

quently unavoidable, as the patients do not consent to gastrostomy. At the same time it should be borne in mind that the use of bougies produces mechanical irritation, and that the growth of tumors may be excited thereby. It must be admitted also that perforation into neighboring organs may occur during the procedure (Clauditz), though others again have not observed such an accident among many cases (Schmidt).

Dilatation may be performed with conical or cylindrical bougies. Occasionally bougies can only be passed with the aid of the œsophagoscope, for the first time at any rate. Dilatation by means of stretched drainage-tubes is the best and most efficient method. (v. Hacker.) The technic of the latter has already been described. As these drains are only allowed to remain in place for several hours every few days, there is less danger of perforation than where permanent tubage is employed. The latter is preferred by some. (Symonds-Gangalphe, Leyden, and Renvers.) Hard-rubber tubes are employed, or in the case of stricture situated high up, elastic tubes, which can, however, be introduced only after dilatation has been sufficiently effected by passing bougies. In order that they may not become obstructed, fluid diet should be given; they are attached to a thread which is fastened to the ear or to a tooth. They must be worn for weeks or even months. This may result in some very unpleasant accidents. The thread may tear or be swallowed. The tube may be displaced; it may be surrounded or obstructed by carcinomatous proliferation, etc. The thread in the mouth is very annoying to the patient.

In some cases cauterization might be considered. This should be performed by the aid of œsophagoscopy. A specially constructed thermocautery might be employed (v. Hacker), or a galvanocaustic loop. Rosenheim has constructed a porcelain burner for this purpose.

The application of medicaments may also be occasionally employed for the purpose of alleviating suffering. Injecting 1 to 2 c.c. of a 1 to 4 per cent. solution of silver nitrate produces a disinfecting action rather than a caustic one. (Rosenheim.) Eight to ten drops of a 1 per cent. solution of silver nitrate may be given internally three times a day. (v. Hacker.) For the purpose of dissolving the accumulations of tough mucus a solution of sodium bicarbonate (10:100) should be frequently administered. The latter occasionally relieves even severe dysphagia temporarily. (Fritsche.) For the pain narcotics are recommended, at first extract of belladonna, aqua amygd. amar. Rosenheim injected 1 to 2 c.c. of a 3 to 6 per cent. solution of eucaine through an œsophageal syringe. v. Hacker orders 8-10 drops of a mixture of extract of nux vomica (0.1) and aqua lauraceras. (10.0), three times a day. Recently heroin muriate has been successfully employed at the clinic in Innsbruck; 10 drops of a 1 per cent. solution (0.5 grain) were given three times a day.

## INJURIES AND DISEASES OF THE ABDOMINAL WALL.

BY PROF. STEINTHAL.

IN injuries of the abdomen, as in inflammations, the abdominal wall plays a secondary part. The force usually expends itself on the abdominal organs rather than on the wall; and the inflammatory process is apt to be marked in the abdominal organs and to extend secondarily to the wall. Still cases occur in which traumatism is confined to the abdominal wall, or in which inflammation begins in it.

With new growths the conditions are different and primary tumors of all sorts occur in the abdominal wall. This is especially true of the umbilicus and its immediate vicinity, a fact which occasions no surprise when one considers the different kinds of tissue which join at this point, and that at different periods of development the intestine and urinary bladder have both maintained an intimate relation with the umbilicus. On this account, and because its inflammatory processes have their own peculiarities, it is well to consider the diseases of the umbilicus apart from those of the rest of the abdominal wall.

### CHAPTER V.

#### INJURIES OF THE ABDOMINAL WALL.

##### SUBCUTANEOUS CONTUSIONS AND TEARS OF THE ABDOMINAL WALL.

THE simplest form of injury is the subcutaneous contusion manifesting itself by a circumscribed effusion of blood which for a time may be painful but which is soon absorbed. If the injuring stroke is stronger, some vessels of the subcutaneous tissue may be ruptured and give rise to free hemorrhage. The blood may appear in the anterior surface of the thigh.

