

ground, owing to septic absorption from a large pelvic abscess. Rectal section in these cases has quickly worked marvelous changes. In one case of this type, a boy seen at the University Hospital, who had a temperature of 102 every night, and was vomiting and so sick that he could not eat, was crying for food, after 2 pints of pus were removed, and this in four hours after the pus was evacuated. He rapidly recovered. After we had demonstrated the great value of this method in the postoperative cases, we extended its use to bad cases of patients seen late in the course of a perforative attack, who had not been operated on. Many of these have been young children who were first seen between the third and the sixth day, dangerously sick, with a marked distention of the culdesac. In such patients in whom the danger is of a back-firing of the pelvic abscess, with a fatal general peritonitis, the first thing done has been the making of a rectal section and the putting in of a winged rubber tube-drain. If the patient was entirely relieved, so far as

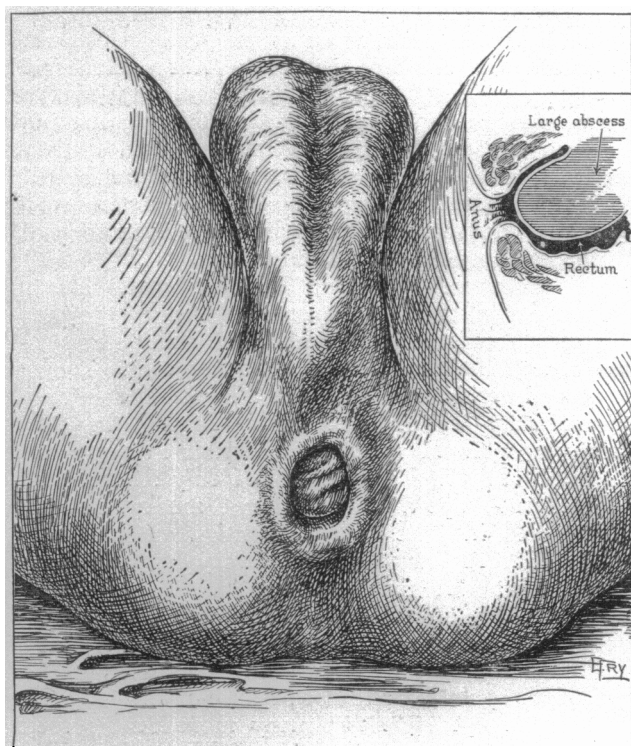


Fig. 4.—Dilatation of sphincter from pressure of large pelvic abscess through anterior wall of rectum.

pain and temperature was concerned, nothing else was done at that time, but usually the very next day, an exploratory laparotomy was done and the gangrenous appendix removed.

I believe in removing the appendix only when it can be done without adding any percentage of mortality to the operative risk. It is surprising how much more one can do toward removing appendixes, however, with added experience.

We believe that the rectal drainage is no more dangerous than vaginal section. In little girls we always use rectal section in preference to vaginal section. Up to the present time we have not used rectal section in adult women, but have continued to drain pelvic abscesses through the vagina, as has been done so successfully for so many years for all sorts of pelvic abscess.

I find that in this last 150 cases, I have considered it wise, to make a primary rectal section 11 times. Secondary to laparotomy I have opened and drained the rectum 13 times, making a total of 24 rectal sections in 150 cases, or approximately 17 per cent.

With the exception of the two patients mentioned above, all the patients of this class treated with rectal section have rapidly recovered and not one has had a fistula. In one case when a large pelvic abscess had resulted from a perforating ulcer on the anterior wall of the upper rectum, drainage through this perforation promptly cured the abscess; when at the end of eight days the winged rubber tube was pulled out of the rectum the perforation promptly closed. Proctoscopic examination in this case two weeks after the tube was removed showed a small scar where the perforated ulcer had been.

#### CONCLUSIONS

1. The successful treatment of acute appendicitis depends on the time when the patient can be operated on after perforation, the earlier the better.
2. We should continue to impress this fact on the laity.
3. Drainage must be complete and, for a certain percentage of cases, rectal drainage is a most efficient measure.
4. After operation has been performed we must not forget these patients. The method of attack is not so important as eternal vigilance, constant watching and frequent rectal examinations, which should be made, if in the future we are to save some who would have been lost in the past.

914 Lowry Building.

#### HAS THE LAST WORD BEEN SPOKEN CONCERNING APPENDICITIS?\*

JAMES E. MOORE, M.D.

MINNEAPOLIS

In 1582 Ambrose Paré said in the preface to his surgery that he had striven so successfully for forty years to bring surgery to perfection that posterity would not be able to surpass us save by some additions such as are easily made to things already discovered—and all that we have left of his teaching is the use of the ligature.

