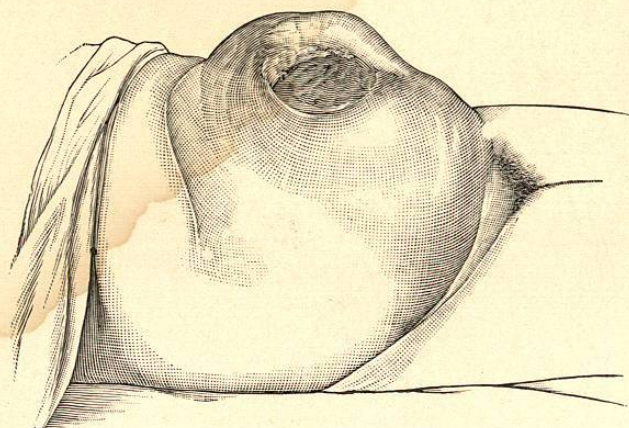


was a bilateral inguinal hernia, and in 12 a unilateral inguinal hernia. In the 494 cases of umbilical hernia occurring in females, however, only 56 were combined with a hernia in other regions, and in 438 the local defect was all that could be found. The prevalence of this condition in women is chiefly due to pregnancy, and of the 496 women with umbilical hernias, 429 had been pregnant and 377 were multipara. Each succeeding pregnancy was associated with an increase in the local condition.

The hernia has a distinct tendency to increase, and even the hernial ring may become 7.5 cm. (3 inches) in diameter, whereas the tumor itself may be as large as a man's head. Not infrequently the hernia has a mushroom appearance. There is a short, thick peduncle with an overlying mass spreading over the surface. The coverings are made up of peritoneum, connective-tissue fibres in the region of the ring,

FIG. 287.



Umbilical hernia of adult.

and sometimes a few strands of the obliterated umbilical vessels. There is no subcutaneous fat and the sac is apt to be extremely thin. Certain of the cases, however, have thickened sac-walls, and occasionally a fatty tumor develops in this region. The skin in the region of the umbilical scar is always extremely thin and adherent to the umbilical sac, so much so that the layers cannot be separated even with a knife, although this is quite easy in the lateral portion of the sac near the base.

As a rule the sac contains omentum and small intestine, or omentum and transverse colon. Sometimes the cæcum is contained, or even the stomach. In 2 cases reported by Léotam and Murray the uterus was found in an umbilical hernia. The intestine is not apt to be adherent, whereas the omentum is very liable to be attached to the wall in several places. Sometimes this apron is ruptured and transformed

into firm strands that may be the cause of strangulation. It does, however, happen that the intestine itself may be adherent over a large area. The adhesions are frequently very close, and the exact relations are sometimes impossible to make out because of the many pockets with the strands and firm adhesions in the sac.

It is not uncommon to have a portion of the hernia extend outward between the skin and the muscles, and it is quite characteristic of umbilical hernia to find the sac extremely irregular. The cavity may be subdivided by partitions and bridges of tissue into numerous smaller cavities, some of which may become entirely closed off and form cysts. These separate cavities not infrequently communicate with the chief cavity by small openings with sharp margins, and offer conditions most favorable for strangulation. Riedel reports a case in which a very small loop of intestine had become strangulated in a secondary small sac in the wall of an umbilical hernia the size of a child's head. Cases have been described in which a properitoneal diverticulum was connected with the sac of an umbilical hernia (hernia umbilicoproperitonealis). This properitoneal sac may extend upward (Sänger) or downward (Terrier) for a considerable distance; the exact condition, however, is detected only on operation.

Small umbilical hernias, especially in fat women, do not produce any tumor that can be appreciated on inspection. On palpation, however, the intestine may be felt to slip back from beneath the fingers with a characteristic snapping or gurgling noise. In the course of time large umbilical hernias become irreducible as a rule, because of inflammation and secondary adhesions. The constant friction of the clothing not infrequently results in superficial ulcerations which may extend inward, and, combined with the tendency of the hernia to increase and have thinner and thinner walls, result in rupture of the wall and peritonitis.