If the contusion of the abdominal wall is uncomplicated, pain is

usually slight and of short duration. A greater degree of pain may be due to rupture of a muscle. Palpation when the muscle is alternately relaxed and contracted may reveal the gap due to rupture.

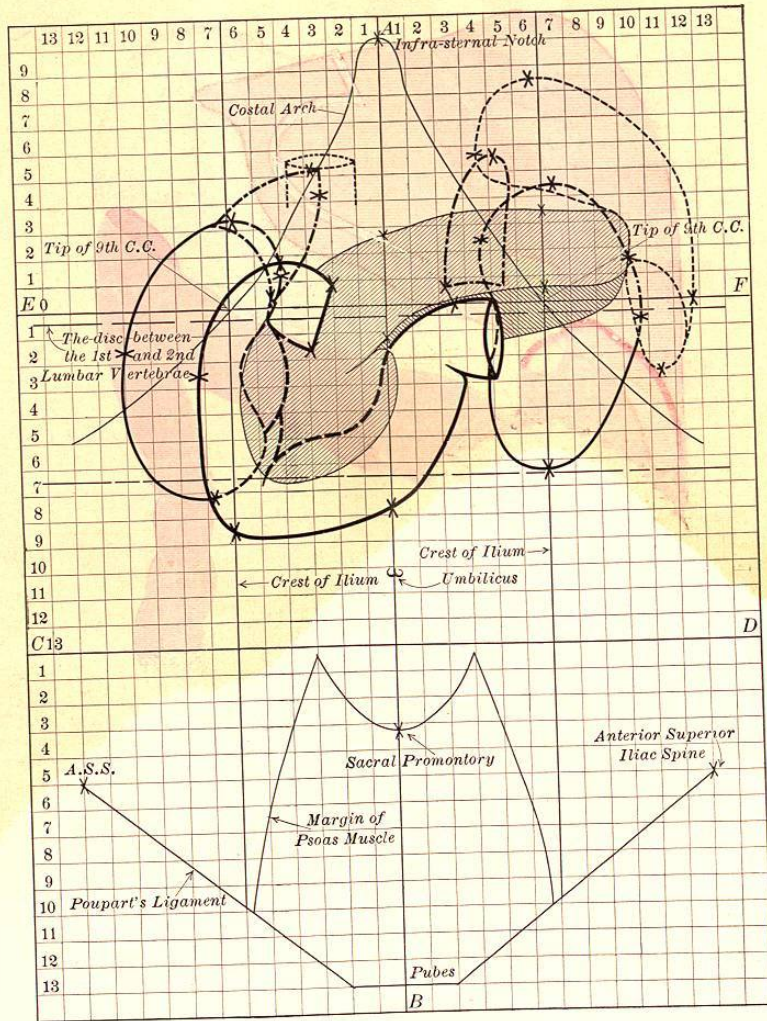
There have been cases in which simple contusions of the abdominal wall were followed by intense shock with feeble pulse and cool extremities, and perhaps even vomiting. Maschka and Templemann reported the occurrence of death after comparatively slight blows upon the abdomen, due apparently to reflex changes in the vasomotor centre of the medulla oblongata. This shock, which is usually of short duration, should be differentiated from internal injury. A like condition is produced by internal hemorrhage; but hemorrhage tends to distend the abdomen and produce dulness in the dependent portions. The latter requires prompt surgical relief, while in shock of the character mentioned no operation is indicated.

**Symptoms.**—If the symptoms of shock continue or recur after subsiding, and especially if the contraction of the abdominal muscles is not confined to the site of the injury, there is always a possibility of rupture of the alimentary canal. This may happen even though the force is a slight one and there are neither general nor local symptoms to indicate the deeper injury. Such a patient should be kept under observation for at least three days. When the injury is of a more violent form—for example, if the patient has been run over by a wagon or kicked by a horse—he should be kept under observation for at least three weeks, since an injured portion of intestine may slough away days after the accident.

