

## INJURIES AND DISEASES OF THE SPLEEN.

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**Anatomy.**—The concave inner surface of the spleen is directed toward the fundus of the stomach and the upper pole of the left kidney, while its convex surface is directed toward the diaphragm, to which it is attached by a fold of peritoneum (the suspensory ligament). The organ lies under the ninth, tenth, and eleventh left ribs, and its long axis is directed from above downward and forward. Its upper end is placed at the level of the tenth dorsal vertebra close under the arch of the diaphragm, so that it is separated from the lung merely by the diaphragm with its two serous coverings, the peritoneum and pleura. For this reason an abscess of the spleen can easily break into the pleural cavity. Between the stomach and spleen there is an extension of the great omentum which is known as the gastrosplenic omentum. Behind this membrane are placed the splenic artery with its five to seven branches and the splenic vein. The peritoneum, which covers them posteriorly, forms part of the anterior wall of the lesser peritoneal cavity. The suspensory ligament of the spleen extends from the left pillar of the diaphragm. Its plane is the same as that of the long axis of the spleen, which again is almost identical with that of the tenth rib.

The spleen is best exposed by an incision along the outer border of the rectus muscle and a transverse incision parallel to the costal margin, or by a lumbar incision similar to that used to expose the kidney. Sometimes, in the case of abscess, it is necessary to resect a portion of the ninth, tenth, and eleventh ribs, and to open the pleural cavity and cut through the diaphragm. In removing tumors of the spleen it is well to remember that the ligaments of the spleen are very extensive and contain numerous large bloodvessels. Its pedicle often requires several ligatures. Absence of the spleen, congenital anomalies, and accessory spleens are conditions of no surgical interest.

## CHAPTER XXVI.

### INJURIES OF THE SPLEEN.

#### TRAUMATISMS OF THE SPLEEN.

THERE are subcutaneous injuries of the spleen (contusion and rupture) and open wounds of the spleen, either stab-wounds or gunshot-wounds. Edler's statistics comprise 160 cases of injury, 51.8 per cent. of which were subcutaneous, 26.2 per cent. gunshot-injuries, and 21.8 per cent. incised wounds. Berger's collection of cases shows that 300 men were injured and only 60 women.

**Etiology.**—Diseases which enlarge the spleen, such as malaria, miliary tuberculosis, and typhoid fever, play an important part as predisposing factors to subcutaneous injury. A healthy spleen is rarely ruptured subcutaneously. Congenital syphilis predisposes to rupture of the spleen during birth. Among the rare cases of subcutaneous rupture may be mentioned violent contraction of the abdominal muscles and diaphragm during sneezing or vomiting, while the spleen of a very cachectic patient has been ruptured by palpation of the abdomen.

The usual causes of subcutaneous rupture are falls, kicks, and the passage of a wheel across the abdomen. Gunshot-wounds and stab-wounds are on the whole not common. The spleen has several times been injured unintentionally by a trocar thrust into the abdomen for the relief of ascites. In one case in which an attempt was made to aspirate a supposed echinococcus cyst of the spleen a bloodvessel was ruptured with fatal result. There are on record several cases of rupture of the spleen during pregnancy and during childbirth. At least five patients who have suffered this accident have been saved by removal of the injured spleen.

**Pathological Anatomy.**—A contusion of the spleen may terminate in abscess, or a simple cyst, or leukemic enlargement of the organ. Ruptures of the spleen are of various depths. Lamarchia says that the hilus is especially likely to rupture. Usually the capsule and parenchymatous tissue tear together, and unless the parts are surrounded by adhesions blood flows into the peritoneal cavity. If adhesions are present, a circumscribed hæmatoma results. If the substance of the spleen is ruptured while the capsule remains intact, an intracapsular hæmatoma results which may strip up the whole capsule of the spleen. If the injury is slighter, one or more hemorrhagic foci will result in which the tissue of the spleen exists in a pulpy condition. These foci may become transformed into abscess cavities or they may shrink and calcify. If they extend to the surface of the spleen and

the organ becomes adherent, rupture may take place into the stomach, colon, pleural cavity, or pelvis of the kidney.

**Symptoms.**—There are no symptoms pathognomonic of injury of the spleen. The usual results of a contusion are pain and enlargement of the spleen. If the spleen is ruptured, the symptoms of internal hemorrhage place all other symptoms in the background. The pain in subcutaneous injuries is noticed at first in the left side, but soon it spreads to the whole abdomen. There are added symptoms of collapse, marked pallor, small pulse, chilliness, and a feeling of exhaustion. In rare instances the spleen may be ruptured without giving rise to any symptoms. Sometimes the vagus is affected owing to a connection of the splenic plexus with the semilunar ganglion, and as a result there are symptoms connected with the lungs or heart or the larynx (hoarseness, or possibly complete loss of voice). The blood which escapes may spread throughout the whole abdomen or it may be more or less limited by pre-existing adhesions. If the spleen which is ruptured was enlarged, it may, if the capsule is also torn, become smaller; on the other hand, if the spleen is ruptured and the capsule remains intact, a palpable tumor may result. There are usually symptoms of disturbed respiration and digestion. Some writers speak of a peculiar waxy color of the face with a brownish-green tint, which they say is pathognomonic of rupture of the spleen. Vomiting of blood and bloody stools following rupture of the spleen when there is no blood in the peritoneal cavity is a sign that the stomach or intestine, being adherent to the spleen, has suffered rupture conjointly with the latter organ.

**Diagnosis.**—It is only occasionally that one can make a diagnosis of contusion or rupture of the spleen. Usually the surgeon must content himself with the diagnosis of intraperitoneal hemorrhage unless a splenic tumor which was known to exist before injury has become smaller. A correct diagnosis is most likely to rest upon accurate description of the position of the patient and the character of the injury.

