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PERI-CÆCAL INFLAMMATION.

PATHOLOGY. By John H. Musser, M.D.

DIAGNOSIS. By William Pepper, M.D.

TREATMENT. By Thos. G. Morton, M.D.

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PERI-CÆCAL INFLAMMATION.

[Discussed December 14, 1887.]

Morbid Anatomy.

By J. H. MUSSER, M.D.

Much confusion appears to exist in regard to the nomenclature of the inflammatory affections of the region we are about to consider. It may, therefore, be well to state the meaning of the various terms which will be used in this discussion. By typhlitis we shall understand inflammation of the cæcum; by peri-typhlitis, inflammation of the peritoneum covering the cæcum; by para-typhlitis, inflammation of the connective tissue behind the cæcum. The term typhlitis is often used to include inflammation both of the cæcum and of the appendix. We shall, as suggested by Dr. Fitz, use the term appendicitis for inflammation of the appendix, appendicular peritonitis for inflammation of the appendix and its serous covering, and para-typhlitis for inflammation of the connective tissue around the appendix, or, if you please, peri-cæcal inflammation.

It is well to know the relative importance of the inflammatory affections in this portion of the intestinal tract. Typhlitis has been considered by systematic writers to be a frequent affection, and yet it is difficult for pathologists to find the records of autopsies in which this condition has been found.

It is true that some writers, especially the Germans, have described cases, particularly of stercoral typhlitis, in which inflammation and ulceration of the mucous membrane of the cæcum, by pressure from fecal impaction, was present. Most of us will, however, agree with Fagge that typhlitis is a good general expression used for all varieties of inflammation occurring in the right iliac fossa, but that in the majority of cases the correct term should be appendicitis. Fagge relates a case of Williams' in which the patient had all the symptoms of peri-typhlitis with a tumor in the right iliac fossa. He was

recovering from this when an acute affection of the pleura caused his death, and at the post-mortem examination there was found appendicitis, with ulceration and perforation, and not typhlitis, which, during life, was believed to be present alone.

Dr. Wilkes agrees with Fagge in this view, and they consider that the difference in degree of the inflammation alone accounts for the difference in the symptoms, and that the largest number of cases are due primarily to inflammation of the appendix.

That inflammation may occur in the cæcum as it may occur in any other portion of the large intestine no one will deny. But we can say from the records of Dr. Fitz that perforation of the cæcum is most rare, for in a most extensive research he was able to find but three cases, and in these instances it was due to foreign bodies. We shall, therefore, with Fagge, consider that appendicitis is the usual acute affection that occurs in the region we are discussing (see Appendix, I.).

A word with reference to the anatomy. The cæcum normally varies much in position as well as in shape. On the blackboard are drawings of different forms of the cæcum, as detailed by Treves in his lectures on the anatomy of the intestinal canal. He thinks that the cæcum is most frequently found, not in the right iliac fossa, but on the psoas muscle itself, or in the pelvis; that the cæcum is entirely surrounded by peritoneum rather than only partially, and, therefore, that behind there is no areolar tissue as was described by the older anatomists. He does not believe, moreover, that there is a meso-cæcum.

It is also of importance to note variations in the appendix in the consideration of peri-cæcal inflammation. The usual position, as found by Mr. Treves and by Dr. Fitz, is behind the ileum and its mesentery, with the tip pointing toward the spleen. The second most usual position is behind the cæcum with the tip pointing upward. Long appendices usually take this upward direction. Fitz also refers to its lying on the psoas muscle with or without the tip in the pelvic cavity. And, indeed, in many recent examinations I have made, this position was found to be most frequent. There are other variations in position.

It may stretch across the pelvis and become adherent to the sigmoid flexure of the colon, and in one instance I have seen the appendix in the inguinal canal associated with hernia. In another instance it was adherent to a pyosalpinx (see Appendix, II.). The appendix varies in size, it varies as regards the character of its walls, and it varies as

regards its contents. It may vary in length from one and one-fourth to nine inches. Here is a famous specimen in which the appendix was nine inches in length. It lay behind the colon, reaching to the under surface of the liver (see Appendix, III.). In subjects dead from causes not associated with this region, the appendix is often found as a cord-like body, having been the seat of previous inflammation. It may have a dilatation either at its blind extremity or in some portion of its length, especially pouch-like at the mouth. Sometimes the entire canal is dilated and filled with catarrhal products.

The character of the contents is of importance. Various articles have been found in the appendix, but chiefly fecal masses. Seeds of various kinds, buttons, bristles, worms, shot, pins and gall-stones have also been found. It is on account of the presence of these foreign bodies that we have the serious inflammatory action that arises (see Appendix, IV.).

