In conclusion, it may be pointed out that in the space of a single lecture it has naturally been impossible to attempt more than a sketch of general principles, and the cases selected for description have been dealt with in an unduly simplified manner in order to bring into relief the facts essential for our purpose. Throughout the lecture, moreover, emphasis has been laid on the psychological factors in causation and treatment, because the recognition of their importance is the keynote of modern methods of treatment.

This must not be taken to mean, however, that physical factors are of no account in these disorders. On the contrary, they must be carefully estimated and suitably treated. Recent researches in endocrinology promise that in the future a flood of light will be thrown upon the nature of the physical factors which play a part in the psychoneuroses, and in particular upon that vague but vastly important thing we call "constitutional predisposition." In this field, moreover, it seems possible that the physiologist and the psychologist will ultimately find a meeting place in which they can join hands and adjust their claims.

APPENDICECTOMY BY A NEW ROUTE.

BY

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THE operation here described is designed for the removal of the appendix vermiformis through the right iliac fossa in cases where no general exploration of the abdominal cavity is called for—that is, in acute cases rather than chronic. The method is a muscle-splitting one, and has proved so successful that I employ it in preference to all others. Indeed, its advantages, anatomical, surgical, and clinical, appear sufficient to justify its general adoption in suitable cases as a substitute for the procedures in general use.

I.—INCISION AND APPROACH.

The incision used for opening the abdomen may from its anatomical situation be described as the para-ilio-spino-inguinal (or ilio-inguinal for brevity's sake), and is made half an inch or less internal or medial to and parallel with the anterior superior spine of the ilium, or as near to it as practicable. The anterior iliac spine, a constant and definite landmark, which is easily felt or demonstrated however obese the subject, forms the centre. The cut is carried above and below this point to an equal extent and parallel with the iliac crest and spine and the attached inguinal (Poupart's) ligament. The length of the incision varies with the size of the individual, but usually need not be longer than 2½ in., although it may be extended in either or both directions if required.

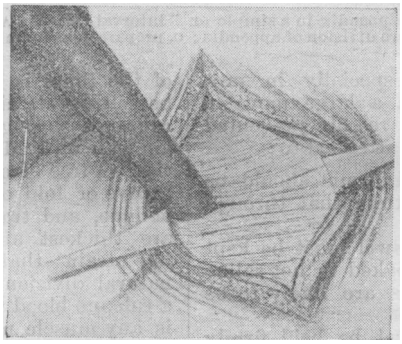

FIG. 1.—Separation of the fibres of the internal oblique muscle.

The cut at once divides the skin, subcutaneous fascia, and aponeurosis of the external oblique muscle to its full length, when an assistant, armed with a pair of blunt rectangular retractors, holds the edges apart, whilst the muscular fibres of the internal oblique muscle are defined and exposed to view. At this stage a white line of varying distinctness may usually (roughly in about 58 per cent. of cases noted) be seen passing across the muscle almost horizontally, in a direction from the anterior superior spine of the ilium to the middle line of the body; this line, which is bloodless, indicates a natural division of the muscle into an upper and lower section. With this line as a guide (the same direction must be followed when no line is visible) the thick fibres of the muscle are incised and then separated with the aid of a blunt instrument such as a Kocher's director, or by the gloved index finger (Fig. 1). The subjacent transversalis muscle is then similarly treated, its fibres being separated at the same time and by the same manœuvre to the full extent allowed by the skin incision. As soon as the fibres of these horizontal muscles have been freely separated and any bleeding stanched the retractors are removed and replaced at right angles to their former position so as to pull and hold the fibres apart, thus exposing the transversalis fascia. This fascia, usually thin, may at times be somewhat thickened and resistant, and through it the exploring finger ascertains the precise condition of the subjacent peritoneum. Up to this stage the procedure is identical for all forms and stages of appendicitis, whether acute or chronic, simple or "interval," with or without abscess. In uncomplicated cases, and whenever there is no evidence of suppuration, as may usually be determined by palpation of the peritoneum through the transversalis fascia, this fascia and the peritoneum are seized with blunt-pointed catch-forceps and divided in a direction parallel with the skin incision, medial or internal to the reflection of the parietal peritoneum on to the iliac fossa, deep to and parallel with the inguinal (Poupart's) ligament.

