An Address

ON

THE MORTALITY OF APPENDICITIS.*

BY

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THE incidence of a disease and its mortality are the two criteria by which the capacity of the medical profession should be judged. To prevent we must eliminate cause. The cause or causes of appendicitis have been a subject for both speculation and research for more than thirty years, but little has been established beyond the fact that the appendix is a dangerous possession. Its removal is therefore the surest method of preventing appendicitis, and the practice of removing an appendix which is to all appearances healthy, when the abdomen is opened for some other operative procedure, is quite sound provided it does not delay matters and add to the difficulty of the operation in hand. There has been talk of a function for the appendix, but as far as I am aware no one really knows what it is, and, surgically speaking, it is not an organ—it is a nuisance. Unfortunately the risk of an abdominal operation can never be reduced to that of having one's hair cut, and therefore preventive appendicectomy is customarily limited to those cases where there is evidence of a present or past attack.

Unless an epidemic occurs it is difficult to be dogmatic concerning the incidence of any particular disease. The increase or decrease can be gauged by personal impressions on the part of practitioners, by the collected statistics of institutions, and, lastly, by the returns of the Registrar-General. The last mentioned are certainly the most reliable source of information, but, unfortunately, they deal only with fatal cases. Mortality is not a fair criterion of incidence. If it be accepted that where mortality figures show an increase this must mean a rise in incidence, then much of what I wish to say becomes pointless. The chief value of the Registrar-General's statistics is that they cover the whole of England and Wales, bearing relation to some forty million inhabitants. Institutional figures are not easy to obtain so that they can all be massed in one total, and the impressions of practitioners, so far as I have been able to benefit by them, do not support the view that appendicitis is noticeably on the increase. The question has been carefully studied by Rendle Short.¹ He states that "appendicitis did not become a separately notifiable and recorded cause of death until 1901." This was about the time of King Edward's historic operation for appendicular abscess on the eve of his coronation. The figures Rendle Short quotes end with 1918. His conclusions are important, and those which bear most directly on our subject are as follows:

1. Appendicitis was present, but was relatively rare in this and other countries until the end of the nineteenth century. Since then it has become very common in most highly civilized countries.
2. The rise in Bristol, and probably throughout England, was beginning in 1895, and was pronounced between 1895 and 1905, since when it has been fairly stationary.
3. This rise was most marked at first in towns, in the male sex, and probably amongst the better-off class.
4. The privations of war did not reduce it.

Six years have passed since 1918 and the mortality is certainly higher. In 1918 the number of deaths shown by the figures published by the Registrar-General was 2,416; in 1923 it was 2,826. If the last part of Rendle Short's second paragraph is correct we have ample justification for inquiring why the returns of the Registrar-General show a steady rise in the death rate. I show below the complete figures from 1913 to 1923 inclusive, with their relation to the population (irrespective of sex). I take 1913 because it is a pre-war year, and 1923 because it is the last year available. The figures for the war years refer only to the civil population, and as this meant the

withdrawal of a large number of males from the statistics they are no doubt vitiated.

Deaths from Appendicitis and Typhlitis.
(Registrar-General's Returns.)

Year.	Male.	Female.	Total.	Persons per Million.
1913 ...	1387	1141	2528	69
1914 ...	1573	1111	2684	71
1915 ...	1441	1062	2503	67
1916 ...	1474	1129	2603	70
1917 ...	1390	1053	2443	67
1918 ...	1298	1118	2416	66
1919 ...	1278	1151	2429	66
1920 ...	1389	1142	2531	67
1921 ...	1474	1237	2711	72
1922 ...	1524	1211	2735	72
1923 ...	1608	1218	2826	74

It may be urged that deaths from peritonitis of unstated origin will show a decrease *pari passu* with the rise in appendicitis deaths. Such, indeed, is the fact, but the total decrease from about 490 to 420 is far too small a figure to afford an adequate explanation for an addition of nearly three hundred deaths from appendicitis. Nor do I think that any satisfaction can be extracted from the variation of the total number of inhabitants of England and Wales. A sufficiently striking contrast is afforded by the difference between the year 1920, when demobilization of the army was completed, and 1923, the respective figures being 67 and 74 deaths per million. These are post-war years, and my own view is that we should be justified in looking for a decrease. Instead there is a rise in these deaths, which most surgeons would be inclined to regard as preventable.

