

THE INCISION MADE IN THE ABDOMINAL WALL  
IN CASES OF APPENDICITIS, WITH A DE-  
SCRIPTION OF A NEW METHOD  
OF OPERATING.

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**S**URGEONS are practically unanimous in discarding the median incision of the abdominal wall when operating for appendicitis. The division of the tissues in the median line is very easily accomplished, and the repair of the wound is probably more perfect than when the incision has been made at any other point, but the entrance to the peritoneal cavity, which is thus effected, does not so readily permit either the operative work in connection with the appendix within the cavity, or the subsequent treatment of the wound in any case where complete closure of the incision is contraindicated.

The usual situation of the appendix, well to the right of the edge of the rectus muscle, and the fact that abscesses and other lesions arising in disease of the appendix are largely confined to the right half of the abdomen, have led operators, almost without exception, to make their entering incisions either at the outer edge of the rectus or at some point between this muscle and the anterior spine of the ilium.

In my earlier operations for the removal of the appendix at the beginning of the disease, and in recurrent cases operated upon in the interval between attacks, I always made the incision parallel with and near the right edge of the rectus. The advantages of this incision are that the deeper tissues divided are purely tendinous, that the hæmorrhage is slight, and that the suture of the wound, when closure is permitted, is very easy and satisfac-

tory. The disadvantage is that the situation of the appendix is usually still farther to the right; indeed, it is often close to the outer part of Poupart's ligament, and, frequently enough, the appendix points upward to the outer side of the colon. In all such cases, if an incision by the side of the rectus is made, the operator is forced to work beneath the overhanging shelf formed by the outer part of the abdominal wall, and the subsequent removal and reintroduction of gauze drainage material, in cases where complete closure is contraindicated, is decidedly interfered with. It has seemed to me that in all cases where it is desirable first to locate the base of the appendix, and usually too where one wishes to make an entrance into an abscess originating in disease of this organ, it is much better to incise the abdominal wall a little to the outer side of the normal situation of the appendix. The inner edge of this wound is drawn inward by a retraction, and but little tissue has to be drawn outward in order to fully expose the caput coli and allow of easy identification of the base of the appendix. Through this incision also, or through a parallel one made still nearer to the anterior spine of the ilium, it is easy to enter, empty, and subsequently treat almost every case of abscess. Of late years I have made almost all incisions for appendicitis about as follows: The incision in the skin is an oblique one about four inches long. It crosses a line drawn from the anterior iliac spine to the umbilicus nearly at right angles about one inch from the iliac spine, and is so situated that its upper third lies above that line.

The incision of the aponeurosis of the external oblique is a little shorter, and practically merely separates the fibres of that muscle and its tendon without cutting them. The section of the internal oblique and transversalis muscles follows, cutting the muscular fibres nearly at right angles to their course, and is completed only at the central half at first. This deeper incision can be readily lengthened if, after cutting the fascia transversalis and peritoneum, the character of the lesion seems to call for more space. The above description corresponds accurately to the incisions I have made during the last few years in the large majority of cases, although, of course, abscesses unusually placed

have required sometimes a larger opening, and sometimes an incision beginning at a higher or at a lower point, or placed much nearer Poupart's ligament. In all of these sections the damage done to the abdominal wall is considerable, and we have all of us been disappointed, especially after operating upon suppurating cases, when it has been necessary to treat abscess cavities with gauze drainage, to find that even very perfect treating of the wound has been followed by small or large ventral herniæ.

It can certainly be affirmed that the formation of a hernia subsequent to these operations is not due to any particular *length* of incision, nor can a specially restricted incision insure against the same result.

In regard to the exact length of the incision, I would say that it should be adjusted to the necessities of the case, just as incisions in other parts of the body, made for various purposes, should be adjusted. Incisions should be long enough to allow complete and safe work to be done, and it is most unscientific and harmful to encourage those of limited experience to believe that a special measure of good goes with a special length of incision. If the parts severed in the making of a wound are properly adjusted, and the wound properly treated, repair will be just as rapid and complete whether the wound be five inches long or three inches long, while, on the other hand, no good surgeon will ever unnecessarily divide tissue simply because he can again obtain repair.

When hernia occurs after an operation for appendicitis, it is due to the imperfect repair following the complete section of a number of superimposed tissues, and it has sometimes followed, both in cases where the incision was made just at the linea semi-lunaris, and also when made through the muscular wall outside of this line. In abscess cases where a free incision and also open treatment of the wound for drainage are essential to safety, hernia of greater or less dimensions is not unfrequently seen within a year after operation.