**Treatment.**—A small umbilical hernia in an individual that is not very fat can easily be held back by a truss, while in obese individuals this may be impossible, especially if the hernia is large. In most of the cases the abdomen is pendulous, so that the problem is very complicated, and the trusses show considerable tendency to become displaced in spite of perineal straps and shoulder-straps. If the especial appliances constructed by Virol, Langaard, Löwy, and others, prove inefficient, it may be best to rely upon some elastic abdominal support, with or without a pad in the region of the hernia. The pad should be made over a plaster-of-Paris cast of the hernia, so as to fit accurately. Beely's abdominal support is very efficient, and consists of two leather plates, a triangular one in front and a square one behind, that are held together by lateral straps and perineal bands. Hoffa describes in the *Centralblatt für Chirurgie*, 1896, No. 20, an abdominal support which is still more efficient. In spite of the supports, the patients frequently continue to have colic, vomiting, and suffer from constipation, etc. Besides these daily symptoms, it happens occasionally that fecal matter becomes impacted in the prolapsed por-



tion of gut, and inflammations in this region are not uncommon, particularly if the hernia is large and irreducible. If the greater part of a hernia was reducible at some previous date, it is no longer so when these conditions exist. Rest in bed with frequent poultices and abstinence from food help attacks of this nature to pass off without grave results. Patients with large umbilical hernias sooner or later become accustomed to a certain amount of discomfort, and are only apt to consult a physician when the condition becomes threatening. They are unwilling to accept his advice, and wish to have the methods tried that helped them in previous attacks. This explains how it so often occurs that operations for umbilical hernia are postponed much too long. Besides, physicians themselves are apt to wait a considerable time because they are undecided whether the condition is really due to harmless circumstances, or whether there is strangulation. The first few days are passed in using half-way measures, while the condition of the patient remains fairly good. Remissions are not uncommon, although the disturbance is not severe. The tumor is not tense nor especially tender to touch, even in the vicinity of the umbilical ring. There need be no vomiting and the bowels do not always cease to act entirely. Suddenly the symptoms become aggravated. The vomiting becomes continuous, the pulse gets worse, and symptoms of peritonitis soon appear. If an operation is undertaken at this time—*i. e.*, on the fifth or sixth day—an intestine is found which is ready to rupture, and the outlook is, of course, unfavorable. For this reason strangulation of umbilical hernia is especially feared, although in itself no different from any other hernia. Severe acute cases of strangulation occur with small umbilical hernias, just as in cases of femoral hernia, for instance. When an umbilical hernia, however, is large and irreducible, the symptoms develop gradually, but in time the results become equally as bad.

A loop of intestine may become strangulated in one of the diverticula of the main sac and be overlooked, because the main bulk of the hernia is soft and not tender to touch. In these cases one should always palpate the mass carefully to see whether there is not some area more firm than the rest and more sensitive to pressure. If the symptoms are marked in cases of strangulation, radical measures should be resorted to immediately, and taxis should be used only in exceptional cases, because the vast majority of large umbilical hernias are irreducible. The sac should always be opened during the operation because the complicated conditions can only be unravelled in this way. The sac itself is extremely thin, so that great care must be taken when opening. Adherent omentum should be tied off in sections and removed. It is sometimes necessary to divide strong adhesions between the intestinal wall and the sac, and it may even be necessary to excise a portion of the sac. If the conditions allow, one should always perform a radical operation after opening the sac. Generally speaking, a radical operation is indicated much more frequently in umbilical hernia than in inguinal or femoral hernia, because they are

difficult to retain with trusses and show a much greater tendency to increase in size, besides being associated with severe complications.

Should a radical operation be done while the hernia is rather small and not especially adherent, then this step is very simple and almost without danger, and the chances of a permanent cure are very favorable.