In order to gain further information as to the incidence of the disease I have obtained figures from the leading hospitals and Poor Law institutions in the London district. These should reflect the incidence in the London population, and I have endeavoured to get figures down to the year 1922. The hospital cases show slight diminution since 1912, and the infirmary figures a definite increase. The explanation of this turnover from hospital to infirmary is that the general practitioner, realizing the urgency of cases of appendicitis and the lack of empty beds in the hospitals, prefers to send his cases where he knows they will be admitted without delay. This attitude is, no doubt, correct, and it remains only to demand that the treatment of the infirmary shall be as good as that of the hospital. The mere change of name from "infirmary" to "hospital," which has become the fashion since the war, will not suffice. There must have been a change of spirit and an increased keenness and capacity on the part of the Poor Law medical officers. Such I believe to have been the case, but I regret that these institutions collectively have been unable to supply detailed figures which could be instructively tabulated. The surgical equipment of many of them may well be the envy of the voluntary hospitals, but down to ten years ago this was not the case, and I believe the merits of surgery were largely overlooked by the guardians until the war enlightened them.

Both hospital and infirmary authorities have kindly replied to my inquiry, but the figures obtained are not sufficiently uniform to be massed together. Such figures have little or no bearing on the occurrence of the disease amongst the rural population, as it is recognized that long journeys are forbidden for acute cases, and most country practitioners do not trouble the London hospitals with their appendix cases. So far as the evidence of general practitioners has been available I have not found that it points to any particular increase in either the incidence or the severity of attacks of appendicitis.

MORTALITY.

At this stage of my argument I propose to leave the statistical method and consider the pathological side of the question. The death rate is certainly proportional to the degree of sepsis present before the case comes under treatment. If an inflamed appendix can drain into the caecum the attack will subside favourably, and this is the state of affairs in catarrhal appendicitis, the mortality of which is nil. If a diseased appendix drains by perforation into the peritoneal cavity the prognosis is grave.

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* Delivered in opening a discussion in the Section of Surgery of the Royal Society of Medicine.

A localized abscess may form, and this may be successfully dealt with by Nature or the surgeon. There is little doubt that appendicular pus may be absorbed and disappear without anything more serious than temporary impairment of the patient's health. Appendix abscesses also do burst into the bowel, and if pus is discharged with the faeces the patient may escape the consequences of perforative appendicitis. The two conditions which may precede perforation are ulceration of the wall of the appendix or obstruction of its lumen. In the latter case the tension inside the appendix ultimately becomes so great that it bursts like a distended paper bag, and most surgeons have experienced this during a difficult operation for appendicitis in the obstructed stage. In the former condition local necrosis of the wall, proceeding from mucosa to serosa, occurs without distension. There is no doubt which is the more serious event. The ruptured appendix pours a quantity of infective material into an unprepared peritoneal cavity. The ulcerated appendix is rather comparable to the leaking gastric ulcer. Protective steps on the part of that very useful ally, the omentum, are likely to have been taken, and a perforated appendix is not infrequently rendered almost harmless by being wrapped up in a covering of omentum. The analogy with the large and small gastric perforation is striking. It is rare to find evidence that the omentum has made any attempt to lessen the size of a large perforation of the stomach. Such perforations, on the other hand, are often obscured by reason of the reaction of the omentum, that energetic "plumber" of the peritoneum.

If, then, the mortality of appendicitis is to be abolished by treatment of the disease, sepsis must be eliminated, and the problem becomes one of early diagnosis. This is an ideal which is not likely to be attained, certainly not until it is recognized by the public in general, and mothers in particular, that stomach-ache is not an indication for a dose of castor oil. The mortality of appendicitis ever since it was first classified by the Registrar-General as a cause of death has always been highest between the ages of 5 and 15. This corresponds to the period when the mother is most apt to dose her offspring with aperients, and also that when the doctor finds the interpretation of symptoms extremely difficult. The liability of the doctor only begins with the first consultation, and the treatment of appendicitis is appendicectomy. Medical experience all goes to show that there are two safe periods for operation—one within twenty-four to thirty-six hours of the onset of disease, the other when the inflammation has subsided. With regard to operation in the acute stage, the capacity of the peritoneum is such that although sepsis may be encountered the convalescence of the patient is rarely affected by it. This means that the mortality is little higher than that of the interval operation, which is usually about 3.5 per cent.

