

fistula may be the result, or the wound in the intestine or stomach may close spontaneously when the object has passed through. If such is the case, the foreign body will be surrounded by an abscess, but there will not be a fecal fistula. Needles may pass from the stomach or intestine without giving rise to either abscess or fistula, escaping notice until they prick the overlying skin.

If a slender foreign body, such as a needle, is discovered, the overlying skin should be punctured and the foreign body removed. Larger and irregularly shaped objects should be removed with care lest adhesions be broken up. The inflammation quickly subsides when the foreign body has been removed.

## CHAPTER VI.

### DISEASES OF THE ABDOMINAL WALL.

#### INFLAMMATIONS OF THE ABDOMINAL WALL.

THE inflammations of the abdominal wall which are confined to the skin or the tissues immediately beneath it do not require special notice. Most of them are of the nature of cellulitis due to external wounds and infection or to foreign bodies entering the abdominal wall through the skin, or from within the alimentary canal.

The median line of the abdominal wall may be the seat of deep inflammatory processes which develop in two forms:

1. If an inflammation develops within the sheath of the rectus, it is limited by the strong fascia about this muscle so that it cannot spread laterally. Above the umbilicus it is also limited by the transverse fascial bands, beyond which it cannot spread longitudinally. It may, however, spread downward to the symphysis and extend over to the opposite side of the median line. The extent of this swelling is sufficient for a diagnosis. If the patient in a recumbent position is asked to raise his head from the pillow, the rectus muscle will be contracted and the swelling will be seen to lie in front of it; but by this contraction the swelling will also be made immovable, whereas a diffuse suppuration of the subcutaneous tissue is more or less movable whether the recti muscles are contracted or not.

2. Deep inflammation of the other type develops in the loose connective tissue below the umbilicus and between the peritoneum and the abdominal muscles. This retromuscular space is divided into three spaces by the transverse fascia and the thin fascia extending from the bladder to the umbilicus. These three spaces have been called the submuscular, the prevesical, and the preperitoneal space. (Fig. 45.) The cellular tissue which fills these spaces is not only connected together, but also with that in the iliac fossa and in the caecal region, so that inflammatory processes may easily extend from one region to the other.

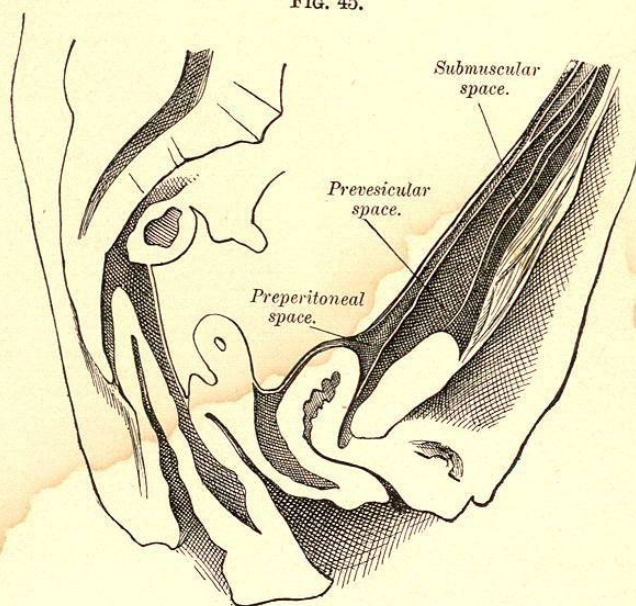
The prevesical space is the most important. If suppuration takes place within it, a rounded swelling is formed behind and above the symphysis which greatly resembles the distended bladder. The bladder is usually involved in the inflammation. Pus may be discharged spontaneously either above the symphysis or into one of the hollow pelvic organs. Suppuration of the submuscular space is situated nearer the umbilicus and seldom reaches the symphysis, nor does it extend into the pelvis. It forms a pear-shaped swelling in the region of the um-

bilicus with the point directed toward the symphysis. Such a swelling may lie on one or both sides of the linea alba. The bladder is not affected. The usual point of rupture for such an abscess is just below the umbilicus.