There are two methods of operating which have an equal number of supporters. One method consists in making an incision over the hernia in its long axis, exposing the sac and its contents, closing the sac, and uniting the soft parts over this. The other method consists in making a circular incision around the hernia and removing the skin that has become stretched, as well as the sac and its coverings. The defect is then closed by a plastic operation. The first method does not expose the field of operation thoroughly in complicated cases, and does not permit the abdominal cavity to be freely inspected with regard to adhesions. One should never be satisfied unless thoroughly convinced that the replaced intestine lies absolutely free within the abdominal cavity. The second operation, called omphalectomy by Condamin-Bruns, is much to be preferred because of the free exposure of the field of operation, and because one is able to complete the operation much more quickly. It has, however, the disadvantage that in a large hernia there may be considerable trouble in closing the defect. For this reason some authors claim that it is best not to carry the incision entirely around the hernia, but be satisfied with doing one side first, and at the end of the operation remove as much of the flap as can be spared. After exposing the hernia itself it is best to attend to the omentum first and tie this structure off in sections. After this has been done the intestine may be attended to. Bruns claims that it is best to close the wound by through-and-through sutures, taking in all the structures of the abdominal wall at one time. Although it would seem that this method does not guard against recurrence as well as some others, it has the advantage, especially if silver wire is used, that it can be done in a short time, and that a great deal of tension may be put upon the stitches. Most authors prefer to sew up layer by layer. The peritoneum is closed with a continuous catgut suture, then the deep fascia, then the muscles, then the superficial fascia, and finally the skin. Biondi tries to prevent the lines of suture from lying immediately one above the other by dividing the peritoneum and the posterior sheath of the rectus transversely. The rectus muscle itself is separated longitudinally, the anterior sheath of the rectus transversely again, while the skin is divided vertically. This method is especially valuable, as emphasized by Eiselsberg and Bumm, when it is easier to bring the structures together transversely. After an operation for a large umbilical hernia it is always best to have the patient wear some sort of abdominal support.

A large umbilical hernia that has existed for a long time is not infrequently associated with conditions that render the prognosis doubtful. The patients are frequently obese, advanced in years, have fatty hearts,



and are chronically constipated, so that the results of the primary operation are not especially good. The mortality is about 10 per cent. Recurrences are common, and are proportional to the size of the hernia. Berger collected 54 cases and found the results to be as follows:

2	Cases of enormous hernia . . . . .	2	recurrences.
25	" " large " . . . . .	8	"
13	" " the size of a fist . . . . .	2	"
14	" " small hernia . . . . .	1	recurrence

It is of very great importance whether the wound heals by first intention or not, for of 10 cases in which suppuration occurred there were 6 recurrences.

#### OBTURATOR HERNIA.

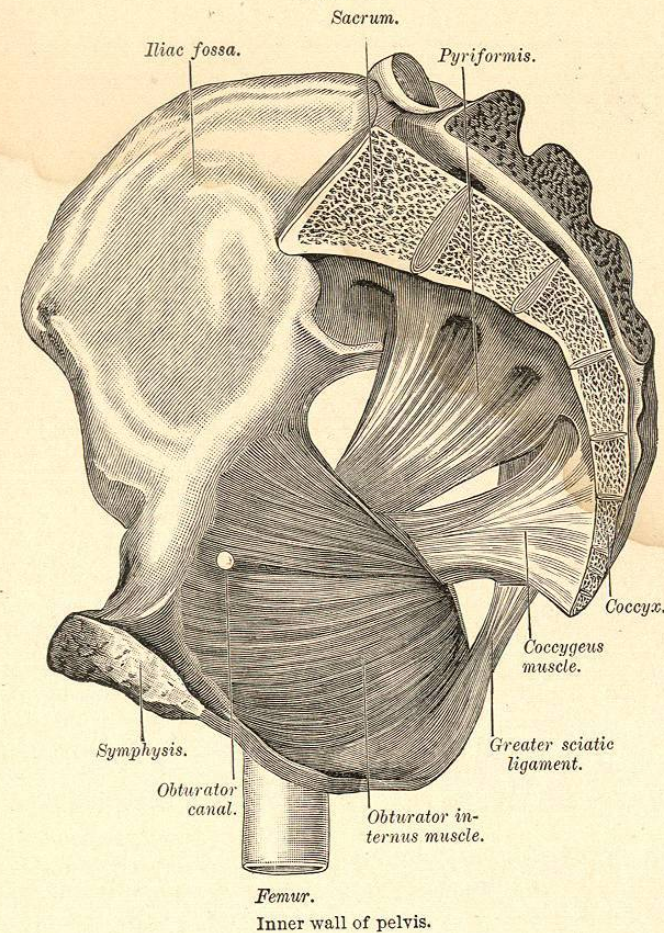
About 200 cases have been reported in literature, and the subject has been gone into with especial care by Fascher, Englisch, Picque, and Poirier. The hernia always leaves the abdominal cavity through the same foramen. The obturator foramen is closed except for the upper portion by the obturator membrane, which consists in this region of two layers, between which there is sometimes a slight amount of fat. The upper and inner portion of the membrane presents an opening which corresponds to a groove on the pubes for the passage of the obturator nerve and vessels. These vessels pass through the obturator internus and externus in a space known as the obturator canal, the direction of which is inward, downward, and forward, its length being about 1.5 cm. (0.6 inch), while its diameter is about 1 cm. (0.4 inch). Behind the obturator internus and its fascia there are the intra-abdominal fascia and peritoneum. Thin people sometimes have a slight depression over the internal opening of the canal. The nerve usually lies above and outside; the vein inside and below, and the artery between. The branches of the obturator nerve given off in the canal subdivide the obturator externa, which in the region of the external opening is covered by the pectineus with the connective tissue of the subinguinal triangle overlying this.

