A CLINICAL LECTURE ON RECURRING APPENDICITIS AND

ITS TREATMENT BY REMOVAL OF THE VERMIFORM APPENDIX.

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As there are now in my wards three patients who have recently undergone operations for the relief of recurring appendicitis, I propose to direct your attention to this condition, as a great advance has been made in its treatment since the year 1887, when the advisability of removing the vermiform appendix was first proposed by Mr. Treves.

SYMPTOMS.

I may remind you at the outset that the characteristic symptoms of this form of appendicitis are as follows:

Recurring attacks of pain varying in intensity, usually felt in the right iliac fossa, but sometimes referred to the umbilicus, epigastrium, or other parts of the abdomen. The presence of a swelling, accompanied by more or less tenderness on pressure, in the right iliac region. In some cases the appendix can be recognised as an elongated tumour, about the size and shape of an adult forefinger, lying above and parallel with Poupart's ligament; in other cases there is a slight fulness or a more diffused swelling, due to inflammatory exudation poured out round the appendix, between it and adjacent parts. Increased resistance on palpation, due to muscular rigidity, over the right iliac fossa. Slight dullness on gentle percussion over the same region. Evidences of intestinal disturbance, the bowels being generally constipated; occasionally diarrhoea and vomiting are present at the outset of an attack, and continue during its progress. More or less elevation of temperature, there often being a rise of several degrees. The attacks last for a variable period, sometimes for several days, sometimes for two or three weeks, the symptoms then subsiding, only to recur after a longer or shorter interval. As regards their condition during the interval the patients may be quite well and free from any symptoms. Often, however, there is a more or less constant sense of weakness or discomfort in the right iliac fossa, or an aching pain, increased on exertion, with persistence of the local physical signs just mentioned, though in a much less degree.

Until quite recently cases of this nature were treated by simple medicinal measures, which, though successful in relieving the symptoms during an attack, were powerless to prevent their recurrence, when dependent upon one or other of the conditions, which our extended knowledge of the pathology of recurrent appendicitis now shows to be usually present.

PATHOLOGY.

A condition very frequently found is constriction or occlusion of the lumen of the appendix, either at its origin or at a short distance from the cæcum, the result in some cases of thickening of its walls, in other cases of twisting or bending of the process on itself. Thickening of the walls of the appendix may be due to chronic inflammatory changes, or to cicatrization after ulceration of its mucous lining; occasionally it is found so thickened and contracted, that its lumen is almost, or even quite, obliterated. Twisting or bending of the appendix upon itself is generally due to the contraction of adhesions dragging upon it. These adhesions, which are the result of local peritonitis accompanying previous attacks of appendicitis, may be very extensive, surrounding the appendix, and fixing it to the parietal peritoneum, omentum, cæcum, small intestine, rectum, ureter, bladder, or iliac vessels. Contained within the thickened or distorted appendix, and often distending it, there is frequently found clear mucus, a muco-purulent fluid, or pure pus; and occasionally a hard faecal concretion is also present. The following cases illustrate these different conditions.

CASE I. Appendix surrounded by Adhesions and almost Obliterated: Removal: Recovery.—A male, aged 18 years, admitted into hospital June 10th

1895, under Dr. Dreschfeld. During the preceding six months he had suffered from three attacks of appendicitis, each of which had confined him to bed for several weeks. On admission he was recovering from the last attack. A distinct induration could be felt above Poupart's ligament on the right side. It was tender on pressure, and more resistance was present over it than upon the opposite side. Operation, June 22nd: The appendix was surrounded by numerous adhesions, which bound it down to the posterior surface of the cæcum. It was twisted backwards upon itself, and its lumen was almost obliterated. It was separated and removed with some difficulty; the wound was then closed, and the patient made an uninterrupted recovery. Nine months have elapsed since the operation. The patient enjoys good health, and there has been no recurrence of the attacks.