**Prognosis.**—The prognosis of subcutaneous injury of the abdominal wall is necessarily uncertain, since it is not possible to determine until time has elapsed whether the force has spent itself superficially or whether internal organs have been injured. Prognosis should be especially guarded if at the time of injury the back of the patient was fixed; for example, if he has been run over, or crushed between cars, or in any way held so that the abdominal organs have been pressed against the spinal column or margin of the pelvis. For this reason, force from one side is less destructive than force from the front. A kick of a horse received from in front is frequently complicated by intestinal injury. Such details of an injury are suggestive, but there are no certain clinical signs which will enable the surgeon to make an exact diagnosis in the first twenty-four hours.

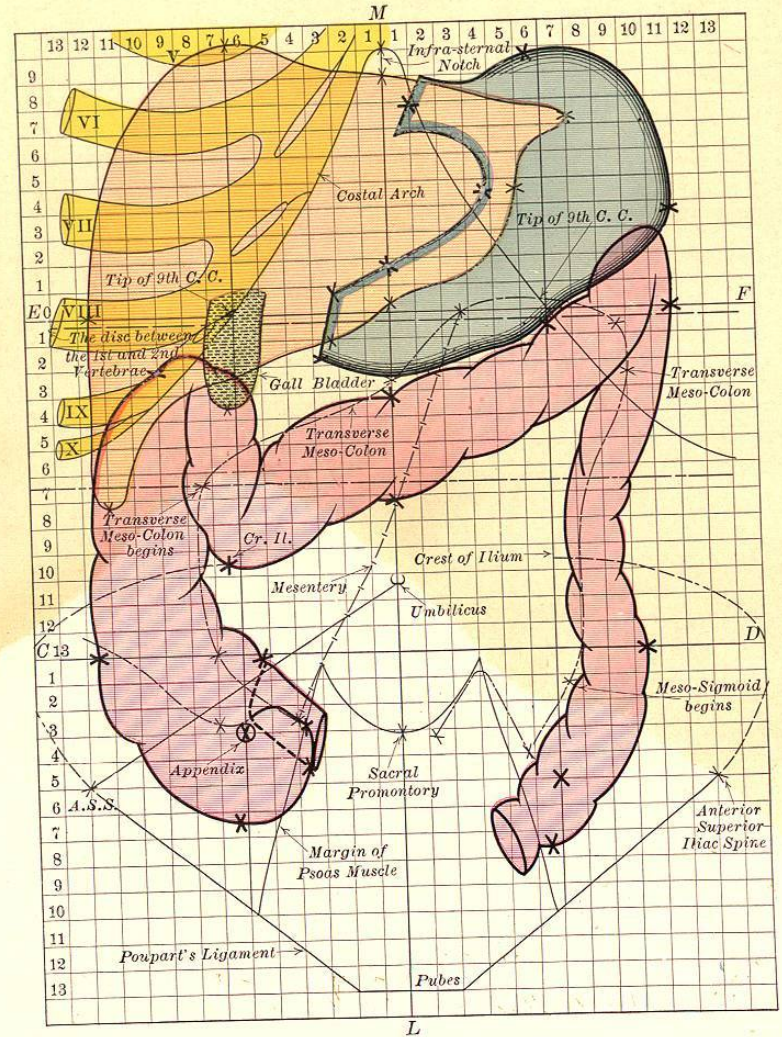
Subcutaneous injury is possible without external violence. Thus, the recti muscles may be ruptured by overexertion even if they have not been weakened by alcohol or disease, such as typhoid fever. During convalescence from typhoid fever so slight a muscular exertion as an effort to rise in bed may suffice to rupture one of these muscles. Palpation will reveal the gap in the continuity of the muscle, usually below the umbilicus. In typhoid patients this injury may be followed by supuration; in other patients the rupture heals without complication. Maydl, who collected 16 cases of rupture of the abdominal recti muscles, found records of rupture of the oblique or transverse muscles in

PLATE III.



