THE RELATIONSHIPS BETWEEN COLITIS AND APPENDICITIS FROM A SURGICAL POINT OF VIEW.*

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I PROPOSE to discuss some of the forms of colitis from a surgical point of view, and especially in their relation to appendicitis. Hitherto colitis has only been of surgical importance when the question of curing it by typhlotomy or colotomy has been raised. But, although Dr. Hale White, Mr. Golding Bird, and others have published good immediate results, nevertheless that procedure can hardly be said to have become established as an assured success. Inasmuch as I have no personal experience of typhlotomy or of colotomy for colitis I do not propose to pursue that branch of the subject. On the other hand, I shall soon tell you of cases of colitis which have got well after removal of the vermiform appendix; of others which have not got well; and of others which have been left alone and transferred to the physician.

But at the outset it is right to own that one's thoughts about colitis are far from clear. To begin with, it is obvious that the group embraces several diseases. Mucous colitis is quite different from membranous colitis, although some would say these two had a connecting link in muco-membranous colitis. But, furthermore, none of the foregoing are at all like the different kinds of ulcerative colitis, whether acute or chronic. Furthermore, all of these different varieties owe their origin in all probability to a number of different causes, and the discovery of the cause often leads to the cure of the colitis.

But, whether all this be true or not, it is not open to doubt that any form of colitis may be associated with appendicitis, and that it is of the very highest importance that we should try to learn their relations to each other. Now, to begin with, there can be no doubt whatever but that appendicitis may cause colitis. Every one who has done many operations for the removal of the vermiform appendix has seen cases in which the end of the ileum, the caecum, and the right colon were obviously inflamed. In addition there is tenderness along the course of the right colon, and rigidity of the abdominal wall; and evidence has been forthcoming to show that the inflammation seen upon the outside of the colon must also have involved its mucous coat, because mucus, or mucus mingled with blood, is seen in the evacuations.

There is no difficulty in understanding the relationship of this kind of mucous colitis to appendicitis. It is a mere question of extension by proximity, facilitated, perhaps, by identity of vascular supply. In cases of this kind the bowels soon recover when the appendicitis has ceased. The presence of this kind of colitis excites no surprise, nor does its subsidence. Also we can easily realize that the inflammation sometimes spreads into the transverse colon, and onwards as far as the left colon, and even into the sigmoid flexure. Indeed, judging from the way in which the tenderness and rigidity follow the course of the large intestine, this extension is not infrequent. In practice a case of this kind would not be difficult because, as I have premised, the appendicitis is obviously present, and is the forerunner of the colitis. The appendicitis is the dominant note.

But now I wish to show that the colitis may be the prominent feature, and so much in the forefront that the appendicitis may be obscured and overlooked; for instance, at the age of 20 a young gentleman began to have attacks of diarrhoea, alternating with constipation. At times he had severe attacks of pain and vomiting. The pain was in the middle of the abdomen, and low down and across to the right side; also pain was felt at the beginning of micturition. He said that he occasionally passed matter and blood with his motions. He saw a well-known authority on appendicitis, who told him that his illness was due to colitis; but before receiving this opinion he was not placed under observation. The clinical examination showed that there was tenderness and rigidity all along the course of the colon. The right iliac fossa was not more tender than the left. The rectal examination showed that the pain at the beginning of micturition was associated with tenderness in the recto-vesical pouch. Thus the pain in the middle of the abdomen, the pain on micturition, and the tenderness in the recto-vesical pouch were