For practical purposes it is well to look upon the retromuscular connective tissue between the umbilicus and the symphysis as a single space in which inflammation may develop sometimes nearer the umbilicus and sometimes nearer the symphysis.

Inflammation of the median portion of the abdominal wall may be either primary or secondary, and either acute or chronic.

FIG. 45.



Frozen section through the pelvis of the female subject after distention of the arteries by water injected at a pressure of ten feet in height. (Kenke.)

**Primary Inflammation.**—The inflammation which arises in the sheath of the rectus is of a primary character. Its common cause is a hemorrhage following muscular rupture during convalescence from typhoid. Such hemorrhage is usually situated below the umbilicus and behind the rectus muscle, so that the resulting suppuration may develop in the submuscular space. There is also an inflammation in the prevesicular space which may be either idiopathic or traumatic. In the latter case hemorrhage follows a blow upon the lower portion of the abdomen and the blood-clots suppurate. Extraperitoneal rupture of the bladder gives rise to extensive inflammation complicated with infiltration of urine. The so-called idiopathic inflammation is doubtless due to infection from an ulcer of the bladder or intestine, or to some similar lesion. Thus the term is of doubtful value. Such

abscesses of unknown origin are seldom found before the thirtieth year of life. They are commoner in men than in women. They are ushered in with nausea, vomiting, and disturbed intestinal action, symptoms which are doubtless due to peritoneal irritation, and which are not usually distinguished from those due to a real peritonitis. Later, local symptoms develop, especially pain, which may be so intense that the patient avoids any exertion and lies with thighs flexed in order to relax the abdominal muscles. Soon a characteristic swelling appears, and persists even after the bladder is emptied with a catheter. The lower portion of the swelling can often be felt if the finger is passed into the vagina or rectum. If the inflammation extends to the symphysis, the bladder will become involved, as shown by disturbances in micturition. These acute symptoms are wanting in the case of a chronic abscess. Such an abscess is usually tuberculous and starts in the abdominal muscles.

**Secondary Inflammation.**—According to Englisch, the commonest form of prevesical inflammation is secondary, and may be due to inflammation of the pelvic bones as well as to inflammations of the pelvic organs. Tuberculosis and osteomyelitis of the bones, inflammations of the bladder and the urethra, of the prostate and of the seminal vesicles, of the uterus and broad ligaments, as well as any other suppuration in the pelvis or in the neighborhood of the appendix vermiformis, may lead to suppuration in the prevesical space. There is a severe gonorrhœal prevesical suppuration secondary to infection of the inguinal glands or to gonorrhœal cystitis. Pus which collects in the prevesical space often ruptures into the hollow organ from which the inflammation is derived. Such a rupture, or an external rupture, relieves the patient of severe symptoms, but leads to long-standing ulceration and fistulæ.

Guyon describes a collection of serous fluid in the prevesical space which he calls "hydroma prævesicale." There is a fibrous cyst-wall without epithelial lining which is dissected out with difficulty. The cause of the accumulation of fluid was unknown in most of the cases reported; in one instance it was said to be gout.

Deeply placed inflammation of the lateral portions of the abdominal wall is always secondary. Such an abscess may originate in the bones of the thorax. More frequently the pus from a perinephric abscess follows along the quadratus lumborum muscle until it appears under the skin at the outer edge of this muscle. On account of the deep situation of such an abscess fluctuation may not be evident for some time. Early symptoms are fever and pain in the region of the kidney. The kidney itself may or may not be the starting-point of the trouble.

An abscess may start from an inflammation in the appendix or in the gall-bladder, or it may be superimposed upon malignant disease of the cæcum, the acute symptoms of inflammation masking those of the tumor. An abscess of this class may result in a fecal fistula. Cancer of the stomach may give rise to inflammation and abscess formation, the pus often reaching the surface below the umbilicus.

**Diagnosis.**—A correct diagnosis in the acute cases of inflammation of the abdominal wall can usually be made from the symptoms of local pain and temperature elevation. It is not always easy to say whether the inflammation is primary or secondary, although this question will often be decided by the previous history of the patient. For example, if the pelvis is filled with pus, the history of the trouble is the only indication as to the starting-point of the inflammation.

