

Diseases of the appendix vermiformis and their treatment / by F.G. Lloyd.

Contributors

Lloyd, Frederick George.
Royal College of Physicians of London

Publication/Creation

London : John Bale, sons & Danielsson, 1904.

Persistent URL

<https://wellcomecollection.org/works/nb2b99b2>

Provider

Royal College of Physicians

License and attribution

This material has been provided by This material has been provided by Royal College of Physicians, London. The original may be consulted at Royal College of Physicians, London. where the originals may be consulted. Conditions of use: it is possible this item is protected by copyright and/or related rights. You are free to use this item in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s).



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

Diseases of the
Appendix
Vermiformis
and their
Treatment.

F. G. LLOYD.

616.346



S.L.

SL

616.346



DISEASES OF THE APPENDIX VERMIFORMIS AND THEIR TREATMENT

BY

F. G. LLOYD, M.R.C.S.ENG., L.R.C.P.LOND.

Late Resident Medical Officer, West London Hospital; late Surgeon (attached) "Brigade of Guards" Hospital, London; late Civil Surgeon His Majesty's Field Force, South African War; late Surgeon and Anæsthetist, Kimberley Hospital, South Africa; late Surgeon "Union" and "Castle" Steamship Companies; and Surgeon, Fort Pitt Hospital, Chatham

Being a reprint and enlargement from Papers by the same Author in "The Lancet" and "West London Medical Journal," 1904; and read before the West London Medico-Chirurgical Society

London

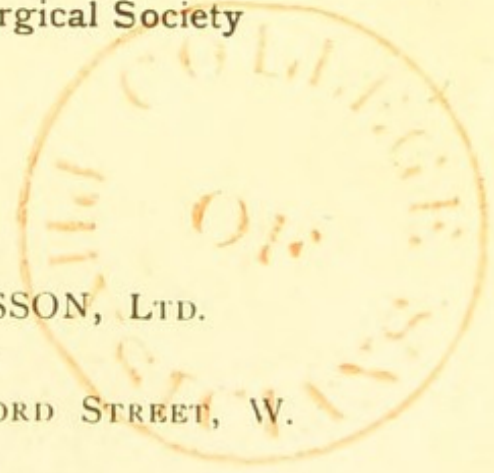
JOHN BALE, SONS & DANIELSSON, LTD.

OXFORD HOUSE

83-91, GREAT TITCHFIELD STREET, OXFORD STREET, W.

—
1904

403



ROYAL COLLEGE OF PHYSICIANS LIBRARY	
CLASS	616.346
ACCN.	24189
SOURCE	
DATE	

P R E F A C E.

In presenting this short work on Appendicitis it is hoped that it may prove of some practical use, especially to those who for various reasons are not able to make a special study of this disease, nor have time to read fully the larger works published by different authors in this Country, in Europe and in America on this subject.

It is hoped by the Author that by reference to these pages many enquirers may find practical hints which may materially assist them in the conduct of a given case.

F. G. LLOYD.

27, RUSSELL ROAD,
KENSINGTON, LONDON, W.,
February, 1904.

CONTENTS.

	PAGE
Importance of the Vermiform Appendix	5
Classification of Appendicitis	6
Anatomy of the Vermiform Appendix	6
Pathology of Appendicitis	12
Inflammation of the Appendix	13
Condition of the Appendix	14
Bacteriology of the Appendix	16
Causes of Appendicitis	16
Symptoms and Diagnosis	18
Leucocytosis	21
Course and Prognosis	21
Treatment	23
Operative Measures	25
Amputation of the Appendix	28
Reference to Special Cases	31
Remarks on Special Cases	33
Conclusions	34

Diseases of the Appendix Vermiformis and their Treatment.

THE IMPORTANCE OF THE VERMIFORM APPENDIX.

MR. PRESIDENT AND GENTLEMEN,—I propose with your very kind attention to read a short paper this evening on the subject of "Appendicitis."

Although my experience of this subject is comparatively limited, I hope it may prove of some slight interest to the members of this Society, and be the means of promoting an interesting discussion. The "Appendix Vermiformis" in health may not be of great importance, but under pathological conditions, when the normal resisting power of the appendix vermiformis is altered or its vitality lowered, and it is the seat of bacterial invasion from local or constitutional causes, this insignificant tube may give rise to some of the most urgent conditions with which we may be called upon to deal. In reading this paper before you I make no attempt to be dogmatic. I venture to place before you only those facts that already seem established, some of which I have been able to confirm, and some observations of my own, knowing that such opinions are apt to be

ill-founded. Especially is this the case with regard to "treatment," where I express a leaning, as you will see, towards the "conservative side."

CLASSIFICATION OF APPENDICITIS.

Appendicitis means inflammation of the vermiform appendix. It is to be distinguished from a similar condition of the cæcum, known as "typhlitis," and the ileum, known as "ileitis." It is a disease which has its origin in the vermiform appendix, but occasionally exists as a complication of typhlitis or perityphlitis by extension, or through the vascular or lymphatic system.

Appendicitis may be divided into the following varieties, which differ from one another rather in degree than in kind, and correspond with the degrees of inflammation to be met with in other parts.

(1) **Acute Appendicitis**, with or without inflammation of the peritoneum, (*a*) ending in resolution; (*b*) ending in suppuration, ulceration, or abscess; (*c*) ending in gangrene; (*d*) ending in perforation.

(2) **Chronic Appendicitis.**

(3) **Relapsing Appendicitis.**

(4) **Latent Appendicitis.**

GROSS ANATOMY.

The vermiform appendix is a tube closed at one end and opening into the cæcum at the other. It has, like other portions of the intestinal canal, a mesentery, known as the *meso-appendix*.

