THE SURGICAL ANATOMY OF FEMORAL HERNIA.

(With Special Plate.)

BY

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It is with very great diffidence that I venture to suggest certain modifications in the description generally given of the surgical anatomy of femoral hernia. Long custom has so firmly established its details that it seems almost sacrilegious to disturb them, and yet a close examination of the cases which have come under my notice has convinced me that some of the statements made about the anatomy of this condition are erroneous and have no foundation in fact, whilst other features of practical importance have not received the attention they deserve.

The Appearance of the Hernia.

One of the most characteristic features of a femoral hernia is its appearance, a small spherical swelling lying below the fold of the groin (Fig. 8). This swelling is not due to the hernia itself or its contents, and still remains when the hernia has been completely reduced. It is produced by a pad of fat, encapsuled by the tissues through which it has protruded, and arising from the mass of extraperitoneal fat which normally occupies the crural canal. This irreducible spherical mass of fat is at least very generally present, and it has given rise to the totally erroneous impression that the contents of a femoral sac are often irreducible. Beneath the skin of the groin this mobile ball of fatty tissue, tethered above in the crural ring, can be readily felt, and it is so characteristic of the condition that an immediate diagnosis of femoral hernia will rarely be at fault. The sac may only occupy a very small portion of its root, and the common existence of this fatty mass at the head of a hernia suggests that its traction on the peritoneum above it may have been the primary cause of the hernia itself.

This fatty tumour is of very definite value in the diagnosis between an inguinal and a femoral hernia. In any ordinary case the contrast is sufficiently striking between this soft, spherical, mobile swelling below Poupart's ligament, and the oblique elongated tumour above the ligament formed by an inguinal hernia (Fig. 8). Absolute certainty can, however, be reached if the finger can be introduced into the external abdominal ring and finds it empty, whilst the swelling below persists.

Relation to the Pubic Spine.

A classical point in the diagnosis between an inguinal and a femoral hernia depends on the relation of the swelling to the pubic spine. In the former case the swelling is said to lie internal, in the latter external, to this point. This statement does not, however, rest on a very secure basis of anatomical fact, for an examination of any normal male will show that the spermatic cord either crosses the pubic spine or lies external to it, crossing the inner extremity of Poupart's ligament, and this remains the natural position of an ordinary oblique inguinal hernia. It is, however, true that the pubic spine is most readily palpated from the outer side of an inguinal hernia, by displacing the latter inwards and upwards, and from the inner side of a femoral hernia. The relation of the swelling to Poupart's ligament is of more direct value, in those cases where it can be readily felt. Even in a stout person the position of the ligament may be ascertained with sufficient accuracy from that of the pubic spine, since the latter can always be exactly located by following up the tendon of the adductor longus to its origin just below it.

Gimbernat's Ligament and the Neck of the Sac.

It is my invariable practice to operate through a vertical incision over the swelling; this at once exposes the spherical mass of fat, when by a sweep of the fingers it can be cleanly isolated from the surrounding tissues (Fig. 1). If

the mass of fat is at all well developed it is a mistake to attempt to discover the sac directly within it. A better plan is to draw it downwards, when the neck of the sac, almost free from fat, will be seen emerging from the crural ring. On drawing down the neck the yellow globules of extraperitoneal fat appear, showing that the whole of the neck is in view and that the normal peritoneum has been reached (Fig. 2).

An observation of great importance can now be made. It will be found that at the neck of the sac, just where it lay in the crural ring, there is a well defined thickening. In early cases this involves the outer coats only, and these can actually be divided without opening the peritoneal coat and the sac itself. In old cases all the coats will be fused together and a narrow band of almost cartilaginous hardness may be formed, producing a close and sharp constriction in the neck of the sac (Fig. 3); and this thickened neck is invariably smaller than the crural ring in which it lay.

It is clear, then, that Gimbernat's ligament and the other structures of the crural ring can play no direct part in the strangulation of a femoral hernia. Apart from the observations made above one would have thought that this was sufficiently obvious, since the femoral vein forms the outer boundary of the ring and must necessarily be compressed by any structure wedged tightly in the ring, with oedema of the leg as an inevitable result (Fig. 4); and this does not occur. Gimbernat's ligament does, however, play an indirect part of great importance. The constant friction of this sharp and rigid structure on the neck of the sac is the immediate cause of the thickening of the neck, first in the outer coats and then in the whole structure. On the inner side of the neck this is most marked, and it is just here that the pressure on a loop of intestine may be the most acute and the most rapidly destructive.