Where, however, an abscess is present or suspected, it is safer to turn the peritoneum inwards or medialwards from its seat of reflection behind Poupart's ligament and to open it posteriorly from the iliac fossa. The transversalis fascia and peritoneum are usually divided together in a line parallel with the skin incision, but they may be cut transversely as with the deep muscles, if the incision is likely to require enlargement. The peritoneal opening should be made as free as the skin and muscle divisions allow, and the edges caught and held apart securely with a pair of blunt-pointed catch-forceps. These instruments are attached near to the extremities of each edge, and serve to retain the cut edges of the peritoneum, acting as retractors during the subsequent manipulations. The forceps should be blunt, lest they wound the bowel; moreover, unless the peritoneal opening is ample there may be difficulty in replacing the viscus at a later stage. When the abdomen is opened, the viscus first seen is generally (86 per cent. of cases noted) large intestine, either the first part of the ascending colon or, less frequently, the caecum. Except in children and in abscess cases the omentum or transverse colon are rarely seen, still less often is the small gut observed, except in cases of excessive intestinal paralysis and distension due to a generalized septic peritonitis.

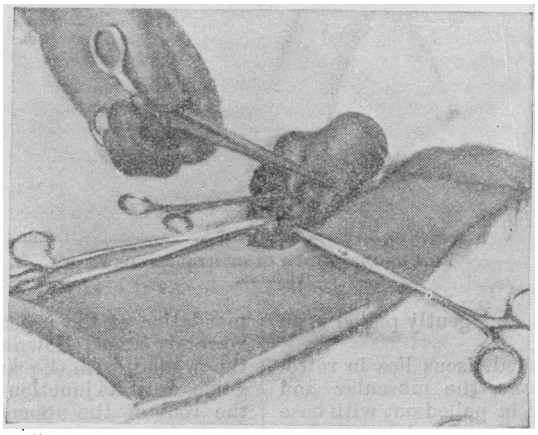

FIG. 2.—Delivery of the caecum and appendix through the wound.

II.—TREATMENT OF THE APPENDIX.

The large intestine is now seized, and drawn gently upwards through the wound, its anterior muscular band serving as a guide, until the caecum with its appendix is delivered through the wound (Fig. 2). When the appendix happens to be retrocaecal—a condition more frequently found than is reported—and is therefore sessile, or is otherwise adherent so that it cannot be delivered complete through the opening without risk or injury, it is wiser to detach the caecum at once, to deliver it through

the wound, and to leave the appendix *in situ* to be dealt with afterwards.

In a simple or "interval" case the appendix is removed outside the abdomen by clamping and dividing its mesentery up to its root. The mesentery is then ligatured, the appendix crushed at its base with a clamp, ligatured with catgut, and divided with a sharp knife at a point distal to the ligature, but proximal to a pair of forceps so placed as to prevent any escape of contents (Fig. 3, A, B, C). The stump is now carefully disinfected with pure phenol and buried between the peritoneal folds of the caecum and small intestine, or invaginated and stitched into the caecum by means of two superimposed layers of Lembert's sutures. The caecum is then cleansed with hot saline swabs, and rapidly returned to the abdomen.

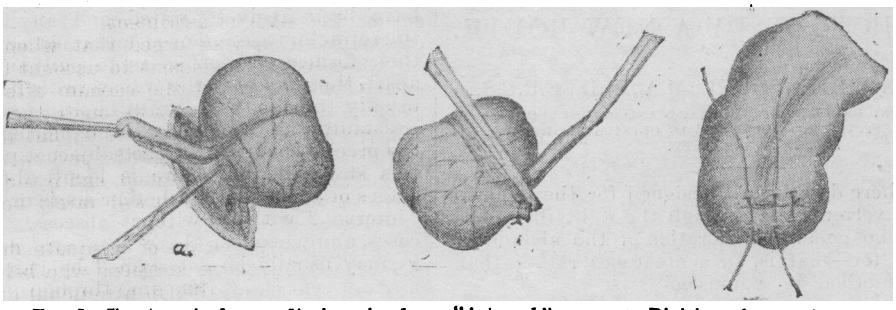

FIG. 3.—Treatment of appendix in a simple or "interval" case. A, Division of mesentery; B, use of forceps before division of appendix; C, preparations to bury stump. (After Kelly.)