It usually opens into the cæcum at its most dependent part and it is an intraperitoneal organ. Its diameter is on an average about one quarter of an inch and rather less in females. Its average length is about three to five inches, although in some cases it may be as short as two, or as long as eight inches, or even longer. It is composed of four coats, serous, muscular, sub-mucous, and mucous, and in a normal state has a lumen running from its proximal end to its distal end. The distal end is free to a varying extent. Its meso-appendix is of varying length and shape, but usually terminates at about one quarter to three quarters of an inch from the distal end. The various folds of peritoneum about the appendix and cæcum make up what are known as: (1) The sub-cæcal fossa; (2) the ileo-cæcal fossæ, and (3) the ileo-colic fossa, which fossæ are situated very closely where their names would indicate.

The appendix in health is more or less elastic in the living subject and is under certain conditions found in most unexpected places. Under normal conditions it will move with the cæcum as well as within the more limited scope of its meso-appendix. This little body resembles in structure the structure of the cæcum and has blood-vessels, nerves, lymphatics, veins and glands; the latter lining its mucous membrane, are known as Lieberkuhn's follicles. It is possessed of peristaltic action, and at its opening into the cæcum is protected by a more or less incomplete valve formed by the folding of the mucous membranes at that point, and this is known as Gerlach's valve.

In structure it resembles the tonsil in the large amount

of lymphoid tissue distributed in its sub-mucous coat. This tissue, when present, probably serves to help in protecting the part from bacterial invasion. The appendix vermiformis is frequently slightly curved, twisted or sinuous, depending upon its contents at the time and the tension of its meso-appendix. Running upwards and backwards from a point about one inch below the ileo-cæcal valve and then pointing sharply upwards and towards the spleen is its usual direction, but this again will vary with its contents, the tension of its mesentery, as also with the contents and position of the cæcum at a given time. Another common direction is slightly curved, but pointing directly upwards, or another lying across the brim of the pelvis. The appendix vermiformis is the remains of the true cæcum and as an appendix is present in "man," certain of the "anthropoid apes" and in the "wombat," and in comparative anatomy is about midway between the "herbivora" and the "carnivora." Its function is not at present entirely known, but the blood-vessels, lymphatics and nerves, and the peristaltic activity, have in all probability the same function as those of the cæcum adjoining it, and it serves to secrete a varying amount of mucus. Under normal conditions it is probably almost functionless.

It is probably the remains of a more or less incomplete effort of nature to close the cæcum at that situation, the result of this atrophy being this little *cul-de-sac* of varying length, mobility and consistence. There is little doubt but that the function of the appendix vermiformis is secretive, excretive and absorptive, that within its lumen a certain amount of formation of gas takes place and the probability


is that the secretions of its glands have the same chemical action and physiological results as the secretions of the same glands in the cæcum.

The probability is that in addition to the functions just mentioned its contents when poured into the cæcum help to keep the contents of the cæcum fluid at that situation and prevent them becoming septic, and also assist in digestion; but the part played by it as compared with the cæcum in this process must be very small under normal conditions.

Beyond having referred to the folds of the peritoneum forming the cæcal fossæ I shall not go into the various small folds and fossæ about the appendix for the purpose of this paper. Abnormally or pathologically the appendix may be found pointing in almost any position within the pelvis or abdomen; in this respect its range is a wide one, or it may be found buried in or adherent to the walls of these fossæ.

Its usual position is behind the cæcum, although it is sometimes found at the inner side of it, the outer side of it, or even in front of it.

The colour of the appendix will depend partly upon its contents and the amount of blood within it at the time—its surface is smooth and glistening, and it is of varying consistence and rigidity in different subjects. Appendicular peristalsis resembles peristalsis in the intestines except that as it is closed at one end, its contents under normal conditions can only move in one direction. When the cæcum is congenitally malformed or deficient, or the position of the appendix is altered from any cause, the appendix may be

found to point in the direction of any one of the points of the compass,  and at times has been found adherent

to almost any of the structures within the abdomen or pelvis.

Under normal conditions no solid or foreign body can enter the appendix, as its orifice, although varying in size somewhat in different individuals, is not wide and it is protected by its nervous mechanism and the movement of its valve, which probably acts more or less as a "sphincter," so far as entrance into the tube is concerned, but when this resistance is interfered with or overcome from mechanical or pathological causes, then gas, liquid, or solid may enter the tube from the cæcum as well as being at times formed within it. When there is no obstruction the tube empties its contents into the contents of the cæcum at its orifice, be they liquid (as they usually are) or partially liquid, partially solid, or partially gaseous. The contents of the cæcum and appendix after death may be influenced by the cause of death as well as by the nature of the food ingested. It is possible that if it was not for the help given by the appendix in this situation that the contents of the cæcum and ascending colon would have a tendency to solidify sooner than nature intended, but as in the case of the tonsil its presence does not seem imperative.

The topographical situation of the appendix vermiformis necessarily varies both in health and in disease, but generally the opening of the appendix into the cæcum is to be found about one inch below the point known as "McBurney's point."

Before leaving the anatomy of the appendix, just a word with regard to "McBurney's" point and "Munroe's" point. If a line be drawn from the anterior superior spine of the ileum to the umbilicus (which line is usually about six inches in length in the adult), it will be found that along this line are situated the points generally known as "McBurney's" point and "Munroe's" point. The former is situated about one and a half to two inches along this line and is a more exact point than Munroe's point, which is situated beneath the outer border of the rectus muscle. To quote Dr. McBurney's own words on this subject he says. "I believe that in every case (of appendicitis) the seat of greatest pain, determined by the pressure of one finger, has been very exactly between one inch and a half and two inches from the anterior spinous process of the ileum in a straight line drawn from that process to the umbilicus. This point corresponds very accurately in the living subject to the base of the appendix." The point at which the spino-umbilical line crosses the outer edge of the rectus muscle is called Munroe's point.