Surgical Bearings.

The practical importance of these observations can scarcely be overestimated. If the sac be drawn well down and the neck fully divided, a wide access to the abdominal cavity will be obtained, ample in most cases for the adequate examination of a loop of strangulated intestine. If further space is required, as for the resection of a gangrenous loop, it is readily obtained by dividing Poupart's ligament in the line of the incision. In my opinion there is no valid objection to this proceeding on mechanical grounds, and indeed some surgeons, notably Mr. Hey Groves, adopt it as a routine method. It certainly has the advantage of allowing the whole operation to be carried out in full view. With such an exposure suture of the conjoined tendon to Cooper's ligament is easy, and the complete exclusion of the femoral canal which results furnishes the most substantial method yet devised for the closure of a large femoral orifice. It is only rarely, however, that such a procedure will be required. After a high division of the sac the opening can usually be closed quite satisfactorily by suturing Poupart's ligament to Cooper's.

The thickening which occurs at the neck of the sac seems to me to be actually defensive, preventing the development of an enormous hernia, and protecting the femoral vessels from pressure. What may happen when no such constricting band is present is well shown in the following case.

Eliza M., a woman of 69, was admitted to hospital with an enormous strangulated right femoral hernia, reaching half-way to her knee. She told us that it had been twice as big, but that the day before it had burst and that a large amount of water had poured out. In addition to the hernia she had had in fact a huge hydrocele of a hernial sac, the whole forming a tumour which actually reached to her knees. On opening the sac several coils of congested small intestine were exposed, with a large mass of adherent omentum wedged into the neck of the sac and producing a moderate degree of strangulation. The contents were returned into the abdomen without difficulty, and it was now found that the neck of the sac was so large that the whole closed fist could be passed directly into the abdominal cavity. The neck of the sac occupied the greater part of the space between Poupart's ligament and the bone, and the femoral vessels, instead of lying to its outer side, lay beneath its centre. The opening was very satisfactorily closed by means of a large filigree of silver wire.

A close examination of anatomical detail during the course of an operation is not easy, but by the kindness of Sir Arthur Keith I was able to find in the museum of the Royal

College of Surgeons several specimens which admirably illustrate the relation to Gimbernat's ligament of the neck of a femoral sac. The accompanying drawings (Figs. 5 and 6) of one of these specimens show clearly that while Gimbernat's ligament lies opposite to the constricted neck of the sac, it is not the direct cause of the constriction. The neck is obviously smaller than the canal in which it lies, and the narrow constricting band completely encircles the neck, although it is best developed on the side of Gimbernat's ligament. The manner in which this constricting band protects the femoral vein from pressure is clearly shown.

I recently operated on a case in which the neck of the sac was constricted in an entirely different manner, and in which the cause of the constriction produced symptoms of a very unusual nature.

A man of 45 was sent into my wards with a diagnosis of renal colic. At long intervals he had had attacks of pain spreading from the right iliac fossa into the groin and accompanied by frequency and scalding on micturition. These attacks had increased in frequency and severity and were accompanied by the appearance of a swelling in the right groin. On examination he was found to have a small right femoral hernia, and the diagnosis was made of a femoral hernia containing a portion of the bladder wall. On exploring, however, no sign of the bladder could be found, but passing round the neck of the sac posteriorly was a dense round cord. Further examination showed that this was an obliterated hypogastric artery, with an abnormal origin from the external iliac. Traction on this cord drew down a part of the bladder wall and no doubt accounted for his symptoms, which have entirely disappeared since the operation, when the cord was divided and a radical cure of the hernia performed.

If in this case the hernia had been strangulated it is highly probable that the bladder would have been pulled down, and in such an event the division of Gimbernat's ligament as usually advised would involve a very real danger of injury to the bladder. It should be remembered that protrusions of the bladder are by no means uncommon complications of femoral hernia.

Conclusions.

I venture to think that the points to which I have referred are of practical importance in the diagnosis and treatment of a femoral hernia. They may be briefly summarized as follows:

1. In most cases the presence of a femoral hernia is characterized by the appearance of a soft, spherical swelling in the angle between Poupart's ligament and the tendon of the adductor longus.
2. The pubic spine is not so satisfactory as Poupart's ligament itself as a boundary between inguinal and femoral hernias.
3. Gimbernat's ligament is not directly concerned in the strangulation of a femoral hernia, and its division serves no useful purpose, and may be dangerous.