Some difficulty is at times experienced at this stage in returning the bowel through the small opening, especially in prolonged operations and in cases with a large movable caecum, although the difficulty may be readily prevented or overcome if the following details are attended to:

1. The opening through the peritoneum should be always as free as or more free than that through the muscles.
2. The exposed and delivered bowel must be kept warm by gauze or lint wrappings soaked in hot saline lotion whenever the manipulations are likely to be prolonged.
3. The edges of the wound must be held firmly apart by an assistant whilst the operator is engaged in returning the caecum.

The wound is closed in layers with catgut sutures (fine for the peritoneum, stout for the muscles), the skin being brought together with silkworm ligatures interrupted so as to allow of the escape of serum (Fig. 4). Only a few sutures are required, since there is but little strain on the edges, and the muscles tend to fall together of their own accord.

When the appendix is so adherent that it cannot be delivered readily with the caecum through the wound—as, for instance, in cases of chronic abscess—the safest and easiest plan is to deal with it as a foreign body by detaching the caecum from its root, and completing the operation by burying the stump as already described. The adherent and detached appendix is then seized at its divided end with a pair of forceps and gently pulled upon until it comes away.

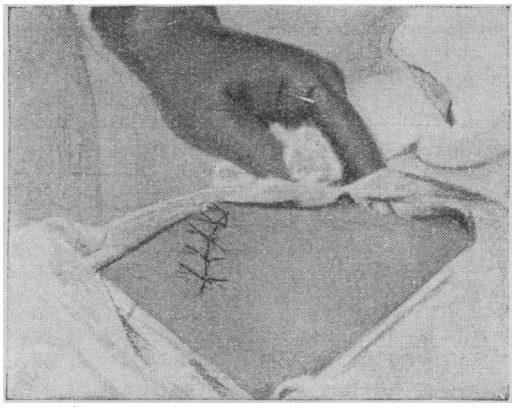

FIG. 4.—Disposition of interrupted silkworm sutures.

In many cases, when the inflamed viscus lies in retrocaecal or retroperitoneal situations, the muscular and mucous portions of the organ may be pulled out with ease from its inflamed and thickened peritoneal sheath, a firm rubber tube of sufficient calibre then being inserted into the track. When the appendix is approached by this route and its base sought for at the junction of the large and small intestines, it can always be found and removed. Only twice out of a series of over 800 consecutive operations was there any insuperable difficulty in discovering the appendix; in one case, after the ingestion of a barium meal, the Roentgen rays showed a complete transposition of the viscera; in the other, owing to displacement, probably congenital, of the right kidney downwards into the paracolic fossa, the caecum, with its appendix, was pushed across to the left side of the body.

Drainage is now seldom used except in case of abscess. The practice of removing the appendix as a routine, and with it the focus of sepsis and infection, is a sound one, for not only does it minimize the immediate risks and any tendency to relapse, but it shortens the period of drainage, and indeed usually enables drainage to be dispensed with altogether.

III.—ADVANTAGES AND DISADVANTAGES OF THE NEW METHOD.

Since the technique described differs but little from that in general use in muscle-splitting operations, the question may be asked, What are the special advantages of this route of approach? The answer is that it presents definite anatomical, surgical, and clinical advantages.

Anatomical Advantages.