indicative of a pelvic inflammation, and an inflamed appendix hanging into the pelvis was obviously the almost certain cause of the pelvic inflammation. At the operation the base of the appendix was fastened down in the iliac fossa, but its distal end was adherent within the pelvis, behind the bladder. A microscopical examination—and statements made about the condition of the appendix without a microscopical examination are worthless—showed ulceration of the mucosa, which in some places had reached the muscular coat, whilst in others granulation tissue had grown into the lumen. A very few cocci, encapsuled diplococci, and bacilli were present. The removal of the appendix restored the patient to health after he had been ill off and on for eight years. Now it is easy to understand how the inflamed appendix had been overlooked. The pelvic position of the appendix is always difficult to diagnose, especially in chronic cases. But why should the chronic appendicitis with ulceration of the mucosa have caused the colitis?—for I think we must agree that the patient really had colitis. Well, a point in the clinical history throws light upon this question. Whilst the patient was under observation before the operation enemata were given and brought away quantities of hardened faeces from the sigmoid flexure, and from the rest of the colon and the caecum. It is unnecessary to say that when old and hardened faeces remain long in contact with the mucous membrane of the large intestine they excite an inflammation which may end in ulceration. In their progress the inflammation and ulceration are accompanied by painful attacks of colic, by tenderness and rigidity along the course of the large intestine, and by mucus and perhaps blood in the stools. But how does appendicitis cause coprostasis? Probably in several ways. It is easy to understand that in severe cases in which the end of the ileum, the ileo-caecal valve, the caecum and colon are inflamed, the muscular action may be so much at fault that the bowels simply cannot propel their faecal contents. But similar cases of appendicitis may have diarrhoea, and others may have hardly any disturbance of the bowels. Indeed, appendicitis has not got a single invariable symptom. Doubtless, it is quite possible that the appendicitis may cause coprostasis by interfering in some way with the nervous mechanism of the bowels. This is suggested by other things that I have seen.

Thus we have cases of appendicitis associated with a form of mucous colitis due to coprostasis. But every one is familiar with mucous colitis associated with coprostasis, and in which there is no evidence whatever of appendicitis. The patient is nearly always a female; the abdomen is slightly distended, and very tender along the whole course of the large intestine. The tenderness is often greatest at the sigmoid flexure and at the caecum. The temperature is a little raised. The bowels act after aperients, and the stools contain mucus and oftentimes membrane. The subjective symptoms I need not attempt to give. Obviously with such a train of symptoms as these, one cannot hastily dismiss the possibility of the whole being caused by appendicitis. Indeed the patient has probably come under the notice of the surgeon because appendicitis has been suspected, and reasonably suspected. But the long duration of the illness, the absence of clear attacks of appendicitis, and the extent of the tenderness tell us to be cautious. Patients of this kind should be examined under an anaesthetic. The faecal lumps are then felt. After they have been got rid of by energetic measures the intestine recovers, the tenderness goes, and the patient is well. The above is not an imaginary sketch, but is founded upon experience. Clearly the examination under an anaesthetic is a very important step in the diagnosis.

I now come to an even more deceptive association of colitis with appendicitis. Perhaps my point will be made clearer by telling you about the cases. For many years a public school boy, aged 15, had suffered from severe abdominal pain and so-called "bilious attacks." The attacks were accompanied with elevation of temperature (100° F.), shivering, and constipation. The pain was always on the left side of the abdomen, never upon the right. During an attack which had just subsided the pain was felt under the left costal margin. The clinical examination threw but little light upon the case. The region of the left colon was decidedly tender on pressure, and the muscles rigid there. The stools were constipated and mixed with a good deal of mucus, and some shreds of membrane. The pulse was rather rapid, and the temperature slightly raised. Obviously the boy had colitis, and Sir Thomas Barlow concurred in this opinion, and likewise Dr. John Harold, who was associated with me in the case. Being

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quite sceptical as to the existence of colitis apart from a cause, I kept the patient in bed and under observation. In about a month's time he complained of pain at McBurney's point, and was tender there. The appendix was removed, and with some difficulty, because it ran up behind the colon in the ileo-caecal pouch. It was kinked near the caecum, and its distal end was bulged out by concretions. The naked-eye evidences of inflammation were abundant. The microscopical examination confirmed the presence of inflammation, and that it had extended to all the coats; also, that the mucosa had lost its epithelial covering, most of its glandular epithelium, and was in places ulcerated almost down to the muscular coat. But, in addition, at the distended distal end there was an unusual amount of purulent and bacterial infiltration of the remains of the mucosa. This fully explained the heightened temperature and the shiverings, always an ominous sign in abdominal disease. The operation had a most happy effect. The general health became excellent, and the abdominal pain soon began to get well.