**Prognosis.**—The prognosis of a primary suppuration is favorable if the patient is not already septic. Sometimes pus in the submuscular space breaks through into the peritoneal cavity and thus adds greatly to the gravity of the condition. The prognosis in a secondary inflammation depends entirely upon the condition of the organ in which the trouble began.

Chronic inflammation of the abdominal wall with extensive ulceration and formation of fistula is often complicated by internal suppuration. Hence the prognosis should be guarded.

**Treatment.**—The treatment of inflammation of the abdominal wall should be antiphlogistic until the presence of pus is manifest. Then an incision should be made, purulent cavities and fistulæ explored and split up and carefully drained. If the dressing of the wound is extremely painful, continuous irrigation may be employed, or the patient placed in a permanent bath.

#### ACTINOMYCOSIS OF THE ABDOMINAL WALL.

Actinomycosis of the abdominal wall comes from the intestinal canal, and is therefore usually preceded by intestinal symptoms; but the latter may be wanting. The disease of the abdominal wall often shows itself in the neighborhood of the appendix, but it may appear at the umbilicus or in the lumbar region. There is a small area of induration with indistinct edges. Soon the inflammation extends to the surface and the overlying skin breaks in one or more places and allows the escape of pus having a fecal odor and containing the characteristic organisms. Sometimes these pearly bodies are found only in the granulations. There may be a fistula which leads to the original seat of disease in the intestine.

The course of the disease is a chronic one unless it is complicated with acute suppuration. If the trouble has lasted a long time, the mouths of existing fistulæ become infiltrated and present a characteristic appearance.

**Diagnosis.**—The diagnosis of actinomycosis of the abdominal wall is easily made when the disease has broken through the skin; before that time the symptoms presented are similar to those of any other inflammation of this region.

**Prognosis.**—The prognosis of this affection is favorable if the extent of the disease in the intestine is not too great. If the appendix is the only portion of the alimentary tract affected, the outlook is

especially hopeful, since a radical operation is possible. If the actinomycosis is associated with extensive cellulitis, and especially if there is reason to suppose that the disease has affected the retroperitoneal tissues, the prognosis is far worse.

**Treatment.**—Treatment is purely operative. The fistula should be split and the diseased tissue removed with scissors or knife or curette. In this manner one approaches the peritoneal cavity, and if the seat of the affection is found to be the appendix, it is removed. The thermo-cautery is serviceable for the destruction of diseased tissue. The wound should be kept open by moist gauze compresses. The operation will often need to be repeated, but a cure is still possible even though diseased tissues have to be removed several times. The internal administration of potassium iodide is recommended, but is of doubtful efficacy.

#### TUMORS OF THE ABDOMINAL WALL.

**Connective-tissue Tumors.**—Angiomata of various sorts occur in the skin, but rarely in the deeper tissue. Fibroma molluscum appears both as a general fibromatosis of the skin and also individually as a small soft pendulous tumor that is freely movable upon the deeper structures and which is more or less attached to the skin which covers it. As the tumor grows it becomes pedicled and may reach a very large size. The pedicle often contains good-sized bloodvessels and the skin of the tumor is usually chafed and broken down. If a fibroma is growing rapidly, it should be removed on account of the danger of sarcomatous degeneration. Its removal may also be desired because of its uncommon situation. Care should be taken to ligate the vessels of the pedicle.

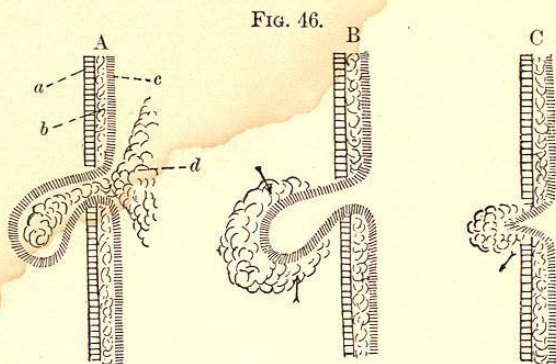
Sarcoma of the skin is rare. It may develop from a fibroma or from a pigmented nævus (melanosarcoma or melanocarcinoma), or it may begin as a sarcoma from apparently sound tissues. This rapid growth and the pain it causes will soon indicate its malignant character. The surface of a cutaneous sarcoma often ulcerates. The tumor quickly grows into the deeper layers of the abdominal wall. The prognosis is unfavorable, especially in the case of a pigmented sarcoma. The growth should therefore be removed early, the incision passing wide of the visibly affected tissue in order to avoid recurrence in the scar.