CASE II. Appendix Bent on Itself and Adherent to the Iliac Vessels: Removal: Recovery.—A male, aged 18 years, seen November, 1895, in consultation with Dr. Hoesgood, of Swinton, during his third attack, the two previous ones having occurred in the preceding April and January. The signs of appendicitis were then masked by extreme general distension of the abdomen; there had been persistent sickness and no action of the bowels for some days, the case rather resembling one of intestinal obstruction due to some form of internal strangulation. He recovered from the attack, but during the next two months there were three further attacks, each attended as before by vomiting and constipation. February 10th, 1896, he was admitted into the infirmary to undergo operation, the acute symptoms having then subsided. The appendix could be easily felt above Poupart's ligament. Operation, February 20th: Extensive adhesions surrounded the cæcum and appendix, rendering the recognition of the latter very difficult, as it was firmly bound down to the cæcum in front and to the iliac vessels behind. Its neck was constricted, and below its middle it was sharply bent upon itself; it contained a small quantity of a muco-purulent fluid. It was removed with some difficulty and the wound was closed. The patient made a good recovery (Fig. 1).

Fig. 1.—Vermiform appendix bent on itself (Case II). A, appendix; C, cæcum, turned up; I, ileum; O, omentum, adherent to appendix; M, muscles of abdominal wall; P, peritoneum, held back by forceps; S, margin of skin; R, retractors.

CASE III. Appendix Occluded at its Origin and Distended with Clear Fluid: Removal: Recovery.—A female, aged 29 years, admitted January 11th, 1896, under Dr. Harris. She was suffering from a second attack, the first having taken place about four months previously. Operation, February 9th. All the acute symptoms had then subsided. The appendix could be felt as an elongated swelling above the outer part of Poupart's ligament. On exposing it, it was found to be adherent to the omentum and the posterior surface of the cæcum. It was occluded at its origin from the cæcum, where its walls were much thickened, and distended with fluid. Near its origin it was extremely thinned at one point, which gave way before any attempt was made to remove it, and nearly half an ounce of a clear mucoid fluid escaped. (On subsequent examination this spot was found to correspond with a small ulcer involving the mucous and muscular coats.) The adhesions having been separated, the appendix was removed, and the wound then closed. Recovery was uninterrupted. (Fig. 2).

CASE IV. Appendix contained a Faecal Concretion: Removal: Recovery.—A male, aged 26 years, under the care of Dr. Leslie Jones and Dr. Macmillan. He had suffered from three severe attacks during 1895, being on each occasion confined to bed for several weeks. Operation performed at home, January 4th, 1896, during a quiescent period, all local tenderness and swelling having quite subsided. On exposing the appendix, which was thickened, it was found to contain a hard, faecal concretion. It was surrounded by adhesions, which bound it down to the back of the cæcum.

There were also firm adhesions between the cæcum and anterior abdominal wall, as well as between the omentum and appendix. The appendix, which was constricted at its origin from the cæcum, was removed,

Fig. 2.—A, appendix, distended with fluid, showing the spot (o) where perforation had almost taken place (Case III). C, cæcum; I, ileum. together with the concretion, and the wound was closed. The patient made a rapid recovery from the operation, and has enjoyed excellent health since its performance (Fig. 3).

Fig. 3.—Vermiform appendix (shown in section) containing a faecal concretion (natural size). Case IV. A, strictured portion of canal; c, faecal concretion filling canal; d, thickened wall of appendix; e, adhesions surrounding and binding down appendix; f, wall of cæcum. The line b shows the point where appendix was removed.

CASE V. Appendix Constricted at its Origin, containing Muco-purulent Fluid: Removal: Recovery.—A female, aged 25 years, sent by Dr. Arthur Helme, and admitted into the infirmary, March 16th, 1896. During the preceding three years she had suffered from five attacks of a severe nature, on one occasion being confined to bed for six weeks. Operation, March 20th: The appendix, which could be distinctly felt previous to operation, measured only $\frac{1}{2}$ inch in length, and was quite free from adhesions. Its walls were much thickened, and it was constricted at its origin, being somewhat dilated beyond, and containing a muco-purulent fluid. It was easily removed, and the wound was closed; recovery was uninterrupted.