The anterior superior spine of the ilium is an unfailing landmark which can readily be felt in all circumstances of life. An incision or scar running through the external oblique muscle within an inch of, and parallel with, its bony origin is practically free from strain, since it lies in a natural groove or fold of the body. The deep muscles—internal, oblique, and transversalis—are divided where their fibres are thickest and strongest, and more capable of bearing strain—that is, along the line which indicates their natural division into an upper and lower section. As a rule, no blood vessels are present to require ligature nor is any muscle nerve liable to be divided. Moreover, the parietal peritoneum is here thick and taut, and well supported by extraperitoneal fat at its line of reflection to the iliac fossa hence it is less likely to approach the skin wound and so predispose to hernia, even after prolonged drainage. Such approximation of the peritoneum towards the skin through the muscles is perhaps the most important predisposing cause of ventral or other form of hernia. A further advantage is that the ascending colon or caecum is situated in the direct route, so that the surgeon may rely on discovering the appendix at its origin from the viscus, no matter where its body lies (except in the rare event of visceral transposition). There is probably no viscus which varies more than the appendix in its position and movements under the ever-changing circumstances of life. Hence an assurance that the appendix will be found in almost all conditions is a great recommendation of the procedure here advocated. If the large bowel is traced downwards or drawn upwards through the wound, with the anterior muscular band as a visible guide, until its junction with the small intestine is reached, the root of the appendix may be found, while, if it is covered by peritoneum, it may be felt and readily dealt with.

Surgical Advantages.

The ilio-spinal approach to a great extent prevents the risk of ventral hernia, since the two main factors concerned in the process—pouching of the parietal peritoneum and muscle strain—are almost wholly eliminated or rendered improbable by the anatomical facts already described. In the oblique incision of McBurney, on the other hand, the scar from its position is exposed to considerable intra-abdominal strain, and as a result the peritoneum often pouches; in fact, in cases of prolonged drainage the peritoneum often approaches the skin

through the weakened muscles, and may even become adherent to it. Both these circumstances predispose to ventral hernia. Further, the not infrequent division of or injury to the twelfth dorsal nerve, supplying the region of the internal inguinal ring, and the ligature of the deep epigastric vessels predispose to inguinal hernia.

General Peritoneal Cavity.—Even more important than the prevention of hernia is the fact that the ilio-inguinal route avoids the necessity of involving the general peritoneal cavity while dealing with the appendix. Such violation defeats Nature's efforts at self-preservation or cure, efforts which are revealed by the tendency of inflammatory processes within the abdomen to become limited and shut off by protective lymph. Any procedure, therefore, which counteracts this natural and conservative tendency should be condemned as non surgical. This criticism is applicable to most of the operations practised to-day in which the appendix is approached through the general peritoneal cavity, whether the organ is at the time healthy, inflamed, or even gangrenous; especially is this true of the straight or para-median incision, to a less extent the oblique. By the ilio-inguinal route, on the other hand, the peritoneum may be opened and the abscess easily reached and evacuated through the iliac fossa without the difficulties and dangers of soiling or infecting the general peritoneal cavity. For this reason the new route is unquestionably safer and in harmony with the principles of surgery. As a further advantage the appendix may invariably be removed at the time. The necessity for a subsequent operation is thus obviated, with its concurrent risks, waste of time, increased expenditure, and worry, apart from the possibility of hernia.

Drainage, when established through the iliac fossa to the stump of the appendix, or even into the pelvis itself, is simpler and safer than when an abscess is drained through the general peritoneal cavity; an extruded faecal concretion may also be more readily found and safely extracted. Again, the procedure as a whole is simpler and takes less time; in uncomplicated cases the saving of time is remarkable. The appendix is so quickly found, and the wound requires so few sutures, that on more than one occasion four such operations have been performed at the Radcliffe Infirmary within sixty minutes, all the details, including dressings and bandages, being carried out by the operator. Indeed, few abdominal operations will be found so simple. No doubt speed may matter little in an ordinary operation. On the other hand, it may be of the first importance when the patient is *in extremis*, cyanosed or ashy-white in colour, with an irregular or flickering pulse, severe meteorism, and where even the anaesthetic adds appreciably to the danger. Simplicity of method and rapidity in execution are of priceless value when life hangs by a thread.