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EPITHELIOMA OF THE SKIN AFTER PROLONGED EXPOSURE TO CREOSOTE.

(With Special Plate.)

BY

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THE following case is an example of occupational cancer. It is an instance of epithelioma of the skin of the right hand in a worker exposed for many years to creosote. It will be noted that he had also a few warty growths on the left arm, one of which presented evidence pointing to possible early malignant changes.

The patient, who was 66 years of age at the time of his death, had worked for thirty-three years in a creosote factory; his work was to carry wood after creosoting, and he stated that he was "up to the eyes in creosote." A good many years ago (certainly fifteen

a small swelling (?) appeared at the back of his right hand, "like a corn." Every now and then it cracked open and healed up again. Eight years ago the growth had increased to the size of a two-shilling piece; subsequently it gradually spread until just before operation it was a large fungating ulcer covering the dorsum of the hand (see special plate).

A portion of the edge of the ulcer, removed and examined histologically previous to amputation, proved to be a squamous epithelioma.

A circular amputation above the elbow was performed by Mr. S. Raw, surgeon to Sunderland Royal Infirmary, to whom, and to Dr. Gilbertson of Sunderland, I am indebted for the clinical history. Seven or eight weeks later the patient died suddenly and a *post-mortem* examination was made.

Post-mortem Examination.

There were a few small warts on the left forearm. Beyond changes common to his age, the organs were healthy, save that there were small secondary epitheliomatous deposits in both lungs, in the liver, and in both kidneys. There were also two secondary deposits in the heart walls—one the size of a walnut in the left ventricular wall, involving its whole thickness and beginning to break down in the interior, and the other, the size of a pea, at the right border of the right ventricle.

The case is put on record because it appears fairly certain that creosote was the cause of the malignant growth and subsequent death of the worker. It will be noted that the internal organs showed numerous secondary deposits of cancer. The large deposit involving the wall of the heart projected into its interior. The glands in the right armpit were enlarged and invaded by malignant disease. The amputation wound was in excellent condition.

REINFLATIONS IN ARTIFICIAL PNEUMOTHORAX TREATMENT.*

BY

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THE importance of rest in the treatment of active tuberculosis is well recognized. Rest of the body and of the diseased part, followed by training of the body and rest of the diseased part until the lesion has healed, is now a common method of treatment. In pulmonary tuberculosis the lung can best be rested by artificial pneumothorax. When a lung is collapsed no special skill is required to put a needle into the pneumothorax cavity and inject gas. But it is only by experience that the amount of gas, and when it should be given, can be judged. A common mistake is to give a definite quantity of gas at definite intervals. Not only does the rate of absorption vary considerably in different individuals, but the optimum degree of collapse also varies. Moreover, the same patient may require more or less gas at refills as the treatment proceeds.

When starting pneumothorax treatment I give small frequent refills until the lung is well collapsed. I like to get a good collapse after about a fortnight and some five or six refills. I then find the degree of collapse which is best for the individual patient. Some require full collapse and others do much better when the collapse is less complete. We have next to discover how long the optimum degree of collapse will last without a refill; this is best done by means of *x* rays. If the patient does not do so well when the intrapleural pressure is higher than -2 cm. water, any further collapse of lung causing such symptoms as dyspnoea and loss of weight, it can be seen by *x* rays how much collapse of lung there is at this pressure, and by frequent screening when the lung begins to re-expand. If it is seven days the refills should be given weekly; if four days, then two refills a week are required. If, when the refill is due, the intrapleural pressure is -12 cm. water, then we know that the optimum pressures are between -2 and -12 cm., and the correct quantity of gas to give is that which will raise the pressure from -12 to -2 cm. By this means the lung is kept completely at rest; it is not collapsed beyond the optimum degree and the intrapleural pressure is never allowed to reach that stage at which re-expansion occurs. As time goes on it is usually found that the gas is absorbed less quickly and so longer intervals can be allowed between the refills. The object is always to keep the lung at rest. Sometimes

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The pad of fat which encloses the sac.

The sac drawn down to expose the neck.

Division of the constricting band.

The boundaries of the crural ring.

Femoral hernia as seen from within abdomen. (From Specimen 2673, Hunterian Museum, Royal College of Surgeons; by kind permission of the Curator, Sir Arthur Keith.)

The same from the left posterior aspect.

Constriction of neck by abnormal obliterated hypogastric artery.

Femoral and inguinal hernia contrasted.