TREATMENT.

If the incidence has not gone up, why is it that the number of deaths has increased? Can there be anything wrong with our treatment of appendicitis? In his presidential address to the Section of Surgery of the Royal Society of Medicine two years ago Mr. James Berry² raised this question. He called attention to the fact that both the public and the medical profession were under the impression that the custom of operating freely for acute appendicitis had resulted in great saving of life. Would that the Registrar-General could support this optimistic view. Mr. Berry hinted that all was not well with the surgery of the appendix, and that greater care was needed in the selection of cases for operation as regards both time and manner. It may therefore not be out of place to review briefly some of the important steps in the history of the treatment.

We start with the beginning of this century. It then required a physician to diagnose the disease and a surgeon to operate on it when required. This plan gave the physician a deal of anxiety and caused the surgeon considerable vexation. Frequently the operator complained that he was not called in soon enough. The physician's attitude gradually underwent a change, and the late Sir William Osler crystallized the position when he wrote in

a late edition of his famous textbook, "There is no medicinal treatment for appendicitis."

There being no scope for drugs, and the diagnosis becoming simple, the physician tended to withdraw from the case. This was the surgeon's opportunity, and the late Edmund Owen, rather more than twelve years ago, was perhaps the most insistent on immediate operation, and immediate appendicectomy, as soon as the diagnosis was made. Postulating that no one could tell the actual condition of the appendix by abdominal examination he made out a strong case, and I think I am right when I say that he carried the bulk of surgical opinion with him. Discussion there certainly was, but the main effect was to enlighten the public and to place the treatment of appendicitis on a firmer surgical footing. The notable achievement was that the practitioner learnt to rush his appendix cases into a surgical home, or hospital, as early in the disease as he could. The Hippocratic facies disappeared, and it did not take long to prove beyond dispute that the mortality for appendicectomy in acute appendicitis when the disease is so limited is very little higher than that for the interval operation.

Sir George Beatson was perhaps Owen's most strenuous opponent, and he advocated a policy of delay. This is in accord with the experience of the American surgeon Ochsner, who since 1892 has practised a policy of delay in appendicular cases. Ochsner maintained that absolute rest in the Fowler position, with only water by the mouth, and the withholding of aperients and morphine, would cause a subsidence of symptoms and an improvement in physical signs in a very short time, even in cases with general peritonitis. That resolution of an inflamed appendix could be confidently expected under this treatment gave the surgeon a new opportunity to practise the art of the physician. Appendicectomy was, and still is, the goal to be aimed at, but the time for the operation is best selected by the operator. It has long been known that the majority of deaths occur amongst cases operated upon from the third to the sixth day of the disease. Therefore if cases can be successfully watched until these days are passed the mortality should be lowered. Many of the cases first seen at this period have an inflammatory mass in the right iliac fossa with little rigidity elsewhere. All such should be classified as having local peritonitis. Some others have general peritonitis. If all these cases are treated by appendicectomy at sight a high mortality must be faced. The patient has already absorbed toxins, and his resistance is an uncertain factor. The disturbance of appendicectomy may just turn the balance of toxic absorption against him before he has had time to develop antibodies and neutralize the toxins present. If all such cases are treated by the Ochsner method, the most favourable result obtainable will be resolution in some and local abscess formation in others. Experience in this country seems to show that there will still be a certain proportion where the symptoms will progress, and because of increasing pain, rising temperature and pulse, and worsened facial aspect, the surgeon will feel impelled to operate. This aspect of treatment has recently been studied by Mr. McNeill Love,³ and two very interesting papers have been published by him based on the statistics of the London Hospital. He agrees with every other observer that cases operated upon during the first twenty-four hours show a low mortality—namely, 0.9 per cent. The same death rate holds for all cases where the disease is limited to the appendix.

