# OVARIOTOMY DURING PREGNANCY.*

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DURING the past ten years I have had occasion to interfere for ovarian cystomata during pregnancy five times, and it occurred to me that a paper on the subject might not be out of place at the present time.

The first case was a cyst the size of a fetal head at term and proved to be a dermoid, which must of necessity have been present for a considerable length of time, but had never been discovered until the patient was pregnant for the fourth time. M. M., thirty-seven years of age, had given birth to three healthy children, all the labors having been easy, requiring no instrumentation. The last child was born three and a half years ago. When seen in consultation the patient was about nine weeks pregnant and complained of severe pains in the back and abdomen. By examination a right-sided, movable cyst was easily made out. Laparotomy revealed a dermoid, which contained hair and fat. Forty-eight hours after the operation labor pains of a mild character commenced, but were controlled by rectal enema of chloral and ammonium bromide in large doses. They

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disappeared completely at the end of forty-eight hours, and the patient went to term, being delivered of an eight-pound girl.

If the symptoms, which cause the patient to consult a physician, are considered, one will usually find that they consist of abdominal pain and backache, coming on rather suddenly and from no evident cause. Most of these patients feel relatively well until the tumor gives rise to pain. In my second case the symptoms were so severe that one might almost be led to suppose that intestinal obstruction was taking place. Mrs. F. W., twenty-nine years of age, had given birth to two healthy children, the labors being uncomplicated. Six months after the last labor she aborted for no known cause at about the third month.

After the abortion the menstruation occurred four times, the last being nine weeks previous to my visit. The patient, who had always considered herself in excellent health, noticed that her abdomen was still somewhat increased in size after the miscarriage. She then commenced to complain of very severe abdominal pain accompanied by vomiting, chills and a slight rise in temperature. The patient was carefully watched for a few days, when these rather violent symptoms subsided. Examination revealed a uterus about the size of a two months' pregnancy and lying behind it was found a cystic tumor. Operation was advised and accepted.

The walls of the cyst were somewhat adherent to the parietal peritoneum and omentum. A dark, reddish-colored fluid was let out from the cyst, after which the pedicle of the tumor was examined and found twisted on its axis twice. It was full of ecchymotic spots. The after-progress of the case was perfectly satisfactory and at no time was there any evidence of a commencing miscarriage. She was delivered spontaneously at term.

In the following case the patient had been cognizant of a gradual enlargement of the abdomen for a number of months, but as there had been no symptoms, no medical advice had been sought when on account of sudden intraabdominal pain, I was asked to see the case. The symptoms presented were certainly peculiar; in a very short time prolapsus had occurred, and for a fortnight before seeing the patient, there had been considerable disturbance in the micturition, to such an extent that, on account of the retention, the bladder had to be emptied with a catheter. The pathologic condition found at operation explains the symptoms.

Mrs. W. H. G., thirty-nine years of age, had had two

normal pregnancies, the last seven years ago. The last menstruation occurred four months ago, at which time a considerable amount of blood was lost. For the past three weeks the patient has noticed the development of a prolapsus and for the last fourteen days has complained of pain in the abdomen and the sensation of severe pressure when passing urine. Three days before we saw her a catheter had to be passed on account of retention. Upon examination the cervix uteri protruded through the vulva. The corpus uteri was retroflexed and lay in the small pelvis. In direct connection with the organ was found a tumor, probably of a cystic nature, extending considerably above the umbilicus. Laparotomy revealed a cyst on the left the size of an adult head which was nowhere adherent. It had displaced the uterus to such an extent that a torsion of the organ had resulted in the supravaginal region. The torsion was about 140°. After the cyst was removed the uterus was readily straightened and brought into normal position. The ultimate outcome of the case was satisfactory and an examination made one week after the operation showed the uterus in its normal position. The patient went to term and had a normal labor.

According to Jetter's statistics, there were thirty-one dermoids out of a total of 105 instances of ovarian tumors occurring during pregnancy. This would make 19 per cent. of dermoids when, generally speaking, relationship of dermoids to other ovarian cystomata is about 4 per cent. Stauda explains this frequency of dermoids, as found during pregancy compared to other cystomata, from the fact that their growth is slow and gives rise to few symptoms, so that the patients do not come under medical observation, whereas in other more rapidly growing cysts, they come under treatment much earlier and are operated on when no preganacy is present. Martin also believes that dermoids, owing to their pelvic situation, are less likely to be discovered than the more superficially situated cystomata.

