APPENDICITIS COMPLICATING PREGNANCY, WITH REPORT OF CASE; REMOVAL OF GANGRENOUS APPENDIX AT THREE AND ONE-HALF MONTHS, DELIVERY AT TERM.*

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THE treatment of a pregnant woman suffering from an attack of any acute disease is full of care and responsibility, more especially because of the fact that temperatures over 104° F. invariably prove fatal to the child in utero,¹ while suppurative conditions with much lower temperatures may lead to fetal death.

There seems to be no reason why appendicitis should not frequently complicate pregnancy, because the ages of eighteen to forty cover most of the child-bearing period, as well as being the ages during which 75% of uncomplicated cases of appendicitis occur. Another important reason arises from the fact that continued and obstinate constipation usually accompanies pregnancy, and we have in addition mechanical disturbances resulting from the rapidly growing uterus, with congestion of all the pelvic blood vessels.

The case I have to report affords an opportunity of going over a few important points in the diagnosis and treatment of appendicitis complicating pregnancy. The happy result to both mother and child in this case is directly attributable to the early recognition of danger signals followed by prompt action. The case is as follows:

Mrs. L. W., age thirty-six, married three years. In October, 1900, gave birth to a son; labor tedious, but aside from this there was nothing abnormal noted about the pregnancy or the puerpium. She became pregnant again in May, 1901. On Aug. 9, 1901, about 11 p.m., she was seized with a severe pain in epigastrium, accompanied by nausea and vomiting; the bowels were and had been constipated; symptoms continuing through the night. Dr. H. W. Dudley of Abington was called on the morning of the 10th. Found patient with a temperature of 100°, pulse 90. Pain was unremitting, and vomiting continued. There was marked rigidity of the abdominal muscles, especially on right side, and the pain worse at first in the epigastrium, had localized at McBurney's point. Hot fomentations were applied, and the same afternoon I saw her in consultation with Drs. Dudley, Wheatley of North Abington and Osgood of Rockland, the two latter afterwards assisting at the operation. At 5 p.m., when I saw her for the first time, the pain of which she had been complaining had in great measure ceased and there had been no nausea for some hours. Temperature was 100.5°, pulse 110. Rigidity of abdominal muscles was very marked, especially of the right rectus, and even moderate pressure over location of the appendix gave rise to pain. Believing that the cessation of pain without amelioration of local signs was not a favorable symptom, and not willing to temporize on account of the existing pregnancy, operation was advised.

The usual preparations for an operation in a private house were made.¹² Under ether a two-inch incision, afterwards enlarged to three, was made through the outer border of the right rectus muscle. Upon opening the peritoneum the appendix was found directly under the incision; it was dark colored, full of concretions,

surrounded by purulent serum which was partially walled off by fresh adhesions of the omentum. Cloudy serum also welled up from the direction of the pelvis. This was carefully sponged out. The appendix was removed in the usual way, one strip of gauze packing was passed down to the stump and another strip passed down to drain pelvis. Incision was closed by through-and-through sutures of silkworm gut, except for about an inch at lower angle of incision, through which the gauze drains were brought out. From the time of operation until the gauze was removed, four days later, there was nothing out of the ordinary to report. After the packing was removed the patient had two or three attacks of syncope which seemed quite threatening, accompanied by regular rhythmical pains, threatening abortion, but the pain was easily controlled by morphin sulphate subcutaneously, and the syncope was treated by alcoholic stimulation. Recovery from this point was uneventful, and the patient was up in three weeks, the abdominal incision being entirely closed. Pregnancy continued until Feb. 26, 1902, when patient was delivered of an eight-pound daughter.

Labor was easy. There was no pain or bulging in cicatrix from operation. In fact, there has been at no time during the pregnancy or puerpium any bulging of the scar.

The report upon the specimens by Dr. Timothy Leary of Tufts College Medical School is as follows:

Received in Zenker's fluid a greatly swollen appendix which had been fixed in gross. The organ measures about 8 cm. long and 1.5 cm. in its greatest diameter, measured at about the mid-point of its length. There is a large fat mesentery running to the tip. The color picture is destroyed, owing to staining with Zenker's fluid. On section the wall of appendix is thinned, and the cavity greatly dilated and filled with soft solid material. Tissue for section taken from along mesenteric attachment at point of greatest swelling.

Examination shows mucosa eroded in good part but showing no evidences of active ulceration, nor indeed much leucocytic invasion. The wall, including submucosa and muscle layers, is deeply infiltrated with polynuclear cells, which in the muscle lie in rows between the bundles of muscle fibres. The portion of mesentery attached to specimen shows similar purulent infiltration, and there is a collection of pus cells along peritoneal surface.

Sections stained by Gram's method show no organisms, but considerable fibrin in delicate fibrillae along peritoneal surface. (The failure to obtain positive results by this method may have been due to the long fixation of specimen in Zenker's fluid.)