The recognized mortality for the so-called interval operation, where inflammation is presumably in abeyance, is rather less than this—namely, 0.5 per cent. Love presents two tables which give the mortality of acute appendicitis treated by immediate operation and by postponed operation. Operation in both instances means appendicectomy, and immediate operation shows a percentage of deaths as high as 5.8, whereas cases treated on delayed lines are only fatal in 3.5 per cent. These figures are important because the immediate operation cases include a high proportion with general peritonitis—one-seventh of the total—and these have a mortality at the London Hospital of 20 per cent.

Statistical proofs are often looked upon with scorn, but nevertheless a surgeon is influenced by his own statistical results, and it behoves us all to know, and to watch, our

personal figures. For this reason I have prepared, with the aid of Mr. A. C. Halliwell, until recently surgical registrar at St. Thomas's Hospital, and now resident assistant surgeon, figures for the years 1919 to 1923, which may be usefully compared with those published by Mr. Love in the *British Journal of Surgery*. These latter are from the London Hospital, and refer to the years 1920 to 1923.

TABLE I.—Cases Operated on within Twenty-four Hours of Onset.

	London.	St. Thomas's.
Number of cases ...	221	303
Recovered ...	219	296
Died ...	2	7
Mortality per cent. ...	0.9	2.3

TABLE II.—Cases Treated on Delayed Lines.

Inflammation Subsidied:			London.	St. Thomas's.
Number of cases ...			232	143
Recovered ...			227	143
Died ...			5	0
Mortality per cent. ...			2.1	0.0
Unsuccessfully Delayed:				
Number of cases ...			109	71
Recovered ...			102	62
Died ...			7	9
Mortality per cent. ...			6.4	14.0
Total:				
Number of cases ...			341	214
Recovered ...			329	205
Died ...			12	9
Mortality per cent. ...			3.5	4.2

TABLE III.—Cases in which Immediate Operation was Performed.

Inflammation limited to the Appendix:			London.	St. Thomas's.
Number of cases ...			633	348
Recovered ...			627	345
Died ...			6	3
Mortality per cent. ...			0.9	0.8
Local Peritonitis:				
Number of cases ...			467	271
Recovered ...			438	257
Died ...			29	14
Mortality per cent. ...			6.2	5.2
Local Abscess:				
Number of cases ...			347	95
Recovered ...			331	91
Died ...			16	4
Mortality per cent. ...			4.6	4.2
General Peritonitis:				
Number of cases ...			230	187
Recovered ...			183	132
Died ...			47	55
Mortality per cent. ...			20.5	29.4
Total:				
Number of cases ...			1677	901
Recovered ...			1579	825
Died ...			98	76
Mortality per cent. ...			5.8	8.4

TABLE IV.—General Peritonitis Cases.

(All treated by immediate operation.)

Day of Attack.	London (230 Cases). Per cent.	St. Thomas's (187 Cases). Per cent.
First ...	6.6	10.6
Second ...	29.8	46.5
Third ...	35.6	21.3
Fourth ...	13.3	9.0
Fifth ...	6.6	5.8
Sixth ...	4.7	1.0
Seventh ...	1.1	3.7

With regard to Table I the higher mortality of the St. Thomas's column may perhaps be excused by the fact that the notes record a rather high proportion of what are called fulminating attacks. Anyhow the figure is higher than it ought to be for such early operation, where the presumption is that the disease is limited to the appendix itself. The last table will show that 10 per cent. of our cases of general peritonitis gave a history of only twenty-four hours, and I shall comment on this later.

Table II seems to show that St. Thomas's has gained in the first section the patients it lost in Table I, and I rather think in reading Mr. Love's paper that the operation has been undertaken unduly early, and thus the higher mortality at the London Hospital is accounted for. I think no great clinical acumen is required to recognize that a large number of cases come to hospital with more than twenty-four hours' history, when the attack is obviously subsiding, and these, if sufficient patience is exhibited, will go far to improve

the statistics under this heading. They are cases which without a twenty-four hour rule could be dealt with at once and do no harm to the mortality table. The heading "Unsuccessfully Delayed" is more important, and here I freely admit that our high figure of 14 per cent. is attributable largely to the pernicious system of dual control.

