Original Articles.

A RECORD OF THE TECHNIQUE OF OPERATION FOR APPENDICITIS FROM THE STAND-POINT OF PERSONAL EXPERIENCE.¹

BY J. COLLINS WARREN, M.D., LL.D.

IN responding to the call of the chairman for a paper before this Section it occurred to me that the moment had arrived when the methods employed in operations for removal of the appendix by different surgeons could, with advantage, be compared. I have, therefore, selected the cases which came into my hospital service during the past winter as a group which might serve as a basis for critical analysis.

There were fifteen cases in all, about one-third of them presenting as difficult problems to solve as occurs to the operator. Among these were two fatal cases. Although the question of diagnosis does not come into this evening's discussion, it may be worth while to state that in none of this series was there any question as to the nature of the disease or as to the time when to operate. Experience seems to have brought with it facility of diagnosis, particularly to the surgeon who has been obliged so often to bring pathological conditions face to face with his previously expressed opinions.

The following cases may be separated more or less accurately into several distinct groups.

Class A comprises Cases I, III, XI and XII, in which there was extensive suppuration.

In Case I it will be seen that the patient was not sent to the hospital until a fortnight after the appearance of the first symptoms. The adhesions surrounding the opening into the abscess cavity were so firm that it was deemed unwise to break them up, and an opening the size of the index finger was the only outlet to a pus cavity which could be felt per rectum. No attempt was made to find the appendix. Convalescence was slow, and after one unsuccessful attempt to reopen the sinus and find the appendix, the appendix was eventually removed six months after the first operation. Each attempt was followed by a fecal fistula, owing to the wounding of the bowel in cutting and tearing tough adhesions. In the final operation by which the appendix was successfully removed, the incision was made parallel to the original incision and passed directly into the abdominal cavity. The sinus wall became then a valuable guide to the locality of the appendicular opening.

This seems to me an important point in the investigation of old sinuses, namely, that the sinus should remain untouched until its *source* has been reached by incision into the abdominal cavity.

Case III is also an example of extensive suppuration due to delay in operation. The appendix was not sought for, and a counter-opening was made in the right flank. Eventually there were four openings, with eight drainage-tubes. The patient made a slow recovery, and had the appendix removed six months later. The correspondence between the leucocytosis and the temperature was very marked in this case.

Case XII was one which had been operated upon in a previous service: owing to the extensive abscess cavity the appendix was not sought, and the patient

returned six months later with the history of a sinus which opened about once in six weeks. On opening the abdomen by a parallel incision, the appendix was found adherent, at its middle, to the cutaneous opening. On removal the appendix was found to be obliterated at its point of origin in the cecum. The secretion which accumulated in the greatly distended fundus forced its way periodically, by an overflow, through the thin cicatrix. This specimen illustrated well the mechanical conditions existing in most cases of "relapsing appendicitis." It is evident that the process is mechanical rather than septic.

This group shows well the tolerance of the abdominal cavity to extensive suppuration when sepsis is held within bounds. It teaches the lesson that we may take advantage of our effective methods of disinfection to deal more boldly with the wall of the abscess cavity. We need not fear to open the peritoneum under suitable precautions, that is, by careful walling off, in order to find and remove the appendix. Many abscesses can indeed be approached on their peritoneal side under these circumstances. All sinuses should be approached from this direction. I am not prepared yet to state definitely whether I should recommend this mode of dealing with large abscesses in all cases; but I think many can be so treated with advantage. The greatly increased control which the "walling off" method has given the surgeon over the abdominal cavity ought to enable him to secure the appendix in the great majority of that class of cases in which hitherto it has been allowed to remain.

Class B comprises two cases, both fatal. They were both operated on within forty-eight hours from the time of beginning of the attack.

In Case VI there was general peritonitis, but the pus was found principally in the right inguinal and lumbar regions. In this case the dry method of cleansing the abdominal cavity was attempted. Dry, sterile gauze was used freely in every direction.

In Case VIII the most thorough flushing of the peritoneal cavity was carried out, and tubes were introduced in all available directions. General sepsis came on later in this case than in the former, but the treatment did not seem to have been radical enough to have destroyed all sources of contamination. It is in such cases that employment of a streptococcus antitoxin may possibly prove a valuable post-operative treatment.

Class D is represented by Case IX. Here the operation had been performed before the suppurating stage; a provisional suture was taken in a small opening through which iodoform gauze had been introduced. This was tightened on the fourth day, and the wound healed by first intention. Such a result may be achieved even in cases in which suppuration is well established. After a thorough disinfection and free use of iodoform gauze which should be frequently renewed, the walls of the wound are often in condition to be approximated in a few days, and rapid healing thus obtained. The period of convalescence may in this way often be shortened several weeks.