Outlines of the Deeper Abdominal Viscera.  
 (From drawing by C. W. Smith (Addison), Brit. Med. Journ., March 16, 1901.)

PLATE IV.



Topographical Anatomy of Abdominal Viscera.

(From drawing by C. W. Smith.)

Lower border of stomach and upper border of transverse colon should be 0.5 cm. lower.

only 3 instances, and in all of these cases the rupture was due to direct violence.

**Treatment.**—The treatment of uncomplicated contusion of the abdominal wall is simple. The patient remains in bed, and either an ice-bag or hot moist compresses are kept upon the abdomen. If there are symptoms of severe shock, ether or camphor should be injected subcutaneously. If contractions of the abdominal muscles or other symptoms suggest injury of some abdominal organ, an exploratory laparotomy is advisable if the patient's general condition permits. Usually a short incision will suffice to make the diagnosis. Simple contusions are recovered from in a few days, while repair after severe contusion may require four or six weeks to be complete. Even after this time there may be local pain, which is increased by bending forward or backward, or to one side.

Witzel believes that ventral hernia may follow slight rupture of the linea alba due to a blow or backward flexion of the trunk. This opinion is accepted by some surgeons and disputed by others. It may be of importance in connection with accident insurance, and some companies have recognized it as a cause of ventral hernia.

#### WOUNDS OF THE ABDOMINAL WALL.

Open lacerated and contused wounds of the abdominal wall are produced by a variety of instruments. When the patient is injured by machinery, a portion of the abdominal wall is often torn away, leaving the fascia or muscles exposed. Extensive wounds may also be caused by scalds, acids, or burns. These wounds do not differ from similar wounds elsewhere in the body unless accompanied by shock. Punctured and gunshot-wounds have long been divided into those which penetrate and those which do not penetrate the peritoneal cavity, while the latter are again divided into those which penetrate without injuring any abdominal organ and those in which some internal injury is produced. While these differences are all-important, such a wound should not be probed with an instrument or the finger. If there is reason to suspect from the appearance of the wound or the nature of the injury that the abdominal cavity has been opened, the wound and its vicinity should be thoroughly cleansed and the edges retracted, and if necessary the wound should be enlarged to permit a determination of its extent. If the wound is situated in the anterior portion of the abdomen, local anaesthesia will usually suffice for such an exploration; if it is situated laterally, a general anaesthetic is desirable on account of the thickness of the muscular walls.

If the omentum or intestines protrude from an abdominal wound, the condition is spoken of as a complete traumatic hernia. If such organs lie between the layers of the abdominal wall, the hernia is an interstitial, traumatic one, whereas if they lie between the peritoneum and the abdominal wall, the term properitoneal traumatic hernia is applied.

A wound just above Poupart's ligament may involve the epigastric artery and produce considerable hemorrhage. This vessel runs from about the middle of Poupart's ligament upward and slightly inward and anastomoses with the mammary artery.

A fall upon a picket fence is a not uncommon cause of injury to the abdomen. Madelung reports a case of this character which is well represented in the accompanying illustration (Fig. 43).

While a penetrating wound of the abdomen can hardly be produced by a blow if the abdominal wall is normal, instances have occurred in which the thin wall of a hernia has ruptured as a result of a fall and exposed the abdominal organs.