In the deeper layers of the abdominal wall are found lipomata and the so-called desmoids.

A lipoma may be subcutaneous, or intramuscular, or subserous. A subcutaneous lipoma is usually surrounded by a thin fibrous capsule which marks it off from the adjacent tissues and makes its removal easy except where it is penetrated by vessels and nerves. These tumors are found chiefly in the lateral portions of the abdominal wall. They are of slow growth and in the course of years may reach an enormous size. They may also become pedicled. If such a tumor

grows rapidly, it excites a suspicion that it is undergoing sarcomatous degeneration. As a subcutaneous lipoma is covered only by skin, its lobular structure is easily shown. This is difficult or impossible in the case of an intramuscular lipoma, a tumor which is seldom seen.

A subserous or preperitoneal lipoma is more important than the two forms already mentioned. Such a tumor is usually small, soft, and lobulated, and situated just above the umbilicus in the median line. It tends to grow through one or more gaps in the fascia and spread out beneath the skin. This growth may pull upon the peritoneum and thus produce pain, which is usually referred to the stomach. Lipoma of this character is so intimately connected with the peritoneum that it is not always possible to distinguish it from a fatty hernial sac or an omental hernia in this situation. All three have this feature in common. They reach the surface through a gap in the fascia and often produce intense pain and disturbances of digestion. If the patient is obese, it may be absolutely impossible to differentiate one condition from the other. If the little fatty tumor can be pushed back behind the fascia, the pain will often subside at once.



Schematic drawing of: A, omental hernia; B, fatty hernial sac; C, fatty tumor simulating hernia in the centre of which a real hernia is forming: a, fascia; b, subperitoneal fat; c, peritoneum.

A subcutaneous lipoma should be removed whenever its size makes it an inconvenience to the patient. This operation can easily be performed with local anaesthesia. A subserous lipoma may be held in place behind the fascia by a close-fitting bandage. If this fails, the tumor must be removed. Such an operation should be performed with all aseptic precautions, since it may be necessary to open the peritoneal cavity in order to reduce a coexisting omental hernia. The pedicle of the lipoma is followed to the fascia, and this is divided sufficiently to permit the operator to ligate the pedicle close to the peritoneum. Omentum should be ligated and removed or replaced. An existing hernial sac should be ligated and cut off and the fascia and skin sutured.

**Desmoid Tumors.**—By far the most interesting tumors of the

abdominal wall are those which spring from tendinous tissues, such as the aponeuroses or the transverse lines of the recti muscles, and which have received the name of desmoid tumors. A desmoid is usually a hard tumor which creaks when cut, and whose cut surface glistens in the light and shows numerous fibrous bands which cross each other at an acute angle without admixture of muscular elements. These fibres may also be arranged circularly around the vessels, in which case the tumor will have a nodular appearance. In both forms the adventitia of the bloodvessels passes without distinction into the new growth. Hence the vessels gape widely when cut and in the living subject bleed profusely. If such a tumor is softer on account of increased cellular activity, it resembles a sarcoma both in appearance and in its rapid growth. A desmoid often contains cysts with serous or mucous contents, and hence it has frequently received the names fibrosarcoma or cystosarcoma or myxosarcoma; but though different tumors of this sort present different appearances, they all originate from the tendinous structures above mentioned and simulate them in some portion of their growth. Hence it is better to include them all under the name of desmoid tumors.

