

# STRANGULATED HERNIA.\*

DAVID C. HILTON, A.M., M.D.

LINCOLN, NEB.

Clinically, the term strangulated hernia refers to strangulated abdominal types. It may be defined as "that condition in which the contents of the sac are so constricted or girt about that there follows pain, obstruction, vomiting, irreducibility and absence of expansive impulse."<sup>1</sup> The relative frequency of strangulation, based on a report of 529 cases, is as follows:

- 250 cases of strangulated femoral hernia.
- 250 cases of strangulated inguinal hernia.
- 29 cases of all other abdominal types.<sup>2</sup>

The pathology of strangulation may be considered with reference to the gross anatomy of hernia, the histopathology of the strangulated parts, and the mechanisms precipitating the crisis.

By reference to the gross anatomy it is observed that the constriction may occur in the canal transmitting the hernia, in the hernial sac or its contents (Figs. 1 to 7). If in the canal, it is usually at one of the natural openings or rings guarding the entrance and exit (Fig. 2). Otherwise, it may be determined by cicatricial contraction, or by the pressure of a neoplastic or inflammatory swelling (Figs. 3 and 4). If in the hernial sac, it may be at one or more places in the neck or fundus, or in a diverticulum (Figs. 4 and 5). In such cases the sac is usually thickened by hyperplasia, or by plicature of its lining. If in the hernial contents, it is secondary to adhesions or the direct result of volvulus (Fig. 6). Constriction may also occur at a rent in the sac through which the hernial contents have extruded (Fig. 5).

The histopathology of the strangulated parts is essentially that of the phenomena accompanying passive congestion, septic infection, and moist gangrene.

Our present knowledge of the mechanisms precipitating strangulation is hypothetical. The two essential elements in strangulation are the constriction itself and the hernial contents bourn off by it. The first is usually a constant; the second is a variant, in that it is subject to rapid alterations in anatomic make up, form, volume and position. In connection with the forces exciting these critical alterations, it may produce strangulation in the following ways: 1, By passing through the constriction under sufficient pressure to induce strangulation at once; 2, by undergoing critical alterations, after having safely passed the constriction, that increase the pressure to the point of strangulation; 3, by the passage of an additional structure through a constriction filled with all the hernial contents it can safely transmit; 4, by volvulus in a part or all the hernial contents. The constriction itself, which is practically a constant, may become a variant by critical contraction of its lumen, incident to cicatricial thickening, acute swelling, or external pressure. Thus it may close too tightly about the contents of an unreduced hernia and bring on strangulation.

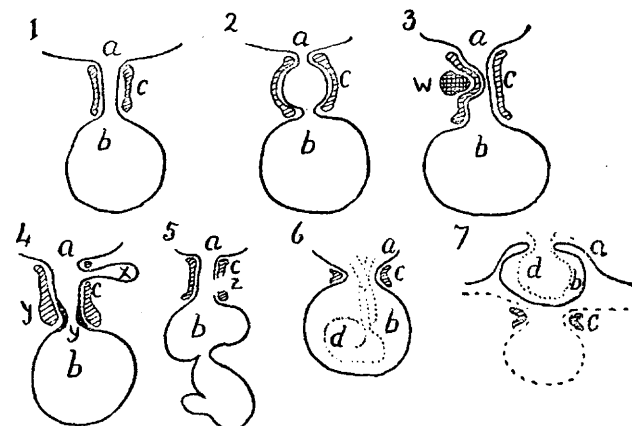
## SIGNS AND SYMPTOMS OF STRANGULATION.

The earlier symptoms and signs of strangulation are abdominal pain, vomiting, quickened pulse and sometimes elevation of temperature, associated with irreducibility, absence of expansile impulse, and increasing volume, turgidity and tenderness of the hernia. If the

bowel is caught, we have the additional symptoms of intestinal obstruction and cessation of the gurgling sound within the hernial sac. The late symptoms are essentially those of peritonitis or of abscess formation, and the more aggravated manifestations of intestinal obstruction. The pain is intermittent and colicky or continuous. At first it may be general or localized about the umbilicus or epigastrium; finally it centers at the seat of strangulation. The vomiting is at first reflex, but later is due to reversed peristalsis or the direct action of septic poisons on certain brain centers. Stercoraceous vomiting seldom begins inside of forty-eight hours. Tenderness over the tumor may develop later. A sudden cessation of pain and of symptomatic violence without reduction of the hernia is a bad omen.

