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INGUINAL HERNIA IN THE MALE.

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THE CURE OF INGUINAL HERNIA IN THE MALE.

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UNTIL recently the cure of inguinal hernia in the male has been considered at the best accidental, and when apparently effected, generally doubtful, and it is still taught that the hernia is liable to return.

The great majority of surgeons look upon an attempt at cure as ill-advised, and believe that operative measures are not to be undertaken except in cases of strangulation.

There is abundant reason for such conclusions, when judged from the earlier history of surgical procedures as attempted for cure. It is impossible in the limit assigned me to consider at all exhaustively this most interesting subject. Three centuries ago the problem was mastered by the surgeons of Europe, but only by the sacrifice of the testicle and the removal of the cord. In this way the abdominal opening was closed and the resulting cicatrix was unyielding. The demand for relief from this burdensome complaint was, however, so great, even at this sacrifice, braving the suffering from surgery without anæsthetics and with the slow healing of a dangerous suppurating wound, that the operation was forbidden by royal edict, lest the nation should suffer from the lessening of the reproductive power of the race.

It is necessary to revert briefly to the anatomy of the parts involved, in order to note the method by which Nature permits the passage of the cord through the abdominal wall without pressure, and retains without inconvenience or suffer-



ing the abdominal organs. This passage is normally lined with peritoneum, loosely attached to the abdominal wall without, and to the cord within, the canal. This peritoneum, owing largely to its loose attachment, presents a slight infundibuliform depression at the site of the internal ring, but never more than to permit a very limited movement of the cord within the canal. The canal itself traverses the abdominal wall obliquely from without inward, in such a direction that the intra-abdominal pressure, radiating from a centre represented by the promontory of the sacrum, is distributed equally along the line of the canal, compressing its walls laterally. The disposition of the canal is not unlike that of the ureter in its entrance into the bladder, the intra-vesicular pressure, closing yet the more firmly the ureter at its orifice. The pathological changes incident to acquired hernia present, as the first factors, a bulging of the infundibulum of the peritoneum about the cord and a depression of the lower border of the internal ring. Thus is produced a change, at first slight, of the direction of the intestinal wave impulse which acts at times as a wedge to open yet more the ring. Little by little the axis of the canal changes, until at length the intra-abdominal pressure is in the line of the opening instead of at right angles to it.

These changes, which culminate in a well-pronounced hernia, more or less direct, have long been recognized, but the reconstruction of the canal to its normal conditions was of necessity impossible, until aseptic surgery established the methods of primary repair of the tissues upon a scientific basis. The most important factor, as I shall presently demonstrate, is the closure of the deep structures by means of the buried animal suture.

The essential considerations for the cure of hernia are :

First. *Strict aseptic conditions.* These pertain alike to all modern surgical procedures, and need not be recapitulated to this audience.

Second. *A free dissection.* This is necessary in order to lay bare the internal ring, to permit of the enucleation of the

peritoneal sac and the separation and elevation of the cord out of the wound. The external epigastric artery often courses in the line of the incision. It is not seldom that the size of this vessel is such that the operator fears he has wounded the larger vessel.

Third. *The disposition of the sac.* The separation of the sac to its very base before removal is to be recommended as the rule. There are times, however, when it is not easy to free the peritoneal pouch, owing to adhesions to the surrounding tissues, and in large, old, irreducible hernia, a more or less intimate fusion of the contents to the inner wall of the sac.

It is generally better to open the sac before ligating or sewing through its neck, since, by so doing, the condition at the internal ring is assured, and by such knowledge the operator is often profited, even when the sac is completely empty. Not seldom the omentum is adherent at the internal ring, and even a constricted loop of intestine may escape observation when it is attempted to resect the sac unopened. Freed to quite within the ring, tension is to be made upon the sac, and then the sutures are applied in the line of the long diameter of the internal ring, and the sac is resected near its base and excised. The retraction should be sufficient to carry the resected peritoneum quite within the ring.

Mr. Macewen and his followers who recognize the (necessarily) from within outward funnel-shaped opening of the inguinal ring after operation, make the attempt to utilize the freed sac, in whole or in part, by puckering it up into a mass and with it embossing the internal ring, more or less filling the open space, otherwise left to invite a lodgment of the abdominal contents and wedge open the canal, causing a return of the hernia. Having demonstrated the feasibility of reconstructing the obliquity of the canal, it needs no argument to show the greater value of such a procedure over the substitution of plugging the opening with pathological tissues.