These tumors are found for the most part in women. Ledderhose found that 90 such tumors occurred in women for 10 which occurred in men, and that 70 of the 90 women affected had borne children. Such a proportion suggests that either pregnancy or the stretching of the abdominal wall which accompanies it is the exciting cause of the new growth. It is noteworthy that no one of these tumors could be ascribed to stretching of the abdominal wall resulting from ascites. Other causes given are trauma and intramural hemorrhage. Whatever their cause, these tumors occur usually in women of about twenty-five or thirty years of age who have borne children or have suffered from an abdominal tumor.

The usual seat of a desmoid is near the median line, since most of them start from the tendinous structures in connection with the recti muscles. They arise less and less often, in the order indicated, from the external oblique muscles, from the transversalis fascia, and from the linea alba. They usually grow more rapidly in the direction of the fibres of the muscle from which they originate; thus the long axis of the tumor, if situated near the median line, will be up and down, while the long axis of one in the side of the abdomen will be oblique or transverse. So far as known, these tumors always grow singly.

One should not confound a desmoid with a fibromyoma of the round ligament which from its situation may grow within or without the inguinal canal.

A desmoid of the abdominal wall begins as a hard swelling which may or may not be first noticed after some traumatism. It grows slowly and causes slight or no discomfort until it reaches the size of a hen's egg. When of this size or larger, it causes a drawing or tearing pain, and tends to grow more rapidly so that in a period of from one to three years thereafter it may reach the size of a child's head.

The veins of the skin are much dilated, but the skin is otherwise normal until pressure from within or trauma produces ulceration and perhaps infection. Sometimes the growth extends over many years, being delayed by periods of quiescence or by calcification of portions of the tumor. But there is no instance of spontaneous disappearance or permanent stand-still in the growth. When the tumor reaches a certain size, it may produce symptoms of pressure upon the intestines, bladder, etc. A desmoid does not produce metastases in other organs or infection of the neighboring lymph-glands unless it has undergone sarcomatous degeneration. This complication seldom arises. In a few cases a tumor invades and destroys neighboring muscles and tendons, but it usually pushes them aside. The prognosis therefore depends not upon the malignancy of such a tumor, but solely upon its continuous growth.

**Diagnosis.**—A superficial desmoid may be recognized by its firm consistence and smooth surface, and by the direction of its growth, which is greatest in the line of the fibres of the muscles from which it springs. If such a tumor lies behind the muscular plane, it may easily be confounded with a hæmatoma, or the swelling which follows rupture of a muscle, or an inflammatory swelling; or, if a large tumor, it may be confounded with an intra-abdominal growth. Like all of the lesions mentioned, a desmoid is withdrawn from the palpating fingers by contraction of the abdominal muscles. If there is no history of injury and the patient is not recovering from typhoid fever, hæmatoma may be excluded. Furthermore an effusion of blood will be either absorbed or will spread, whereas a desmoid will continue to grow. It can be differentiated from a deeply placed inflammation by its lack of tenderness, by the fact that it is sharply differentiated from the surrounding tissue, and by the absence of fever, and there is almost always some known cause for an inflammatory swelling, such as disease of the bladder, intestine, bones, etc. A tumor of the liver will move with respiration, which a desmoid will not do. A tumor of the spleen has a peculiar notched border. Retroperitoneal growths, especially those springing from the kidney, are covered by rising intestine, or may be so covered if the intestine is inflated with air. A desmoid can scarcely be confounded with a tumor of the female pelvic organs unless it has reached a large size, since the only small pelvic tumor which extends beyond the pelvis is a fibroma of the round ligament. When a pelvic tumor is large, it is accessible through the vagina or rectum and its relation to the pelvic organs can easily be determined. An intestinal tumor which presses against the abdominal wall is more difficult to differentiate by palpation, but such a tumor can hardly exist without causing intestinal symptoms. A myofibroma of the round ligament lies partly or wholly within the inguinal canal. An encapsulated peritoneal exudate is a condition rarely seen and one in which the fluid may be demonstrated by aspiration. A fibroma of the abdominal wall, and a sarcoma of the omentum which has attached itself to the abdominal wall, cannot perhaps be differentiated

before operation. The rapidity of growth may indicate whether the tumor is fibrous or sarcomatous.