I shall next speak of the morbid anatomy of peri-cæcal inflammation. First, with regard to the manner of making a post mortem examination in such a case. There is usually an extreme degree of peritonitis, and unless the post mortem is made with great care, it will be impossible to find the seat of perforation, if one exist, and the exact conditions and relations of the peri-cæcal inflammation. The easiest method is to begin at the first loop of intestine that is reached and from that unravel the bowels, separating with great care the adherent parts. If a source of obstruction is found, tie the bowel on both sides and examine the portion in situ, opening the gut if necessary. Such an examination is absolutely necessary in order to make a thorough study of the part.

Inflammation of the appendix occurs both of the simple catarrhal and of the ulcerative type. That we have catarrhal inflammation we know from the lessons of morbid anatomy. Clinically, it would be impossible to determine the presence of such an inflammation, however. Catarrhal inflammation with succeeding ulceration, local peritonitis, and, finally, perforation, and encysted peritonitis also occurs; and the following conditions are generally found after death. In the first place, on section of the abdominal walls there is found, especially in the right iliac region, an œdematous state of the tissues; not only may there be serous œdema, but there may also be infiltration of pus, due to the burrowing from the primary abscess. The peritoneum, if involved, will exhibit an intense degree of inflammation with the characteristic injection, sometimes general, sometimes limited; more particularly marked to the right iliac fossa and the pelvis (see Appendix, V.). Serum will be found in the peritoneal cavity, and in some instances pus;

blood is occasionally found. In the more severe forms, especially, large flakes of lymph cover the intestines, the parietal peritoneum, and the abdominal organs. The intestines are also more or less adherent to each other, depending upon the duration and the degree of the inflammation. The location of the abscess, for it is usually circumscribed, depends upon the position of the cæcum. There are three positions in which it is most frequently found—either in the right iliac fossa just above Poupart's ligament, or behind the cæcum, or in the pelvis. In a case which recently came under my observation, the abscess was found in the pelvis, one and one-half inches below the level of the psoas muscle, four inches from the anterior superior spine of the ilium on the right side, and two inches from Poupart's ligament. In another case the abscess was found behind the cæcum in the connective tissue of the right iliac fossa. The size of the abscess varies, sometimes containing only two or three ounces of pus, and in other instances as much as a pint or more has been removed. The walls of the abscess differ according to its position. In the first instance mentioned the upper wall was made up of the cæcum, the right, by the side of the pelvis while posteriorly and on the left it was circumscribed by the adherent intestines. The walls of the abscess may be composed of the intestines alone. The appendix is always found in the abscess, and has undergone changes varying in degree with the duration and severity of the inflammation. Inflammation and ulceration of the mucous membrane, serous or purulent infiltration of the walls, with perforative ulceration and encysted or localized peritonitis (the abscess) are discovered. In some instances a portion has sloughed entirely off and cannot be found, having undergone dissolution; in others the portion beyound the ulceration is found as a soft mass of necrosed tissue (see Appendix, VI.). The perforation varies in size; sometimes it completely surrounds the appendix, or even severs it in two, or it is sufficiently large to admit a probe only, while even in other instances it can scarcely be detected. Sometimes two or more perforations are found, and frequently they are covered by recent lymph. The canal of the appendix is very often dilated. We usually find in the canal, near the cæcum, a foreign body; it may, however, be found in the abscess. In the cases detailed by Dr. Fitz, foreign bodies were found in sixty per cent. In other cases their presence or absence could not be positively determined, from haste at the autopsy, from their disintegration, or from their discharge into the bowel, so that the proportion is probably larger than stated. There is one point of importance in reference to the surgery of this region, and that is, that the perforation

usually occurs within one and one-half or two inches of the colon. Whatever may be the length of the appendix, the perforation is as a rule found at the point just indicated.

There are, of course, many cases which do not terminate fatally. Under such circumstances resolution takes place, or the abscess becomes encysted, or the abscess ruptures into some neighboring organ. Dr. Bernardy related a case to me where rupture occurred in the upper portion of the rectum and also through the abdominal wall at the umbilicus. Dr. Edwards had a case in which fully one and one-half inches of the appendix had sloughed off; the abscess ruptured into the bowel, carrying with it the portion of the appendix and a mass of grape seeds, which were discharged together. The abscess may discharge through the abdominal wall, through the scrotum, into the hip-joint, through the loin or the perineum, or in other directions. Sometimes the pus burrows upward, even as high as and into the pleural cavity. I may say too, that the bladder is a favorite seat for the rupture of such abscesses.

That cure may take place in cases of perforation of the vermiform appendix, this specimen distinctly shows. It was prepared by Dr. William Pepper, and is in the museum of the Pennsylvania Hospital. The patient died of another affection. The appendix was cord-like, except in one place, where an old perforation was seen, with organized blood-clot and lymph on the surface.