Sometimes small collections of pus are found outside but in close proximity to the appendix, surrounded and shut off from the general peritoneal cavity by adhesions. This condition is probably secondary to one or other of those already described, perforation of the appendix with escape of some of its contents having taken place, and being followed by the formation of an encysted abscess, the suppurative process being limited by the surrounding adhesions. Under these circumstances the appendix probably becomes obliterated, for if the abscess is evacuated no further recurrence of the attacks takes place. This condition is illustrated by the following cases:

CASE VI. Abscess in close Proximity to Appendix, which was not Removed: Drainage: Recovery.—A male, aged 29 years, suffered from a first attack in September, 1895. He was seen in consultation with Dr. Saul during a second attack in January, 1896, and was admitted into the infirmary. Operation, February 15th: He was then in the quiescent stage, a localised swelling being evident above the outer part of Poupart's ligament. Upon

exposing it by the usual incision a small collection of pus shut off from the general peritoneal cavity was opened. The surrounding parts were so thickened and matted together that no attempt was made to remove the appendix (which was not seen), for fear of opening and infecting the general peritoneal cavity. The abscess cavity was drained, and the patient made a good recovery.

CASE VII. Abscess in Close Proximity to the Appendix which was not Removed: Drainage: Recovery.—A boy, aged 10 years, was an in-patient under Dr. Harris for a month in August, 1893, suffering from a first attack. There was no recurrence until May, 1894, when he was re-admitted under Dr. Harris, suffering from a second attack. The symptoms having subsided in a fortnight, he was transferred to the surgical wards. Operation, June 7th, 1894: On opening the peritoneal cavity, the cæcum was exposed after drawing aside a mass of omentum which lay in front of it. In separating some dense adhesions which lay behind and to the right of the cæcum, a small cavity containing about a teaspoonful of pus was opened. As the appendix was buried in the adhesions it was not further sought for. The pus was carefully sponged away and a tube left in the abscess cavity. The wound quickly healed, and since the operation—nearly two years ago—there has been no recurrence of the attacks.

THE OPERATION FOR REMOVAL OF THE APPENDIX.

This should only be performed in the quiescent period following an attack, never during the active stage, when inflammatory symptoms are present. The best incision is one commencing about an inch above and internal to the anterior superior spine of the ilium, carried downwards and inwards parallel to Poupart's ligament for 2 or 3 inches. The peritoneal cavity having been opened and the appendix found, any surrounding adhesions should be carefully separated. The appendix should be clamped lightly close to its origin, in order to fix it, by means of a pair of forceps, the blades of which are protected with india-rubber tubing, and then removed about half an inch from the cæcum. The divided stump should be closed with a double row of silk sutures, the first row including the mucous membrane, the second row including the muscular and serous coats, which are drawn together over the mucous coat. All bleeding having been arrested, the external wound is then closed, no drainage tube being required. In most cases healing takes place by first intention, for, if careful antiseptic precautions have been observed during the operation, it is quite exceptional for any suppurative process to occur.

The operation in many cases is not an easy one, the chief difficulty being due to the presence of adhesions, which may be extremely dense and extensive, rendering it sometimes impossible to recognise the appendix, so completely is it hidden and buried in them. This condition is illustrated by the following case, and it is interesting to note that though the appendix was not removed, yet considerable relief followed the operation, probably from breaking down adhesions.

CASE VIII. Extensive Adhesions round Cæcum: Appendix not Recognisable: Relief from Breaking down Adhesions.—A male, aged 25 years, admitted February, 1895, under Dr. Harris. Eight months previously he had suffered from a severe attack of appendicitis, which had confined him to bed for two months. Ever since, at intervals of a week or ten days, he had been troubled with slight attacks, which quite incapacitated him from following his occupation as a labourer. On admission, he complained of pain and tenderness on pressure in the right iliac region; no tumour could be felt, but slight fullness was present, and more resistance than on the opposite side. Operation, March 16th, 1895. The cæcum was adherent in front to the abdominal wall, and surrounded on all sides by adhesions, so dense and extensive that the appendix was quite unrecognisable. The adhesions were separated as completely as possible, but without finding the appendix, and the wound was then closed. The patient made a good recovery, and since the operation his general health is much improved, and he has been able to resume his occupation. He is, however, still liable to slight attacks of pain in the right iliac region, but they are of a much milder character and recur less frequently.