**Treatment.**—The complete removal of a desmoid is the only form of treatment worth considering. Operation should be undertaken with all the precautions suitable to laparotomy. The results of treatment warrant a very favorable prognosis.

One of the difficulties of operation is control of the hemorrhage. Another is the separation of the tumor from the peritoneum, accompanied in some cases by resection of the latter. The skin-incision should be made in the long axis of the tumor and all intervening vessels should be divided between ligatures. In order to avoid a possible recurrence it is better not to dissect away from the tumor muscular and fibrous tissues which are adherent to it. Proceeding in this manner the base of the tumor is reached. The tissue to which it is attached, whether a layer of fascia or the peritoneum, must be removed with the tumor. Here again no vessels should be divided until they have been secured by clamps or ligatures. The peritoneum should be separately sutured whenever possible. If this is impossible on account of the extent of the incised portion, the omentum should be spread over the intestines and sutured to the margin of the wound. If the defect in the muscular planes and skin is too great to permit of direct suture, the wound may be closed by a plastic operation. If there is sufficient skin, it may be brought together by mattress sutures so as to form a cock's-comb and thus strengthen the scar. Such a procedure will not of itself prevent a hernia. The patient should wear a suitable bandage for a long time. The suture of the wound in layers may be supported by a few stitches which pass through the whole thickness of the wall, and any large pockets which remain should be drained. A firm bandage completes the operation. If the wound remains partially open, a tampon of iodoform gauze may be placed within it, which should be removed on the sixth day.

**Epithelial Tumors of the Abdominal Wall.**—Dermoid cysts and sebaceous cysts are found in the vicinity of the umbilicus. Their relation to the normal tissues is exactly the same as when they occur elsewhere in the body, and they can be readily removed under local anæsthesia.

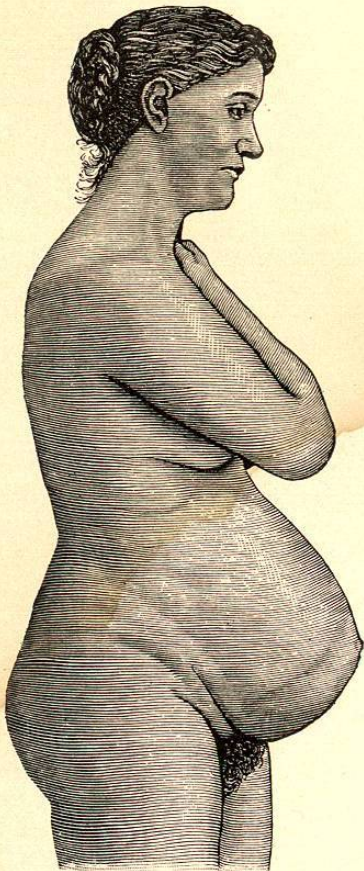
Primary carcinoma of the abdominal wall occurs only in the vicinity of the umbilicus. Cancer of the uterus may so affect the inguinal lymphatic glands that they break down and give rise to cancerous ulcers. Cancer of the stomach or intestine may involve the abdominal wall and produce cellulitis or abscess, a cancerous ulcer, or even a fistula. The treatment of such conditions is merely palliative.

**Echinococcus.**—Echinococcus of the skin constitutes 2.5 per cent. and that of the muscles 1.5 per cent. of all echinococcus. It is readily understood therefore that primary echinococcus is rare in the abdominal wall. Madelung mentions 1 such instance in 196 cases. It may appear in the lumbar region, which it has reached from the duodenum, or it may appear in the preperitoneal connective tissue of the umbilicus.

The growth of the cyst is slow, and only when it reaches a considerable size does it cause pain and pressure upon the abdominal organs. It scarcely disturbs the respiration. The appetite is poor and there is loss of flesh. If the sac becomes inflamed, acute symptoms are added, with fever, redness of the overlying skin, and possibly external rupture of the contents of the cyst.