I will now narrate another case of appendicitis with pain upon the left side of the abdomen, and none in the right iliac fossa. In July, 1903, I saw a man aged 36, a patient of Dr. Gully's. When I saw him he had pain and tenderness in the left side of the abdomen along the course of the colon, but none in the right iliac fossa. However, he had been sent to me because he was supposed to be recovering from a recent attack of appendicitis. Here the chances of error were obviously less than in the former instance. But all doubt was set at rest when, after a week in bed, the pain and tenderness settled in the right iliac fossa and along the right colon. The pain in the left side of the abdomen was clearly caused by colitis, because it followed the course of the left colon and the evacuations contained a good deal of pinkish mucus. At the operation the appendix was difficult to find and to remove, because it lay behind the right colon, concealed, I believe, in the retro-colic fossa. It was constricted in two places and dilated beyond the strictures. Microscopically the dilatations were full of muco-purulent contents mixed with moderate quantities of bacteria. This septic fluid had infiltrated the mucosa at places where superficial ulceration was in progress. Moreover, some of the septic fluid had forced its way into the sockets of a certain number of the tubular glands in the manner depicted in my book on appendicitis (Fig. 13, p. 58). Clearly a dangerous state of affairs, and quite enough to explain the severe illness from which the man had just recovered.

Here we have two cases of appendicitis with left-sided pain—one a schoolboy, the other a grown-up man—both most difficult to diagnose, because of the absence of pain and tenderness about the site of the appendix. The man was the least puzzling, because of the previous history derived from Dr. Gully. In both the cause of the left-sided pain was clearly colitis. But why was there, for a season at all events, no pain or tenderness at the site of the obviously inflamed appendix? Now, the two cases had one feature in common: in both the inflamed appendix was hidden away behind the right colon. Is it possible that the colon when distended affords some sort of protection? At all events, in both instances the tenderness was elicited after successful steps had been taken to clear the colon of its gaseous and faecal contents.

Lastly, it is to be noted how the difficulties of these cases cleared themselves up after a probationary period of rest in bed, careful dieting, and enemas. These three are, in my opinion, essential measures for the diagnosis of any doubtful case of appendicitis, especially the first.

I now come to that most embarrassing combination of muco-membranous colitis and appendicitis. That strange disease, muco-membranous colitis, seldom comes under the notice of the surgeon, but, nevertheless, it is highly necessary that he should be familiar with it. I do not know whether appendicitis can cause muco-membranous colitis; but, on the other hand, I do know that muco-membranous colitis can cause appendicitis. For instance, about three years ago a lady came under my observation who was undoubtedly suffering from muco-membranous colitis. She had all the general and local signs. When the constipated bowels acted after aperients mucus and mucous casts of the intestine were present. These casts were seen under the microscope to consist of mucus and epithelium, but without any trace of blood. Now, although the whole course of the colon was tender, nevertheless the tenderest spot was at McBurney's point, and there she felt the greatest pain.

This had led two able physicians to diagnose chronic appendicitis and advise removal. In addition a surgeon had rather heedlessly spoken of the possibility of malignant growth. It was not easy for me to decide whether the appendix ought to be removed. Whilst the muco-membranous colitis was not at all dangerous to life, clearly the inflamed appendix might be. The removal of the appendix would at all events obviate this danger, and might at the same time have a favourable influence upon the muco-membranous colitis; a favourable influence such as the operation is known to have on mucous colitis. The question of malignant disease would also be laid at rest. So, with a perfectly clear understanding that the colitis might not be cured, the appendix was removed through the rectus incision. It was about 4 in. long, distended, congested, and lay upon the pelvic brim beneath a capacious caecum. As far as could be seen and felt the abdominal contents were perfectly healthy. The microscope showed that the coats of the appendix, especially the muscular, had been thinned by distension, that the mucosa and submucosa were slightly inflamed, with much dilatation of their lymphatics; also that much of the lining epithelium had been shed into the lumen, which contained, in addition to the shed epithelium, bacterial, faecal, and mucous contents. It is reasonable to assume that we have here a picture of what would have been seen if the intestine itself could have been microscopically examined. With the exception of the thinning of the coats the changes would have been the same. But to my mind the appendix did not seem to be in a particularly dangerous state. We know perfectly well that this form of muco-membranous colitis may continue for years without jeopardizing the life of the sufferer; nevertheless, its progress and dangers may be different when it spreads into a narrow, easily-occluded canal, such as is the lumen of the appendix, especially when that lumen loses much of its epithelial lining, and harbours bacteria of various kinds.

I have tried to find out what good was done by the removal of this appendix. The patient herself is convinced that her condition has been decidedly improved. I doubt myself whether the colitis is really much better, but the abdominal pain and discomfort are much less, except when she allows herself to become constipated. Also the violent headaches and incapacity for any mental exertion are better. Putting aside the gain in safety from a serious attack of appendicitis, she herself is quite sure that she has made decided improvement since the operation, and is hopeful of complete recovery.