In Case X the McBurney method of incision was employed successfully, although the appendix lay in a small pus cavity. The opening was easily enlarged downwards by dividing the linea semilunaris. This was subsequently sutured. The various layers were also united by provisional sutures. In this way the wound was eventually closed.

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In the three cases of operation during the interval the McBurney incision was employed with the most satisfactory results. In none of these cases was an abdominal supporter advised.

In the *Virginia Semi-Monthly* of April 24th, Dr. Stuart McGuire has published a paper giving the views of prominent surgeons throughout the country on the prophylactic value of the abdominal belt after laparotomy. Opinions here given vary greatly. The author recommends it (1) in cases where the wound heals by granulation and the cicatrix is large and weak, and (2) when the patient is obese and the abdomen pendulous. It has been my custom to use it in all cases (with the exception above mentioned) for a year after the operation as it undoubtedly affords protection against stretching of the cicatricial tissue during unusual exertion or violent exercise. It serves as a sort of insurance against the indiscretion of patients.

ACUTE APPENDICITIS.

CASE I. M. J. C., aged about twenty years, was operated on October 3, 1895. This, his first attack, began about two weeks ago with violent pain in the abdomen, vomiting and fever. The symptoms varied in intensity at different times, and were treated principally by poultices and morphine. He was sent into the hospital by Dr. Conant, and at that time his temperature was 98.5°, pulse 108, respiration 24. The abdomen was distended, and a large cake could be made out. There was also a suspicious bulging into the rectum. The abdomen was opened by a three-inch incision over McBurney's point, and very firm adhesions found, principally in the pelvis. After walling off the general abdominal cavity, a small opening was made with the finger, and pus flowed freely from deep in the pelvis. A glass drainage-tube was inserted its full length. The resulting sinus healed slowly, fecal concretions being expelled frequently, probably from the end of the appendix. He was discharged with a small sinus on November 29th, after having had several chills and collections of pus at the bottom of the sinus. He returned in four days with a relapse due to indiscretion. An attempt was made to lay open the sinus, during which the colon was opened. From this time the sinus did well, and was healed by February 6, 1896. The cicatrix, however, bulged, but was held well by a belt. On Monday, April 17, 1896, the patient having returned to the hospital with a discharging sinus, I opened the abdomen parallel to and inside of the original incision, and traced the sinus to the edges of the pelvis, where it was found to lead from a small pocket containing a fecal concretion. The appendix was found also communicating with the same pocket by an opening in its end. The appendix was removed, and the greater part of the wound closed, an attempt being made to readjust the various layers of the abdominal wall which had become separated during the previous operation.

CASE II. M. D., aged forty-eight, entered the hospital October 16, 1895, with a history of severe cramps in the abdomen for thirty-six hours previous to entrance. The pain at first was diffuse, but became localized in the right iliac fossa. He was thought to have cancer by the physician who sent him in. At entrance his temperature was 102°, pulse 104, respiration 36. He had felt poorly for a week or more before coming in. At McBurney's point there was

great tenderness, and a cake was distinctly made out. Rectal examination was negative. On the next day the abdomen was opened by a three-inch incision, and the appendix found close under the thickened peritoneum of the abdominal wall. A mass of thickened omentum was tied and removed, and the wound drained by gauze wicks. The wicks were removed on the third day, and on November 14th he was discharged with a small superficial wound.

CASE III. F. W., thirty years old, entered the hospital on November 5, 1895, with the following history: From October 21st to 28th he had complained of malaise. On the 28th he began to have sharp pain in the epigastrium, which in the course of a week became localized in the right iliac fossa. At first the bowels were costive, but later were loose. On November 4th he had a very severe pain in the right iliac fossa, and his bowels moved eight times. The next day he vomited once, but has never had a chill. At the time of entrance his temperature was 101°, pulse 102, respiration 28. The abdomen was rigid, somewhat distended, and no tumor could be felt. There was leucocytosis of 21,700. Dr. Scudder operated, and found pus coming from the right flank chiefly; and here a counter opening was made, and a drainage-tube, and two wicks were put in. Pus was also found coming from the direction of the pelvis. The appendix was not sought for. On the 14th an incision was made in the epigastric region, but still the leucocytosis continued high — 24,400 on the 15th, and 47,700 on the 18th. On the latter date an incision was made just above the prevesical space. A mass still being felt by rectum, two drainage-tubes were on the 20th passed down into the pelvis. At this time the leucocytosis began to diminish, and on the 22d was only 10,000. On December 1st he had four wounds with two drainage-tubes in each; but these closed, and he was discharged with only a small sinus in the epigastric region.