Obturator hernias are found chiefly in old women (Berger, 118 women, 18 men). They are not infrequently bilateral, or combined with ruptures in other regions, especially in the femoral region. The sac usually contains small intestine or a portion of the gut-wall, sometimes omentum, vermiform appendix, bladder, and quite frequently some portion of the female genital apparatus, such as an ovary or tube, or even the uterus. (Brunner.) In a typical case the sac follows the vessels along through the canal and appears above the upper margin of the obturator externus immediately beneath the ascending ramus of the pubes. It is covered by the pectineus muscle, and because of the thickness of the overlying structures the condition may exist for a considerable length of time before producing any noticeable swelling.

When present, this swelling will be found in the triangle bounded internally by the adductor longus, externally by the femoral artery, and above the ramus of the pubes—*i. e.*, in the region where one would expect to find a femoral hernia.

**Diagnosis.**—The diagnosis is quite difficult, although most of the cases are recognized before operation, but generally after symptoms of strangulation have appeared. A small tumor will be found immedi-

FIG. 288.



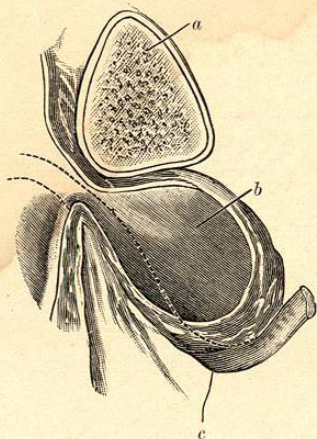
ately below the pubes, to the inner side of the large vessels, and should be compared with the conditions on the healthy side. The examination should be made with the thigh in different positions, but it will be found most advantageous to relax the muscles by flexing, adducting, and rotating the thigh outward. This position relaxes the pectineus, as well as the adductor and iliopsoas. The ascending ramus of



the pubes should be followed backward and outward with the finger, and sometimes it will be possible by bimanual examination to detect a strand reaching up to the anterior wall of the pelvis. If no tumor can be made out, localized tenderness to pressure, which is almost always present if there is any strangulation, is a valuable sign. One should always investigate whether there is any increase in the amount of pain when the obturator externus is put under tension—*i. e.*, when the thigh is abducted and rotated inward.

Romberg's symptom is extremely valuable when present, and consists in disturbances in the regions supplied by the obturator nerve. As a rule the thigh will be held flexed, cannot be adducted, and any

FIG. 289.



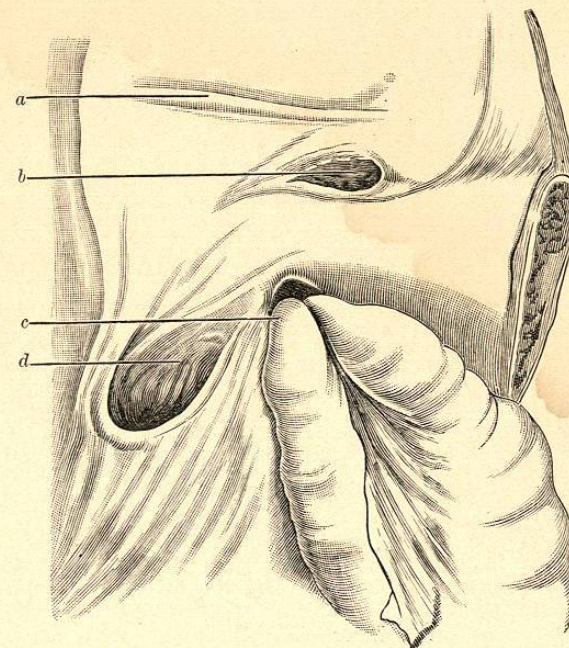
Section of left obturator hernia seen from within: a, pelvis; b, sac; c, thigh.