By the term hernia, used in this connection, is meant the partial eversion of the cicatricial tissue caused by intra-abdominal pressure at one or more points in the line of the wound, where

repair of the deeper tissues incised has been imperfect. Even after operations for the removal of the appendix in the interval between attacks, and when the wound may be completely or nearly completely closed at once, small herniæ, of the same variety, are not unknown. The recurrence of hernia is due, first, to the more or less constant intra-abdominal pressure, and, secondarily, to the difficulty in obtaining perfect repair in the parts divided. The peritoneum is often very perfectly sutured, the transversalis fascia usually very imperfectly. The external oblique aponeurosis is usually, when its suture is permissible at all, very completely repaired. The greatest defect in repair is due to the section at right angles either of the muscular fibres of the internal oblique and transversalis, or of the tendinous fibres forming the conjoined tendon of these muscles at the edge of the rectus. In either case, the retraction of these muscular fibres, aided by intra-abdominal pressure, tends constantly to separate the edges of the deeper part of the wound, thus permitting at first slight, afterwards increasing, eversion of peritoneum, and the formation of an incomplete hernial pouch. Such cases require the use of an abdominal belt or other apparatus to give sufficient support to the belly wall. The consideration of this defective result in some cases has led me to attempt a different method of entering the cavity in operations for the removal of the appendix in non-suppurative cases.

The skin incision should be made as already described. The section of the external oblique muscle and aponeurosis should correspond, great care being taken to separate these tissues in the same line, *not cutting any fibres across*. This is easily accomplished.

When the edges of the wound in the external oblique are now strongly pulled apart with retractors, a considerable expanse of the internal oblique muscle is seen, the fibres of which cross somewhat obliquely the opening formed by these retractors. With a blunt instrument, such as the handle of a knife or closed scissors, the fibres of the internal oblique and transversalis muscles can now be *separated*, without cutting more than an occasional fibre, in a line parallel with their course,—that is, nearly

at right angles to the incision in the external oblique aponeurosis. Blunt retractors should now be introduced into this in turn and the edges separated.

The transversalis fascia is thus well exposed and is then divided in the same line. Last of all the section of the peritoneum is made.

Two sets of retractors must be in use, one holding open the superficial wound from side to side, the other separating the edges of the deeper wound from above downward. A considerable opening is thus formed, through which, in suitable cases, the *caput coli* can be easily handled, and the appendix removed. The appendix having been taken away, the wound in the peritoneum, which is transverse, is then closed by suture. The similar wound in the fascia transversalis is also sutured. The fibres of the internal oblique and transversalis muscles fall together as soon as the retractors are withdrawn, and with a couple of fine catgut stitches the closure can be made more complete. The wound in the external oblique aponeurosis is sewed with catgut from end to end. When the operation is completed it will be seen that the gridiron-like arrangement of the muscular and tendinous fibres, to which the abdominal wall largely owes its strength, is restored almost as completely as if no operation had been done. In performing this operation I have noticed several advantages.

In the first place, muscular and tendinous fibres are separated, but not divided, so that muscular action cannot tend to draw the edges of the wound apart, but rather to actively approximate them. Excepting during the incision of the skin, almost no bleeding occurs. The fascia transversalis not being drawn away by the retraction of the deepest layer of muscular fibres, this fascia is easily completely sutured, and thus greater strength of repair is assured. No muscular fibres or larger nerves having been divided, pain after operation is almost absent. The operation requires rather more time than the usual one, and a larger number of assistants is needed, for four retractors are in use during part of the time. The opening into the peritoneal cavity is not large, but may be made larger if necessary, by continuing

the separation of the fibres of the internal oblique and transversalis, and dividing the conjoined aponeurosis in the same line with scissors. In the opposite direction the separation of muscular fibres may be carried as far as the crest of the ilium.

I have now done this operation on four patients, all cases of recurrent appendicitis operated upon in the interval between attacks. The first operation took place at the Roosevelt Hospital on December 18, 1893. Sufficient time has not elapsed to justify me in presenting the final results as positively an improvement upon those obtained by older methods. I shall expect, however, in these cases, a much more perfect result as regards the strength of the abdominal wall than is usually observed.

I present the method now, hoping that others may be induced to give it a trial.

This operation does not appear to be suitable for cases accompanied by suppuration about the appendix, which require to be treated by extensive packing with gauze, nor in cases non-suppurative which require during operation a large intra-abdominal dissection.

It is not an easy operation, and should not be attempted by those who are unfamiliar with operations upon the appendix, and I again call attention to the fact that in performing it two extra assistants will be occupied part of the time with retractors.