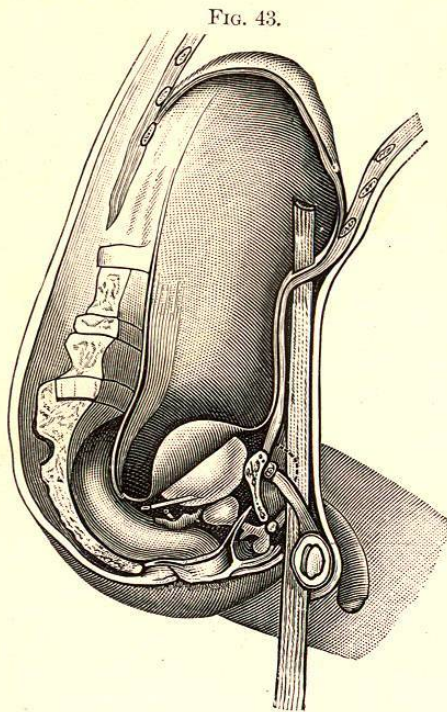


FIG. 43.

Diagram to show the effect of a fall upon a picket.

A punctured wound may be complicated by the introduction of bits of clothing, of buttons, or the instrument which caused the wound may break off within it. Such foreign bodies, if they are not removed, will give rise to protracted suppuration.

**Prognosis.**—The prognosis of punctured wounds of the abdomen rests chiefly upon the presence or absence of complications in the form of injury of the abdominal organs. Wounds of this character which are uncomplicated heal without reaction unless there is primary or secondary infection. Recovery is much delayed if there is a considerable loss of tissue, especially when this is the result of a burn.

Repair is constantly interfered with by the motion of the abdominal wall. Larger wounds are often followed by ventral hernia.

**Treatment.**—Punctured wounds which do not penetrate the peritoneal cavity should be cleansed and sutured. All hemorrhage should be checked in order to avoid collections of blood, which might lead to suppuration or which might otherwise defeat primary union. Oblique punctured wounds must be split up in order to free them from foreign bodies and to prevent protracted suppuration. Penetrating wounds which are not complicated by injury to any organ should also be sutured, the sides of the wound being approximated by a single row of stitches or by a suture in layers. If the epigastric artery is wounded, both ends of it will require ligation on account of its free anastomosis with the mammary artery. Abdominal organs which present in the wound are to be cleansed with warm sterile salt solution and replaced.

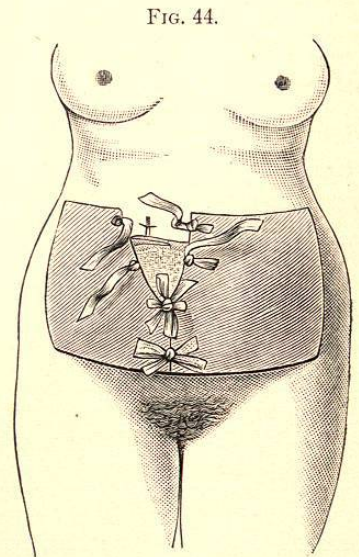


FIG. 44.

Adhesive plaster dressing.

If suppuration occurs in a sutured wound, the stitches should be removed, the wound cleansed, and a dressing wet with a 1 per cent. solution of aluminum acetate applied. Gaping of the wound-edges can be prevented in the following manner (Fig. 44): A broad strip of adhesive plaster is fixed on either side of the wound; the edge of the plaster is bent under and stuck to itself so as to leave a cloth margin about two inches wide along the wound which will not stick to the wound. Several tapes are fastened along these folded edges, and by their aid the abdominal walls can be drawn together in order to prevent gaping of the wound. At each change of dressing these tapes are untied and the edges of the plaster laid back out of the way.

Contused and lacerated wounds should be made smooth. Large gaps in the abdominal wall may be overcome by flaps or by secondary skin-grafting.

#### FOREIGN BODIES IN THE ABDOMINAL WALL.

Removal of foreign bodies from wounds in the abdominal wall has been spoken of. Needles and small splinters may penetrate the abdominal wall without producing noticeable wounds. Such objects are sometimes inserted by hysterical individuals. Needles and other objects which have been swallowed may pass from the stomach and intestine and appear subcutaneously, especially in the region of the umbilicus. A fecal

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 cæcal 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-