motion whatever causes pain. The symptoms may be continuous or may recur as attacks at intervals of varying length, and are due to pressure upon the nerve-trunk in the obturator canal. Most of the pain is referred to the inner side of the thigh, although the hips and knee-joints may also be involved. It should be remembered that one branch of the nerve, because of its communication with the long saphenous, reaches almost down to the middle third of the leg. The symptoms are by no means uniform, and it should be remembered that these nerves may be irritated by other conditions than a hernia. Rheumatism, neuralgia, perimetritis, and purulent peritonitis in the iliac fossa should be borne in mind in this connection. Landerer reports a case in which the symptoms were due to osteomyelitis of the pubes, and in which there were also signs of intestinal obstruction. The symptoms of strangulation are usually thought to be due to internal strangulation, so that one should always examine the hernial regions very carefully when signs of this sort are present. It should

also be remembered that a femoral hernial and an obturator hernia may be present on the same side and at the same time. It has also happened that an inguinal hernia or an umbilical or crural hernia has been treated while the obturator hernia was found on autopsy. (Auerbach, Paci, Wilke, Martini.)

**Treatment.**—On account of the deep position in the thigh and the mobility in the region, the technical difficulties of operating are very great, and up to the present time only one case has been reported which was operated upon before symptoms of strangulation appeared. The results are still unfavorable. Taxis is absolutely to be condemned.

FIG. 290.



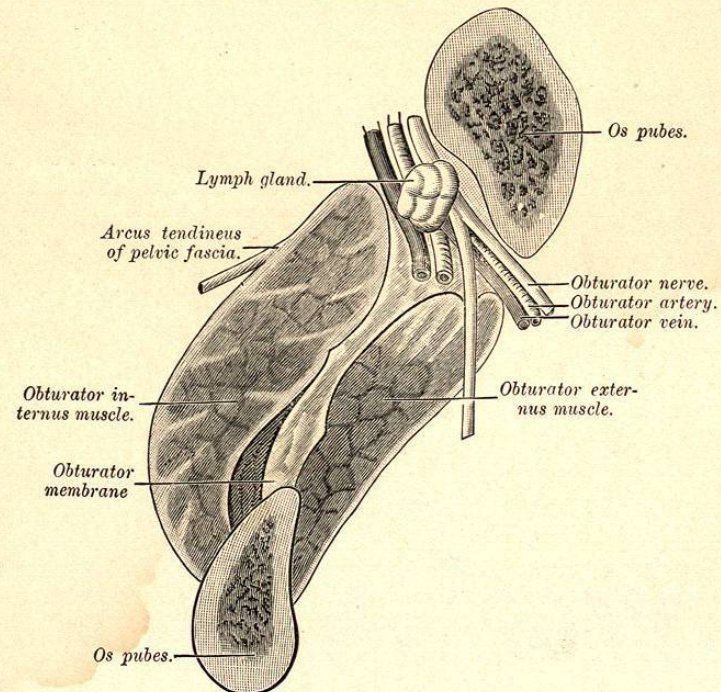
Obturator hernia seen from within true pelvis: a, Poupart's ligament; b, internal inguinal ring; c, neck of hernia; d, obturator membrane.

The firm constricting bands produce gangrene of the gut within a very short time, especially if the wall of the intestine has been caught. Care should be taken during the operation not to allow the gut to slip back into the peritoneal cavity, and large incisions should be used so as to expose freely the field of operation. The pelvis should be raised and a long incision made along the inner margin of the saphenous vein. After dividing the fascia the inner edge of the pectineus muscle is exposed, and if necessary, the attachment to the pubes is divided, so as to be able to get to the seat of trouble. The hernia is freed from the surrounding tissue, the sac is opened, and if the gut looks suspicious, it should be handled with the greatest care. Riedel



resected a piece of the pubes, and considers that this should be done in all difficult cases. The operation is liable to be bloody, because

FIG. 291.