These are the chief points in regard to the morbid anatomy of peri-cæcal inflammation. In the first place, that peri-cæcal inflammation is due to the inflammation, ulceration, and rupture of the appendix vermiformis with the secondary formation of an abscess or an encysted peritonitis; that the position of the abscess depends entirely upon the position of the appendix; that the further course of the abscess cannot be determined; that in the larger number of cases the inflammation and ulceration are due to the presence of a foreign body occluding the canal—a retention inflammation. The sequence of events appears to be as stated; and while it may appear to be a refinement of terms to differentiate between typhlitis and appendicitis, it is almost necessary in order that a correct and well-defined appreciation of the pathology be determined, so that early and proper treatment may be instituted. Unless such a refinement be made, cases of this kind will be frequently treated as simple typhlitis, whereas in sixty per cent., or perhaps a larger proportion, they are cases of inflammation of the appendix.

Appendix.

The following notes are presented explanatory in a measure of the text. They are based on the appearance of the specimens the writer had on exhibition at the meeting, collected from private sources and from hospitals. Some twenty specimens were obtained for this purpose. The writer's best thanks are due to Drs. Pepper, Edwards, Bernardy, Willard, Woodbury, Longstreth, Hinsdale, Seltzer, Daland, Bodamer, and others, for notes and specimens. Some excellent descriptions may be found in the Catalogue of the Museum of the Pennsylvania Hospital.

I. Strictly speaking, we should say the sequence of typhlitis, perityphlitis, and peri-cæcal abscess occurs but rarely. A typhlitis and perityphlitis, no doubt, are seen clinically, but the cases do not come to the post-mortem table unless perforative appendicitis occurs conjointly. For this reason, and because a similar sequence of lesions does not obtain in similar inflammations of the large bowel under like circumstances, as fecal impaction from stricture, or from paresis in the aged or after typhoid fever, the pathologist may well doubt the existence of perityphlitis and succeeding peri-cæcal abscess without conjoint primary appendicitis. In the more violent inflammations of the gastro-intestinal tract, in gastritis, enteritis, or in dysentery, such sequential lesions moreover are not found.

II. *Case I.*—Matilda Thomas, aged one hundred and four years. Cause of death, exhaustion from strangulated hernia. Abstract from autopsy record, Philadelphia Hospital. Abdominal cavity: no effusion; adhesion of large and small intestine; appendix dilated to size of first finger, end of it incarcerated in inguinal canal, with portion of mesentery and small intestine; so much post-mortem discoloration, could not determine color of parts; local peritonitis; in canal and layers of muscles and fasciæ considerable amount of greenish pus; the portions outside of canal adherent to the bladder, uterus, and ovary, the latter being included in the inflammatory mass. Organs occupy normal position. (Musser.)

Case II.—Philadelphia Hospital. Female, aged twenty-two years. Appendix four inches long, dilated to size of finger, contained mucoid fluid, adherent to a large pyosalpinx. (Musser.)

III. From Museum of Pennsylvania Hospital, described by Wistar. (See a Catalogue of Pathological Museum, 1869.)

IV. Cranberry seeds (Mears). Fecal concretions (Hartshorne, Daland, Hinsdale, Seltzer, Musser). Grape seeds (Edwards, W. A.). A concretion one-half inch long and one-quarter inch thick, cone-shaped, apex pointing toward the perforation in the appendix, base concave, firm, fecal color and odor, in mass of which black bodies, size of cranberry seed, were found. It completely occluded the canal, causing retention of the natural secretion, inflammation, ulceration, etc. The perforation was one-eighth inch from the apex of the concretion (Musser). A "phosphatic concretion" in Mütter Museum (Woodbury).

V. General peritonitis (Woodbury, Willard, Hall (Mütter Museum), Bodamer [Case I.], Seltzer, Pepper [1637 Pennsylvania Hospital Museum], Long-

streth [Pennsylvania Hospital Museum Catalogue, No. 1368[10]], Meigs [Pennsylvania Hospital, 1366], Bernardy, Musser). Local peritonitis (Mears, Pepper, Hinsdale, Bodamer [Case II.], Hartshorne, Musser).

VI. Two inches of the appendix necrosed, slate-gray color, soft, floated in the pus, attached slightly to the healthy stump (Musser). Appendix sloughed off. Male, forty years. Peritonitis fourth day (Bodamer, Case I.). Appendix one and a half inches long, ulceration one inch from bowel, a few lines in diameter. No communication between appendix and cæcum. Gelatinous mass in appendix (Bodamer, Case II.). Appendix removed by amputation, was attached by its blind extremity to omentum, also removed. Length two inches, one inch occluded by concretions, and one dilated and empty (Woodbury, Mütter Museum). Appendix two and a half inches long. Ulceration three lines in length and two inches in width, half an inch from extremity. Canal not dilated. Walls not thickened (Willard).

Mütter Museum, College of Physicians of Philadelphia, A. D. Hall. Vermiform appendix, cæcum and portions of ileum, perforation, peritonitis; death. When recently examined a perforating ulcer of the appendix was found, through which a grooved director could be passed, communicating freely with the peritoneal cavity. There are two perforations, one, 2.5 centimetres, from the caput coli; the muscular coating of the appendix appeared to have been destroyed by ulcerations, and then the peritoneal coat had given way in three small openings about 2 millimetres in line. These were arranged in a triangular manner. The second was a solitary perforation, 4 centimetres from the end of the appendix. Although thick patches of lymph had been thrown out, no attempts to limit the effusion of foreign material by lymph barriers was discoverable. There was nothing to show that any foreign body or concretion or impaction had been the origin of the lesion. Fluid pus was found in the interspace between liver and stomach, and about six ounces of turbid serum were in the pelvic cavity. The intestines were glued together.