Generally speaking, diagnosis of ovarian growths during pregnancy can be made with ease, but in one of my cases it was only a probability, and, as will be seen, this case shows how, under some circumstances, the diagnosis may be far from easy, because, in spite of the fact that the pregnancy had reached nearly the sixth month, it was impossible to palpate the uterus on account of the very large size of the neoplasm. It is possible that under narcosis I might have been more successful, but, as

operation was indicated, it was considered needless to submit the woman to more than one etherization.

Mrs. H. F. C., thirty-two years of age, married seven years, had never been pregnant. The menstruation had always been regular and painless, but has been absent for five months. For about two years the patient has noticed a gradual increase in the size of her abdomen, although she has never suffered. Ten days before coming under observation, she was suddenly taken with very acute pains in the abdomen and these have steadily increased. The abdomen is enormously enlarged, and when the patient is in the erect position it sags forward. Percussion gives a clear note all over the abdomen, excepting in the left hypochondrium where a tympanitic note can be elicited. A distinct fluctuation could be made out. The bases of both lungs were pushed upward. The vaginal mucosa and cervix are of a dark blue color and extremely lax. The anterior and posterior vaginal culs-de-sac are prolapsed, and distinct fluctuation can be detected in the posterior cul-de-sac. The uterus and adnexa cannot be palpated. After incision of the abdominal walls a sticky fluid made its exit under high pressure, about twelve to fifteen liters being voided. After this had occurred it was found that there was no ascites, as we had at first suspected, and that the walls of the cystic growth were intimately adherent to the peritoneum. With considerable difficulty the cyst was finally peeled off, a short pedicle was found with difficulty and ligated. After the cyst had been freed, a five months' pregnant uterus came into view. Recovery was uneventful and the patient was delivered by her physician at term.

The indication for operative interference during pregnancy is usually due to the severity of the symptoms presented by the patient. These usually appear rather suddenly and indicate in many instances that some change has taken place in the growth. In the last-mentioned case the great dimensions of the growth in itself, combined with pregnancy, were enough to cause serious danger to the patient. The difficulty in micturition and the prolapse in my third case would also have led to serious complications, even if the uterus had not undergone torsion. According to Martin, only two instances of cases of ovarian tumor complicating pregnancy are known in which hyperemesis was the principal symptom and indicated operative interference. One of these cases, which was recorded by Atlee, died in spite of removal of the growth thirty days after the opera-

tion from exhaustion, while the second patient, who was under the care of Mangiagalli, continued to vomit after ovariotomy had been done, so that he was obliged to empty the uterus, this resulting in recovery. Now, while in both of these cases, removal of the cyst had no influence upon the hyperemesis, I saw in consultation one case occurring in the practice of another surgeon where vomiting stopped after the interference and pregnancy continued to term.

In my fifth case I removed the cyst by posterior colpotomy, and, although much has been said about the dangers connected with this operation when undertaken during pregnancy, it will be seen that, at least in this case, no difficulties presented themselves. It has been upheld that the vaginal route is more apt to give rise to interruption of pregnancy than abdominal incision, because more manipulation is required for the removal of the growth, and consequently more direct irritation is caused to the lower uterine segment, but in my case the growth was very movable, about the size of a large orange and laid directly in the small pelvis; consequently, it seemed rather more proper to remove it per vaginam. What we particularly noted was that excessive bleeding of the vaginal incision did not occur. The history of the case is briefly as follows:

Mrs. M. W., thirty-four years of age, had been previously delivered of two healthy children. For the last three years her menses had been irregular, sometimes occurring every three weeks, at others every five or six. The last menstruation was four months ago. For several weeks she has complained of rather sharp pain in the right side. Upon examination the uterus was found enlarged, corresponding to a pregnant uterus between the third and fourth month. Behind it and somewhat to the left a movable elastic tumor could be detected. Posterior colpotomy. Upon incision of the vaginal vault no marked hemorrhage was encountered. Upon opening the abdominal cavity a cystic tumor presented itself directly into the vaginal wound. Pushing the uterus to the side, the growth was easily brought down and its pedicle clamped. During this maneuver the cyst was ruptured, its contents proving that is was a dermoid. The pedicle was easily ligated and the cyst removed. The pedicle was reduced into the abdominal cavity and the colpotomy incision closed; recovery was uneventful, the patient going to term and being delivered without complications.

As to the frequency of miscarriage occurring after abdominal

or vaginal operations, I am unable to find any statistics of value, but, generally speaking, it would seem that, at least in the case of ovarian cystomata, this unfortunale occurrence is not frequent. Circulatory disturbances following operation have been accused as the cause for interruption of pregnancy, and these may naturally occur whether the cyst is removed by abdominal incision or per vaginam. At the present time I believe it may be said that ovariotomy during pregnancy is a justifiable procedure and should always be resorted to when indications present. It is evident that colpotomy is a simpler operation, and in my opinion, when the existing conditions are such that it can be undertaken, it is preferable to abdominal incision.