The ureter crosses the spino-umbilical line at the point of junction of its inner and middle thirds. The genito-crural nerve is close to it. The eleventh dorsal nerve enters the sheath of the rectus beneath Munroe's point. The structure on the right side, which comes more directly under McBurney's point or Munroe's point, is the ileo-cæcal valve and not the base of the appendix. The base of the appendix is usually rather more than an inch below the opening of the ileo-cæcal valve. In 40 cases recorded and figured by

Dr. C. Addison and 10 by Dr. Keith it was found that in 22 instances the valve was situated under or near Munroe's point, in 14 instances above and on the average external to that point, and in 14 instances below and internal to that point. We thus see that McBurney's and Munroe's points are most interesting, as being situated at a point closely corresponding to the middle of the right lower quadrant of the abdomen. Tenderness at or about McBurney's point is, according to Sir Frederick Treves, common in colitis affecting the cæcum and also other pathological conditions affecting that portion of the great intestine. It will be remembered that the ileo-cæcal valve has an elaborate nerve supply (like most other orifices of the body) from the eleventh and twelfth dorsal nerves, and that the bowel, the abdominal wall and the skin, are all supplied by the eleventh dorsal.* So that we see that in inflammation giving rise to pressure and tension from within pain may be evolved, as well as from pressure from without, directly over McBurney's point, according to the structures which this pressure implicates and which are situated in the right iliac fossa.

PATHOLOGY.

Disease of the appendix vermiformis is very common and morbid changes are met with in about 20 per cent. of all bodies examined *post mortem*. Appendicitis may originate from local or constitutional causes: (1) It may originate from causes within the lumen; this I venture

* Dr. Arthur Keith.

to think is by far the commonest ; (2) from causes within the wall of the tube or arriving through its vascular, lymphatic, or nervous supply ; (3) from causes outside the tube by injury, pressure, or extension of inflammation.

INFLAMMATION.

It would seem to depend on one of three causes, namely :—

(1) Lowering of the vitality of the tube from any cause giving rise to deficiency of normal resisting power to bacilli, cocci and mixed infection.

(2) The number, virulence and specific kind of bacteria present.

(3) The capability of the walls of the tube to expel its contents into the cæcum.

Bacteria are always found present in the gastro-intestinal tract from the mouth to the anus, but except under altered pathological conditions give rise to no pathological signs or symptoms. These bacteria are not present in the foetal appendix, but are usually found present in a normal appendix after birth. They probably assist digestion in the process of fermentation.

The vermiform appendix may be found in part or along its whole length in one of the following conditions of inflammation : (1) confined to the surface of the lumen ; (2) involving one or more of its coats ; (3) perforating its peritoneal coat or dissecting between the layers of its mesentery. The inflammation present may be of the simple, specific, or malignant variety.

CONDITION OF THE APPENDIX.

An abscess associated with appendicitis may be found to have tracked in any of the following directions : (1) Into the cellular tissue ; (2) into the cæcum ; (3) into the abdominal wall ; (4) into the rectum ; (5) into the uterus or its appendages ; (6) into the bladder ; (7) into the peritoneal cavity, either direct or after being first of all an abscess, with strictly local peritonitis and otherwise shut off from the general peritoneal cavity ; (8) through the sheath of the psoas muscle or opening up the iliac vessels ; (9) through the sciatic or obturator foraminæ or through one of the abdominal rings ; or (10) in the so-called extraperitoneal variety, that is, with strictly local peritonitis it may burrow up behind the colon and perforate the diaphragm, giving rise directly to pleurisy, pneumonia, or pericarditis. There is an intimate sympathy existing between the various synovial cavities and the peritoneum, and this is regulated by means of the blood, lymphatic and nervous centres controlling them.

In appendicitis with perforation into the general peritoneal cavity there is a tendency for the pus to gravitate to the most dependent positions (*i.e.*, into Douglas's pouch or into the recto-vesical pouch). In this variety the false as well as the true ligaments of the bladder are frequently involved.

The appendix may be (*a*) twisted upon itself or kinked, giving rise to mucocele, empyema, gangrene or perforation ; (*b*) it may be the seat of one or more strictures, or may be

partially or completely obliterated from old inflammation or ulceration, or (c) it may constitute an intussusception (it may even be found completely invaginated), or may constitute a hernia, or part of a hernia, partial or complete, of one of the following varieties: inguinal, femoral, ventral, obturator, or umbilical; (d) it may be considerably elongated and lying in one of the following positions: (1) over the pelvic brim; (2) adhering to the abdominal wall or to almost any structure within the abdomen, for instance, the gall bladder, Meckel's diverticulum, duodenum, or may be buried in the wall of, or intussuscepted into, the cæcum; (e) it may be the seat of embolus, thrombosis, tubercle, papilloma, sarcoma, carcinoma (primary or secondary), or of primary or secondary deposits of actinomycosis, or again of parasites or worms. Secondary deposits and degenerations are commoner than primary growths of the appendix. The tendency of any of these conditions is to more or less obliterate the appendix.

In suppurative appendicitis, with perforation and acute diffuse septic peritonitis, the pus is very rarely found to extend higher than the transverse meso-colon.

Appendicitis may terminate in resolution, complex adhesions, suppuration (local or general), or gangrene, with or without perforation.