Section through obturator region and obturator canal.

it is difficult to avoid the surrounding vessels. It will be found best to enlarge the opening downward and inward.

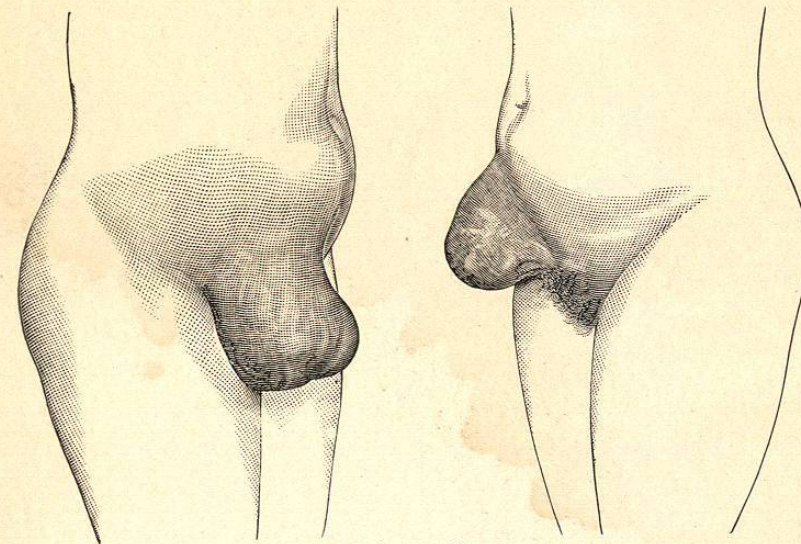
#### VENTRAL HERNIA.

The varieties of hernia that have just been described occurred in regions that could be anatomically defined, whereas the following cases may have little in common as far as their anatomical relations are concerned. In certain regions of the abdominal wall it is not uncommon to find a rupture, such as in the linea alba, which may be subdivided into hernia paraumbilicalis and hernia epigastrica, and besides these there are the cases occurring in the lineæ semicircularis. A great many of these cases are due to protrusion of a lipoma developing in the subperitoneal fat and adherent to the peritoneum through some gap in the abdominal wall. They are found not infrequently along the course of the vessels, for instance, in the mammary line, where these structures perforate the muscle diagonally. In other cases there may have been some preliminary disease associated with suppuration of the

abdominal walls, or there may have been bruises, subcutaneous lacerations of muscles with the formation of blood-clots, or perhaps some

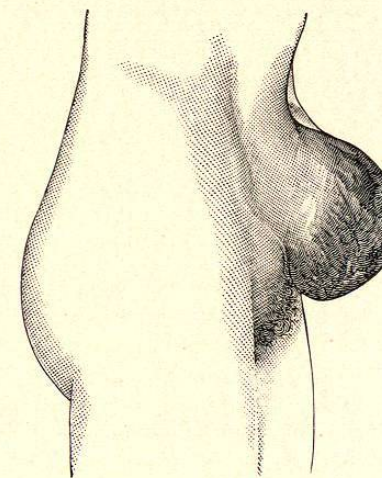
FIG. 292.

FIG. 293.



Hernia in appendix scar.

FIG. 294.



Post-operative hernia.

previous laparotomy provided for the favorable conditions. The anatomical relations differ, of course, according to the primary cause. When the hernia follows some trauma or an operation, the sac may be incomplete for a considerable distance, and the viscera are covered



only by a thin layer of scar-tissue. Strictly speaking, a case of this sort should not be classified as hernia, but should be spoken of as a prolapse. Those due to some previous operation are included in the term "hernia of a scar."