In 1882 Samuel D. Gross, founder and first president of the American Surgical Association and the leading surgeon of his generation, said, "Operative surgery challenges the respect and admiration of the world, and if it has not attained its finality it is as nearly perfect as we can hope to make it"—and he had never performed an appendectomy.

If these men, who were the greatest in their day, were so mistaken, it would be absurd for any of us to say that the last word has been spoken concerning any topic in surgery, for it is a live subject and while the present generation can justly claim that it has added more toward its perfection than has been added in all time before, future generations will doubtless improve on it to a point far beyond our fondest dreams.

The last word has not been spoken concerning appendicitis, and possibly never will be, because the

\* Read before the Section on Surgery, General and Abdominal, at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

last word can not be spoken until the mortality from this affliction has been completely obliterated. A few years ago every program for this meeting contained too many papers on appendicitis, but for the past few years they have been too few. We have doubtless all changed our views since we had our last "battle royal;" is it not time, therefore, to review and see how our present views compare? If in our discussion we find that we are nearer of one mind we shall know that we have advanced. If, on the other hand, we find that we are as far apart as ever, we shall know that there is great need for improvement and that we must renew our efforts as though the topic were a new one.

Little has been added lately to our methods of diagnosis. That syndrome, diffuse abdominal pain which later becomes local in the right lower quadrant, vomiting, local tenderness, and muscular rigidity, is one that can not well be mistaken. The average case of acute appendicitis is the easiest of intra-abdominal conditions to diagnose, but there are exceptional cases in which the most skilled diagnosticians may be mistaken. Within one month we have had four patients in the University Hospital who had no pain, rise of temperature or vomiting when they were admitted. The evidence on which a diagnosis of appendicitis was made was the history of pain and vomiting before admission, the presence of muscular rigidity, and leukocytosis. In all four a ruptured gangrenous appendix and an abdomen full of pus were found. All recovered, but without operation would surely have died. The most common mistake is to make a diagnosis of appendicitis when it does not exist. Not every pain in the abdomen is appendicitis. In our northern climate pneumonia is frequently mistaken for appendicitis in children. Intussusception has not infrequently been mistaken for appendicitis. Retrocecal appendicitis is now a well-recognized condition, and a positive diagnosis of this condition can usually be made by a careful observer. Muscular rigidity over the appendix is the most reliable symptom of appendicitis, and when a patient has all of the other cardinal symptoms and this one is lacking retrocecal appendicitis should be suspected; and if tenderness can be elicited by pressure in the loin just back of the cecum a diagnosis of retrocecal appendicitis is quite certain. In some cases of retrocecal appendicitis psoas contraction is a marked symptom. Refinements in diagnosis should not be undertaken before operation, because it is a waste of time and a mistake in classification may lead to disastrous delay. The time to decide whether a case of appendicitis is catarrhal, perforative, or gangrenous is after the surgeon has removed the specimen.

The prognosis in appendicitis has become better each year, but there is still room for improvement. Statistics concerning appendicitis are preeminently unreliable, but it has been quite generally accepted that without operation there is mortality of at least 20 per cent. With operation at the present time the mortality rate is near 5 per cent., and in hospitals under expert surgeons it is less than this.

When shall we operate? Every surgeon has answered this question differently at different stages of his experience. Whether he began as a conservative or an extremist he has changed, because he had a mortality rate which he hoped to lower by changing. I began very conservatively, operating only when a well-defined abscess was present. Under this practice the operative mortality was low, but the mortality

from the disease was high. Then came a period in which operations were performed by the calendar, or after careful selection. Under this practice the operative mortality was higher and the actual mortality considerably lower, but still too high. During the past few years the rule has been to operate as soon as possible after the diagnosis was made, and the actual mortality rate has been very much lower than that during either of the other periods. We abandoned the waiting plan because we have learned that while some patients will improve, many will die while we are waiting for a more favorable time for operation, and that no living man can tell what will happen in the next twenty-four hours in a case of acute appendicitis. After long experience with all plans we can conscientiously recommend operation as soon as the diagnosis is made, because it has been accompanied by the minimum mortality rate. We would not recommend this plan, however, for the unskilled operator or in the absence of hospital facilities.

In the Minnesota University Hospital we have had eighty-seven patients with acute appendicitis, all of whom have been operated on as soon as possible, with a mortality of but 3.4 per cent. This excludes all chronic cases and appendectomies made when the patient was being operated on for other conditions. Nineteen of them had extensive suppuration. It is of interest to note that all of our deaths occurred while we occupied the old frame building as a temporary hospital. The last forty-four cases have been operated in the new hospital with no mortality.