There is no doubt whatever but that the severity of the operation, the length of time consumed and so forth, influence the pregnancy, and another most important factor in the production of miscarriage is, to our way of thinking, a cooling of the abdominal organs and peritoneal cavity during laparotomy. If we are correct in this supposition, then posterior or anterior colpotomy should be selected when possible. When the cyst is small and located in the small pelvis, and if it is movable, removal per vaginam seems proper, because there is less intra-abdominal manipulation.

Of the complications found during operation, I would call particular attention to torsion of the pedicle and, whether this occurs during pregnancy or not, the symptoms to which it gives rise may simulate acute or chronic intestinal obstruction or appendicitis. In my second case the violent symptoms presented by the patient were undoubtedly due to the torsion of the pedicle. From reported cases, adhesion of the tumor with the neighboring organs, the omentum or intestine, is not uncommon, and in one of my cases these united the growth so firmly to the parietal peritoneum that the tumor ruptured before it was first noticed. Marked displacement of a pregnant uterus is also common in these cases and torsion of the organ may occur. The greatly elongated prolapsed cervix in this case may, in all probability, be accounted as a result of edema of the cervix, due to shutting off of the vascular supply and the prompt recovery of this symptom after operation would seem to favor this theory.

Pregnancy complicated by ovarian growths has been considered rather infrequent when one considers the great frequency of ovarian tumors. This rarity has been accounted for by the

fact that women having pathologic changes in the ovaries generally conceive less readily. Now, although without any doubt this may be quite correct, that the diseased ovaries are the cause of sterility, still, as a matter of fact, numerous cases have been recorded in which, in spite of advanced degeneration of both glands, pregnancy nevertheless occurred. The fact that in such cases conception did take place simply goes to show that a portion of healthy ovarian tissue is sufficient for the occurrence of normal ovulation. I have had one case, where, on account of cystic changes in both ovaries the patient, having been married for a number of years, had never been pregnant and had been a great sufferer. I removed one ovary and resected two-thirds of the other, with the result that a few months after operation, she became pregnant and was delivered at term of a robust child.

Personally, I am of the opinion that cystomata complicating pregnancy is much more frequent than has been generally admitted because it must be that very many cases where there is pregnancy complicated by an ovarian tumor, do not come under surgical observation for the simple reason that no symptoms arise. Then, again, we all know that an accidental discovery of an ovarian tumor during pregnancy, labor or the puerperium is often made, the case having run a symptomless course. Furthermore, among patients who are operated on for ovarian growths those who have been sterile are far from representing the majority, and I believe that, in going over statistics, one will usually find that they are multiparous in a large proportion, so that it may be assumed correctly that the growth existed during the patient's last pregnancy. Reamy, out of 257 cases of ovarian growths, found that there were 321 pregnancies and 266 normal labors. Reports from obstetric clinics show beyond doubt that small ovarian growths frequently remain undiscovered if no definite symptoms are present causing an examination of the patient to be made. I would point out what seems to me a rather astonishing statement, viz., that out of 17,832 labors taking place in the Obstetrical Clinic of Berlin, only twenty were complicated with ovarian growths. Dohrn believes that pregnancy complicated with ovarian tumors may be placed at 4 per cent., while Williams has stated that such growths are observed relatively less frequently in married than in single women. This peculiar relationship may possibly be explained by the fact that unmarried primiparæ are examined much more

frequently during pregnancy or labor, because they represent the largest contingent of public obstetrical clinics.

From what has been said, it becomes evident that, even with the presence of an ovarian tumor, pregnancy, labor and the puerperium may give rise to no disturbances and a large number of cases have been reported in which, in spite of certain complications, the patient has had a normal labor without surgical interference. In the majority of these cases, it is probable that the growth was of a benign nature and of slow development, in which instance it is likely that the tumor was a dermoid. For all that, it should not be said that the prognosis is good, generally speaking, although so many favorable cases have been reported, and in every instance where an ovarian tumor is found accidentally during pregnancy, labor or the puerperium, the physician should realize that he is dealing with a serious condition of affairs which at any moment may result fatally for the patient. The interchangeable relationships between ovarian tumors and pregnancy, labor and the puerperium are very numerous, and reference will be made to them later on.