There are one or two points of difference in the practice of the two hospitals to which I should like to draw attention, and I have to thank Mr. Love for information so far as the London Hospital is concerned. In the first place, he tells me that all appendix cases are treated in the surgical wards at that hospital; that many of the surgeons adopt the expectant line of treatment in late cases more or less as a routine. At St. Thomas's Hospital, on the other hand, very little expectant treatment is indulged in on the surgical side, and a large number of appendix cases are still admitted to medical wards. Cases there are seen in the first instance by the resident assistant physician and surgeon, and where the disease appears limited to the appendix or the patient appears to have general peritonitis, immediate operation is arranged for. Where an appendicular mass is diagnosed the case is commonly admitted on the medical side, and here expectant treatment is practised. Dual control I have no hesitation in condemning, and I am convinced that it does not serve the interest of the patient; appendicitis is a surgical disease, and the man who sees and handles the interior of the abdomen is surely the one to make the most accurate estimate of the physical signs. A study of the nine fatal cases in our series of seventy-one shows that the mortality was attributable to imperfect appreciation of the degree of infection, and not to the fact that operation was done in the dangerous period of the third to the sixth days. Three of them had general peritonitis when the delayed operation was performed, and an equal number a sub-phrenic abscess, while the remaining three had obstruction of the small bowel.

If we turn now to Table III we shall see that at both hospitals the mortality is weighed down by the cases of general peritonitis. We all know that if our ideals of diagnostic accuracy could be reached the number of these widespread infections would shrink very considerably. General peritonitis is rare with only one day's history, and if we cut out these cases altogether and perform immediate operation on all cases, as shown in Table III, the St. Thomas's mortality comes down to 2.9 per cent. and that of the London to 3.5. These are very respectable figures, and seem to me to justify the gospel of immediate surgical treatment. To strengthen this view I have prepared a fourth table, which deals only with cases of general peritonitis, and shows the day of the disease when they were operated upon in accordance with the principle of immediate attack. It will be obvious that it is the first twenty-four hours which give the diagnostician his chance. It matters not whether he be general practitioner, physician, or surgeon—he must make up his mind early or the risk to the patient will be increased. It may not matter vastly who does the surgery, but it does matter when the patient first comes under medical observation, and who sees the case. Diagnosis will always be the highest art both in surgery and in medicine, and let us recognize that herein lies the chance of practising preventive surgery, which alone can bring down the mortality of this disease to a level consistent with the pride of our profession.

I think I shall find general agreement when I say that there are three main types of acute appendicitis viewed from the clinical aspect. There is one where the disease is limited to the appendix, characterized by local pain, local tenderness, and usually hyperaesthesia of the skin above Poupart's ligament. To the second variety the old-fashioned name of "perityphlitis" might still be applied, for the infection has passed beyond the confines of the appendix, which itself is often gangrenous and usually perforated. The infected peritoneal zone is that of the right iliac fossa or the pelvis. A localized abscess, an inflammatory mass without evidence of pus, or infection ill limited by adhesions, may be in existence at the time the patient is seen. The third main class is that where

there is widespread inflammation, diffuse rigidity of the abdominal wall, very little respiratory excursion, and an anxious expression on the face of the patient. In this last type general peritonitis may be inferred.

If it is true that immediate operation in the first class carries with it a death rate of 1, or less than 1, per cent., I think we shall all agree that we have learnt the correct line of treatment. Personally I do not feel disposed to pay very strict attention to the alleged day of the disease. Appendicitis seldom exhibits the dramatic onset of a gastric perforation, and frequently there is a day or two of ill health before actual pain is felt. I think there may be marked pathological changes in the appendix which cause no pain at all, and they may certainly give rise to no vomiting. If so, the patient may easily be forty-eight hours out in his length of history. If the clinical signs point to appendicitis proper, appendicectomy is the quickest route to restored health. This is in accordance with the view that one can never tell what the diseased appendix will do next.