The termination of the suppurative or gangrenous varieties after operation may be (1) resolution; (2) recovery with adhesions; (3) fistulæ; (4) death from (i.) pyæmia, or toxæmia, (ii.) intestinal obstruction, (iii.) lardaceous disease, (iv.) acute yellow atrophy of the liver, (v.) exhaustion.

BACTERIOLOGY.

Inflammation of the vermiform appendix is probably always due to bacteria. It is usually the result of a mixed infection and invasion from within its lumen whilst it is in a predisposed condition.

The *Bacillus coli communis* is constant, but except in diseased or damaged tissues, or tissues whose vitality is lowered, its action is probably aseptic rather than septic. This bacillus is largely in excess of any other variety found present, and is frequently the only bacillus to be found present. In disease of the appendix the following additional varieties have been demonstrated: cocci, micrococci, streptococci, staphylococci, diplococci, pneumococcic bacilli, tubercle bacilli, leptothrix, saccharomyces, and some others.*

CAUSES.

The causes of appendicitis may be simple, specific, or malignant. The exciting causes are numerous. Some of the commonest may be classified as indigestion, arising from any of the usual causes, cold, injury, foreign bodies, concretions, constipation (giving rise to pressure and tension, and to chemical irritation within the tube, thus lowering the vitality of the wall of the tube at that part, and becoming the seat of invasion of the bacterium), diarrhoea, dysentery, typhoidal and tubercular causes, and malignant ulceration (primary and secondary).

* Javel and Lanz, Leipzig, 1893. Lockwood, "Appendicitis," London. 1901.

Concretions within the tube are commonly made up of phosphate of lime, carbonate of lime, of magnesium, bile salts, and organic matter mixed with fæces and teeming with mixed bacteria. They are of varying consistence. The nucleus is usually a hardened mass of organic matter, fæces and bacteria, often concentrically arranged, although occasionally it is a foreign body which has entered at the mouth of the tube or been forced through its wall, such as small pips, pins, shot, bits of bone, &c. The salts of the nucleus are often a deposit from a catarrhal exudation, as in the tonsil and nose, mixed with organic matter and bacteria, whilst the appendix is in a state of inflammation.

It is probable that in a patient predisposed to an attack of appendicitis that movement of any kind will help to aggravate a local condition, and if appendicitis is present, that violent muscular movements from any cause may prove the immediate and exciting cause of rupture. This fact may account for the disease being commoner in the male than in the female, and in the young and active rather than in those past middle life. The worms and parasites found present are the usual varieties which infest the intestine of man. Rheumatism or gout sometimes invade the appendix vermiformis, but I venture to think they are very rare. Simple colic of the tube, or neuromimesis, or a pyæmic, sapræmic or septicæmic condition of the tube, or muscular rheumatism of the abdominal wall in the right lower quadrant of the abdomen, are probably commoner. In pregnancy inflammation of the right appendages closely simulate a mild attack of appendicitis.

SYMPTOMS AND DIAGNOSIS.

The symptoms may be divided into local and constitutional. There are three cardinal symptoms (1) pain, (2) tenderness (superficial and deep), (3) rigidity; and two others are usually present, viz., fever and constipation. The intensity of the symptoms varies somewhat with the degree and variety of the inflammation, as in other parts, as well as to the structure implicated, unless the sensibility of the nerves of these structures has been destroyed or paralysed from inflammation, pressure, or tension. The pulse may be considered as a far more reliable guide than the temperature in this disease. In diagnosis, the questions that present themselves are three in number: (1) Is this a case of appendicitis? (2) What is the probable condition of the appendix? (3) What degree or variety of appendicitis is it?

With regard to the first of these questions, the following diseases may have to be excluded by differential diagnosis, each condition mentioned having a specific history and cardinal symptoms of its own: (a) COLIC—intestinal, renal, hepatic, pancreatic, and splenic; (b) OBSTRUCTION—acute strangulated intestine, or pseudo-strangulation, perforation of the gastro-intestinal tract, other than appendicitis, hæmatocele, parasites and worms; (c) if fever is present, typhoid fever and pneumonia before consolidation; (d) intussusception or hip-joint disease in children; (e) a distended gall-bladder; (f) simple or specific inflammation of colon, the cæcum, or the ileum.

In the chronic and relapsing varieties of appendicitis the

following diseases more or less simulate appendicitis : tuberculosis of the cæcum, cancer of the cæcum, large gall-stones or enteroliths within the cæcum or ileum, psoas abscess, perinephritic abscess, diseases of the uterus, ovaries or Fallopian tubes and hip-joint disease, and also pseudo-swellings.

The following considerations may help us in our diagnosis : the seat of pain ; the occupation of the patient ; the history of the present illness ; past illnesses and environment ; the present condition, as evidenced by local pain, tenderness, rigidity, the cachexia of the patient, facial expression, pulse, tongue, temperature, respirations, the catamenia, the urine, the stool, the vomit and the expectoration ; auscultation of the abdomen and chest ; the use of the exploring needle ; leucocytosis, and laparotomy.

In doubtful cases an examination should always be made *per rectum* and in the female *per vaginam*, and with great care, bimanually.

The presence or absence of a definite swelling in appendicitis is very unreliable and depends amongst other things upon the position of the appendix at the time.

Another point of great importance is the fact that in " perforation " due to " appendicitis " the signs of collapse appear slowly and the progress is comparatively slower than in perforation of other portions of intestine. Generally, but not always, in appendicitis signs of complete obstruction appear late and peritonitis appears early. This fact is important in diagnosing between it and the complete intestinal obstruction of other parts due to adhesions and bands, &c.