On January 28th he reported with the wounds all healed, no sinus, and apparently perfectly well. On March 20th he reported that the wound had opened twice since leaving the hospital; and at that time he had two wicks in the sinuses, from which there was a slight amount of discharge, but which were tending to close. He came in later for a removal of the appendix; which was done by Dr. Cabot. The appendix being found reflected backward and high up in the abdominal cavity.

CASE IV. F. H. G., aged nineteen, entered November 7th. Five days ago he had pain in the epigastrium, becoming localized in the right iliac fossa within forty-eight hours. There was diarrhea for two days; and on the third day he took a dose of castor oil, which was followed by a movement. At no time was there any vomiting or chill. He entered with a temperature of 103°, pulse 96. The pain had much diminished under the administration of morphine, and he had no movement of the bowels for four days. There was a well-marked tumor in the right iliac region, and the incision at the operation was directly into an abscess cavity, from which flowed about three ounces of pus. He did well after the operation, was up on the 22d, and went to the Convalescent Home with only a shallow sinus.

CASE V. H. C., aged forty-seven, married, living in Stoneham, was seen by me in consultation with Dr. Nickerson on October 27, 1895. He had been per-

fectly well until two days before, and since then the chief symptom had been abdominal pain. He had had slight nausea without vomiting, no chill; his temperature was 103, pulse 112. A distinct cake was found at that time, and operation was advised but refused. He entered the hospital on November 8th, with a temperature of 99.8°, pulse 100, respiration 14. The abdomen was opened by a three-and-a-half-inch incision slightly above the usual point, and normal bowel presented. Resistance being felt in the direction of the median line, the general peritoneal cavity was walled off and the adhesions broken down, liberating pus. The cavity was douched out with boiled water, and a slough, evidently the appendix, washed out. The cavity was drained by large and small tubes and iodoform wicks. Two days later the drains were removed and clean wicks substituted therefor. On the 20th the edges of the wound were drawn together; a linear cicatrix resulted, and on the 28th he was discharged in good condition.

On March 20, 1896, except for some numbness and disability of the right foot, he was perfectly well and at work, with a solid cicatrix and no bulging.

CASE VI. J. G. B., eighteen years of age, entered November 30, 1895. He played football three days before entrance, and on the night of that day was taken with general abdominal pain. The next day he was up until evening when the pain increased. He vomited several times. His bowels were constipated. The next day he was brought to the hospital with temperature of 104.5°, pulse 120, respiration 48. The tongue was extremely coated, skin mottled, pulse poor. The abdomen was generally tender, especially in the right side, but not much distended, and the recti tense. Rectal examination was negative. The abdomen was tympanitic except at a point about as large as the palm of the hand in the right iliac fossa. No tumor was to be felt. A three-inch incision over the dull area exposed the intestines, injected and covered with lymph flakes. The appendix was found pointing towards the brim of the pelvis and in a sloughing condition. Two or three ounces of rather foul pus were evacuated from about the appendix. The bowels wherever seen were covered with lymph flakes. There was a general peritonitis. The peritoneal cavity was wiped out as thoroughly as possible with dry gauze. Iodoform gauze was packed in the direction of the liver and down towards the deep pelvis, walling off the bowels on its inner border. The appendix was tied off with catgut and removed. He did not improve after the operation. His temperature rose steadily during the next twenty-four hours, and he died of septicemia.

CASE VII. F. H., a school-boy, age thirteen years, entered the hospital on December 3, 1895. Three days before entrance he was taken with general abdominal pain and vomiting. His bowels moved on that day, but not after. The following day the pain became localized in the right iliac fossa, but at entrance was less severe. He had had no previous attacks. At the time of entrance he had a temperature of 101.6°, pulse 120, leucocytosis 32,600. The abdomen was slightly distended, rigid, tympanitic, except for a dull area the size of the palm extending up to the costal border. At this point there was extreme tenderness, but no cake to be felt. A two-inch incision was made over the cecum, adhesions freed, and the swollen, inflamed appendix laid bare, tied with catgut and re-

moved. The stump was cauterized with carbolic acid. No pus was seen, but the wound was packed with gauze. On the third day the gauze was removed and replaced with fresh packing. Two days later the wound was drawn together with crepe lisse, one small wick being left in the sinus. On the 18th he had an attack of vomiting and tenderness, probably due to indigestion, which quieted down during the day. Otherwise he made a good recovery, and was discharged on the 24th, well. On March 20, 1896, he was at school with no signs of any trouble at the seat of operation, and still wearing a swathe (could not afford a belt).