In the case of general peritonitis I doubt if a policy of "wait and see" has much to recommend it. When it was always thought necessary for a physician to diagnose and a surgeon to operate, some fifteen to twenty years ago, the mortality was 70 per cent. at St. Thomas's. Now it is 29 per cent., and at the London Hospital 20 per cent. These cases still bulk far too largely in our tables, for in the London Hospital cases 13 per cent. of the total treated by immediate operation had general peritonitis, and at St. Thomas's 20 per cent. In spite of this our hospital figures are better than they were fifteen years ago, and I think the credit of this should be given to the improved capacity for diagnosis on the part of the general practitioner, and also to the doctrine of immediate operation for appendicitis. The actual fall in mortality since 1910 for all types of the disease is from 8 to 5 per cent. at St. Thomas's. Another factor, which has perhaps been overlooked, is the abolition of chloroform from operations on septic patients. I say this rather than the introduction of gas and oxygen anaesthesia, because I think that ether is still the anaesthetic most generally used, and when given by the open method it is most satisfactory for the surgeon, and almost anyone can administer it. It is true that cases of general peritonitis under treatment by starvation, the withholding of aperients, and the Fowler position, undergo resolution, or the infection may settle down to a localized abscess, but at present I think we have very few data which will guide us in the selection of such cases if we meet them for the first time with generalized peritoneal involvement.

If, as Mr. Love states, delayed treatment can only be carried out satisfactorily under hospital conditions, are we not in danger of reverting to the old state of affairs? For what the hospitals do to-day the general practitioner will do to-morrow. Let it be admitted that each case presents an individual clinical problem. Is it not so with every disease? But let it be recognized by the public that immediate operation yields the best results in appendicitis and the doctor's duty will be simplified. If we change this point of view the public will get the idea that appendicitis should be treated on medical and not surgical lines, and I think there is a very real danger of the mortality continuing to rise. Public opinion is first trained by the medical profession. Later the same public opinion tends to call the tune for medical treatment. As a proof of this I need only refer to the recent trial of a doctor who failed to take a throat swab in a case of diphtheria and objected to the use of antitoxin. He was prosecuted, not by his medical enemies, but by the Crown for manslaughter. The Crown prosecution was at the instigation of a coroner's jury. Such a power over us does public opinion acquire as the result of education by ourselves. For our peace of mind I think it was a blessing he was acquitted; but the fact that the trial took place shows how careful we must be in formulating rules for public guidance. Patients are less exigent than before the war in demanding the immediate attention of their doctors. Perhaps they are more prone to treat their abdominal pains before summoning assistance. I hope this does not mean that the precious surgical opportunity afforded by

the first twenty-four hours of an attack of appendicitis is often allowed to slip. As long as the ownership of children is vested in the parents I am afraid mothers will continue to misuse aperients, and I am heartily in agreement with Mr. Love when he writes that delayed treatment is hardly to be recommended in the case of young children. Nearly every surgeon, I think, has had bitter experience in this connexion. I would add also that at the other extreme of life, in advanced age, watching and waiting have greater dangers.

It has been advised by some, particularly Sherren, as long ago as 1905,⁴ that when cases are seen after the first thirty-six hours of the disease—that is, when the infection is likely to have spread beyond the appendix itself—the tendency should always be towards a policy of delay. Nevertheless he admitted then, and other surgeons have admitted since, that we may regret leaving a case, but we are not likely to regret operating when there is a doubt as to the chance of temporary improvement.

Sherren based his doctrine on the state of cutaneous tenderness present. If superficial tenderness is present in the "appendix triangle," bounded below by Poupart's ligament, above by a line drawn out from the umbilicus, and to the inner side by a vertical line just to the right of the mid-line, it usually means that the appendix is distended and intact. In cases that are subsiding the area becomes smaller and smaller. Disappearance of tenderness without signs of improvement of the patient means serious mischief in the appendix. This latter is a call for immediate operation irrespective of the disease. The presence of cutaneous hyperaesthesia, however, is not a proof of safety, since the infection may spread outside the appendix without leading to any loss of tension within its lumen.