Mrs. C., aged twenty-five years, mother of two children, youngest four months old. Death on fifth day of idiopathic peritonitis, with characteristic symptoms.

Catalogue of Mütter Museum, College of Physicians, E. Hartshorne. Appendix, gangrene and perforations. Recently observed the appendix was inflamed and greatly enlarged, and intimately adherent to surrounding parts; was distended to a sac 5 centimetres long and 2 centimetres broad, and communicated by a small opening with the cavity of head of colon; walls thickened, infiltrated with dark blood and serum; its peritoneal coat highly injected and covered with exudation, and the mucous lining showing traces of extensive inflammation, which had run into a superficial gangrene. The latter had produced a honeycombed appearance of the inner surface, and had covered it with a dark greenish, pulpy, and extremely fetid matter. On its side, about two-thirds of the distance from the cæcal extremity, an ulcerated perforation, some 6 lines in length and 3 lines in width, was found, from which fluid fecal and other matter had been flowing in small quantities. Immediately behind this opening, and encased by the appendix, a peculiar, moderately hard concretion, of the shape and color of an elongated olive stone, presented itself, having been apparently moulded by the cavity by which it was contained.

This was in layers, and was probably hardened fecal excrement which had accumulated by slow oozing of the fluid contents of the large intestine through the small orifice of the distended appendix. No other evidence of morbid action in abdominal cavity, except congestion and œdema of ovaries and fimbriated tubes. Death on the fifth day from peritonitis.

Diagnosis.

By WILLIAM PEPPER, M.D., LL.D.

I FEAR that the remarks that I shall make may seem vague and desultory, for it is difficult to compress what is to be said within the very reasonable limit assigned. I am quite willing to accept the terms suggested by Dr. Musser, but I do not think that the term para-typhlitis, as indicating inflammation of the peri-cæcal connective tissue, is likely to gain general usage. It is probable that the term peri-typhlitis will continue to be used to indicate inflammation of the walls of the cæcum and of the neighboring connective tissue. Still, anatomically and for parity of nomenclature, it may be well to recognize para-typhlitis, as indicating inflammation of the peri-cæcal connective tissue.

The anatomical points made clear by Dr. Musser are very striking. I would merely add to these one or two facts. In the first place, the appendix presents evidences of disease in a very large number of indifferent autopsies. I remember the report of a series of three hundred autopsies, in which there were signs of disease of the appendix in thirty-three per cent., although in none of these was there a history of typhlitis. We have this little organ, singularly useless physiologically so far as we know, placed in a singularly unfavorable position anatomically, very liable to become impacted, so formed that escape of its contents is very difficult, and very prone to become diseased. We must recognize the fact that the appendix is often diseased when we have no reason to suspect such a condition. I cannot agree, however, that the cæcum also is not often the seat of disease. In a long experience in which I have paid much attention to these cases, I have collected a number of instances of independent cæcal disease, where the cæcum alone presented lesions, sometimes going on to chronic inflammation, ulceration, and perforation. The real condition of things seems to be this. In the first place, there are many cases of

mild appendicitis which cannot be recognized during life; in the second place, there are a considerable number of cases of typhlitis where the symptoms are chiefly due to inflammation of the walls of the cæcum and of the peri-cæcal connective tissue, which end in recovery. It is impossible in these cases to determine what proportion of the symptoms has been due to appendicitis. Finally, there are also a good many cases of severe appendicitis resulting in ulceration and perforation, with the formation of circumscribed abscess or of general peritonitis. If we could accept the view that perforation of the appendix, leading to peri-typhlitis or para-typhlitis, often resulted in recovery by resolution, it would be a matter of comparative indifference where the lesion was chiefly situated; but do clinical experience and anatomical records justify the view, that perforation of the appendix, followed by peri-and para-typhlitis, often ends in resolution? It is true that I have found one specimen and that others have been placed on record where perforation of the appendix has not been followed by grave results, but do these amount to anything comparable with the great mass of cases where lesions of the appendix have occurred with peritonitis and fatal result unless relieved by operation. It seems to me that we have to recognize that while in typhlitis, peri-typhlitis, and para-typhlitis, in all probability appendicitis always exists, yet it is often present in only a very mild degree, and can cause only a small portion of the symptoms. This conception seems necessary to a correct diagnosis of these lesions; it is necessary in guiding our treatment.