Fourth. *The posterior border of the inguinal canal.* Having freed the cord to its point of entrance within the

abdominal cavity, and lifted it to one side, we are prepared to study the structures which may be utilized in the re-formation of the internal ring and the posterior border of the canal. Sir Astley Cooper was the first to emphasize the remarkable development of the transversalis fascia, which is here usually found to consist normally of a thick layer of connective-tissue fibres.

In large hernia the lower border of the internal ring has often fallen quite on a line with that of the external ring—direct hernia—but it will usually be observed even where abnormal pressure of the truss has produced absorption, that Nature made a distinct effort to fortify the parts, and that the lower margin of the ring and the transversalis fascia have become markedly thickened. These structures are to be utilized in the re-formation of the posterior wall of the canal. Upon the lower and outer border this fascia blends with the posterior edge of Poupart's ligament, while upon the upper and inner border it unites with the lower edge of the transversalis muscle and conjoined tendon. Often the finger may be introduced into the internal ring to aid in the guidance of the needle, which is made to traverse from side to side the relaxed fascia and evenly intra-fold it with a layer of double continuous tendon sutures. These are carried from below upward until the internal ring is closed upon the spermatic cord at its exit from the abdominal cavity. One unaccustomed to the operation will be surprised to note the amount of tissue that may be thus intra-folded to form the posterior border of the canal.

If, however, for any reason the structures seem to be insufficient, it is easy to unite the deeper edge of Poupart's ligament to the lower border of the transversalis muscle, and thus strengthen the parts. This is usually recommended by Prof. Bassini, and upon this, in large measure, his method of operation is based.

Halsted, of Baltimore, has gone one step farther, and buttresses the posterior wall of the canal by uniting all the muscles beneath the cord, forming an entirely new canal external to

them. These operators carry the methods which I have long used and taught, to extremes which I have found rarely necessary, very likely in large measure because, by my method of using the deep double continuous suture, I am enabled to coaptate a thick layer of firm resisting structures and re-form the posterior portion of the inguinal canal much more closely after the pattern of normal construction.

Once satisfied that the coaptated structures are sufficient, the cord is replaced and the uniting of the external structures is conducted in the same manner, with a layer of deep double tendon sutures joining the divided muscular wall of the abdomen and bringing into close apposition Poupart's ligament with the conjoined tendon quite upon the cord, until the external ring is reconstructed. It is surprising to note the little interference which follows upon the close approximation of the structures upon the cord the entire length of the canal, as evinced by back-pain, swelling of the testicle, or even œdema of the scrotum.

The structures external to the muscles are best approximated by one or more layers of single continuous sutures taken by means of a Hagedorn needle introduced from side to side. The skin is closed in a similar manner with a continuous buried tendon suture. The needle, straight or curved, is best held in the fingers, and is carried through the deep layer of the skin, entering upon the other side of the wound just opposite the point of emergence of the last stitch. This is important, otherwise the wound assumes a wavy look, owing to a puckering of the skin, as tension is made upon the suture.

This I have termed "the *parallel suture*," since the needle is carried through the skin exactly parallel to the line of incision. It will be noted, however, that when the points of entrance and emergence of the needle are exactly opposite the suture lies in the wound transversely, and if, for the purpose of demonstration, the wound is allowed to remain only partially closed, the suture lies in parallel lines, like the

rounds of a ladder, and at right angles to the long axis of the wound.

I believe it is generally safer to conduct the entire operation under irrigation with a weak sublimate solution, and often not a sponge is needed. It is better to remove shreddy tissue, if much tearing of the parts has occurred, since it is most important to join well vitalized structures in order that primary union may supervene. I think it is also wise to dust the parts with iodoform before sealing the wound with collodion.

It is well worth while to take the time and trouble to dry the wound, and to coaptate evenly the edges of the skin, sealing, if need be, only a part of the wound at a time. This is best effected by spreading evenly a few fibres of absorbent cotton upon a smooth surface, and moistening with iodoform collodion. This, gently laid upon the approximated edges of the wound, soon dries and makes a germ-proof dressing, holding, as in a splint, the tissues in a firm, sure grasp. The treatment of wounds in this way is of sufficient importance to be emphasized, since primary union almost always supervenes, without suppuration, pain, or inflammation.

Aseptic animal sutures, aseptically applied in an *aseptic* wound, *aseptically* maintained. This is the *sine qua non* without which more or less of failure must ensue. Otherwise buried sutures are not to be commended in any wound, and must ever be a source of danger. The advantages of the above method of operation and closure of the structures for cure of hernia are obvious. First. By no other means than deep closure of the parts by the use of sutures to be left in the wound, and not to be subsequently removed—buried sutures—can the posterior border of the inguinal canal be restored, the parts strengthened and reinforced, or even the neck of the sac closed, and the redundant tissue removed. To accomplish such a purpose the use of silver wire or silkworm-gut is not to be considered, since, by general consent, these sutures must act as irritants, and usually are a source of much annoyance and suffering until they are finally eliminated as foreign bodies. Silk is used by many operators for this

purpose, but abundant clinical and experimental studies have demonstrated that silk at the best is encapsuled, never absorbed. It may, after months of suffering, be thrown off by suppurative processes.