The important discussion, I think, centres around the proper treatment of those cases which I have included in the second clinical type. The disease is no longer limited to the appendix, but as far as the clinical signs are capable of interpretation the name of general peritonitis is not justified. There may be an inflammatory mass, there may be a visible tumour in the right iliac fossa, there may be pus in the pelvis. The day of the disease may be anything from the third to the fourteenth. Cutaneous hyperaesthesia may be present, though usually it has disappeared. What is the proper treatment, viewed in the light of our knowledge of the mortality statistics? Love says that if you practise the delayed operation and choose your cases aright you may expect a mortality as low as 2.1 per cent. If, however, you plan your operation in the future and are compelled to do it in the present, the mortality in unsuccessfully delayed cases will be 6.4 per cent. If you perform immediate operation on cases with local peritonitis or local abscess, the mortality you may expect is 5.52 per cent. He puts together the first two figures and gets the more favourable result of 3.5 per cent. mortality for all cases treated on delayed lines, but I suggest that this includes a large proportion of cases where the condition is obviously subsiding. I do not feel disposed to quarrel with these figures, but I would suggest that it is still good surgery to drain local abscesses rather than to trust to Nature to absorb or discharge the pus.

With regard to the absorption of pus in the peritoneal cavity, I think a note of caution must be sounded. It is true that it can be absorbed, and actual pus may thus disappear, and in due time render the operation of appendicectomy easy; but is it certain that the patient may not suffer in the process? A recent unpleasant experience makes me hesitate to subscribe to this as an ideal process. A previously healthy man was admitted to a medical ward with what was diagnosed as an appendix abscess. His fever lasted only a few days, and in about a fortnight the mass had subsided. He convalesced satisfactorily, and was discharged from the medical ward with instructions to return on the surgical side for appendicectomy. This he did, and the operation was done without any undue difficulty, no pus being encountered. All went well until the tenth or twelfth day, when his heart suddenly began to fail and he died within twenty-four hours. All that the *post-mortem* examination revealed was a fatty and degenerate heart muscle. Personally I am inclined to

attribute this to the toxins absorbed from his abscess. It is one thing for the peritoneum to absorb pus; it is quite another matter for the system to absorb toxins. Relief of tension is the best method of prevention, and I believe that this unfortunate event would not have occurred if the abscess in the first instance had been surgically drained.

In doubtful cases, where the presence of pus is uncertain but there is an inflammatory mass, there is much to be said for the operation of coeliostomy. Drainage, preferably with corrugated rubber, may with advantage be made down to the appendicular lump, and discharge, or resolution, hastened in this way. Immediate operation should not always mean immediate appendicectomy, but rather the relief of intraperitoneal tension. If there is scope for this the general principle for the urgency of surgery is unaltered, and I do not think that the watching and waiting policy is likely to be revived in the case of general peritonitis, except in those cases where the condition of the patient does not appear to warrant any operation. Anything short of appendicectomy here appears to be rarely successful, and if the patient will not stand this by all means give Nature a chance to localize the infection.

In conclusion I would suggest that the treatment of acute appendicitis should now be standardized on the following lines irrespective of the length of the illness:

For acute appendicitis limited to the appendix, appendicectomy without drainage.

For appendicitis with general peritonitis, appendicectomy with cleansing of the peritoneum and perhaps temporary drainage.

For appendicitis with local peritonitis, relief of tension with subsequent appendicectomy.

The last suggestion is not intended to imply immediate operation in all cases, and treatment by physiological rest and the application of heat may be as successful in the treatment of acute inflammation in the right iliac fossa as in other parts of the body.

Treatment which is based on success gradually becomes standardized by the profession and recognized by the public. Experiment gradually gives place to routine, and it is our business to see that our practices are based on sound principles. Immutability is not to be expected in human affairs, but pathological laws do not change greatly, and to lower the mortality of a disease we must either prevent it, or fashion our cure to meet the disease when its victim will best respond to the treatment.

REFERENCES.

¹ *Brit. Journ. of Surg.*, October, 1920. ² *Lancet*, November 11th, 1922. ³ *Brit. Journ. of Surg.*, April, 1923, and October, 1924. ⁴ *Practitioner*, June, 1905.

An Address

ON

APPENDICITIS.

DELIVERED AT THE NORTH-EAST LONDON POST-GRADUATE
COLLEGE ON FEBRUARY 16TH, 1925,

BY

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SURGEON TO THE LONDON HOSPITAL.