There appear, then, to be two classes of cases. In one the affection is more limited to the walls of the cæcum and the peri-cæcal connective tissue, and the appendix is affected to a comparatively slight degree. We have no record as to the frequency of such cases. The record is not to be sought on the post-mortem table, for the large proportion of these cases if properly treated from the beginning end in resolution. I have the records of scores of such cases, the vast majority of which ended in resolution. I think the experience of those I address would give a large number of cases of inflammation in the cæcal region so terminating. So large is the number that I cannot consider that in any large proportion of them did perforation of the appendix occur. As I have seen them, these cases are marked by pain as the initial symptom, not excruciating in character, not associated with evidences of collapse, often accompanied with nausea and vomiting, and with elevation of temperature, which continues to rise until decided fever is present. With these symptoms there is excruciating tenderness in the right iliac fossa, a sense of fulness and induration, not rarely with

dorsal decubitus and flexed thigh, with a constipated condition of the bowels possibly preceded by one or two irritative movements during the first day, and with these there is considerable acceleration of the pulse. In proportion as the induration and swelling is early and marked, it has seemed to me that the chances are that the appendix is not seriously involved, but that the affection is chiefly one of inflammation of the walls of the cæcum and of the peri-cæcal connective tissue with exudation, and I have no doubt usually accompanied with considerable fecal impaction of the cæcum.

If absolute rest be insisted upon, if abstinence from food and absolute avoidance of interference with the state of the bowels be adhered to, if local depletion be employed, if counter-irritation followed by the application of the ice-bag, or warm fomentations be employed, and if the internal use of opium and mercury be begun early, the vast majority of such cases terminate in resolution and complete recovery if the convalescent is properly treated—that is, if these restrictions be insisted upon until the sensibility of the part is entirely removed. I am satisfied that the well-known tendency to the recurrence of typhlitis is largely dependent upon the management of the convalescence from the primary attack. Such would seem to be the diagnostic marks of this type of case.

On the other hand, we know very well that such cases not rarely go on without resolving, that the induration extends, that the symptoms become aggravated and possibly are such as to indicate suppuration, and that at periods varying from seven to fifteen days pus formation occurs. Such cases demand operative interference, and are successfully treated by the Parker operation. The existence of pus can often be demonstrated by exploratory puncture with a fine aspirator needle.

There is a second class of cases of an entirely opposite character, with which we are all equally familiar. Here the patient may apparently have been in almost perfect health, for perforation of the appendix may occur without any previous symptoms of which the patient had complained. But in these cases there has been a catarrhal appendicitis; the fecal matter which is present in nearly every healthy appendix, is no longer able to circulate and escape, because the outlet is partially closed by the swelling of the mucous membrane; the pent-up secretions and the irritating fecal matter excite more serious inflammation in the walls of the appendix; ulceration is established, and finally perforation occurs, and the symptoms of the attack begin. I have rarely seen a fatal case of disease of the

appendix where there was not stenosis of its orifice. I think that, to a large extent, it is this tendency to closure, and the accumulation of the secretions and of fecal matter, that causes the more serious type of inflammation and the occurrence of perforative appendicitis.

The first symptom in these cases is usually intense and excruciating pain, so severe at times as to cause collapse, occasionally so severe as to be followed by death in a few hours. Following this there is the rapid development of the signs of peritonitis. The pulse becomes frequent. There is marked tenderness, not in the iliac region only, but also toward the middle of the abdomen. The belly becomes distended, but there is no induration to be felt; there may even be no fulness in the right ileo-cæcal region. The appendix often lies under the cæcum, and I have frequently percussed these cases with great care without finding any evidence of dulness or of induration. After the occurrence of the initial pain, the fever may not rise very rapidly. There may be only moderate febrile reaction for one, two, or three days, associated with continued, moderate pain simulating an ordinary catarrhal attack with intestinal colic. For two or three days these cases may be viewed as not being seriously ill, so delusive may be the symptoms after the subsidence of the initial pain. In these cases there is absence of ileo-cæcal infiltration, or induration, or tumor, or prominence, or dulness on percussion. There is in these cases a less degree of vomiting than in the first class of cases mentioned. The vomiting is often rare, and only induced when the stomach is taxed. The bowels are quiet, but not so obstinately constipated and not so strongly resistant to the action of laxatives as in typhlitis with more or less impaction of the cæcum. After a time which varies with the intensity of the attack and the direction which the exuded matter has taken, there appear the symptoms of a rapidly spreading, general peritonitis. The belly becomes greatly distended and tender, and the coils of intestine are outlined through the tightly stretched skin. The vomiting becomes frequent, the temperature rises, the pulse grows thready and rapid, and we have the familiar signs of general peritonitis. These cases end fatally, from exhaustion, in from five to ten days.

Here are two groups of cases which seem to me to differ not only in degree, but also to differ in the seat of their lesion and the character of that lesion. I cannot believe that in any great number of cases of the first group there is perforation of the appendix. Yet, unless perforation is present, we have seen that all the other lesions of the appendix may exist without the production of any serious or charac-

teristic symptoms. Therefore, I cannot attribute to ordinary appendicitis the symptoms of peri-cæcal inflammation which mark the first group of cases. These symptoms we must assign, in chief part, to the inflammation of the walls of the cæcum and of the peri-cæcal connective tissue.