CASE VIII. C. F., aged nineteen years, entered December 21, 1895. He was always well until forty-one hours before entrance. At eleven o'clock at night he had a severe pain in the lower right abdomen, which abated somewhat towards morning. The next day the pain returned with vomiting, which continued all day; the bowels were costive. He had received three-fourths of a grain of morphia before being brought to the hospital. At the time of entrance his temperature was 102.4°, pulse 112, respiration 24. Examination showed a strong, well-developed boy. The abdomen was board-like in its rigidity, and there was general tenderness, with dullness over the right iliac fossa. Rectal examination was negative. The boy was in considerable pain in spite of morphia. A five-and-a-half-inch incision over the point of greatest resistance opened the peritoneum, from which there was a gush of thin and quite foul pus. The bowels were injected and covered with numerous flakes of fibrin, and were bathed in the thin, purulent fluid. The appendix was found to the inner side of the cecum, low down in the iliac region, with a perforation near its base. Fecal concretions were found in the appendix as well as in the cavity—free. The cecum near the attachment of the appendix appeared sloughy. The appendix was tied off with catgut, removed, and the stump cauterized with carbolic acid. A counter-opening was made in the loin, the peritoneal cavity flushed out with large quantities of Ringer's solution, and a glass drainage-tube passed to the lowest point of the pelvis. A rubber tube was passed from the inguinal incision through the lumbar opening, and the original abscess cavity walled off with iodoform gauze wicks. Two provisional sutures were placed in the inguinal incision. The glass tube was sucked out every hour, only clear serum being obtained. The dressing was changed during the night, and in the morning the glass tube was replaced by gauze. On the second day he began vomiting greenish matter in the morning, gradually failed, and died twenty-four hours later.

CASE IX. R. H. (colored), twenty-eight years old, entered January 8, 1896. Three days before he was suddenly seized with general abdominal pain. His bowels were constipated, but he had no nausea or vomiting. Later the symptoms abated, but returned, eighteen hours before entrance, in the cecal region so severely as to require one-third of a grain of morphia. He vomited twice. At the time of entrance his temperature was 103°, pulse 104, respiration 20. The abdomen was not distended, but was very rigid and acutely tender over an area as large as a silver dollar at McBurney's point. There was dullness in the cecal region, but no cake could be felt, and rectal examination was negative. The abdominal cavity was opened by a four-inch incision over the usual point, and the

fascia and peritoneum found edematous. The appendix presented immediately under the abdominal wall, and was well walled off by adhesions. It was tied off with catgut, removed, and the base cauterized with crude carbolic acid. Two iodoform wicks were inserted, one to wall off a small opening into the peritoneal cavity, and one to the base of the appendix. The wound was sewed with silkworm gut, except a small opening for the wicks, which received a provisional suture. The wicks were changed on the third day, removed on the fourth, and the wound sewed tight. On January 17th all the sutures were removed, and a few days later he was discharged. On March 20th he had been at work for a month. The wound was solid and with no bulging, even on coughing.

CASE X. This was a pus case, but was operated by the McBurney method. C. K. entered the hospital on January 2, 1896, with a temperature of 100.2°, respiration 20, and pulse 96. He was perfectly well until nineteen days before, when he was seized with general abdominal pain, which later became localized in the right iliac fossa. He was in bed with constipation, but with no vomiting. On the day of entrance he was again seized with pain in the right iliac region, more severe than the original attack, and accompanied by chills and vomiting. There was slight abdominal distention and tympanites, no cake, and nothing to be felt by the rectum. He was kept in bed for subsidence of the symptoms. At this time he had a leucocytosis of 17,000. On the fifth day the tympany and distention had disappeared sufficiently for a small cake to be felt in the right iliac fossa; the leucocytosis had diminished to 15,000, and his temperature was normal. On January 12th the abdomen was opened by the usual three-inch McBurney incision, and a small pus-cavity found just beneath the abdominal wall, containing about an ounce of quite foul pus. The appendix was tied with silk and removed, as was also a piece of thickened omentum. A small wick was left in the wound, and the aponeurosis sewed with provisional sutures of silk. The external wound was sewed with silkworm gut, leaving two provisional sutures. On the next day the wicks were changed and one provisional suture tied. The stitches were removed on the fourth day and replaced by crepe lisse and collodion. He left the hospital on February 4th with a small sinus and wearing an abdominal supporter. Under date of March 20th he writes that the wound had healed, but that quite recently a small opening had appeared at the lower edge of the wound. This, possibly, may be due to an infected silk buried ligature.