In connection with the second question, "What is the

probable condition of the appendix?" the same considerations which helped us to answer the first question are applicable.

Respecting the third question, "What is the variety of appendicitis?" we must, as with the second question, be guided by the same considerations, together with the acuteness of the symptoms, the duration of the disease, and the physical signs and symptoms present. If general peritonitis be present in addition to fever and vomiting there is usually painful micturition, or retention of urine, rigors, and one or both legs are drawn up. The abdomen is tympanitic in front, owing to the presence of free gas, and is partially dull in the flanks. The right lower quadrant of the abdomen, in addition to being exquisitely tender and fixed, is sometimes resonant, sometimes dull, depending upon the presence or absence of free gas and the condition of the parts between the finger and the appendix.

Even in the ultra-acute variety of appendicitis the temperature frequently does not rise above 103° F. (it may even be sub-normal) or the pulse exceed 120; but there are present all the usual signs of collapse, often accompanied by rigors and vomiting.

The vomit is usually greenish in colour; but in the later stages, if the patient is not operated upon, it becomes darker in colour and more or less fæcal in odour, but true fæcal vomiting is never present in appendicitis.

I have already referred to cachexia and facial expression briefly, as an aid to diagnosis. Anæmia is a frequent accompaniment of appendicitis, but so it is of indigestion and

many other serious conditions, and the drawn, anxious, pinched expression of peritonitis is familiar to us all. We must be very careful in most cases of this variety not to be deceived by "masked" temperatures, "nervous" pulses and respirations complicated by "toxæmia" or "pyæmia," or altered by nervous stimulation or exhaustion, or set up by co-existent inflammation.

LEUCOCYTOSIS.

Leucocytosis is undoubtedly of value as an aid to diagnosis and frequently helps us to confirm a diagnosis, but it is at present in its "infancy." Dr. Osler says, "unfortunately at present the leucocyte count gives little aid in the more serious cases."

COURSE AND PROGNOSIS.

The tendency of appendicitis is to recovery. Appendicitis may be so slight as merely to give rise to a feeling of discomfort, without even laying the patient up. On the other hand, it may give rise to all the signs and symptoms of acute septic peritonitis with complications and secondary deposits. Any intermediate stage may be met with. In appendicitis 11 per cent. of cases are fatal. With abscess it is about 30 per cent., but when surgically treated, is put as low as 2 per cent. by many authorities. Some of the most acute cases terminate fatally in from thirty-six to forty-eight hours, more commonly about the end of the first week. In 50 per cent. of fatal cases death takes place within eight days. An ordinary attack of appendicitis lasts

from seven days to three weeks. The variety of abscess with strictly local peritonitis when surgically treated offers a favourable prognosis. Operation should not as a rule be undertaken hastily, but each case should be treated on its individual merits, even when very acute physical signs and symptoms are present. Peace and rest should be encouraged within the abdomen both before and after operation. When the peritonitis is general, prompt action is needed, and except in the early stages, radical measures which will be described under treatment are imperative.

In about 8 per cent. of cases pus enters the peritoneal cavity by dissecting between the layers of the meso-appendix. During the progress of the disease, especially in the more serious varieties of appendicitis, general toxæmic symptoms are present with frequently evidence of secondary infection.

Acetonæmia and nephritis are sometimes to be demonstrated. There is also evidence in some cases of pathological changes and secondary abscesses in other organs. Appendicitis co-existent with another disease, such as typhoid, dysentery, or tubercle, will usually have its symptoms somewhat masked by the greater invasion. Œdema of the right or even the left leg is sometimes caused by pressure, mechanical interference, and thrombosis, or due to the weak condition of the patient and the septic condition of the blood; and there may be many other symptoms present common to sapræmia and secondary infection.

A condition resembling acute yellow atrophy of the liver of septic origin is sometimes present in the later stages of the ultra-acute variety, but this is probably only part of the

general condition, or one of the organs affected by the poisoned condition of the blood.

TREATMENT.

The general rules in the treatment of inflammation of the vermiform appendix are the same as those in the treatment of inflammation of other parts.

When appendicitis is suspected or diagnosed the patient should be placed at rest. Rest must be insisted upon and obtained.

The diet should be restricted, nutritious and spare, very little being given by the mouth.

The application of hot or cold fomentations and leeches to the right iliac fossa or at the seat of pain are sometimes of benefit, especially in the earlier stages of acute cases. The first stages of inflammation are often better treated by cold than by heat. A very mild saline aperient should be employed in the earlier stages, so as to clear out the intestine, and this should be followed by a simple enema. At the same time purgatives must be given with discretion and care. Dr. Osler says they should not be given. Dr. Deaver says the bowels should always be made to act both by aperient and by enema. If there is much distention, there should be added a little turpentine to the enema, and the rectal tube should be passed from time to time, great care being taken to disturb the patient as little as possible. When the diagnosis of variety has been made out, a little opium may be given to relieve pain, anxiety and discomfort, either

as an injection of morphia ($\frac{1}{6}$ of a grain) or in the form of the liquor sedativus (10 minims twice in the day), according to the amount of the distress. Opium in these cases is a very valuable friend, but a dangerous friend, and must be given with care, the physical signs and symptoms being carefully watched. If the symptoms are very acute no food should be given by the mouth, except a few spoonfuls of milk (peptonised) or a little hot water or weak tea to relieve thirst, the patient being fed by rectal enema. No aperient should be given by the mouth at this stage for obvious reasons. In acute cases the treatment should correspond to that for "acute peritonitis." Many prefer to add a little antiseptic by the mouth, say "salol," 10 grains twice or three times in the twenty-four hours if the bowels are acting. It is very doubtful whether sufficient antiseptic can safely be given by the mouth in appendicitis without being harmful to the patient. On this account many authorities prefer not to attempt this method. If stimulants are indicated they must be given. They are probably best given either in the form of brandy, whisky or (iced ?) champagne, to be sipped slowly, or administered *per rectum*, or by hypodermic injection, the patient being fed by the rectum.