The portion of appendix examined shows diffuse interstitial purulent appendicitis and peri-appendicitis. Fresh examination of mucosa would probably have shown ulceration at some point.

In 1890 Hirst read to the Obstetrical Society of Philadelphia a paper on symptoms during pregnancy simulating appendicitis.³ Mixer, in 1891, reported a case of operation on an appendiceal abscess following premature delivery of a dead child at seven months.⁴

Munde, in 1894, reported the case of premature delivery of a dead child induced by acute appendicitis, with remarks on appendicitis in women.² These cases served to call the attention of the profession to the occurrence, not only of appendicitis in women, but to its danger as a complication of pregnancy. The number of cases reported since that time have been so few as to give the idea that the disease must be a very unusual complication of this condition, while the

* Read by invitation before the Obstetrical Society of Boston, April 16, 1902.

mortalities both fetal and maternal, in reported cases, are so high that it appears to be the most fatal extra-uterine complication of pregnancy with which we have to deal. The maternal mortality in this condition is given by Bouillier (twenty-two cases) as 30.4%,⁵ Abrahams (fifteen cases) gives 46%,⁶ and Hawacek (thirteen cases) 85%,⁷ and the fetal mortality varies from 49% to 90%. These mortalities are in cases operated upon previous to 1898. A few cases reported since that date show better results, due principally to early operative treatment. Many explanations for the high mortality in these cases as compared with appendicitis in general have been given, based mostly upon the relation which necessarily exists between the pregnant uterus and the appendix.

Clado,⁸ who has especially studied the anatomy of this region, in describing the relations and course of the appendicular lymphatics, proves an intimate relation existing between the appendicular lymphatics and those of the broad ligament.

These lymphatics are transmitted by a peritoneal fold named by Clado, the appendiculo-ovarian ligament. This is a fold of peritoneum which is prolonged outward from the infundibulo-pelvic ligament to the meso-appendix, and in some cases, according to Lockwood,⁹ even to the cecum and mesentery. Dr. Dwight (personal communication), in a description of the peritoneum, notes this as "a secondary fold of peritoneum sometimes seen springing from the base of the meso-appendix and connecting with the broad ligament. It is said to contain a lymphatic gland which we have rarely seen." In an examination of twenty-four female cadavers which I had the opportunity of making through the kindness of Dr. Dwight of the Harvard Medical School and Dr. Charles P. Thayer of Tufts Medical School, I was able to demonstrate without difficulty the presence of this fold in eighteen cases, while in the remainder demonstration without drawing on the imagination was somewhat difficult.

That this is important in cases of inflammation in and around the appendix, there can be no question. Lockwood reports a case (Case 69)⁹ in which the broad ligament was inflamed and swollen during an attack of appendicitis, and Clado also describes two cases in which he saw infection pass from the appendicular lymphatics to the utero-ovarian. It seems, however, that the importance of this lymphatic connection can be easily exaggerated, as the cases of utero-ovarian-lymphatic infection must be very much less common than the involvement of the glands lying along the inner side of the right colon behind the ascending mesocolon.

The diagnosis of appendicitis complicating pregnancy should ordinarily be easy, not differing materially from an uncomplicated case. The most important diagnostic signs are localizing pain, muscular rigidity, and the elevation of pulse or temperature.

Vomiting of pregnancy gives rise to pain localized at the diaphragmatic attachments, while ac-

celeration of the pulse and elevation of the temperature are exceptional.¹⁰

An extra-uterine pregnancy, situated on the right side, might be confounded with appendicitis, as might a small ovarian cyst, with twisted pedicle, but a differential diagnosis is not important.

The death of an intra-uterine fetus has given symptoms which have led to laparotomy, and this condition as well as the possibilities of miscarriage should be considered in making a diagnosis.

Pains supposed to be characteristic of appendicitis in the right iliac fossa may be mistaken for the uterine contractions such as not rarely occur in primiparae.¹¹

The examination of the blood in suspected cases for a leucocytosis will give valuable information, especially as "the blood is normal during the first six or seven months of uncomplicated pregnancy. The occurrence of leucocytosis during this period, if associated with local signs in the right iliac fossa, would favor the diagnosis of suppuration in that region. During the latter months of pregnancy a leucocytosis has been reported by various of the older writers, but there are no satisfactory or recent data bearing upon this point." (Dr. R. C. Cabot, personal communication.)

The importance of this fact is shown when we consider that in at least 80% of reported cases the acute attack of appendicitis has occurred during the first six months of pregnancy. The treatment of this condition should be operation as soon as diagnosis is made, as the danger not only to mother but to fetus increases rapidly with the increase in sepsis.

Pregnancy adds little, if any, danger to the performance of a capital operation (as shown by the many successful ovariectomies, myomectomies, etc., reported), while almost the slightest amount of suppuration will be fatal to the child and may lead to a fatal termination for the mother from the extension of sepsis to the uterus.