In other cases the appendix is so adherent to adjacent structures that its separation without injuring them is often a very difficult matter (as in Case II), and when, as not infrequently happens, the cæcum is adherent to the anterior abdominal wall, it is not easy to know when the peritoneal cavity is reached, and in opening it, the bowel is liable to be wounded by an incautious use of the knife.

INDICATIONS FOR OPERATION.

As the operation for removal of the appendix is often a somewhat complicated one, it should not be performed unless it is really required, and an important question which suggests itself is this, When are operative measures indicated in a patient suffering from recurrent appendicitis, and after how many attacks is it right to interfere?

From a consideration of the cases which have come under my notice, it is my opinion that operation is indicated after

two well-marked attacks of appendicitis, especially if the physical signs—more particularly a swelling in the situation of the appendix—persist in the quiescent period after the subsidence of the attacks.

In two of the three patients operated upon after a second attack (Cases VI, VII) small collections of pus were found in the immediate neighbourhood of the appendix, while in the third patient (Case III) the appendix was distended with fluid and upon the point of rupture. In another patient, operated upon after a third attack (Case IV), a hard faecal concretion was found in the appendix, probably the cause of the preceding attacks. When an appendix is constricted or occluded, and especially when it is distended with fluid or contains a faecal concretion, there is always a risk of ulceration and perforation taking place, followed by escape of its contents and suppuration around it. Owing, however, to the fact that the appendix is under these conditions generally surrounded by adhesions, which act as a protective barrier, shutting off the general peritoneal cavity, this complication, as already mentioned, is usually followed by a local or encysted abscess, which may, however, sometimes form with acute symptoms, as in the following case.

CASE IX. Recurrent Attacks for Several Years: Sudden Formation of an Acute Abscess: Incision and Drainage: Recovery.—A male, aged 26 years, seen in consultation with Dr. John Watson on March 14th, 1896, and operated upon the same day. For more than three years he had suffered at irregular intervals from frequent attacks of a mild type. Three weeks previously more acute symptoms suddenly developed, followed by the formation of an abscess, which became most prominent on the outer aspect of the caecum. It was opened and about a pint of pus with a very offensive faecal odour was evacuated. The abscess cavity was drained, no attempt being made to remove the appendix, and the patient made a satisfactory recovery.

In some instances, however, of recurring appendicitis—fortunately of more rare occurrence, and owing no doubt to the absence of these protective adhesions, which are not always present—perforation of the appendix may be followed by diffuse suppurative peritonitis, almost always a fatal complication, as is illustrated by the following case.

CASE X. Recurrent Attacks for Many Years: Sudden Perforation of Appendix: General Suppurative Peritonitis: Death.—A female, aged 16 years, who for many years had suffered from typical attacks of a slight nature, usually accompanied by what she described as “a lump” in the right iliac fossa. On the evening of March 2nd, 1896, having been at work all day, she was suddenly seized with severe pain in the right side, accompanied by vomiting. Symptoms of acute peritonitis developed, and she was admitted under Dr. Dreschfeld, and afterwards transferred to the surgical wards. March 6th. On opening the abdomen, a ragged perforation was found in the appendix, which was quite free from any adhesions. There was general suppurative peritonitis, pus welling up in all directions from between the coils of intestine. The peritoneal cavity was flushed out as completely as possible, and drained, but the patient sank the following morning.

These two cases illustrate the advisability of removal of the appendix at an early stage in the course of recurring appendicitis, for the fatal result in the one last mentioned would certainly have been prevented by the adoption of this treatment.

An appendix which is the seat of recurrent attacks of inflammation may be compared to a volcano, at times quiescent, at times showing signs of an impending eruption, which may be indefinitely postponed, or at any moment take place with disastrous results.