Cases of acute, chronic, relapsing, or latent appendicitis are best treated in this way, unless ultra-acute symptoms or special symptoms have presented themselves. It must be remembered that after repeated attacks recovery may be perfect, and that in any case the operation is best performed in the quiescent stage where possible.

OPERATIVE MEASURES.

The large majority of cases of appendicitis require no "operative" treatment. In ultra-acute cases, with gangrene or abscess, laparotomy should be performed early.

Operations for appendicitis do not differ in principle from other antiseptic or aseptic operations on the abdomen. Suppurative appendicitis, whether intra- or so-called extra-peritoneal, call for immediate operative interference. The term extraperitoneal appendicitis is not strictly correct, except when the inflammation is limited to the lumen and coats of the tube ; but by it I mean when the peritonitis is strictly local and the general peritoneal cavity is not involved, or is shut off by adhesions. In all cases of appendicitis Nature endeavours to localise and to limit the mischief by throwing up adhesions. In the so-called extraperitoneal variety the incision should be made as low as possible so as to avoid opening the general peritoneum, *i.e.*, half an inch above Poupart's ligament along the outer half, according to the point of maximum dulness and resistance, which may be decided upon after the patient is under the anæsthetic. During the incision in the non-suppurative variety the muscular fibres are best separated by McBurney's method for preference (that is, separating each muscle in the direction of its fibres). In this variety many prefer the incision through the linear semilunaris along the outer border of the rectus muscle.

Appendicitis with intraperitoneal mischief and general septic peritonitis requires very careful packing and sponging, so as to try to prevent more septic extravasation than already

exists. The number of sponges and pieces of gauze in use must be carefully counted, both before and after an operation. In operating, after opening the peritoneum, probably the shortest guide to the appendix, whatever its position, is the anterior longitudinal band on the front of the cæcum, but very often when searching for it the surgeon's finger is even more useful.

It is unnecessary to state that the intestines and adhesions should always be handled very gently, and with the greatest care, but if in spite of this a slight tear should occur, say in the cæcum, it should be immediately sewn up.

In early acute septic inflammation without suppuration an incision should be made and the appendix removed, and there should be a thorough sponging away of all septic material.

There are three varieties of abscess of the appendix, viz., (1) with strictly local peritonitis in which the pus is discharged outside the general peritoneal cavity; (2) involving more and more of the peritoneum, but still shut off from the general peritoneal cavity by adhesions; (3) discharging directly into the peritoneal cavity or else, after being of the so-called extraperitoneal variety then entering the general peritoneal cavity. The first two varieties should be cut down upon, and evacuated and drained efficiently, taking great care not to break down new and delicate adhesions. If in either of these varieties whilst operating the appendix is presenting itself in the wound, or easily accessible by very gentle manipulation, tie it and remove it, but if not do not break down Nature's adhesions in searching for it during the

acute stage. It will either slough away or become obliterated after efficient drainage and rest.

The third and most fatal variety occurs often after a few days' delay or when the peritonitis is very acute from the first, and is probably best treated by the radical method recommended by the late Mr. Walsham in his excellent work on appendicitis, and which operation I will now proceed to describe.

An incision is made over the seat of the appendix and is removed. An incision is then made at a point midway between the ensiform cartilage and the umbilicus and carried as far as the pubes. The intestines are then turned out and cleaned, being kept by an assistant at the body temperature by the application of hot sterilised towels. With the intestines thus turned out the peritoneum can be thoroughly flushed and sponged free from all pus and extravasated fluid, especial attention being paid to the recto-vesical pouch, Douglas's pouch, and other *cul-de-sacs* of the abdominal cavity. When every visible particle of septic material has been removed we have next to deal with the intestines. When they have been flushed and sponged, incisions should be made into the distended coils in sufficient number to empty them of gas and liquid fæces and the peritoneum should then be united by Lembert's method.

The intestines are then returned into the abdomen, and a drainage tube is inserted at the lower part and the abdominal wall is sewn up with silkworm gut. Shock should be counteracted by the usual methods as far as possible, *i.e.*, the limbs should be wrapped in cotton wool and the operation

should be performed on a hot water bed or table. Time must not be wasted during the operation. Subcutaneous injection of strychnine and brandy injections *per rectum* should be administered.

The decision of the surgeon as to prolonging an operation in a given case must depend on the condition of the patient at the time and cannot be decided by rule. Each case must be treated according to the conditions found on exploration.

There are other authorities who even in this variety advocate a simple incision and drainage by one of the usual methods, hoping for the best and trusting to the self-preserving and resisting power of the tissues. No doubt in many cases, owing to the condition of the patient, this is all that it is advisable to attempt.

Amputation of the appendix in these cases is sometimes easy and sometimes difficult or impossible, on account of extensive adhesions. When a second or third incision has to be made, the first should be closed with gauze and collodion flexile after sewing up.

AMPUTATION OF THE APPENDIX.

There are many methods for removing the appendix vermiformis, according to the extent of the inflammation. It is quite probable that when the base of the appendix is in a fairly healthy condition that tying it with a simple catgut ligature and snipping it off would have the desired effect. But when the appendix is septic or the cæcum is in a state of very low vitality or gangrenous, then special methods must be adopted.

