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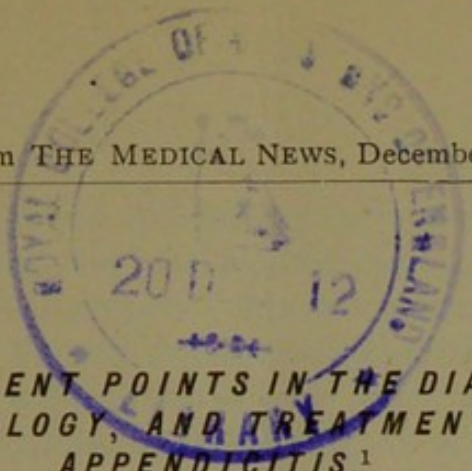

SOME SALIENT POINTS IN THE DIAGNOSIS, PATHOLOGY, AND TREATMENT OF APPENDICITIS.[1]

BY JOHN B. DEAVER, M.D.,
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APPENDICITIS, owing to its unusual frequency and alarming gravity, has become the most important intraabdominal inflammation encountered by the surgeon at the present time. Occupying this position, the subject is one worthy of the gravest consideration and sufficiently warrants the presentation of a few facts which I have learned in the careful study and treatment of a large number of cases. As many of these points have not been brought to the attention of the medical profession, I desire to emphasize them as much as possible and give to them the prominence which I feel they deserve. I refer most particularly to the early recognition of the varied symptoms of appendicitis, to a proper appreciation of the possible disastrous results of such a morbid process, and to the prompt application to all such cases of the most advanced surgery. I believe the time has arrived when those of us who have had the opportunity of observing and operat-

[1] Read at the meeting of the College of Physicians of Philadelphia, December 4, 1895.

ing upon a number of cases of appendicitis should declare ourselves without fear and without reservation concerning the operative treatment.

A glance backward over a period of 18 months shows that there has been a decided wave of progress in the diagnosis and treatment of appendicitis; and that there has been developed a keener appreciation of its dangers and a more uniform acceptance of operative treatment than before. Many have been brought to justly realize, only through the school of bitter experience, the gravity that a comparatively insignificant pain in the abdomen may suddenly assume.

A tempest of argument has been raised, a storm of protests has been hurled against what has been called too radical surgery, and, as a result, the sea of life is strewn with human wrecks, absolutely lost or crippled beyond repair.

It would be only charitable for us to believe that those who to-day, either by voice or action, place themselves in the ranks of conservatives on this question, have not encountered the experiences of many others in the treatment of this disease. Their apathy is the result of an inexperience which underestimates its destructive tendencies. Unseen and frequently unheralded save by a few premonitory symptoms, like ripples on the surface of calm water, the deadly process begins, but as those ripples broaden, so do the symptoms intensify until the whole body becomes agitated by the fury of the storm, and the question becomes one of life or death. I venture to say that among those present to-night there are some who can recall sad experiences with

this foolishly styled "fashionable disease," appendicitis, in which the patient, who was supposed to be the subject of an acute attack of indigestion, in a few hours showed unmistakable evidence of a purulent peritonitis which resulted in death, or perhaps the peritonitis was confined to the right iliac fossa and terminated in an intraabdominal abscess, which when opened, the appendix not being removed, left the patient a chronic invalid from fecal fistula or subject to subsequent attacks, each one of which was attended with the awful uncertainty of death.

There are many cases in which inflammation of the appendix is so intense that necrosis sets in, and either perforation occurs or gangrene supervenes before there is even an attempt upon the part of nature to protect the peritoneum against infection. This is so common an occurrence that I am compelled to bring you face to face with the question, *Can you, or I, or anyone, presume to say when or where this condition will arise?*

In previous papers upon this subject I have laid stress upon the wisdom of early operation in acute attacks. A richer experience and a careful analysis of the knowledge acquired impel me to state again, in terms so strong that they cannot be misunderstood, that early operation is not only the safest, but the only sure road to recovery. Every case of appendicitis places one in the position of deciding immediately what is best to be done. The patient's life and future usefulness frequently hang upon the slender thread of your judgment. You may say that many cases get well without operation (that is, do

not die from the attack), but should you rest content with a fair percentage of recoveries, when a much greater number would recover by operation?