**Hernia in the Linea Alba.**—It is not uncommon to find the recti muscles considerably separated even at birth. This separation may extend from the symphysis to the ensiform process, but as a rule the condition is more common above the umbilicus, or when present throughout the separation is greater above. The condition is probably a congenital defect, although in later life a similar state of affairs is frequently observed, especially in women who have been pregnant repeatedly at short intervals, or when there has been some great distention of the abdominal cavity. The bulging is more noticeable on standing up, when the abdominal walls are relaxed. If the patients are told to lie down, it is sometimes possible to push the abdominal wall inward and examine the entire cavity. The gap is best appreciated if the patients are told to raise the head while in a horizontal position, which puts the muscles under tension. The congenital condition frequently gets well of its own accord; at least the condition is seen much less frequently in children that are older. Sometimes there are separate openings in the fascia with sharply defined dense margins through which a true hernia may come, and even without any separation of the recti muscles it is not uncommon to find small slits in the upper portion of the linea alba through which a hernia appears. They have been called epigastric hernias. A special name has been given them on account of their practical importance. The hernia is usually small, and in obese individuals may not produce any bulging of the surface, although occasionally it is sufficiently large to produce a hemispherical prominence of the abdominal wall, or may hang downward like a pouch with a long pedicle.

Subperitoneal lipomata probably always are of some etiological importance, and not infrequently the entire tumor mass is made up of a lipoma, behind which the peritoneum is drawn outward in a funnel-shaped manner. The fat extends outward between the fibres of the linea alba, which become more and more separated, and finally become firm and dense and form a distinct hernial ring. As a rule there is only one opening, although several superimposed rings have been observed, as in Berger's case, in which four small hernias were found one over another, each of which could be reduced separately. When cutting down upon little tumors, one not infrequently finds that the condition seems to be a simple lipoma, for nothing betrays the funnel of peritoneum behind until the tumor itself has been removed. The sac may be empty, although it is not uncommon to find a piece of omentum, and sometimes a loop of intestine, especially the transverse colon. It is not proved that they may contain the stomach.

In Berger's statistics, including 10,000 cases of hernia, there are 137 cases of epigastric hernia, 120 of which were in males, and the majority were associated with hernias elsewhere, especially in individ-

uals well advanced in years who were considerably emaciated. Witzel claims that the condition was more common in people with some gastric disturbance, perhaps because of the emaciation and vomiting. Other authors consider that they may be of traumatic origin, and Witzel claims that 50 per cent. of the cases may arise in this way. A direct blow upon the stomach or lifting may be the primary cause, or an already existing hernia may be sufficiently enlarged by these factors to become noticeable.

These hernias frequently produce considerable disturbance, although not always. The patients have frequent attacks of colic of a boring or pulling character, and they vomit. The abdomen may be distended and there is difficulty in moving the bowels. Besides this there is frequently a distinct sense of depression, palpitation, and the individuals may even become unconscious. The pain is intermittent and appears after some sudden motion, especially after overextension of the trunk. In other cases the pain appears regularly at a stated interval after eating. The continual discomfort and fear of impending pain make these people unable to follow any occupation; they become disgruntled, hypochondriacs, and emaciate progressively.

**Symptoms.**—Because of the symptoms referable to the stomach, it has frequently been supposed that this organ was the subject of more or less violent insult. However, the majority of the cases contain omentum and transverse colon; but it is possible that the stomach is pulled upon because of the ligamentum gastrocolicum. It is also possible that the symptoms are due to bruising and traction upon nerve-trunks in the region of the hernia, especially in the cases in which the lipoma is not firmly connected with the peritoneum. As a rule the lipoma contains a small diverticulum of peritoneum which becomes filled sooner or later with omentum or intestine. The attacks of acute discomfort are probably due to slight strangulation, such as are noticed in the early stages of hernia elsewhere, especially in the femoral region. On examination it is very easy to overlook the condition entirely, although an experienced observer will discover a small soft swelling in the linea alba which is somewhat sensitive to pressure and slips from beneath the finger, leaving a small depression in the abdominal wall. The symptoms of which these patients complain, such as repeated attacks of pain, gastric disturbances, etc., are not uncommonly referred to some other condition, such as an ulcer of the stomach or biliary colic, the clinical picture of which may be very similar.

**Treatment.**—Trusses are usually useless, and a small epigastric hernia in itself is perfectly harmless. If, however, there is marked discomfort, then the only relief is in a radical operation. The technic is not difficult, although the operation must be done with great care, and the sac should always be opened so as not to overlook any adhesions. An incision should be made a little larger than the diameter of the tumor, the hernia should be exposed, and the pedicle freed down to the hernial ring. The sac is then opened, the adhesions tied