefully examined, and if there is suspicion that the loop is gangrenous, it should be wrapped about with sterile gauze and brought outside the abdomen while the rest of the intestines are replaced. The abdominal wound is then partially closed by suture and the resection of the damaged intestine is carried out extraperitoneally. The peritoneal cavity should not be irrigated either with antiseptics or with sterile water. Any exudate which it contains at the time of operation should be sponged out.

If the intestine is markedly tympanitic, it is with difficulty replaced. Too much force should not be employed, as tears are thereby produced in the serosa which may lead to further trouble. It is far better to make one or several small incisions in the distended intestine to permit the escape of gas and fluid contents. Every such wound is to be carefully closed by suture and its vicinity carefully washed with sterile salt solution and dried before the intestine is replaced. This step in the operation has another advantage: It relieves the patient of a great quantity of poisonous material situated in the intestine and enables the latter more easily to resume its normal function.

Treatment of Obstructive Ileus.—The most important point in the treatment of obstructive ileus is the speedy relief of the distended intestine. This is accomplished by means of an artificial anus. Ileus due to strangulation requires an immediate laparotomy in order to prevent threatened gangrene, whereas the slight operation necessary for the

establishment of an artificial anus can be performed under local anaesthesia with very little risk to the patient. When the intestine has become freed from its putrid contents, which have much the same injurious effect upon the organism as the contents of a large putrid abscess, the vomiting subsides and the condition of the patient rapidly improves. At a later period laparotomy and a radical operation can be carried out under much more favorable conditions.

Enterotomy is necessary for another reason. The circulation in the distended intestine is suspended if distention reaches a certain point even though the vessels of the mesentery are unaffected. There may follow venous stasis with ecchymoses and ulcerations of the mucous membrane, and possibly perforation and peritonitis. But long before perforation occurs bacteria may pass through the damaged intestinal wall and set up infection. These ulcers of the mucous membrane, to which Köcher has given the name dilatation ulcers, are not the result of pressure from hardened fecal lumps since they occur in the small intestine as well as the large intestine. Their significance is very great as they permit the escape of bacteria and the development of sepsis which is frequently fatal.

The affected intestine should be opened as near the point of obstruction as possible, for there its dilatation is the greatest and the escape of gas and feces will most easily be accomplished. Moreover, by making the opening as far as possible from the stomach the nutrition of the individual will be best preserved.

Sometimes the site and cause of obstruction cannot be determined and the history may fail to indicate the nature of the obstruction. A safe rule to follow in these cases is to cut down directly upon the obstruction when its situation is known. Otherwise an incision should be made over the cæcum. The obstruction in these cases is usually in the large intestine, and an opening made in the cæcum will preserve the function of the whole of the small intestine. If the cæcum is found collapsed, the affected loop of small intestine can be searched for and brought out through the wound already made.

The incision should be about 6 cm. (2.4 inches) long, similar to the incision made for appendicitis. A peritoneal incision 3 cm. (1.2 inches) long will usually suffice for inspection and palpation of the cæcum and the subsequent incision in it. The bowel to be opened is first stitched in the peritoneal wound with interrupted or, better, continuous catgut or silk sutures. The incision in the bowel should be made longitudinally 2 cm. (0.8 inch) in length and its cut edges fastened to the skin. If the contractility of the intestine is preserved, there will be an immediate escape of gas and fluid fecal matter. This is in sharp contrast to the sluggish escape when the opening is made in an intestine which is distended by peritonitis.

The intestine should be emptied as thoroughly as possible. As soon as the intestine is firmly adherent in the wound it should be cleansed by irrigations and laxatives should be administered to the patient. Until such time nourishment should be given by the rectum, and in