The literature I have read has not given me much information concerning the relationship between muco-membranous colitis and appendicitis. One author says: "It has been asserted that pathogenetic relations exist between appendicitis and enteritis membranacea, but this does not brook criticism at all."¹ There is a fine air of didactic finality about this sentence. Doubtless the incessant use of the microscope would show that, as in the case I have just given, the appendix may be inflamed in muco-membranous colitis.

I now narrate a case of quite a different kind of colitis, and in which the appendix was inflamed and ulcerated. A man, aged 35, was admitted into St. Bartholomew's Hospital under my care on May 3rd, 1902, and died a month later. In December of 1901 he began to have diarrhoea. At first the bowels acted from two to four times in the twenty-four hours, but latterly from six to twelve times. The motions contained soft faecal material, undigested food, much blood, and muco-purulent material. Many patches of ulceration could be seen in the rectum. They oozed blood freely. The abdomen was tender, but no pain was complained of except when the bowels acted. At first the temperature was 98.4° F. and the pulse 90. During the last days the temperature ran up to 103° F. and the pulse to 140, and he became exceedingly emaciated.

The examination showed that the body was healthy throughout, with the exception of the large intestine. That "was congested, with some ulceration, and with many well-defined, dark, raised nodules." The presence of the dark, raised nodules led the morbid anatomists to label the case as one of colitis polyposa. Mr. Ernest Shaw saved a portion of the intestine and the appendix.

In the intestine the whole depth of the mucosa was ulcerated away, so that no trace of the tubular glands remained. The submucous, muscular, and peritoneal coats were much inflamed, with dilatation of their blood vessels and lymphatics. There was marked proliferation of the endothelial lining of many of the blood vessels. The

base of the ulcers had in them numbers of intestinal bacteria. We had no reason to suspect that the appendix had suffered, but microscopically it was ulcerated exactly the same as the intestine. Its mucosa had disappeared, and its lumen contained pus cells, epithelial cells, red blood corpuscles, and a few bacteria. The endothelial plates of many of the blood vessels and lymphatics were swollen and detached.

The impression left upon my mind by the histological examination of this intestine and appendix is that bacteria had little to do directly with this condition. In other severe kinds of ulceration of the appendix the invasion of the coats by bacteria is almost an invariable feature. On the other hand, the alterations in the endothelial linings of the vessels of the intestine and appendix suggest very strongly that they at all events were at fault. Many possibilities suggest themselves—were they inflamed by something which had entered them from the ulcerated surface, or were they altered by something conveyed by the circulation? The high temperature and the accelerated pulse show that some poison had entered the circulation, and that that entrance was synchronous with an aggravation of the intestinal disease.

We do not know, but it seems probable that the ulceration of the appendix began after that in the intestine, also it was obviously due to the same cause. I regret that this case has not been more scientifically worked up. We are quite in the dark as to the state of the splanchnic nervous system. Many things were tried to avert the fatal ending. The rectum and as much as possible of the colon were lavaged with weak solutions of nitrate of silver. The rectum was systematically drained with rubber tubing. Colotomy or typhlotomy were not tried although often discussed. Perhaps it would have been better to have tried one of these expedients. Clearly the removal of the appendix was out of the question.

REFERENCE.

¹ *The Diseases of the Intestines and Peritoneum*. Nothnagel; edited with additions by H. D. Rolleston, 1904, p. 278. This excellent work, which Dr. Rolleston has so ably edited, is most helpful.

An Address

ON

THE OPERATIVE TREATMENT OF CERTAIN SEVERE CASES OF INDIGESTION.

Delivered before the Oxford Medical Society.

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WHEN I was asked to read a paper before the Oxford Medical Society it seemed to me, on reflection, that there was no subject which could be of wider general interest than that of severe indigestion. It is interesting to the physician as well as to the general practitioner, because the number of cases of this condition which they are called on to treat must necessarily be numerous, and demand the exercise of much patience and skill in their management. This subject is also at the present time especially of great interest to the surgeon, because he is being called upon to supplement medical measures by surgical when drugs fail to alleviate severe conditions of this nature. I feel, therefore, that I may reasonably hope from the discussion, to which this is a prelude, to elicit some new facts—and I hope, too, some new indications—by which we may be enabled to learn more accurately how long it is justifiable to trust in medical treatment, and at what period the aid of the surgeon should be called for.