I have been accused of being too radical upon the subject of appendicitis, of having removed normal appendices, but I have the courage of my convictions, and say to you that my statements are founded upon facts, and that if I can convince one of you, who may be skeptical, that what I say is true, then have my time and labor been well spent. In support of what I say I can produce the statistics of 200 operations performed between attacks, with two deaths, both of which deaths occurred in the first series of 100 cases.

DIAGNOSIS. I wish to emphasize a fact I have already stated in former articles, that is, that the diagnosis of appendicitis is an easy one to make. There are three cardinal symptoms which when present warrant without exception a diagnosis: the sudden onset of acute abdominal pain with or without vomiting occurring in one who was previously well; rigidity of the right side of the lower abdominal wall; tenderness over the site of the appendix.

It is not my intention to go over the entire subject of the diagnosis, the pathology, and the treatment of appendicitis, but to discuss some salient points not touched upon in the paper I read before the College, May 2, 1894, and which I hope will throw sufficient additional light upon this subject to clear the horizon for those who are still groping in the fog of uncertainty and doubt.

The affections with which I have seen appendicitis

most commonly confounded are typhoid fever, pyosalpinx, ovarian abscess, pyonephrosis, abscess of the kidney, and perinephric abscess. I cannot understand why appendicitis should be mistaken for typhoid fever, particularly in the early stage of either affection, and yet upon more than one occasion I have seen the surgeon forced to defer an operation because the consensus of opinion of the majority of the medical attendants was opposed to such a procedure. In the early stages of the two affections the characteristic symptoms are distinct. The sudden onset, the rigidity of the right lower abdominal wall, and the tenderness which is more marked and smaller in area, being limited to the position of the appendix, are pathognomonic of appendicitis. In typhoid fever the slow onset attended by lassitude, headache, nose-bleed, etc., the temperature-record, the general abdominal tenderness with the accompanying peculiar doughy condition of the abdominal walls, the enlarged spleen, and the absence of rigidity, should be sufficient to establish a differential diagnosis with absolute certainty. If, in connection with these differential points, a digital examination of the rectum demonstrate a sensitive mass, then any doubt which may exist in the mind should be at once dispelled. Spots may be found in either affection, but they are not of any diagnostic value, as I believe that in both cases they are of septic origin.

Follicular abscesses of the appendix are responsible for some of the mistakes in the differential diagnosis between appendicitis and typhoid. The minuteness of the collections accounts for the

mildness and the prolongation of the sepsis and the lessened degree of the local symptoms. In this type of appendicitis we have a constant source of absorption with a small amount of tissue involved. It is not uncommon to find cases which have been supposed to be typhoid fever, in which an operation has demonstrated the presence of macroscopic follicular abscesses in the appendix, varying in size from a millet-seed to a mustard-seed, an eroded, mucous membrane, and a more or less infiltrated organ.

The difficulties in making a differential diagnosis between appendicitis and typhoid fever in the later stage are more fancied than real. The early history, the local symptoms, on the one hand; and the general abdominal symptoms, with the dry tongue; the sordes on lips and teeth, the temperature-record, and the characteristic diarrheal stools, on the other hand, are quite sufficient to make the differentiation clear and distinct. The spleen is enlarged in both affections; in both instances as a result of sepsis. The enlargement, however, due to septic infection from an active suppurative process like appendicitis is likely to be associated with pain caused by a perisplenitis from embolism.

The following case is related to illustrate the fact that follicular abscesses in the appendix are capable of causing a train of symptoms which suggest to the medical man the probability of typhoid fever:

One morning in the early fall, my friend, Dr. M., called at my office, saying that he was worried about his little girl, who was ill, because the nature of the illness was not clear to him. He came to

the city with the purpose of having one of our medical men see the child. He related to me the history of the case and showed me the temperature-record, and I suggested that the symptoms resembled those of subacute appendicitis. An appointment was made with the medical man, and I was asked to accompany him. This being impossible, I suggested one of my assistants and Dr. F., of the German Hospital, who were accepted. The consultation was held, but a definite conclusion was not reached, as the medical consultant believed the trouble to be typhoid, while Dr. F. and my assistant thought it appendicitis. The following day I was asked to see the child and to operate if I concurred in the diagnosis of appendicitis. This I unhesitatingly did, and operated at once. The following conditions were present: The appendix was situated behind the colon, to which it was adherent; the mucous lining of the tip of the appendix, which was club-shaped, contained several follicular abscesses, the largest of which was the size of a split pea. The recovery was uninterrupted and rapid; the symptoms which had suggested typhoid disappeared immediately after the removal of the appendix.