In operating I believe thoroughly in the rectus incision. It is fully as easy to reach the appendix in this way; the incision is easy to enlarge without cutting muscle fibre, and in healing there is a constant tendency of the rectus fibres to close the opening. If this incision is used and properly closed, there will be little danger of rupture before, during or after delivery.

In conclusion, I would suggest for your consideration that in view of the serious nature of the condition which we have considered, are we not justified, not only in insisting upon immediate operation, if the attack occurs during pregnancy, but also upon operation in all cases where appendicitis has occurred in women who are susceptible of becoming pregnant?

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Medical Progress.

REPORT ON THE PROGRESS OF SURGERY.

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(Continued from No. 9, p. 216.)

LEUCOCYTOSIS AS A POINT OF PROGNOSIS IN APPENDICITIS.

Joy and Wright,²² in a paper on this subject, state that their general principle is this: The degree of leucocytosis is an index of the severity of the case; a high stationary or an increasing leucocytosis indicates a progressively serious case which demands immediate intervention; a decreasing leucocytosis, save in some exceptional cases, very few in number, to which special reference will be made, points to a case of decreasing severity in which operation *may* be safely delayed if for any reason it be so desired.

This cardinal principle is the result of their observations in 124 cases of which they have hospital records, and probably as many more externe cases of which no records are at hand. It is the result of this experience alone. The authors state that given the dictum to start with, they have worked out its truth for themselves, with certain modifications and additions. They can cite no principles in its support, but base their belief in its correctness, as they confidently do, solely on experience.

They summarize their views as follows:

(1) The leucocyte count is a valuable aid to prognosis in appendicitis.

(2) This is distinct from its diagnostic value.

(3) A high stationary or an increasing count indicates a morbid condition of increasing severity which demands operation, no matter what the clinical symptoms may be.

(4) A low stationary or decreasing count indicates that the severity of the case is abating and that operation may be safely postponed. Cases in which a falling count is accompanied by unmistakable signs of a generally bad condition, form the rare exception to this second principle, and in them there is no chance of error.

(5) No arbitrary set of prognostic values to be assigned to various degrees of leucocytosis can be constructed. The important point is to follow any scheme in which one learns to have confidence, provided the essential principle be preserved.

(6) The count indicates when operation should be performed for the best interests of the patient.

²² Medical News, April 5, 1902, p. 628.

(7) Circumstances often render it desirable to postpone operation in appendicitis. Study of the blood-count enables it to be determined whether this may be done with safety, and often renders such postponement permissible.

COURVOISIER'S LAW.

Cabot, R. C.,²³ in an article on this subject, states that his material consists of thirty autopsies and fifty-six cases which did not come to an autopsy, but in which the condition of the gall bladder and of the common bile-duct was seen and felt at operation. Among these eighty-six cases were fifty-seven of obstruction of the common duct by gallstones, and twenty-nine in which the obstruction was due to other causes, almost invariably cancer of the pancreas. Out of the whole eighty-six cases there were but four which violate Courvoisier's rule. The gall bladder was atrophied in forty-seven cases of obstruction by stone, normal in eight and enlarged in two. In one of these two cases the record states that the gall bladder was "moderately distended," but gives no figures regarding its size. In the other cases six ounces of bile were evacuated from the distended gall bladder. These two cases form the only exceptions to Courvoisier's rule out of the total of fifty-seven cases of stone in the common duct.

On the other hand, out of twenty-nine cases of obstruction by cancer of the pancreas or other cause not stone, there were but two in which dilatation of the gall bladder was *not* found. In one of these the gall bladder was empty; in the other it was contracted around three gallstones. With the exception of these four cases, which constitute only 5% of the total number examined, every record of the Massachusetts Hospital series in which definite statements are to be found concerning the points at issue goes to confirm Courvoisier's rule.

GALL BLADDER WOUNDS.

Enderlen and Justi,²⁴ owing to the familiar difficulty with which wounds of the gall bladder sometimes heal, were inspired to undertake experiments on dogs directed toward filling defects in the gall bladder by means of omentum. Their results are interesting and as follows:

(1) Wounds of the gall bladder heal with complete restoration of the mucous membrane.

(2) Copious suppuration and hindered outflow of necrotic masses check the healing.

(3) The new epithelium shows at first low forms which change on developing into the high cylindrical epithelium.

(4) The regeneration of the muscular coat is somewhat incomplete.

(5) A tendency of the epithelium to grow along the holes made by silk threads is present in only a few cases.

(6) The transplanted omentum is absolutely adapted to replace defects in the gall bladder.

²³ Medical News, Nov. 30, 1901, p. 844.

²⁴ Deutsch. Zeitsch. f. Chir., October, 1901; Medical News, Dec. 14, 1901, p. 940.