Without more ado, therefore, I will briefly put before you my own views on the indications for operative treatment, so that you may at once determine whether you agree with me or not.

The cases in which surgical interference is called for may be divided into acute and chronic. I will deal with the acute varieties to start with, because I do not think you will differ much with me in the propositions which I shall lay down about them.

1. Ruptured gastric and duodenal ulcers should always be treated surgically without delay.

2. Severe cases of hæmorrhage which threaten life should likewise be treated by opening the belly and securing the bleeding point or points.

3. When chronic ulcers of the stomach and duodenum cease to improve under medical treatment, surgical interference is indicated and is capable of affording much relief.

In order to enable me to devote the bulk of my time this evening to the consideration of this third proposition, I will merely allude briefly to ruptured ulcers and the surgical treatment of hæmorrhage from the stomach. The symptoms of a ruptured ulcer are generally characteristic. The patient who has usually suffered for some time previously from chronic dyspepsia, is suddenly seized with an attack of severe pain in the region of the stomach and duodenum, and becomes collapsed, usually before many minutes have elapsed. Sometimes he vomits the contents of his stomach. His pulse-rate speedily falls, and in severe cases the pulse is soon scarcely perceptible. If he is placed quietly in bed and kept warm with blankets and hot bottles, the general condition will speedily improve especially if a small amount of morphine is administered. This temporary improvement is often very deceptive. It is important to recognize the fact that it occurs, or the medical attendant may be liable to defer summoning the surgeon until the period for operative interference has well-nigh passed away.

If the diagnosis of this condition is unattended with much difficulty in those cases in which the symptoms are well marked, it is in some cases hedged round with considerable difficulty, and a great responsibility will always rest on the doctor's shoulders whether an operation be suggested at once or expectant treatment is decided on, at least for a time.

But even if an operation is decided on, no prudent surgeon would state that it should be undertaken on the spur of the moment. It is rare to find the patient's condition so grave within an hour or two of his seizure as to demand immediate interference. The more favourable moment to seize is shortly after the temporary improvement which I have just referred to has taken place, and if the warmth of bed and hot bottles is not sufficient to induce temporary abatement of the more urgent symptoms, an injection of a pint or more of hot saline solution, at about 100° F., into the rectum is usually attended by a very beneficial effect. It is certainly not easy, and probably not possible in all cases, to distinguish between a ruptured gastric and a ruptured duodenal ulcer, but when once the peritoneal cavity has been opened the distinction is not usually a difficult one. The fluid which issues from an ulcer of the duodenum is clear and limpid, and reminds one of the contents of an ovarian cyst, and at first is usually confined to the right side of the abdominal cavity, to which it is limited by the attachment of the mesentery. It is on this account that some of these cases are recorded as being mistaken for an attack of appendicitis, for the effused fluid finds its way into the right iliac fossa and gives rise to pain in that region. The sudden bursting of an abscess in this region of the abdomen, the rupture of a gall bladder, or plugging of the mesenteric veins may be mistaken for this condition, and so also may a ruptured tubal gestation. Errors in diagnosis have been recorded by various observers, but in most, if not all of them, an operation was urgently called for in order to save the life of the patient.

The fluid which issues from a ruptured gastric ulcer is usual greater in amount than that which finds its way out of a duodenal ulcer, mainly, I believe, because the stomach holds more than the duodenum, and also because stomach perforations are usually of considerable size and thus permit the easy escape of stomach contents. The character of the fluid which is poured out from the stomach when an ulcer ruptures varies much more in character and consistency than does that which comes from the duodenum, and this depends mainly on the stage of digestion at which the rupture occurs. It would appear from the observations of various surgeons that the ulcers which rupture are more commonly found on the front surface of the stomach or on the back of the first part of the duodenum. These regions, therefore, should be first searched by the operator. The search will be much assisted by a momentary inspection of the abdominal cavity as soon as it is opened. The direction from which the effused liquid is flowing forms a valuable guide to the position which the ulcer occupies.

The method which I usually adopt is to make an incision about 3 in. in length, parallel with the fibres of the right rectus muscle above the umbilicus, because an incision in this position gives good access to the part affected, and generally results in a good sound scar when it is healed. If the ulcer be not within reach from this incision it must be extended, and occasionally the whole rectus muscle will have to be cut across before it can be satisfactorily dealt with.