Before directing attention to the points of differentiation between appendicitis and the affections attended with pus-formation which may be confounded with appendicitis, permit me to say that the occasion for making a differential diagnosis between appendicitis with pus-formation and other forms of pus-collections should never arise, as in all cases of appendicitis the appendix should be removed before pus has formed.

The presence in the rectouterine cul-de-sac of an

inflammatory mass in intimate relation with the uterus, which renders it partially or completely immovable, and which can be clearly outlined by vaginal or combined vaginal and rectal examination, in connection with the history of a vagino-uterine infection, establishes the diagnosis of a pyosalpinx or an ovarian abscess. The essential thing in the differentiation between these two affections and appendicitis is the absence of a history of the three cardinal symptoms of the latter affection. This is also the essential point in the differential diagnosis between appendicitis and pus-affections of the kidney.

Too much stress cannot be laid upon the importance of urinary examinations, not only in the supposed kidney-affections before mentioned, but also in appendicitis. I have recently operated upon a case in which the urine contained pus and epithelium from the pelvis of the ureter, in which there was present a swelling in the right loin, accompanied by tenderness, extending in the direction of the attachment of the appendix, and in which a history of the three cardinal symptoms was elicited. I opened the right iliac fossa, finding the appendix, which was postcolic and contained pus, pointing north, adherent to and in communication with the pelvis of the ureter, through which the contents of the appendix were being emptied into the bladder, thus explaining the urinary symptoms. The recovery was uneventful.

In certain cases of appendicitis the pain is entirely referred to the left side. I wish to empha-

size this point, as I have seen a number of cases in which the attending physicians who were familiar with appendiceal symptoms were totally misled. From my experience in operating upon a number of such cases, in which I invariably found the appendix holding a southerly position, I am prepared to make the statement that when the pain is referred to the left side, the appendix occupies the pelvis; also, that in this class of cases, when suppuration has taken place, resulting in a large pelvic collection, there is pronounced bilateral rigidity of the lower abdominal walls. Therefore when I am asked to see a patient, and the diagnosis of the ailment is not clear—with a previous history of the three cardinal symptoms, with the pain referred to the left instead of the right side, with a temperature denoting a hectic condition, and bilateral rigidity of the lower abdominal walls—I am convinced that the case is one of suppurative appendicitis, in which both the pus-collection and the appendix occupy the pelvis. A rectal and vaginal examination under these conditions, with the exception of great pain, elicits nothing but a sense of fulness. The contrast between this condition and that of suppuration in the pelvis dependent upon uterine infection, to which reference has been made, is marked. The following case will illustrate the importance of these diagnostic points:

During the past summer I was asked to see Miss ——, the history of whose illness was as follows: About two weeks prior to my visit she was suddenly attacked with what was at first supposed to be an

attack of acute indigestion, which did not yield to the ordinary remedies. A provisional diagnosis of typhoid fever had been made, in view of the fact that the spleen was enlarged, spots were present, and the temperature was suggestive of an irregular case of typhoid. The suddenness of the onset, accompanied by acute abdominal pain with very decided bilateral rigidity of the lower abdominal walls, the temperature-record, the vaginal and and rectal examinations which elicited great pain with the characteristic fulness only, pronounced the case one of suppurative appendicitis with a pelvis full of pus. I advised operation without delay. Adverse opinion of other counsel delayed the operation for a period of two days, at which time the pelvis was found to be full of stinking pus; the appendix, which was perforated and gangrenous, occupied the pelvis. The appendix was removed and the recovery was uneventful.