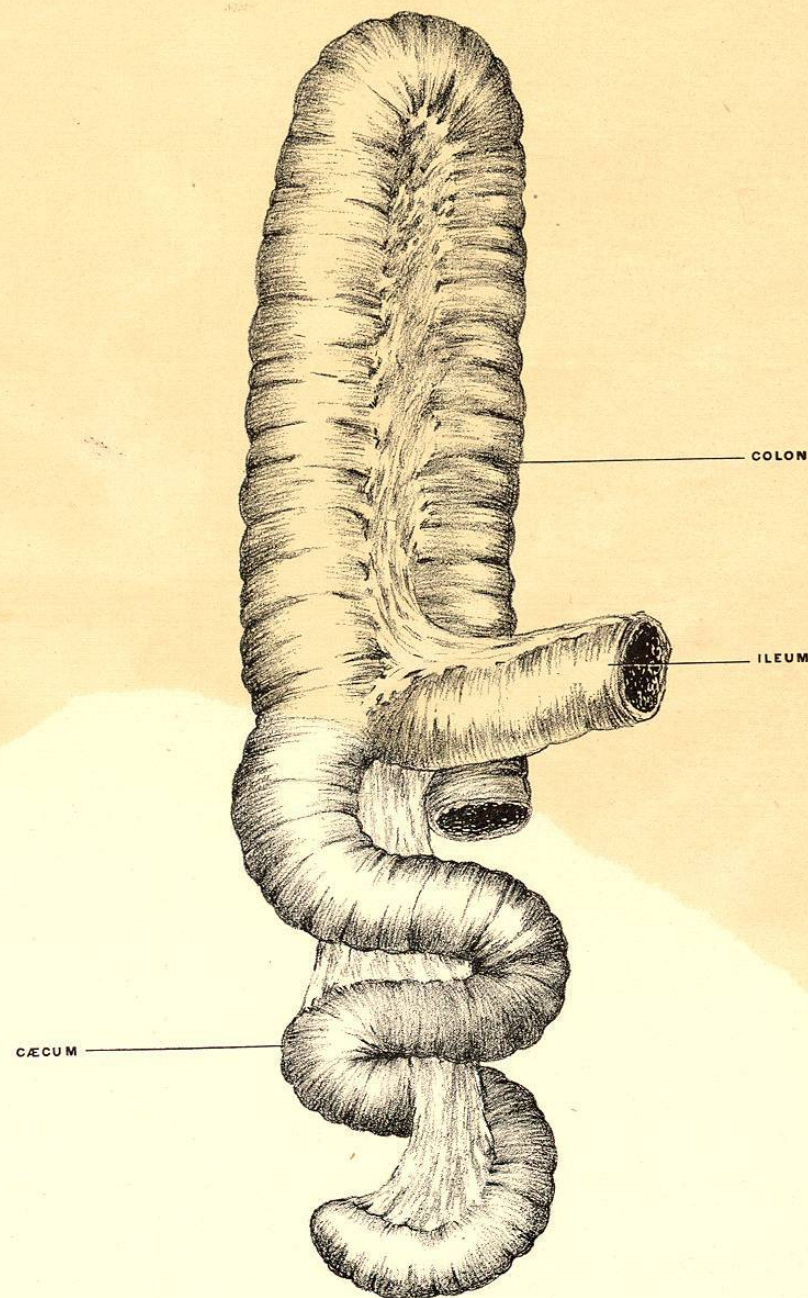
serious cases no fluid should be given by mouth, but the necessary amount should be administered in the form of subcutaneous saline injections. If there has been fecal vomiting, it is well to wash out the stomach.

The diagnosis of gall-stone ileus is usually a probable one. Even if it is certain, the severity of the attack cannot be foreseen, so that it is safer in all such cases to open the abdomen and to follow the distended small intestine to the point of obstruction. The stone is usually easily palpable. The loop of intestine which contains it should be brought out of the abdominal cavity, and the incision in the abdominal wall partially closed by suture. The intestine is then incised, the stone removed, and the wound in the intestine sutured. The intestine is then replaced and the abdominal wound sutured. If operation is performed early, a complete cure may be expected. If there have been repeated attacks with more or less ulceration of the intestine, all the symptoms will not at once subside.

There are other simple measures which sometimes succeed in reducing invaginated intestine. These are: injection of water from a fountain-syringe or funnel, distention of the rectum and colon with air, and direct reposition through the anus of the invaginated bowel in case the trouble is situated low down. If these measures fail, a laparotomy should at once be performed. The results of operation are naturally better if it is performed early. When the abdomen has been opened, it may be possible to reduce the invagination even though it has lasted two or three days. If manipulation fails, resection should be performed. The results of enterotomy in these cases are not so good as those of resection, and the former operation should therefore be reserved for patients who cannot withstand the more radical procedure.

It must not be inferred from what has been said concerning the treatment of ileus that every case demands operation. On the contrary, many patients suffering from dynamic ileus or from acute or chronic peritonitis, or from fecal obstruction, or from ileus due to hysteria, or spasm of the intestine, have recovered without operation. Moreover, in spite of improved methods of diagnosis there are still a few cases in which it is not possible to determine the nature and cause of the ileus with certainty. But in this class of cases delay works more harm than good, and therefore an early operation is strongly to be advised.

PLATE VI.



Lemur Mongoz, Lemur. Ileocolic Junction and Cæcum.
(Drawn from Preparation.) (Columbia University Museum,
No. 1478.) (Huntington.)