Diagnosis of Gravity.—Further, the ilio-inguinal route of approach, whether for exploration or removal, enables the surgeon to make a fair estimate of the gravity of the case before the peritoneum is opened. When the transversalis fascia is reached, digital palpation makes it possible to determine not only the presence but the precise situation of an abscess. The extraperitoneal fat in cases of abscess is often considerably thickened and oedematous, and offers distinct resistance even in the early stages; hence if the fingers are pressed gently through the fat against the peritoneum the resistance encountered enables the surgeon to form some idea as to whether the abscess is immediately subjacent or has passed upwards behind, or to the outer side of the colon, or downwards and forwards into the pelvis. When the resistance is slight, the peritonitis is almost certainly localized and the peritoneum may be incised anterior and internal or medial to its anatomical line of reflection, so that the general cavity can be opened with but little risk. On the other hand, if the resistance is such as to justify the suspicion of abscess it is safer to turn the peritoneal fold inwards and forwards, to open the abscess from behind through the iliac fossa, and then to deal with the appendix or its concretion, and to establish drainage through the opening.

Clinical Advantages.

The principal gain lies in the lessening of the period of convalescence. Prolonged drainage is seldom needed, since the actual source of disease is removed at the time, and consequently recovery is usually rapid. When no drainage is necessary, the patient may be allowed out of bed as soon as the wound is quite healed (usually from the tenth to twelfth day), and is able to walk soon after.

DISADVANTAGES OF THE NEW METHOD.

What are the drawbacks?

In the first place, one possible objection is that by this route no satisfactory exploration of the contents of the abdominal cavity can be made. This objection, however, is scarcely to the point, since, as stated before, the operation is recommended for the removal of the appendix, and not for general exploration. Laparotomy and exploration of the abdomen may be superadded by means of another incision, and without detriment.

Secondly, it may be urged that, when the mischief in the appendix is insufficient to account for the symptoms entirely, the return of the caecum after removal of the appendix may be difficult through the small peritoneal opening. This objection is valid; but if care is taken to make a free opening through the peritoneum to begin with, if the edges are well retracted, and if the exposed bowel is kept warm, the difficulty will rarely be formidable, and never insuperable.

Thirdly, the provision of adequate drainage is felt to be a difficulty by those surgeons who believe that gravity plays an important rôle in abdominal drainage. Experience, however, proves that an appendix abscess, even in Douglas's pouch, may be quite as efficiently drained through the iliac fossa as through the central abdomen, provided that a sufficiently rigid though pliable rubber tube is used. It is not suggested, however, that every case need be drained in this way, since treatment must always be adapted to existing circumstances; and it is quite possible that in a few cases it may be advantageous to supplement it by another incision.

IV.—CONCLUSIONS.

The value of the operation is attested by a wide experience, having been practised by the writer for over twelve years; during the last eight years it has been used almost exclusively. The procedure was at first reserved for simple, quiescent, or "interval" cases, the oblique muscle-splitting incision of McBurney being substituted whenever an abscess was suspected or evident. With increasing experience, however, the special method was found to be suited for almost every condition and adaptable to almost every emergency. Out of 843* consecutive operations performed at all stages of the disease, whether simple or complicated, and all ages ranging from 3 to 79 in both sexes, there have been in all 18 fatal cases, yielding a mortality of approximately 2.25 per cent. In a recent sequence of 117 cases there was no death, whilst the 118th and 119th were unsuccessful. The immediate mortality would appear, therefore, to be no higher than that pertaining to any of the other modes of procedure, while as regards remote sequelae not a single case of hernia or abnormally weak scar has occurred. These results amply justify an appeal that the suggested operation should receive at least a trial. In fact, now that it is becoming the rule to operate in almost every acute case as soon as the diagnosis is established and the necessary arrangements can be made, there is every reason to anticipate a fall in the immediate mortality, whilst the necessity for prolonged drainage and convalescence will be so lessened that any permanent abdominal weakness will be rarely met with.

The results, immediate as well as remote, obtained from any particular method of operation must, however, depend upon clinical details, as well as on operative technique. Did space allow, a full account of post-operative treatment and clinical methods would have been added. It is thought advisable, however, to record these later in a special article.

* Since this paper was written 51 additional operations have been performed, with one death.

THE *Boston Medical and Surgical Journal* states that there were 1,367 deaths from tuberculosis in Boston last year. The local association for the relief and control of the disease has after careful investigation come to the conclusion that for each death from tuberculosis there are twenty persons ill with the disease, of whom nine are in the advanced or contagious stage.