H. J. Paterson<sup>1</sup> reports a like experience. During the first period he rarely operated except in the presence of abscess, and never until the acute stage had passed, and the mortality was 16 per cent. During the second period each case was a law unto itself, and the mortality was 13 per cent. During the third period he operated as soon as possible in every case and in 95 cases had a mortality of only 5.2 per cent.

The term "operative mortality" means that the patient died in spite of an operation and not as a result of it. A few years ago a very common newspaper report was that someone had died from an operation for appendicitis. Even the laity have learned that the operation for appendicitis in competent hands is a very safe one, and that people die for want of an operation and not because of it. Christian Science is responsible for many more deaths from appendicitis than operations are. Many lives have been sacrificed and surgery has been brought into disrepute by surgeons who were striving to make a record. The record-maker is an unsafe man in surgery because he is very prone to give his record greater consideration than he does his patients. Every surgeon's actual mortality rate from appendicitis is made up of all deaths occurring among his patients whether he has operated or not.

Shall we always remove the appendix in acute appendicitis? To this question I answer, emphatically, No, because I have known of many instances in which the patient's life has been sacrificed through a determined effort to remove the appendix at all hazards. It should be remembered that the operation is performed to save the patient's life and not to remove the appendix. I have removed the appendix in fully 95 per cent. of cases during the past few years, but there have been a few cases, possibly one in twenty,

1. Paterson, H. J.: *Brit. Med. Jour.*, Oct. 5, 1912.

in which I deemed it safer to leave it. We believe that, at present, every experienced surgeon removes the appendix in the vast majority of cases, but that the best, that is, the safest, surgeons occasionally leave one. When the appendix is in evidence, it should always be removed, but when its removal necessitates the extensive breaking down of Nature's protection and the contamination of the general peritoneal cavity, it should be left for a later operation, when it can be removed with perfect safety. The leaving of the appendix in these exceptional cases with the established drainage is safer than its removal. The fact that leaving the appendix necessitates another operation is of no importance, because this is a matter of life and death and not of expediency. If it were the accepted practice to remove the appendix in every case, many lives would be sacrificed by inexperienced operators.

Should patients be operated on after an acute attack of appendicitis to avoid future attacks? The construction of the appendix is such that recovery is seldom if ever complete, and the fact that the first attack was a mild one gives no assurance that the next one will be. The interval operation is so free from danger, and later attacks of appendicitis are so often very dangerous, that we do not hesitate to advise the interval operation as a routine practice. In child-bearing women the operation should be insisted on.

How shall we treat appendicitis in pregnant women? Appendicitis in a pregnant woman is more than twice as dangerous as it is in a non-pregnant woman, and should be operated on at the earliest possible moment, for admitting that the operation and the accompanying anesthetic are attended with some danger, the disease without operation is infinitely more dangerous. The very great increase in danger during pregnancy is due to the facts, first, that two lives are in jeopardy, and, second, that the mother's condition renders her much more liable to grave complications. Abortion occurs in about 40 per cent. of these cases, which is always a very grave situation, and early operation is the best preventive of abortion. I believe that it is good practice to advise every woman who finds herself pregnant after a severe attack of appendicitis in which the appendix was not removed to have an operation as soon as she knows that she is pregnant.

The exact method of removing the appendix and of treating the stump is immaterial so long as it is skillfully done, for different surgeons employing different methods secure equally good results. In suppurative cases drainage is a very important matter, and is very often improperly carried out. It is a very grave mistake to plug the wound with gauze and depend on this plug for drainage, when it only prevents the escape of pus. My personal practice is never to use gauze for drainage except when it is surrounded by a rubber tube or rubber tissue, for it drains only serum and that for only a few hours, when its meshes are filled and it has lost its capillarity.

It is quite a common practice, at present, to place the patient in a sitting position to cause the pus to drain into the pelvis. I have not followed this practice, because it is based on mistaken theory, and it is an uncomfortable position for a feeble patient; and my patients have done just as well as those who were in a sitting position and have been much more comfortable. A few years hence this will be remembered as only a passing surgical fad. No matter what position a patient has been in before operation, with free

pus in the abdomen the pelvis will always be full when it is opened. It is very important to pump out the pelvis in every pus case. Large-sized soft rubber tubes should be passed to the bottom of the pelvis and into the flanks. It is not necessary that they should run down hill, for the intra-abdominal pressure will care for that.