## DIAGNOSIS AND PROGNOSIS.

The diagnosis of concealed strangulated hernia is of vital importance. Persistent abdominal pain, especially if accompanied by vomiting, with the diagnosis unsettled, demands a search for this condition. Strangulation of Richter's hernia, one in which only a part of the circumference of the bowel is caught, is most fatal and difficult to diagnose. In operating for this condition, it is essential not to allow the strangulated segment to slip into the abdomen without thorough examination.



Strangulated Hernia.—a, abdominal cavity; b, hernial sac, neck and fundus; c, hernial canal; d, hernial contents; w, mass exerting pressure; x, diverticulum; y, cicatricial contraction; z, rent in sac.

As to prognosis, it is well to remember that the passing of each succeeding hour with strangulation unrelieved portends a decreasing chance of recovery and an increasing probability of a tedious convalescence in case of survival. In violent cases after twelve hours, and in all cases after twenty-four hours, the mortality is increased by further delay at an alarming rate.

Strangulation is more common and more rapidly fatal in enterocoele than in epiplocele or in entero-epiplocele. It is also more common in small and recent hernias than in large and old ones. Femoral strangulations have a larger mortality than inguinal types. To illustrate, I shall describe two cases of strangulated femoral hernia referred to me by Dr. Van der Slice, of Cheney, Neb.

CASE 1.—April, 1905.—Patient, a farmer's wife, of middle age, had been afflicted with a small femoral rupture for two years. At 9 o'clock one morning she noticed that her rupture had come down and could not be reduced. Dr. Van der Slice was called and taxis tried without avail. I saw the case with the doctor at 6 p. m. We decided to prepare and operate immediately, if taxis under anesthesia would not relieve her. By 8 p. m. we were ready, having improvised baking pans for sterilizers and pie pans for instrument trays. The patient was rapidly getting worse. Dr. Myers of Bennett ad-

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1. Agnew's Surgery.

2. Hancock on Strangulated Hernia.

ministered chloroform and taxis was tried for five minutes with negative results. The tissues were incised down to the hernial sac and bloody serum was encountered both outside and inside of it. A small knuckle of ileum was found badly strangulated and of a dark purple color. Hey's ligament was cut to release the constriction at the external femoral ring, and the bowel drawn out. Although the intestine had been strangulated for only twelve hours, the state of affairs within and about the sac indicated that gangrene would have set in shortly. It was decided to replace the loop within the abdomen. The femoral canal was obliterated by four interrupted sutures through the deep crural arch above, and the tissues over the ramus pubes below. The wound was closed under aseptic conditions and the patient made an uneventful recovery.

CASE 2.—December, 1906. A farmer's wife, of middle age, with large irreducible femoral hernia of twenty-five years' standing, was taken sick with the usual symptoms of strangulation. At the end of twenty-four hours Dr. Van der Slice was called. At the end of thirty-six hours, consultation was held and immediate operation urged. The patient grew worse steadily. I operated toward the end of the second day without attempting taxis. The sac was large and filled with omentum and a large loop of sigmoid colon. There was some clear serum in the sac. The bowel and omentum were partially but not severely strangulated. The neck of the sac was large and the omentum firmly adherent to three-fourths of its circumference. It was necessary to cut the deep crural arch slightly to reduce the bowel. The omentum was ligated, amputated, and the stump of it sewed within the femoral canal, making as it were a new septum crurale. The wound was closed as in the preceding case. The patient has recently recovered after a complicated postoperative course.

The strangulation in the first case, a small enterocele of two years' standing, was much more complete than in the second case, a large entero-epiplocele of twenty-five years' standing. In the latter case the strangulation was precipitated by the slipping down of intestine into a sac already filled by an irreducible mass of omentum.