I will now describe the method recommended by most authorities. The appendix should be clamped three-quarters of an inch from its base. The first incision should be made through the serous and part of the muscular coat; this is turned back and the remainder is cut through after being clamped; the stump is then touched with a wooden match dipped in carbolic acid or the actual cautery or the galvano-cautery; the clamp is then released and the flap turned over it. It is then sewn up. First of all the mucous and muscular coats and then the serous coats by Lembert's method. A little graft of omentum may be placed over this. If the base of the appendix and the portion of the cæcum are gangrenous, this portion of the cæcum with the appendix should be "cut out," the walls of the cæcum should then be slightly turned in and sewn up by Lembert's suture. Extravasation may frequently be prevented by closing the orifice before amputating, either by a purse string suture or by a clamp. If the base of the appendix is fairly healthy, but the appendix is sloughing or gangrenous, it should be tied with catgut and nipped off with the scissors. An india-rubber tube of large size is then passed to the bottom of the cavity (some surgeons prefer two tubes) in suppurative cases, and in "non-suppurative" cases the wound is closed.

The cavity in suppurating cases is probably best drained by suction, *i.e.*, passing a smaller tube attached to a syringe to the bottom of the larger one and then drawing off the contents and repeating the proceeding at each dressing, combined with the careful placing of strips of gauze. Drainage

by suction has the disadvantage of making us considerably dependent on other people. All tubes, syringes, &c., should be kept in carbolic solution of 1 in 20. The after-treatment is similar to the after-treatment of other abdominal operations, except that in the gangrenous and perforative varieties of appendicitis with peritonitis, the cavity is difficult to efficiently drain, and irrigation must be almost limited to cleansing of the tube and the superficial parts. When gauze only is used this should be loosened by a few drops of warm water at each dressing.

The sinuses and fistulæ remaining in these cases exhibit a tendency to close spontaneously in time, but are usually very slow and difficult to heal. If the skin is allowed to heal too quickly or if they do not heal from the bottom after "fair trial," explore and refresh the edges of the sinus or the sinuses, at the same time cutting through any adhesions that may be necessary. There are a few cases on record where enterostomy or even the cutting out the cæcum or other portions of the intestine become necessary.

The appendix should be removed during a quiescent period for preference, but when an abscess is diagnosed it is safer to operate at once.

There is no fixed day for operation; but too early and too late operations are to be avoided. Operation or exploration are seldom called for before the third day and then only if the symptoms are progressive.

In the relapsing variety of appendicitis we cannot be guided by rule alone, but operation is perhaps best performed after the first or second, or third attack, in the

quiescent period for preference, unless ultra-acute symptoms suddenly supervene, in which case operative measures should be undertaken at once.

I will now proceed to relate a few cases to illustrate some of my points, which cases have come under my care in hospital and private practice.

Case 1.—A. R., aged 25, seized with sudden pain in the abdomen, but specially about umbilicus over the region of the stomach and right lower quadrant of the belly. Tongue furred but moist, temperature 100° F., pulse 110; has not been sick but feels inclined to be so. Put to bed. Slop diet, mild saline aperient. Recipe: Mist. quininae, t.d.s.—salol 10 grs., three times in twenty-four hours. Next day he feels better, tongue, pulse, and temperature normal, local pain almost disappeared. Kept at rest four days longer, and then allowed to return to his work—well.

Case 2.—C. D., admitted into hospital in apparently a more or less neuro-mimetic condition, complaining of general illness, great pain in the stomach, not strictly localised, vomiting, constipation and fever.

A surgeon under whose care he was placed informed me that the patient was very hysterical and seemed to have very little else serious the matter.

Two days later I assisted at his *post-mortem* examination.

It was a case of the ultra-acute perforating variety of appendicitis with gangrene, and abscess discharging into the general peritoneal cavity and with general septic peritonitis; a faecal concretion and perforation were found in the appendix.

Case 3.—E. F., admitted into the hospital with the usual physical signs and symptoms of appendicitis and acute septic peritonitis. The surgeon under whose care he was admitted informed me the patient was very ill, suffering from rigors and vomiting, and that after consultation they had decided to operate. An operation was performed. The patient was opened in the middle line, and a drainage tube was inserted. A large quantity of foetid pus was evacuated. No washing out or sponging was done.

Two days after I assisted at the *post-mortem* examination. The usual evidence of fulminating or ultra-acute perforating peritonitis was found, with a perforation and faecal concretion in the appendix.

Case 4.—G. H. was admitted in the hospital under my care suffering from the usual signs of appendicitis. He was put to bed with the usual treatment. The following morning he was much better, but whilst the nurse's back was turned he got out of bed and went to the lavatory. He said he felt he wanted to go to "stool" and could not do so, and his object in going to the lavatory was to try. Within the next two days his physical signs and symptoms were more pronounced and he again got out of bed without being observed. His physical signs and symptoms became much aggravated as a consequence. He had repeated rigors, continuous vomiting, legs drawn up, flushed face, dark lines under the eyes, pinched anxious facial expression, limbs cold and he was acutely ill, and he had all the physical signs and symptoms of appendicitis with perforation and considerable local peritoneal infection, the main portion of the general

peritoneal cavity being probably shut off by adhesions. After consultation with the senior surgeon we decided to operate at once.

He was placed under a general anæsthetic and an incision made in the middle line. The bladder was found distended and adherent. The wound was then closed with gauze and collodion flexile and an incision made over the appendix. On opening the peritoneal cavity about one pint of a very foul smelling pus with fæcal odour was evacuated. The cavity was very gently irrigated and a large drainage-tube was inserted. This cavity was carefully drained by the suction method and also by a few well placed strips of gauze, according to the method already described, and the case was generally treated on antiseptic principles. He did well and eventually made an excellent recovery, although the sinuses were long and difficult to heal.