It is, therefore, of momentous importance that we should be able to diagnose the sort of case that we have to deal with, and that at the earliest moment. I should say, that in proportion as the tumor, prominence, induration, and dulness are marked, delay is safe, especially if rectal examination—the mention of which I have postponed until the last—does not indicate any fulness on the right side of the roof of the pelvis. If this is present, it indicates an amount of exudation which will probably end in abscess, and is a strong indication for operation. If digital examination, pushed if necessary to the extent of the introduction of the whole hand, reveals no fulness in the roof of the pelvis, I think delay for several days is justifiable, and with such treatment as I have indicated, the symptoms will, in the majority of cases, subside ; and although the case is fraught with great anxiety, resolution will begin, the symptoms will become milder, and the patient recover, and under proper treatment the part will be restored to absolute health without relapse. Even if frequent relapses occur—and I have seen as many as fifteen or eighteen in the same individual—complete recovery may follow a protracted course of treatment with absolute rest, rigidly restricted diet, constant counter-irritation, and suitable alterative treatment internally.

Of course if, after waiting a few days, there is no evidence of the commencement of resolution ; if the fever is sustained, particularly if it assume a hectic type, we know from experience that suppuration will not be long postponed. Exploratory puncture should be made, and operation should follow without delay.

The most important question to be considered is, What is the earliest moment that we can establish the diagnosis? On account of the shortness of the time, I limit myself to the differential diagnosis between the two forms of cæcal inflammation to which I have referred. The initial symptoms give us some indication of the seat and the gravity of the attack. Typhlitis and peri-typhlitis soon offer demonstrable symptoms, but as the appendix is hidden under the intestine, the symptoms of perforative appendicitis are often obscure for two or three days. The most careful palpation may fail to show the slightest fulness. The patient may complain of pain over the cæcum, or over the hypogastrium. External examination does not aid us in the

diagnosis. Are there any special features which will help us? I would again refer to the importance of the rectal examination. Early and repeated rectal examination is the most important diagnostic means we possess in this class of affections. Often, on opening the body after death, there is no appearance of peritonitis in the exposed coils of intestine. There is no inflammatory process seen outside of the cæcum, and nothing is found until the cæcum is lifted up, when it is discovered that the inflammation is behind it, and extends downward to the pelvis. Sometimes, on removing a layer of lymph, you disclose the pelvis filled with pus. In such cases, if rectal examination should give a sense of distention of the right side of the pelvic roof, might not a puncture be made with a curved exploring needle introduced through the rectum? This has suggested itself to me, although I have never tried it. In this way we might demonstrate the presence of pus, when it would not be possible to do so through the external abdominal wall.

In many of these cases there has seemed to be an unusual abundance of urine and an increased frequency of urination. I think that the former is associated with the absence of vomiting. In typhlitis and peri-typhlitis, there is often so much vomiting that very little liquid is absorbed, and the urine becomes concentrated. I have seen cases of perforation of the appendix, where the urine was voided at intervals of an hour or an hour and a half, the total amounting to a large quantity.

Again, it has seemed to me that in perforation the pain is more apt to extend to the middle line of the abdomen, and sometimes into the genitals, especially into the right testicle and spermatic cord.

The agony of pain which marks the initial lesion, the development of fever, the acceleration of the pulse, the distention of the abdomen, the pain referred to some point in the ileo-cæcal region, the comparative rarity of vomiting, the absence of induration and tumor, possibly, the ability to detect fulness or induration in the roof of the pelvis by rectal examination, the frequent micturition with a free supply of urine, the pain possibly radiating in the direction of the genitals, have, I think, been in the majority of cases the most marked symptoms.

Suppuration occurs in these cases very early, even earlier than in the other group of cases. In one case in which Dr. Keen operated for me as early as the close of the third day, perhaps the earliest operation on record, a pint of pus was found in the pelvis.

So much for the suggestions that I am able to offer with reference

to these important affections. The point to which we should bend our exertions should be to determine the early diagnostic symptoms of these two varieties of cæcal inflammation, and to see whether there is a constancy in the description that I have given of the first type of inflammation of the walls of the cæcum which, under proper treatment, offers a considerable hope of recovery. We should, in particular, strive to point out the indications for operation in the two classes of cases.

I would ask if general peritonitis may not be a positive indication for instant operation. It has been asserted that general peritonitis is not a contra-indication to laparotomy under other circumstances. If this is the case, the development of general peritonitis in a case of inflammation of the cæcal region would at once indicate operation, for after this develops death results under medical treatment.

I will not take up the question of the diagnosis of these affections from intussusception and internal strangulation. Although this would be necessary for a comprehensive discussion of the subject, the time at our disposal will not permit it on the present occasion.

Treatment.

By THOMAS G. MORTON, M.D.