(I am indebted to my late house-surgeon, Mr. J. P. Hall, for the accompanying drawings.)

A CONTRIBUTION TO THE SURGICAL TREATMENT OF DISEASES OF THE APPENDIX VERMIFORMIS.

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ENFORCED absence from the annual meeting of the British Medical Association at Carlisle last year prevented my adding a contribution to the literature of the treatment of diseases of the appendix vermiformis as I had intended (the subject which was so ably introduced to the Section by Dr. MacDougall). It is, however, an important subject, and I should like to place before the Association a few remarks relative to the treatment of two of the varieties under which disease of the appendix presents itself to the surgeon.

In the first place, as regards relapsing appendicitis, I would submit a method of operating which in my opinion presents many advantages over the usual methods. Towards the end of the year 1894 I was asked to see a case of recurring attacks of inflammation in the region of the appendix. These attacks had been severe and the patient very ill during them. Altogether there had been five or six attacks during nearly as many months, and he had been invalided home. His medical attendant could feel what appeared to be a thickened appendix, which remained when all the symptoms had subsided, and operation was consequently advised. To this the patient—who was in danger of being retired from the service, had suffered greatly from the attacks, and went in constant fear of another—readily consented. The question submitted to me was, If the operation was performed, could I guarantee that no weakness of the abdominal wall would remain, as it was essential that there should be no hernial protrusion nor anything to prevent the patient from taking a command, which involved the ability to ride well? The usual incision through the abdominal wall for removal of the diseased appendix in cases of relapsing appendicitis had not, according to my experience of the operation as performed by other surgeons, given that uniformly good result to enable me to express confidence in it, and a consideration of the anatomical arrangements of the region led me to suggest and carry out a plan which has invariably produced the desired effect in my hands. Indeed, it is not easy to imagine how it can possibly fail in its object if performed with ordinary care.

An oblique incision is made in the right iliac region with its centre corresponding to the point which, in the opinion of the surgeon, is probably that of the attachment of the appendix, and its length varies with the size of the patient and the fatness of the abdominal wall. The direction of the incision is that of the linea semilunaris, and is usually about midway between the anterior superior spine of the ilium and the umbilicus. After division of the skin and subcutaneous tissue, the incision is continued through the aponeurosis of the external oblique and the outer part of the sheath of the right rectus muscle, this part of the incision is placed about an inch from the external margin of the sheath. The rectus muscle is then drawn towards the middle line, having been separated from the inner surface of the sheath with the forefinger. When the edges of the wound are retracted, the deep epigastric artery will be seen lying on the posterior layer of the sheath running from below upwards. The artery is easily avoided, and the posterior layer of the sheath (or the transversalis fascia) the subperitoneal tissue, and the peritoneum divided to the full extent of the wound. The use of retractors will bring the area of operation well within reach. The small intestines can now be pushed towards the middle of the abdomen, the region affected isolated, the appendix amputated by the coatsleeve method, and the peritoneum closed over it with Lembert's sutures.

On the completion of the operation, the wound is closed by interrupted silk sutures in three layers from behind forward. The posterior part of the sheath and the structures behind the muscle are brought together with one line of sutures, and the rectus itself allowed to return to its normal position. The anterior part of the sheath and the external oblique aponeurosis are then sutured, and afterwards the skin and subcutaneous tissues. By this method of operating, the uninjured rectus muscle is interposed between carefully-united layers, which do not accurately correspond with one another, and the risk of hernial protrusion is done away with.

There is one point to be remembered when applying the sutures, and that is an anatomical one; it is that the tendinous expansion of the external oblique is apt to become displaced during the manipulations of the wound, and escape notice in the suturing; this would not in all probability produce any weakness of the part of moment, but it should be sutured in order to render the part as strong as possible. It has been urged against this method (1) that it takes a longer time to perform the operation, especially when the sutures are being inserted than when the operation is performed in other ways; (2) that it is difficult to get at the appendix through the wound.

As regards the first of these, I grant that it does take a