A wound that is closed aseptically in layers with the tendon suture leaves no pockets to become distended with blood or serum, and hence the drainage-tube is not required. In aseptic wounds the drainage-tube is ever to be considered as a foreign body, positively harmful, since it separates tissues which should be in contact, and, if long maintained, this portion of a wound must be restored by secondary processes. During its retention it is ever a positive source of danger from infection, which must be guarded against by the most careful of antiseptic dressings. This is most difficult in the region of the groin, and the large proportion of suppurating wounds following operations for hernia, in the hands of our best operators, shows the great risk from an open wound in this portion of the body. The complete closure of the skin by a line of buried animal sutures has been my daily practice for years, and was decided upon in order to prevent stitch abscesses long before the beautiful demonstrations showing their cause to be from the introduction with the suture of the *micrococcus pyogenes albus*, the normal habitant of the healthy skin, aiding in the destruction and proliferation of the dying and dead epithelium.

The iodoform collodion seal is useful in two ways: First, it holds in fixation at rest the divided edges of the skin which should be carefully approximated; secondly, it prevents the possibility of subsequent infection. An aseptic wound thus protected must remain aseptic, and, when the tissues are well vitalized, union is always primary. If the skin is in close approximation, the union is linear, and often after a few months can scarcely be detected.

In many wounds in other parts of the body this is of great value, especially facial wounds in the female. It is interesting to note briefly the repair-processes which supervene in such a wound. Histological investigations upon animals

show that the tendon or animal suture is little by little invaded by leucocytes which are abundantly proliferated to surround the material. Gradually, dependent upon age, activity of developmental processes, vitality of structures, etc., this proliferated material is transformed into connective-tissue cells, until the suture is, in large measure, replaced by a band of living tissue. This is important in most wounds, but is perhaps never of greater value than in hernia, where the resistant power of the structures has long been defective.

An aseptic wound thus closed is rarely painful, œdematous, or even tender to gentle touch. The new proliferated material can be easily felt for a considerable period, and is perhaps at its maximum from four to six weeks after the operation.

For many reasons the tendon suture is greatly to be preferred to catgut, a subject of extreme interest and of the first importance, but can receive here only reference. The kangaroo tendon has met with the unqualified approval of nearly every operator who has used it, and is now in the market in quantity and price so that it comes within the reach of every surgeon. Time does not permit an analytical comparison of the different methods of operation. I have recently treated this subject *in extenso*.¹ The operation is eminently a safe one. In a table which I have recently collated of over three thousand cases, the mortality is less than one per cent., and is usually explained as having been from causes which the authors state were accidental, and were not due to the operation. In numbers Bassini's clinic leads the list, 262 operations and only one death, due to pneumonia; Championnière reports 254 cases operated upon, 2 deaths; Schede's clinic, 165 operations, 2 deaths; Banks, 106 operations, no deaths; Park, 115 operations, 85 reported cured; Marcy, 115 operations, no deaths, 78 traced, 4 relapses. The experience of the late celebrated John Wood, of London, covering years of

¹ Anatomy and Surgical Treatment of Hernia. By Henry O. Marcy, A.M., M.D., LL.D., Boston. Quarto, with 66 full-sized illustrations; 8 colored, 37 woodcuts. D. Appleton & Co., 1892.

labor before the period of antiseptic *régime*, gave only seven deaths in 339 operations.

By estimate, between three and four millions of the people living in the United States are subject to this usually life-long progressive disability ; and, if the demonstration is complete, that the risk of life is less than one per cent. from the operative procedures instituted for cure, and that scarcely more than ten per cent. are subject to relapses, and these almost invariably in a state improved by the operation, the plea is a very strong one to consider favorably the advisability of operation in a very large majority of all the sufferers from hernia.

We are all painfully familiar with the dangers of strangulation in neglected hernia and the large percentage of mortality which results therefrom. It seems to me a duty, resting heavily not only upon all surgeons, but upon every physician residing where he cannot easily obtain surgical assistance, that he make himself familiar with all the details of the operation for hernia, its relief when strangulated, its cure when troublesome, and thus fit himself for the discharge of a solemn obligation which may at any moment of his professional experience be freighted with the issues of life or death.