DURING the year 1923, according to the Registrar-General's statistics, there were 2,826 deaths (1,608 male and 1,218 female) registered as due to appendicitis in England and Wales. There has been a little fluctuation in the death rate from year to year, but this was the largest number of deaths yet recorded; in 1913 it was 2,529 (1,387 male, 1,142 female). These figures cannot be considered exact, as cases of resulting intestinal obstruction, peritonitis, or other direct complications are not necessarily included, but they do give us an approximate idea. When we consider that the majority of cases of acute appendicitis occur in the young it is a serious figure, and in itself would be sufficient excuse for venturing to take up your time by speaking to you on a subject about which you might think there was nothing more to be said.

The damage done, however, is by no means limited to this loss of life. Among those that recover, in many there

has been an enormous waste of working time and much suffering that could have been prevented if the condition was surgically treated while it was still appendicitis. In the hospital to which I am attached we still get these cases too late—for example, in the twelve months preceding September 30th last 102 cases of acute appendicitis (57 male and 45 female) were admitted to my firm's beds at the London Hospital; of these only 27 were within the first twenty-four hours of the attack—the most favourable time for operation—and these were almost the only cases which could be treated as uncomplicated appendicitis. We should have advanced far from the day when it was stated, "The disease is essentially a variety of peritonitis; its manifestations, its effects, and its possibilities are those only of peritonitis. Whatever be the antecedent condition, an attack of appendicitis is not in evidence, and, indeed, does not exist until the peritoneum is implicated."¹ We should now say that the disease has ceased to be simply appendicitis when this has happened, and that cure is no longer certain by simple removal of the appendix.

I wish specially to direct attention to the symptoms, particularly, but not entirely, in so-called chronic appendicitis. I say advisedly, as I have repeatedly said before, pain starting in and confined to the right iliac fossa is not the symptom of appendicitis. This conception of the symptoms dates, I feel sure, from the time when much of our knowledge was based on swellings in the right iliac fossa; the disease was called perityphlitis, of which inflammation of the appendix was not the only cause. No surgeon saw the case while it was still appendicitis; he was not called in until pus was diagnosed and the pain had become right-sided. That is, however, ancient history, and yet the number of individuals with right-sided pain who are admitted to hospital as acute or chronic appendicitis, or are seen after the appendix has been removed, without relief, shows no diminution. It is for these reasons—delay in submitting cases to operation and want of appreciation of the exact symptoms—that I consider there is still need for education in the matter of diagnosis and treatment.

Sometimes the delay in operating on acute cases is on the part of the public, who think, excusably, that as the appendix is on the right side, pain produced by its inflammation must be right-sided also. But in the majority of cases the patient has seen a medical man, and here there should now be no excuse for delay in recognizing the condition because the pain is general; on the other hand, cases of right-sided pain are still sent into my beds at hospital by medical officers of that institution as appendicitis.

There is now no sufficient reason for considering the symptoms of appendicitis to consist of pain in the right iliac fossa. Even the early writers on acute appendicitis in this country correctly realized its symptoms and mentioned the general nature of the pain, although they did not lay sufficient stress on it or always act on that knowledge. Treves spoke of it, but in the greater part of his writings this was not insisted upon, and in his last contribution² these words occur: "Removal of the appendix is also to be recommended in chronic appendicitis, in those examples in which there are no active attacks but in which there is abiding discomfort in the right iliac fossa with exacerbations of uneasiness." These, of course, are the cases in which appendicectomy is unlikely to bring relief. Tubby,³ in his excellent little monograph, published twenty-five years ago, was one of the first to direct sufficient attention to it, and writes: "A sudden and severe pain in the abdomen is in nearly every case the first symptom. Its situation is, during the first twenty-four to thirty-six hours, all over the abdomen." Lockwood⁴ also drew attention to it. Battle and Corner⁵ are perfectly clear on this matter. In a paper read at the Medical Society in 1907 by Sir Holburt Waring⁶ on "Some surgical affections of the right iliac fossa which simulate appendicitis," he wisely prefaced his illustrative cases with this observation: "I shall also restrict my remarks to those cases in which the cardinal clinical symptoms of an attack of acute or subacute appendicitis have been manifested—by these I understand abdominal pain commencing usually in the umbilical or epigastric region." In the most widely read student's textbook of surgery (Rose and Carless) the symptoms are correctly given, as they are in