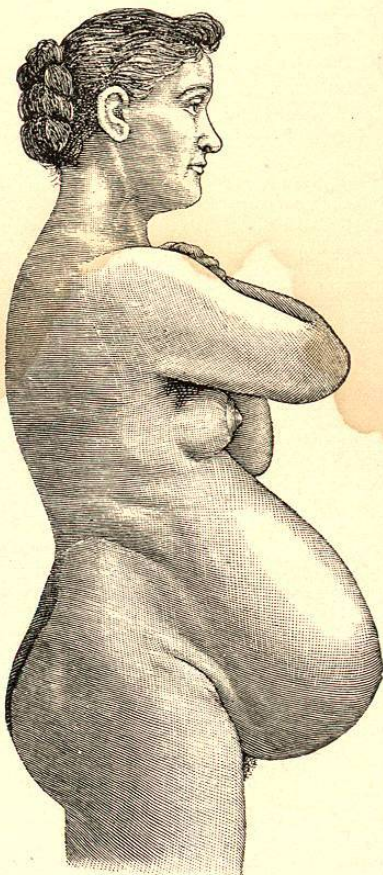
**Diagnosis.**—The first point in diagnosis is to exclude intra-abdominal affections, such as tumors of the kidney or liver, ovarian cysts,

FIG. 47.



Pendulous abdomen between pregnancies. (Landau.)

FIG. 48.



Pendulous abdomen in the ninth month of pregnancy. (Landau.)

and encapsulated peritoneal exudates. If the sac is inflamed, it is difficult to distinguish it from a preperitoneal suppuration. An exact history, a careful bimanual examination, and attention to the clinical signs will usually save the surgeon from mistakes in diagnosis. An exploratory incision is preferable to puncture, since if the cyst is an intra-abdominal one its contents may escape from the wound made by

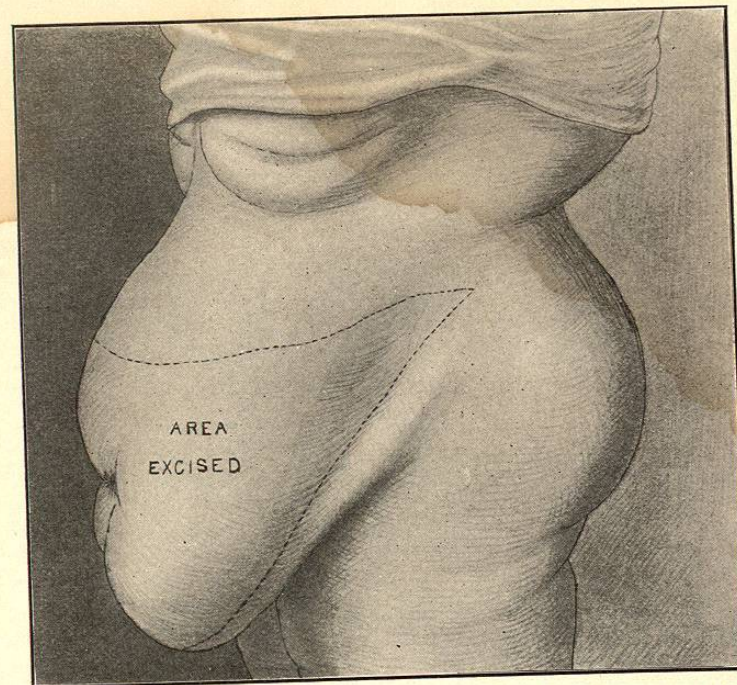
the needle and infect the abdominal cavity. If the cyst is recognized as echinococcus, it is important to know whether other portions of the body are affected. If the echinococcus of the abdominal wall has existed for a long time without symptoms referable to any other part, it is probably the only lesion.

**Treatment.**—The proper treatment is incision of the sac, evacuation of its contents, and a careful dissection of the inner sac from the surrounding tissues, care being taken not to open the peritoneal cavity. If such a dissection is impossible, the sac should be kept open and allowed to granulate.

#### OVERGROWTHS OF THE ABDOMINAL WALL.

**Pendulous Abdomen.**—Sometimes the abdominal wall is so stretched by repeated pregnancies that it fails to keep the abdominal

FIG. 49.