CASE XI. J. McK., about fifty years of age, a carpenter, entered the medical wards on January 13, 1896. He had always been well until one week before, when he was attacked by general abdominal pain, with fever, headache and vomiting. He had no chills, and his bowels were kept open by cathartics. On the second day the pain became localized in the right iliac fossa, and had continued as a dull ache up to the time of entrance, but tenderness, which at first was marked, had much diminished. There was a leucocytosis of 23,000; his tongue was pale with a white coat; and in the right iliac fossa was a firm, resistant cake, over which there was slight dulness and moderate tenderness. Rectal examination was negative.

I saw the patient on January 14th and operated on the 15th. At this time his temperature was 102°,

pulse 116, respiration 32. There was a pronounced cake in the right iliac fossa, tenderness most marked a little above McBurney's point, and the leucocytosis down to 16,000. A three-inch incision was made along the outer border of the cake and the peritoneal cavity opened at once. After carefully walling off the general peritoneal cavity, the adhesions at the outer border of the wound were broken through, giving vent to foul pus. The finger could be passed down towards the pelvis and upwards toward the gall-bladder in a well walled-off cavity. This was well cleaned up with peroxide of hydrogen and boiled water, and packed with iodoform gauze, the appendix not being obtained. On the next day the central wick was changed; on the second day all the gauze was changed, at which time there was an abundant discharge of pus. Two days later all the gauze was removed and drainage-tubes introduced. After this he made a good convalescence, and when seen by me late in March had only a small sinus, and his general health was excellent.

April 22d. The sinus has closed and reappeared several times, occasionally with pain. To-day he was operated for removal of the appendix by Dr. Cabot. An incision was made into the peritoneal cavity parallel to the original incision, in which is the fistulous opening which was found to communicate with the appendix at about its middle. The appendix was removed.

CASE XII. This patient was a woman, and entered October 15, 1895. She had been operated upon in the June previous by Dr. Cabot for acute appendicitis, but the appendix being down in the depths of an extensive abscess cavity was not removable. Since the operation in June she has had a sinus, which has discharged about once in five or six weeks for a week at a time and then closed up again. Each reopening of the sinus had been preceded by pain, swelling, chills and fever. On October 18th she was operated upon, and the appendix found to communicate directly with the opening in the integument by an opening at about its middle portion. The neck of the appendix was completely obliterated, so that none of its secretion could find its way into the intestine. The appendix was removed and the stump invaginated into the cecum. The patient made an uneventful recovery, and was discharged well on the 3d of November. The case illustrates one of the modes of recurrence, and probably not an infrequent one.

This patient was last seen on March 22, 1896, and had been unable to attend to her occupation — dress-maker — on account of pain at the seat of operation, which appears upon any exertion. In the region of the operation wound is a good-sized indurated mass, which is tender to deep pressure, and is apparently the cecum glued up with adhesions. There is no hernia or tendency to the formation of any, and she thinks that she is becoming stronger.

This completes the acute (with one secondary) cases, and leaves the recurrent cases to be considered, that is, the cases in which the appendix was removed "during the interval."

RECURRENT APPENDICITIS, WITH REMOVAL OF THE APPENDIX DURING THE INTERVAL.

CASE I. About two years ago J. Q. had an attack of severe abdominal pain referred to the right iliac fossa, and accompanied by nausea and vomiting. Since then he has had four or five similar attacks, the

last one occurring one month ago, when a mass was felt in the right iliac fossa. This time he was confined to bed for four days. Six days before entrance the soreness returned, and at the time of entrance, December 23, 1895, a mass the size of the little finger was felt at the point of greatest tenderness. On the next day the abdomen was opened after the McBurney method, the peritoneal incision being one inch long. The finger detected the appendix low down behind the cecum, and it was brought up into the wound. It was large, red, rigid and shiny, much resembling a dog's penis. Amputation was performed by the "peritoneal cuff" method, the stump being disinfected by crude carbolic acid and sutured into the wall of the cecum. The peritoneum was sewed with a continuous suture of silk, and the muscles and fascia united by interrupted sutures of the same material. The skin was closed with silkworm gut, which was removed on the eighth day. Except for occasional retention of urine, the patient did perfectly well; he left his bed on the sixteenth day, and was discharged on the twenty-first day without an abdominal supporter.