The citation of one case occurring in the person of the son of a physician, a most excellent diagnostician, will serve to illustrate the importance of the pain being referred to the left side, as indicating the position held by the appendix, viz., the pelvis; the cardinal symptoms were present:

Master A., son of Dr. E., was suddenly seized with acute abdominal pain, vomiting, and rigidity of the right lower abdominal wall, which followed the ingestion of numerous articles of indigestible food. After a period of three days, symptoms of acute peritonitis developed, at which time his father consulted me. He remarked that he would have regarded the case as one of appendicitis if the pain had not been referred to the left side. I told the father that, with all deference to him, I regarded

the case as one of appendicitis demanding immediate operation. Two days later I was hastily summoned to see the son, whom I found suffering from a diffused peritonitis of an active type, with a pulse of 130, leaky skin, constant retching and obstipation. I declined to interfere, advised the discontinuance absolutely of opium or any of its preparations, and ordered small and repeated doses of calomel to be given to the extent of free purgation, believing this a wiser course to pursue than operation. The boy apparently recovered from this attack. I then advised operation in order to prevent a recurrence of the trouble, but the father could not agree to have his son operated upon when he was apparently well. Within ten days a second attack occurred; I was again summoned, but being absent from the city other counsel was sought; the operation was again deferred, and the result was an incomplete recovery from the second attack. I was again consulted and again advised operation. The boy was brought to Philadelphia. The operation showed that the appendix, the tip of which contained a pus-collection, with an encysted abscess surrounding this, occupied the pelvis, being adherent to the floor of the pelvis and to the right of the rectum. The appendix was removed and the recovery was uneventful.

In those cases in which the pain is referred to the left side and the point of greatest tenderness is immediately above the pubis or in the left iliac fossa, the greatest intensity of the inflammation will be confined to the tip of the appendix. It is in this class of cases in which the appendix occupies the pelvis that bladder symptoms, such as irritability, frequent micturition, and retention, are of value from a diagnostic

point of view. The abrupt cessation of pain previously located in the region of the appendix, followed by fall of temperature, increased pulse-rate, and an anxious expression, indicates the occurrence of gangrene in that organ.

PATHOLOGY. The primary pathologic condition in an attack of appendicitis is catarrhal inflammation. The outcome of the attack after the catarrhal condition is established depends upon several important factors: 1st. Drainage of the organ; 2d. The character of the microorganisms present; and 3d. The presence or absence of fecal concretions or foreign bodies.

In a large percentage of cases the appendix holds a northerly position running up behind the cecum. This position favors, by gravity, the drainage of the organ. It also opposes the entrance of foreign matter and in such cases the primary attack is more likely to subside. The conditions are changed, however, in an appendix which has been the seat of an inflammation. In the process of healing of the mucous membrane lining the organ, strictures and twisting of the appendix due to contraction occur, which interfere with drainage and often entirely close its lumen. A condition I have met with is one of constriction with an enlargement on either side of the stricture, causing the appendix to assume an hour-glass shape. When the organ occupies any of the other positions than northerly, drainage is interfered with by gravity. An appendix which cannot drain itself and which becomes inflated is a menace to the life of its possessor.

The character of an attack varies with the asso-

ciation of the bacterium coli commune with the staphylococcus or with the streptococcus, the latter combination being by far the most unfavorable. When the bowel is red and excoriated the streptococcus is present, and the prognosis of the case unfavorable. I believe that the presence of a fecal concretion in appendicitis is a mere coincidence, and acts as a pathologic factor only by interference with drainage, thereby making perforation more likley, and also by constricting the entire lumen, and causing pressure and interference with the circulation, favoring gangrene of the organ to the distal side of the concretion.

Obstruction of the bowel is not uncommonly met in the various stages of appendicitis. Ordinarily this is due to bands, the result of the inflammation, or to the adhesion of the tip of the appendix to the adjacent bowel. I have recently met with a case in which the patient had been operated upon for the relief of a circumscribed abscess. The patient for ten days progressed favorably, and was considered to be beyond the danger-point. Suddenly symptoms of intestinal obstruction manifested themselves. The wound was reopened, and the obstruction found to be due to pressure upon the bowel, caused by the contraction of the abscess-cavity in the processes of healing.

Follicular abscesses of the appendix are frequently met. They are minute, often not larger than a millet-seed.

The postperitoneal lymphatics are sometimes affected secondarily, causing large retroperitoneal collections of pus. I have met with the pus of an

appendicitis situated between the liver and the diaphragm, where it had burrowed behind the diaphragm and communicated with a bronchus, causing a purulent expectoration with an odor which indicated that gangrene of the lung was the cause of the patient's trouble.

I do not believe that leukocytosis is sound evidence of pus. I believe that ordinary means are sufficient to enable one to make the diagnosis, and that the time spent in demonstrating the leukocytes which prove nothing could be better utilized in liberating the collection.