Pendulous adipose abdominal wall. The excised area is included between the dotted lines; the scars of the previous amputation of the immense pendulous breasts are shown.

organs in place, and the outline of the abdomen when the patient stands is that shown in Fig. 47. This deformity is increased during pregnancy as is shown in Fig. 48. If the overstretching of the wall is general, no relief is to be looked for from operation, but the patient can be made more comfortable by an elastic abdominal support. If

FIG. 50.

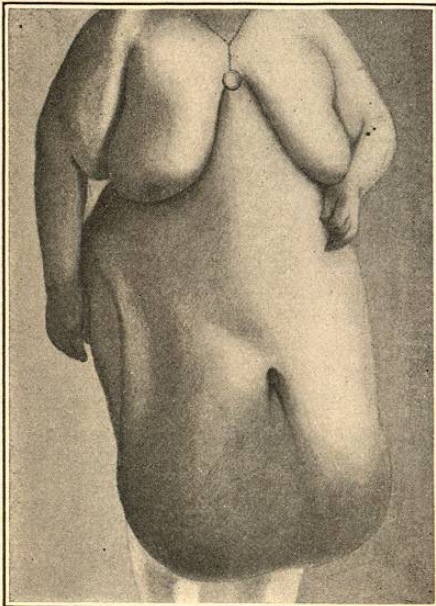
Elephantiasis of the abdominal wall.  
Front view.

FIG. 51.

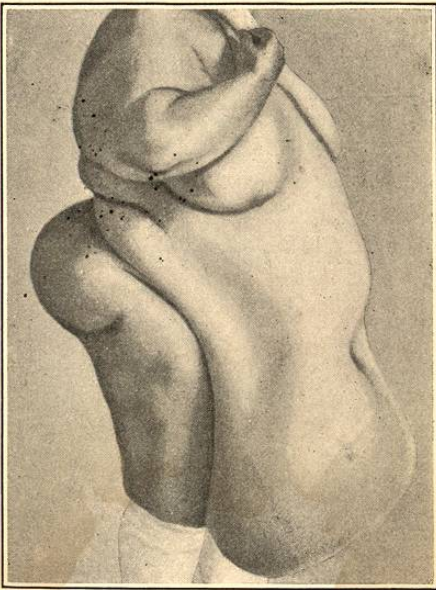
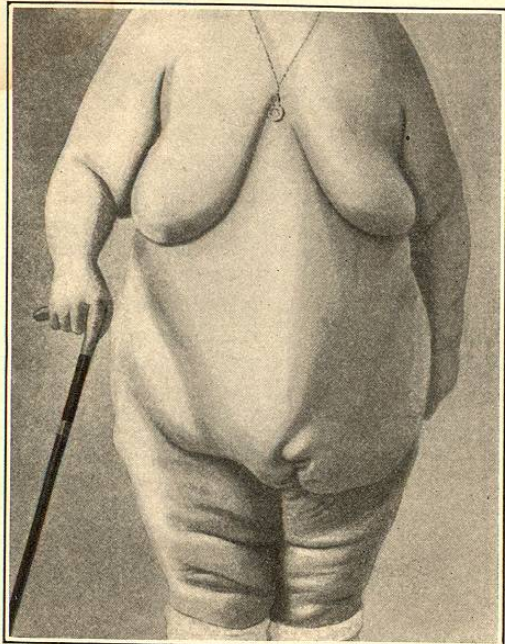
Elephantiasis of the abdominal wall.  
Side view.

FIG. 52.



Elephantiasis of the abdominal wall. Front view after operation.

the wall has given way in a part only, it may be brought together and sutured according to the methods described for the cure of Ventral Hernia.

**Fatty Overgrowth of Abdominal Wall.**—The subcutaneous fatty tissue of the abdominal wall may so increase in amount as to become a real annoyance to the patient. Such a patient will be benefitted by the excision of a large elliptical piece of the skin and fat, weighing several pounds. (Figs. 49 and 50.)

Elephantiasis may involve the abdominal wall, as well as other portions of the body. (Figs. 50, 51, and 52.)