March 30th: He writes that he is well and has no hernia. No supporter used.

CASE II. E. D. McC., aged eighteen years and single, entered on January 8, 1896. Four years ago he was sick in bed for two weeks during the summer with pain in the lower abdomen and vomiting. The pain was controlled by morphia. Since then he has had six attacks each year, some of them not being severe enough to incapacitate him for his work. The last attack was two months ago, and was the only one except the first one in which vomiting occurred. Abdominal palpation and rectal examination yielded no definite results. On January 12th the abdomen was opened by the McBurney incision, with an inch opening into the peritoneum. Later the first incision was enlarged slightly by cutting for a half-inch in the linea semilunaris. The appendix was finally discovered firmly glued to the under surface of the cecum, which was low down on the pelvic brim. The appendix was tied at the base, and then gradually dissected off towards the apex. After removing the organ and disinfecting the stump with crude carbolic acid, the peritoneal cuff was stitched over the end, and the whole stump invaginated into the cecal wall in the usual manner. The peritoneum was closed with a continuous suture of catgut, the divided fibres of the linea semilunaris with interrupted catgut, the aponeurosis with the same material, and the skin by a buried suture of silkworm gut. This last suture was removed in ten days. He was up on the sixteenth day, and was discharged without an abdominal supporter.

CASE III. R. R. was operated on January 17, 1896. He was twenty-eight years of age and single. His present trouble began eighteen months before, with violent pain in the epigastrium soon extending into the right side. He was sick in bed for a week with vomiting and chills, the pain being controlled by morphia. Considerable tenderness persisted in the right side for several days after the attack. Four months later he had a second attack with about the same duration, the pain being more severe, but the vomiting less. Since then he has had three attacks of varying severity, the last one two weeks ago. At the time of entrance the right rectus muscle was rigid, but no cake was to be felt. A three-inch incision was made at McBurney's point, and a parallel incision

through the aponeurosis. At right angles to this incision another was made between the fibres of the internal oblique and transversalis muscles, and, finally, the peritoneum was opened by a one-inch incision. The finger found the appendix overhanging the brim of the pelvis. The linea semilunaris was incised downwards for an inch, and the whole wound pulled down with retractors, thus exposing the thickened and cord-like appendix. The latter was tied at the base, and a circular cuff of peritoneum turned back. The appendix was then removed, the stump cauterized with ninety-five-per-cent. carbolic acid, and the cuff sutured over it. The whole stump was then buried by suturing the wall of the cecum over it. The peritoneum was sutured with continuous silk, the linea semilunaris and aponeurosis — separately — with interrupted silk, and the skin with silkworm gut. On February 4th he was walking about the ward, wearing a swathe.

A MODIFICATION OF THE MCBURNEY INCISION FOR APPENDECTOMY.¹

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APPENDECTOMY for chronic relapsing appendicitis is now well established, and I find myself an enthusiastic advocate of the operation. There is no room for doubt that many dangerous and fatal operations for acute appendicitis can be avoided by the timely removal of an appendix which has shown symptoms of disease.

The safety of the operation between the attacks is illustrated by the fact that in my own cases, which now number thirty, there has not been a single death, and most of the patients have made rapid recoveries. My colleagues at the hospital have had the same good results.

In recommending this operation not only should the immediate mortality be considered, but all possible complications dependent thereon must be kept in view. The possibility of hernia is the most prominent among such considerations. As a certain percentage of hernia is inevitable after operations in acute cases where the wound is kept open by gauze or drainage-tubes, the almost certain avoidability of hernia would be an additional reason for doing the operation between the attacks.

It is my belief that hernia is rare after this operation, by whatever method it may be done; nevertheless, it is of interest to perfect the method and thereby reduce the chance to a minimum.

In the McBurney operation the skin incision is made an inch inside the spine of the ilium in an oblique direction, passing through skin and connective tissue only. The next incision passes through the aponeurosis of the external oblique in such a way as merely to split the fibres and not divide any of them across. The aponeurosis is split a distance of about four inches. The edges of the wound in the aponeurosis are pulled apart with retractors so as to uncover the surface of the internal oblique, the fibres of which lie at nearly a right angle with the incision made in the external oblique. Then the direction of the incision is changed from nearly vertical to nearly transverse, and the fibres of the internal oblique and

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