For practical purposes the treatment of peri-cæcal inflammation must be divided into two subdivisions, that of the pre-purulent, and that of the post-purulent stage; or, 1st, before formation of pus or of appendix perforation; and, 2d, after that event.

The treatment of the pre-purulent, irritative, or simple inflammatory disorders of the cæcum and its surroundings, or appendix, should consist of rest in bed, restriction of diet to nourishing liquids, hot poultices or fomentations frequently replaced upon the parts, perhaps local depletion, and possibly the hypodermatic exhibition of morphia to control pain; whilst the bowels should be kept open and free from accumulations of gas and feces by the administration of salines and enemas—perhaps with the addition of turpentine to the latter.

Those disposed to cavil at the advice just given, I would ask: Shall we keep the bowels in liquid condition, and so best prepared to

resist peritonitis, should it occur, whilst at the same time the mere draining of fluid from the intestines and surrounding parts would influence for the better the peri-cæcal inflammation? or shall we paralyze and congest, and inflate the bowels by the old-fashioned "splinting" treatment, and thus beckon on peritonitis?

Pain of intense character would often be as much an indication for operative relief as for morphia.

Prompt resolution should take place in cases which are not to go on to the stage of pus formation; and very long continuation of symptoms, or relapses, or recurrences, would be strong indications for surgical interference.

The presence of such tedious recovery, relapse, or recurrence would point to the probable presence of conditions exceedingly dangerous to the patient from liability to general peritonitis or perforation at any time; they further would point, as a rule, to the appendix as the source of irritation and danger. Indeed, in man, that worse than useless appendage must be regarded as the root of most evil in the region under consideration.

To illustrate this point by a single impressive instance, let me quote a case which was reported for me in the Philadelphia *Medical Times* of June 11, 1887. It was that of a woman who, for a long time, had been having mild attacks of abdominal pain, located in the region of the cæcum, which had usually yielded with great promptitude to anodynes. During the course of the last attack of that nature, violent symptoms of perforation and general peritonitis came on. I did not see her until two days after this unfortunate accident; but, though she was then in a most desperate condition, I advised operation as her only chance, and forthwith performed abdominal section. The appendix was found perforated in two places, and violent general purulent peritonitis going on. She died a few hours afterward, but I felt better satisfied that the operation had been performed.

Coming now to our second division, suppose the process to have gone beyond the simple, inflammatory stage, and the presence of pus, even a few drops, to have been diagnosed.

In the great majority of instances, the presence of even a minute amount of pus so near to the peritoneum would be of vastly more risk to the patient than abdominal section for its relief. Hence, I should operate whenever the diagnosis of pus had been made—occasionally even without positive diagnosis. But in this paper diagnosis of distinct conditions is presumed, and I am expected simply to outline treatment for those defined conditions; hence, without qualifica-

tion, I repeat, that pus being present in the region of the cæcum operation is positively indicated.

Many other risks are to be taken rather than those of purulent peritonitis, for early interference will save most if not nearly all cases from this latter dread complication, while the danger of operation becomes slight compared to that of rampant abdominal inflammation.

Local or general peritonitis supervening in a person who has a history of cæcal trouble, or starting during a first attack, would more than justify operation.

At a later or even perhaps chronic stage of the disorder, all available diagnostic skill must be exerted when a peri-cæcal abscess may have pointed in an anomalous situation, and we must ever adhere to the modern surgical rule, always to attack pus at its source if possible. When the cæcum is normally placed, this is always feasible, if the disease be recognized.

Coming now to speak of actual operative measures, the patient, as a matter of course, must be got into the best possible condition, and surgically clean by the usual methods of attempting these ends. Asepsis should rigidly prevail throughout.

The aspirating needle must never be used, for if it does not find pus we cannot be sure that none is present, whilst its own dangers are not inconsiderable. In these cases it is a poor and especially unsafe diagnostic resource.

The abdominal incision should be lateral, *not* median. For if median the peritoneal cavity would often be needlessly opened, and the cæcum and appendix cannot well be reached or dealt with through it. But if lateral it can be made of less size, circumscribed abscesses will frequently be found before the peritoneum is reached, and at its base all necessary manipulations can be made upon the cæcum, appendix, and surrounding parts without opening the peritoneal cavity, whilst should the abscess or ulcer have reached that cavity the intestines, etc., can just as well be examined and cleansed through a lateral as a median incision.