REMARKS ON CASES.

It appears to me that Cases 2 and 3 of ultra-acute appendicitis with perforation into the general peritoneal cavity and general septic infection might probably have had a better chance if operated on according to the method I have described as "radical," but it by no means follows that they would have recovered from such a serious condition. It seems to me that in all cases of this variety, "emptying the intestines" and thorough and efficient drainage are the least the surgeon should attempt, and that in cases which are not so far advanced the decision of the surgeon

as to the extent of the operation can only be arrived at after laparotomy, as well as by the general condition of the patient at the time of the examination.

CONCLUSIONS.

(1) That as appendicitis is essentially protean and as the more serious cases cannot be anticipated, it would not be wise to open the abdomen in all cases of appendicitis simply on the possibility of their becoming of the ultra-acute variety.

The statistics of many thousands of cases in hospital and private practice, both in Europe and America, prove to us that the large majority of cases recover without operation and without acute septic peritonitis. I am well aware that the time has not yet arrived to be dogmatic on this subject.

(2) The exploring syringe has been used with considerable success in America, but in the ultra-acute cases, owing to the usual septic condition of the parts and the depth of tissue, as well as to the possibility of missing the pus, a laparotomy would appear preferable and is usually practised in this country. The exploring syringe is no doubt of use in a few cases.

(3) In a paper published by me in the *Lancet*, September 21, 1901, I advocated that in addition to making the counter opening in the loin, or in the female behind the cervix uteri for purposes of efficient drainage, I was of opinion that aspiration, or a small counter opening *per rectum* when the pus was collected in this locality, was in suitable cases of value. Since that time I have had the pleasure of reading in this Society's Journal that the peritoneum had been successfully

washed out and drained *per rectum*, in some cases of ultra-acute appendicitis, in America. There are also some recorded cases of simple appendicular abscess successfully treated by way of the rectum.

I was prompted to make the suggestion after repeated experiments in the deadhouse, and owing to the difficulty I experienced in draining successfully in these ultra-acute cases.

(4) It is well to remember in making incisions when peritonitis is present: (a) That the peritoneum is injected or of a dull red colour, and is often as much as half an inch in thickness. (b) That adhesions are best divided and not torn through. (c) That the visceral and parietal layers of peritoneum are usually adherent. (d) That the small intestines are often glued together and if opened by accident they should be united by Lembert's sutures. (e) That the bladder is sometimes dilated and adherent. (f) That each piece of omentum is best transfixed and tied at both ends. (g) That if the whole appendix cannot be removed owing to adhesions, try and dissect away part of it, if you have decided to attempt removal. (h) That the amount of pus present in perforation cases varies from a few drachms or ounces in the direct perforating variety to as much as a couple of pints or even quarts.

(5) That 70 per cent. of cases of appendicitis get well on careful medicinal treatment alone, and that although a new set of false teeth and regular and careful attention to digestion, to the bowels and to diet, have warded off relapse, that gangrenous appendicitis may occur in upwards of 15 per cent. of cases.

(6) That all cases of appendicitis may develop into the ultra-acute variety requiring surgical treatment, but that the tendency of appendicitis is to recovery.

(7) “* That appendicitis occurring in a pregnant woman should be treated in every way as if she were not pregnant, *i.e.*, the same as in man or in the non-gravid uterus.” The statistics of appendicitis occurring during pregnancy when of the ultra-acute variety, show it to be a very grave complication, but when of the simple varieties the patient not uncommonly does well. Abortion or miscarriage frequently occur both after as well as before operation.

Nature is wonderfully protective and conservative in many of these cases, and it is often advisable in doubtful cases to leave the intestines to take care of themselves under suitable medical treatment. Pregnancy does not prejudice appendicitis unfavourably—in many of the proved cases the local pains are mild. On the other hand the complication gravely affects pregnancy—abortion and miscarriage being relatively frequent in the more serious varieties, but by no means invariable.

Mr. President and Gentlemen,—In concluding my paper I have to thank you for your very kind attention, and it seems to me the knowledge we now possess on this subject should teach us when not to operate, as well as when to operate, for “appendicitis.”

The present generation are wise, inasmuch as they are

* Dr. Boiji, of Helsingfors, based on all cases which he could find recorded in literature (Berlin, Karger, 1903.)

hoisted on the shoulders of their ancestors. I believe appendicitis by coincidence is sometimes epidemic, that it often runs in families, that it is much more frequent in the male than in the female, and that it is commonest during the first half of life and during the hot weather, especially in tropical climates.

I do not know why one person should develop appendicitis whilst another person taking exactly the same risks does not do so, and I cannot tell why an appendix eight inches in length lying in a left inguinal hernia of ten years' duration, or in other cases abscess around the cæcum, should be latent, or give rise to no symptoms during life, but this is sometimes the case.

In preparing this paper I am much indebted to the works of Dr. Pye Smith, Sir Frederick Treves, the late Mr. Walsham, Mr. Lockwood, Dr. Kelynack, Dr. Deaver, Dr. Osler, and to some kind suggestions from Mr. C. B. Keetley, my brother, Mr. Rickard W. Lloyd, Col. C. E. Harrison, and Dr. T. J. Dyall; also to some specimens of appendicitis at the Royal College of Surgeons, London, and the Museum of St. Bartholomew's Hospital, and elsewhere, and to some interesting cases which came under my care and observation at the Guard's Hospital, London, in South Africa during the late war, and in general practice.

Russell Road, Kensington,
LONDON, W.

Jan. 4, 1904.