TREATMENT. My paper has no doubt impressed you with the fact that in my opinion operation is the only treatment for appendicitis. The best results and the smallest mortality are obtained when the operation is performed at the earliest possible opportunity. The diagnosis can and should be made in a few minutes, and the operation should follow without the delay of days or even hours. If through doubt and delays immediate operation be impossible, then the quiescent period, that between attacks, is the next most favorable time. Operation at this period has been performed by me with a mortality of 1 per cent. in a series of two-hundred cases, both deaths occurring in the first hundred. The added risks of operation for appendicitis when pus has already formed cannot be denied by any one who is familiar with the dangers which accompany such a condition of affairs. In fact, no surgeon or physician will deny that pus complicates and materially increases the danger of any operation, and particularly when that greatest

of all absorbing surfaces, the peritoneum, is involved. Picture to yourselves the operation for the removal of an appendix before pus has formed—the clean abdominal incision; the removal of the diseased organ, with the closing in by serous flaps and the invagination of the entire stump into the cecum, with the subsequent closure of the abdominal wound, on the one hand; and, on the other, an abscess with its foul-smelling and infectious contents bathing the incision and contiguous parts; the unquestionably increased risk of infecting a peritoneum which nature has closed off by the removal of an appendix which has perforated and which is probably involved in the confining wall of the lymph; the necessity of drainage by gauze and tubes, with the increased likelihood of subsequent hernia, fecal fistula, etc. Can anyone who is familiar with these two conditions pretend to say that the former is not less dangerous and more desirable than the latter, or that the two conditions of operation do not bear the testimony of unbiased observers? There is, of course, a small percentage of recoveries following operations for abscess-cases in which the peritoneum has been generally infected; but this depends upon the amount and character of the pus and upon the operation being done before collapse has set in. I cannot say that I think it wise to operate upon a patient in collapse.

In operating upon pus-cases in which the appendix is involved in the wall of the abscess-cavity, I believe that it is possible and always advisable to make the operation a complete one, as in no other

way is recovery assured. To leave an appendix which has sloughed off, or has a perforation in it, or which has been intensely inflamed by migration of microorganisms through its walls, with the certainty of fecal fistula or subsequent attacks, I believe to be bad surgery. It is my practice to remove the appendix in all cases. Certain it is that by the proper disposition of gauze and careful attention to technic, an appendix which is deeply imbedded in a wall of lymph, whether it makes a portion of the abscess-cavity or not, can be removed, and the dangers which attend its removal are far less than those which occur when it is allowed to remain. A practice which I believe is a frequent one is simply to evacuate the collection, there being no attempt made to remove the appendix if it be not plainly visible. This I consider, with all due deference to the surgeons who practice it, incomplete surgery. Cases of congenital absence of the appendix are reported, but the congenital absence probably exists only in the mind of the searcher. I have never failed to find the appendix in chronic cases, although many times I have been able to find it only after a prolonged search and a careful dissection.

I beg the privilege of a few more minutes to relate the report of a case upon which I operated November 23, 1895, and which will serve, I hope, the purpose intended, namely, to disabuse the minds of those among you who are still of the belief that a patient who has apparently recovered from an acute attack has safely passed the danger-point, and that operation is superfluous:

A boy of 13 was referred to me by my friend, Dr. P. Moylan, with a history of three attacks of appendicitis. During the last attack he was under the care of Dr. Moylan, who said to me that at the time of his first visit a general peritonitis was present, and was attended with so much distention that he was unable to make out by examination the cause of the peritonitis. There was apparent recovery from this attack. Operation was by incision through the right semilunar line, opening up a cheesy mass situated beneath the transversalis muscle. The peritoneum beneath the collection had been destroyed and the posterior wall was formed by the great omentum. The cheesy material was curetted away and the cavity antisepticized. The great omentum was tied off around the involved portion and the latter cut away. The cecum contained two perforations which were brought to view after the removal of the diseased and adherent omentum. The appendix lay postcecal, imbedded in a mass of lymph. It was perforated at its base. The pelvis contained a collection of pus which was confined by adherent coils of small bowel. The patient recovered.

In conclusion, I desire to say that an appendix that has been at any time the seat of inflammation will be a constant source of danger to the life of its possessor; that there is no medical treatment for the cure of appendicitis; and that, as Osler has so happily said, "the surgeon is frequently called too late—never too early."

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