The favored or lateral incision should begin at a point an inch above Poupart's ligament and to the outer side of the right linea semilunaris, be continued in a vertical direction upward about four inches, and carried down through the parietal muscles until pus, cæcum, or peritoneum encircling that organ be reached. Then the wound can be enlarged if necessary. If pus be found, wash its containing cavity clean, and get a clear view and careful examination of the cæcum and appendix. The latter is almost always the seat of trouble, and perhaps

it would be well to excise it whilst we have the chance in any case, for any cæcal trouble would be likely in time to excite disorder of its appendages. Without a doubt it should be so treated if found inflamed, perforated, or harboring a foreign body. This can best be accomplished by ligating it as close as possible to its cæcal attachment and cutting it off, or, if possible, by excising it and then uniting the gaping surfaces with Lembert sutures. Cæcal perforations, if found, should also be closed by Lembert sutures, whilst ulcers, which may be present but have not perforated, should by the same means be turned into the bowel lumen. If the general peritoneal cavity has not been involved, the abscess or cæcum, or what not in view, should be gently curetted, washed out with a one to one thousand bichloride of mercury solution, a large glass or rubber drain introduced, and the abdominal wound closed around it with silk sutures, and a dressing superimposed.

If the peritoneum has become involved and but a short time before the operation, the whole abdominal cavity must be most thoroughly washed out with hot (105° to 110°) distilled water, or one to ten thousand bichloride of mercury solution, and cleansed with sponges, and the foreign body, if that has been the source of trouble, searched for. Should peritonitis be found further advanced the intestines must be withdrawn, and all adhesions parted with the finger or knife during the process of cleansing and before they are returned to the peritoneal cavity. In the case of general peritonitis a glass drain must be carried to the bottom of the pelvis and kept in working order by means of absorbent cotton ropes acting by capillarity. If a second tube is not used for the superficial or peri-cæcal abscess cavity the drain going to the pelvis must have perforations as high in it as the level of the cæcum and any surrounding trouble.

If the inflammation should be caused by the presence of a foreign body in the cæcum itself or by impaction of feces, they must be either excised or urged by prudent force along the bowel. In their operative removal a simple incision, afterward united by Lembert sutures, would answer every purpose.

If portions of the cæcum have sloughed or become gangrenous and the breaches of continuity are too large to approximate with Lembert sutures without producing dangerous constriction of the gut, we will have to content ourselves with the formation of an artificial anus.

Post-operative treatment would consist in keeping the bowels in a fairly soluble condition, the tube clean, and in meeting threatening peritonitis by active purgation.

These same general principles of treatment will hold even for those rare cases of displacement of the cæcum as into scrotal and other, herniæ, its abdominal transposition, etc.; the great question in these cases will be diagnosis.

Typhoid cæcal or appendicular inflammation or perforation likewise should receive identical treatment as for the simple inflammatory disorders of that region. This whole subject is still in its infancy so far as the majority of the profession are concerned, but is of almost boundless promise.

I can terminate this going over the field of cæcal inflammatory disorders, their pathology, diagnosis, and treatment in no better way than by showing to you a patient upon whom I operated, and whose case was reported by Dr. Woodbury in April last. He has been benefited as much by the practical application of the principles of treatment which have been laid down, as any human creature ever can be. His surgical history is as follows:

Charles K., aged twenty-six years, had enjoyed good health until three years ago. Since that time he had been subject to frequently recurring attacks of abdominal pain. They would come on without warning whilst he was apparently well, and completely prostrate him. The pain was of a stabbing character and most severe about the lower abdomen and umbilicus, and was attended with great tenesmus of rectum and irritability of bladder. These attacks, after lasting a few hours, would usually pass off, leaving him in a quite weak condition. During the periods between attacks he kept very well. The last seizure began about April 20th last, when he consulted Dr. Woodbury. He was then haggard, sallow, and constipated; the tongue was heavily coated. Abdominal pain was much complained of. Urine contained much albumen and few casts. He was placed upon the usual medicinal treatment, but steadily grew worse. Two days later his temperature rose to over 103°, pain became very severe, there was much nausea and vomiting, and a distinct hardening, but no tumor could be felt in the right iliac region of the abdomen. These symptoms continued to augment until I saw him three days later, and determined that operation was his best and only chance. At the time of operation his condition was discouragingly wretched—that of a man in the dying stages of general purulent peritonitis. Nevertheless operation was begun and carried to successful termination.

The patient was stimulated and antiseptically cleansed. The incision was made laterally over the seat of induration. The latter had now became slightly prominent. An abscess cavity was entered at

a depth of an inch below the abdominal surface, a free flow of pus took place, and the cæcum and its diseased appendix came into view. A concretion of inspissated fecal material was found alongside that organ, but entirely outside it, and evidently the cause of the whole trouble.

The vermiform appendix was greatly swollen, and exhibited a perforating ulcer three-fourths around its circumference and very near to the point of its cæcal attachment. A silk ligature was applied close to its root and the remainder excised, together with a large portion of omentum which projected into the abscess cavity. The peritoneal cavity was then thoroughly washed out with warm water; for an opening into the general peritoneum was found and through it a quantity of pus had passed into the cavity of the peritoneum.

The abscess walls were then thoroughly curetted, and after a final wash a rubber drain was carried to the bottom of the pelvis and the wound closed about it. Convalescence was uninterrupted from the time of operation; his temperature never again reached 100°, and he has enjoyed perfect health until the present time, when his appearance speaks for itself.

The drain was removed piecemeal; the last portion not until sixteen days after operation.