Syndicate Building.

#### ABSTRACT OF DISCUSSION

ON PAPERS OF DRs. MACLAREN AND MOORE

DR. ALBERT J. OCHSNER, Chicago: Some five years ago when Dr. Maclaren brought out the facts contained in the present paper I recalled several instances in which, undoubtedly, judging from the symptoms, patients whom I had observed should have had this additional treatment. Since that time I have encountered four cases in which this condition existed. In one of these there was an additional condition which might have resulted seriously to the patient had it not been discovered by accident. The patient had a greatly distended bladder so that there were two points of bulging, one point a little lower than the other, which made me suspicious that the bladder might be full and that this entire mass might not be due to the abscess. When the bladder was catheterized the abscess remained, but the upper swelling disappeared. In following the histories of these four cases I found that each patient had been carefully treated for some time by the use of cathartics. The shortest time of treatment was four or five days and the longest eleven days. I have never seen this condition present in any case in which the appendicitis had not been treated by cathartics. Many a surgeon with less skill than have the surgeons in this splendid new hospital referred to by Dr. Moore has a mortality in 100 successive cases of less than 3 per cent. by following a method of treatment of which I have spoken so often before this Association that the older members must know it by heart by this time. If in those cases in which the surgeon is doubtful, or feels that he cannot expect recovery, he inhibits peristalsis by washing out the stomach, performing gastric lavage and giving absolutely nothing, not even water by the mouth, feeding by the rectum; he will find that the mortality in this class of cases will be reduced to less than 2 per cent. Dr. Moore's plan of counting mortality is absolutely correct. Every patient with appendicitis who dies must be counted whether operated on or not. I believe in the Fowler position, and agree with what Dr. Moore said about operating during gestation. The reason the diagnosis is frequently not made is because in these cases the surgeon has not the intelligence or does not give the attention necessary to make a physical examination. Usually a patient who comes without having had an early diagnosis is one in whom the doctor took something for granted, not making a physical examination to begin with.

DR. J. M. T. FINNEY, Baltimore: Dr. Moore's paper was so sane and founded on such good surgery and pathology that it is difficult to disagree with him in any respect. There are one or two points, however, with which I disagree. He said the last word has not been spoken, nor will it be spoken until we have 100 per cent. recoveries. I agree with this statement. In appendicitis, in my judgment, the mortality is absolutely preventable. When a death occurs from appendicitis it is *prima facie* evidence that somebody has made a mistake. When pus is found in appendicitis, it is also *prima facie* evidence that somebody has blundered. It is not always the physician, nor is it the surgeon. It is not infrequently the patient or some officious member of the patient's family who interferes, and doesn't send for the doctor early enough. No case of appendicitis should progress so far as the formation of pus. I understood Dr. Maclaren to say that he had had no mortality whatever in any patient operated on except when pus was present. That is my experience. I think that it is the experience of a great many surgeons. If that is true, and the well-known and safe paths are followed in operating on these patients, I believe that mortality can be absolutely elimi-

nated in operations for appendicitis. This whole question, then, resolves itself into one of diagnosis. If the patient can be seen early enough, and if no mortality occurs in patients with appendicitis operated on except after the appendix has ruptured, it necessarily follows that 100 per cent. of recoveries will occur in patients operated on. That is a proposition which cannot be gainsaid in view of the facts in the case. If, then, it is a question of diagnosis, the thing we should devote our attention to for the time being is to improve our methods of diagnosis. There are ways in which that can be done. I cannot mention them all. Attention should be called to one or two points, however. If one has conscientiously examined his patient, as Dr. Ochsner says, if he has made use of every means at his disposal to make a diagnosis, and if he has failed to satisfy himself as to the existence or not of an appendicitis, if the condition of his patient is such as to make him believe that there is some more or less serious condition, it is the duty of the surgeon to offer, indeed, to insist on, operation. Make the diagnosis at the time of the operation if necessary, don't wait until the patient is as good as dead, and then attempt to do the impossible. That may seem to be an extremely radical position, but it can be backed up by the facts in the case, by statistics, by results, and that is what we are after. I call attention to the fact that appendicitis in children is a very different proposition from appendicitis in adults. I called attention to this fact in a paper some years ago, and reported a long list of cases coming under my observation in which all sorts of bizarre diagnoses had been made for appendicitis or the reverse. I have operated on a great many patients that I thought had appendicitis which did not so prove. I do not regret one operation. I am sorry to say I can look back on a goodly number of patients on whom I did not operate when I should and I had grave reason to regret it.