If omentum alone is strangulated, the case may result in recovery with an irreducible hernia. But since it is impossible to know that some part of the bowel is not included, we must treat each case with those prompt and often radical measures necessary to the saving of life in strangulation of the bowel. Unrelieved strangulation of the bowel means certain death.

As to treatment, it is best at the outset to throw a bomb shell into the midst of those who have it in hand to say what shall be done by telling them the patient will shortly die unless relieved. If they doubt you, call for intelligent counsel, and go about your task.

After the diagnosis, determine whether it is a case for taxis or not, bearing in mind the following contraindications: 1, When taxis has already been thoroughly tried; 2, when the case is extremely acute and violent; 3, when several days have intervened; 4, when dealing with an irreducible hernia; 5, when stercoraceous vomiting occurs; 6, when there is a suspicion of inflammation or gangrene; 7, when a skilful and clean operation can be immediately performed.

Taxis can not be done thoroughly without a general anesthetic. Place the patient in such a position that gravity favors reduction. If an inguinal hernia, flex the pelvis and thorax ventrad to relax the anterior abdominal wall. If a femoral hernia, the leg of the same side should be partially flexed, adducted and rotated inward to relax the fascia lata. The tumor should be drawn down in a line with the long axis of the canal transmitting the hernia. Then, while firm, continuous, even pressure is made to direct the contents of the sac in a line perpendicular to the plane of the opening through which they must first pass; traction enough should be made on the sac to draw

out the folds into which it may be thrown at the neck. The fingers of one or both hands should be so applied as to mold the part which must first pass the constriction into that form most favorable to its return. Taxis should not exceed ten minutes, for he who persists unduly will be inviting death oftener than relief. If taxis fails, immediate operation should be carried out under aseptic precautions, in order that the hernial canal, the sac and its contents may be dealt with as they severally require.

When the hernia apparently has been reduced by taxis, and symptoms of strangulation continue, one of the following conditions may be present:

1. Another strangulated hernia.
2. Strangulation within the reduced contents.
3. Paresis of the released intestine.
4. Reduction *en bloc* (Fig. 7).
5. Reduction beyond the first but not beyond the second narrow where strangulation persists.
6. Presence of strangulation in an interstitial diverticulum of the sac.

7. Eruption of the hernial contents through the sac into the interstitial tissues of the abdominal wall.

The situation must be met by eliminating the possibility of another strangulated hernia, and operating according to indications. If it is probable that the hernial contents have not entered the abdomen, they can be exposed by an incision over the hernial tract. If they have entered the abdomen, a median laparotomy incision will, as a rule, be most serviceable.

Following actual relief of strangulation by taxis, other serious conditions may arise. Chief among these are peritonitis and hemorrhage. Such unfortunate occurrences may be due to direct injury from rough handling of the hernia, or to the fact that necrosis or active inflammation had actually set in before reduction. Again, these conditions are surgical and must be met promptly as the special case demands.

Finally, to the end of saving life in this crisis, let us bear in mind the words of Macbeth that

If it were done, when 'tis done, then 'twere well  
It were done quickly.

## VASCULAR LESIONS OCCURRING SUBSEQUENT TO ABDOMINAL SECTION.\*

W. A. NEWMAN DORLAND, A.M., M.D.

Associate in Gynecology, Philadelphia Polyclinic.  
PHILADELPHIA.

There are three bounden duties which the conscientious up-to-date surgeon feels called on to fulfill. These are, first, preservation and publication from time to time of accurate and authentic records of his work; second, the publication in the current literature of all anomalous and unusual cases, or cases of extraordinary interest, which chance to fall in his way, wherefrom the collators of the profession may eventually cull some previously unknown fact or arrive at more or less positive statistics of the rare condition; third, and morally foremost, careful reports of accidents that have occurred in his hands in order that not only he himself may profit by the lessons to be derived therefrom, but that the profession at large, and the laity indirectly, may enjoy the benefits of his painfully-acquired information.

The cases that have become the texts for this article come under the third of these classes, and I report them,

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