In case of open wounds the site of the wound and the character of the hemorrhage are to be noted. Hemorrhage from the abdominal wound is rare in the case of gunshot-wounds of the spleen. In about 70 per cent. of gunshot-wounds of the spleen the diaphragm is also injured. If the external wound is very large and the ligaments of the spleen are long, the organ may be forced into the wound by the contraction of the diaphragm. Such a prolapse may occur through a wound which seems too small to have permitted the exit of the spleen. This is partly due to the elasticity of the organ and partly to the enlargement which takes place after prolapse as a result of venous congestion. Prolapse is not usually accompanied by hemorrhage, both because the prolapsed spleen is generally an uninjured spleen, and because the pressing of the spleen into the abdominal wound stops hemorrhage from the abdominal wall. Unless the spleen is replaced, it becomes gangrenous with more or less rapidity according to the amount of constriction of its pedicle.

Prolapse of the spleen is easily recognized, and unless there are other injuries or hemorrhage from a portion of the spleen which is not exposed to view the prognosis is favorable. Ledderhose states that recovery occurred in 29 of 32 cases, the treatment being reposition, or partial or total extirpation. Berger reports 8 cases treated by reposition, 13 by resection of the prolapsed portion, and 20 by removal of the whole spleen. All the patients excepting 1 recovered.

**Treatment of Prolapse.**—If a patient with prolapsed spleen is seen soon after the injury occurred and the organ is sound, it should be thoroughly cleansed and returned to the abdominal cavity. If for any reason asepsis cannot be perfectly carried out, it is better to remove the spleen. If the prolapse is a partial one, the affected part of the organ may be excised and the wound of the spleen sutured. The abdominal wound in such circumstances should be tamponed.

Contusion of the spleen unless followed by abscess or a cyst usually terminates in recovery. The outlook for a patient whose spleen is ruptured is far less favorable. Edler estimates that the mortality is about 75 per cent. from hemorrhage and 10 per cent. from peritonitis. Berger places the mortality as high as 92.6 per cent. in rupture of the spleen, one-half the patients dying within an hour after the injury, and most of the remainder within twenty-four hours.

**Treatment of Contusions and Ruptures.**—A patient who suffers from contusion of the spleen should be treated by ice both internally and externally; and if a cyst or abscess develops, it should be opened, or the spleen removed. (Page 709.)

Rupture of the spleen requires the same treatment as rupture of the liver, to which the reader is referred. (Page 634.) The abdominal incision should be long. It may be made in the median line or at the outer border of the left rectus muscle, or a transverse incision may be preferred. If the spleen is sufficiently exposed and its tissue is firm, the rupture may be sutured. One should be certain, however, that a second rupture does not exist, otherwise he may lose his patient from hemorrhage. This happened to Lamarchia, who states that the inner surface of the spleen behind the gastrosplenic ligament is a favorite seat for rupture. Madelung succeeded in suturing a ruptured and bleeding spleen into the pleural cavity. He resected a portion of the thorax-wall and reached the spleen through an incision in the diaphragm. Several other surgeons have reported successful suture, although the number of successes following extirpation for rupture is far greater. Berger collected reports of 130 operations of this character, 77 of which were followed by recovery (59.2 per cent.). Expectant treatment was followed by recovery in only 7.4 per cent. Expectant treatment after gunshot-wounds was followed by recovery in 10 per cent. of the cases, and after incised wounds in 21.4 per cent. The results of operations recently performed are far better than those of even ten years ago. Thus recovery followed in 73.3 per cent. of 45 operative cases treated in 1900 and 1901.

## CHAPTER XXVII.

### DISEASES OF THE SPLEEN.

#### ABSCESS OF THE SPLEEN.

**Etiology.**—The acute inflammation and swelling of the spleen which occurs so often in connection with infectious diseases possesses no practical interest for the surgeon. The reverse is true of abscess, which may be idiopathic and primary, but is generally secondary. Injury and excessive muscular exertion are given as causes of primary abscess, while secondary abscesses are for the most part the result of embolic infarcts (endocarditis) and metastatic inflammation occurring in connection with pyæmia, typhoid fever, acute rheumatism, and malarial fever.

**Pathological Anatomy.**—An abscess of the spleen is apt to be situated in its upper portion, and to present on the outer surface or along the anterior margin. It varies in size from that of a walnut to that of a hen's egg. Much larger abscesses may result from the union of several suppurating infarcts and the destruction of intervening splenic tissue.

Sometimes an abscess rapidly destroys tissue, produces marked septic symptoms, and leads quickly to death. At other times it runs a chronic course with few symptoms. The abscess that is usually observed reaches the capsule of the spleen and then produces a variety of symptoms according to the direction of the pus after it breaks through the capsule. If the spleen becomes adherent to the stomach, or intestine, or kidney, or diaphragm, or abdominal wall, it may break into one of these organs, or externally, without infecting the peritoneal cavity. Indeed, suppurative peritonitis from splenic abscess is rare. Pyæmia, due to emboli discharged through the splenic vein, is another rare outcome of splenic abscess. The pus may break through the posterior peritoneum and extend behind the descending colon to the anus or vagina.

It is worth noting that a pathological examination of the pus from a splenic abscess has sometimes failed to reveal the presence of microorganisms. This fact may explain the latent course which these abscesses sometimes exhibit.

**Diagnosis.**—It is rarely possible to make a diagnosis of splenic abscess situated centrally in the spleen, although this condition should be considered if during typhoid or malarial fever the temperature rises, splenic tumor increases, and pain develops. Usually pain is not noted until the abscess reaches the capsule, nor is fever a constant