DR. LINCOLN DAVIS, Boston: Much credit is due to Dr. Maclaren for his pioneer work in pointing out the advantages of rectal drainage in cases of appendix abscess. If we could operate on all cases of appendicitis at an early stage, there would be no need of this procedure. Unfortunately, in spite of much missionary work on the subject by surgeons, cases continue to come into our hospitals from the fourth to the tenth day of the disease, with large accumulations of pus. There is no doubt that there has been a great improvement in the mortality after operations for appendicitis in the last few years. This is due, I think, to three factors: (1) more efficient operation; the appendix is removed with less disturbance of the peritoneal cavity; (2) better drainage; the cigarette wick is certainly an advance over the old gauze pack; (3) more intelligent after-care. In the cases in which residual abscesses form after operation in spite of our best efforts to drain from above, there can be no question that rectal puncture is very definitely indicated. It is certainly safer to open such abscesses from below, rather than to poke down through the wound.

Preliminary rectal puncture, as advocated by Dr. Maclaren, has a more limited application, but still a very definite one in a small number of cases. I have not used it in just that way. I have drained two cases of appendix abscess by the rectum, without abdominal operation, with good results. The method is risky. The patient must be closely watched. There are nearly always two abscesses, one at the site of the appendix and the other in the pelvis. The drainage of one does not necessarily drain the other; therefore, after having drained the pelvic abscess, watch with the greatest care that there is no septic absorption from the original focus.

One point on which I do not fully agree with Dr. Moore is with regard to the value of Fowler's position; we use it extensively at the Massachusetts General Hospital. Post-operative rectal seepage is a life-saving procedure. Avoidance of violent catharsis is also an important matter. I have looked up all of my cases at the Massachusetts General Hospital, 249 in number. These were all acute, including general peritonitis as well. Every patient seen was operated on. Some of the cases were desperate ones. If they are sicker in the country farmhouses, they must be very sick indeed. In all but nine cases drainage was done. The appendix was removed

in all but thirteen cases, in which there was merely drainage of the abscess; in two cases by rectal puncture. There were thirteen deaths from all causes; mortality 5 per cent. plus. Secondary operations were done in ten cases; five were for drainage of residual abscesses; two by vaginal puncture, one by rectal puncture and two by incision in the flank.

## THROMBOSIS AND EMBOLISM, THEIR SIGNIFICANCE AND CONSEQUENCES IN ABDOMINAL AND PELVIC SURGERY\*

ANGUS McLEAN, M.D.

DETROIT

A condition which has been before the medical profession for many years, especially since the inception of modern surgery and modern surgical technic—a condition which is becoming more frequent with the ever-increasing number of abdominal and pelvic operations—a condition about which much has been written but concerning which little is known definitely, is the subject I wish to bring to the attention of this Section to-day. I refer to thrombosis and embolism.

The importance of this subject is at once apparent when we consider the great rôle played by thrombosis and embolism in raising the mortality in our surgical cases. Besides the mortality, the morbidity caused by these conditions is no small matter. Many are the cases of pulmonary, renal, and hepatic abscesses, not infrequent the cases of gangrene of extremities, necessitating amputation, that had their origin in thrombotic or embolic processes. Arteriosclerosis, a disease that in the course of time has been attributed to many different causes, is now looked on by many as originally due to embolic occlusions of many of the smaller vasa vasorum, is really the beginning of the arteriosclerosis. How does syphilis cause arteriosclerosis? The *Spirochaeta pallida*, circulating in the blood, become lodged in the smallest branches of the arteries. Their lodgment in the smallest ramifications of the vasa vasorum is really the beginning of the arteriosclerotic process. Likewise the other chronic low-grade infections often result in the same terminal process. These conditions do not, however, concern us now. In this paper I wish to consider, more especially, postoperative venous thrombosis and its probable resulting embolism.

Several etiologic factors are usually given as necessary for the formation of a thrombus: (1) trauma, especially injury to the endothelial lining; (2) stagnation or slowing of the blood-stream; (3) infection, and (4) chemical changes in the blood itself. Regarding these causes it is hardly necessary to say that not one is alone sufficient to produce a thrombus. When a thrombus does occur it is usually due to various combinations of these causes acting together. Again thrombosis often occurs, as, for instance, a femoral thrombosis that follows a surgically clean appendectomy, when, as far as we can ascertain, each one of these factors is wanting. We are therefore forced to look for some other etiologic factor in such cases. With the hope of finding some explanation for the thrombotic process in these cases, we undertook some experiments on dogs.

\* Read before the Section on Surgery at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

† Drs. R. C. Andries, W. D. Barrett and myself.