Opinions are divided as to the influence of pregnancy on ovarian growths. Undoubtedly, if a patient the possessor of an ovarian tumor becomes pregnant, the symptoms, if already present, will become more marked. The theory put forward by Leopold and Wernich, that ovarian growths complicated by pregnancy have a tendency to undergo malignant transformation, is a much-discussed question. If this theory be correct, then, in reality, one would encounter malignant transformation in these growths during pregnancy very much more frequently than is actually the case. In point of fact, not a single instance recorded by these authors strengthens their theory, because they could not prove that the neoplasms were not originally malignant. On the other hand, I believe it is generally admitted that pregnancy influences the growth of ovarian neoplasms. The increased blood-supply to the genitalia resulting from conception should, theoretically, increase also in the tumor, which naturally would result in a more rapid growth; but other authorities believe that the increase of the vascular supply existing in the uterus and ovaries is only manifest during the first three months of pregnancy, as is shown by the development of the corpus luteum verum, and that during the remainder of the pregnancy ovarian activity ceases completely, and consequently there is no cause for an increased blood-

supply to these glands. Other competent writers maintain that the blood-supply to the ovaries is less during pregnancy, because the premenstrual congestion, which, according to them, is the principal reason for the growth and development of ovarian tumors, does not take place during pregnancy. Consequently they maintain that, when ovariotomy is done during pregnancy, and an increased vascular supply and extravasated blood is found in these growths, this should not be considered as the result of an increased arterial supply, but rather the result of stasis from venous reflux. If these facts be correct, pregnancy should have a retarding influence on the growth of these tumors. A number of investigators have come to the conclusion from their own observations that, owing to the enlargement of the uterus, the resulting limitation of space would hinder further development of ovarian growths. According to this point of view, which, in reality, is of no very great importance, after the uterus becomes empty, an immediate and rapid growth of the neoplasm would naturally be expected, and Sir Spencer Wells made the observation that ovarian tumors decreased in size during pregnancy and after labor again increased in size. Now, although the theory that ovarian tumors evince a greater tendency to increase in size after pregnancy has taken place, cannot be upheld as absolute so far as its correctness is concerned, it nevertheless remains a fact that the dangers of ovarian tumors in pregnancy are many.

In the first place, one should take into consideration the disturbances in the blood-supply which arise as a result of the particular position of the growth, with or without torsion of the pedicle. Displacements of these tumors can easily be explained by the gradual pushing up of the abdominal organs and those contained in the small pelvis by the constantly increasing size of the pregnant uterus. Löhlein after a careful study has come to the conclusion that torsion of the pedicle occurs in 8 per cent. of these cases. Aronson found torsion of the pedicle eight times in seventy-two ovariotomies performed during pregnancy, thus making 12.8 per cent., while Dsirne met with it ten times in 109 cases; in other words, 9.1 per cent. From these figures the first conclusion to be drawn is that certain writers have laid too much stress upon the enlargement and upward growth of the uterus, and that the influence of pregnancy and the placenta upon the blood-supply of the ovarian cystomata has been much overrated. On the other hand, Löhlein does not attribute

much to pregnancy as far as circulatory disturbances from a twisted pedicle are concerned, but is of the opinion that, during the postpartum this complication is much more frequent. He points out that the anatomical conditions after labor are particularly favorable for the occurrence of torsion, because, in the first place, the pedicle has been greatly stretched on account of the upward growth of the corpus uteri and to this is added the sudden decrease in the abdominal contents following the emptying of the uterus and which leaves behind it relaxed abdominal walls. All these circumstances naturally allow an ovarian cyst to become very movable if the latter is not adherent nor of very large size. If, to this is added a rapid change in the location of the tumor, then torsion of the pedicle or its rupture may easily result.

It would seem evident that pregnancy, in which the change in the position of the abdominal viscera takes place gradually leads to a constant limitation in the mobility of the various abdominal viscera and the tumor, a condition of affairs not favorable to the development of torsion. Besides, in most cases, torsion of the pedicle during pregnancy will occur so gradually if no trauma is inflicted that oftentimes it does not lead to severe symptoms, such as are enountered in a torsion suddenly taking place and giving rise to hemorrhages into the cyst. That intracystic hemorrhages giving rise to peritoneal symptoms may take place during the puerperal state without any twisting of the pedicle is a fact too well known to cause any comment here. In many of these cases the cause of the symptoms was a rupture of the pedicle which, perhaps, was overlooked at the time of the operation.

Under some circumstances torsion of the pedicle, by cutting off the blood-supply to the growth, may result in atrophy of the latter, until a blood-supply is again given it through peritoneal adhesions contracted by the tumor. A decrease in size of ovarian cystomata during pregnancy has been observed by a number of competent men. Cases in which intracystic hemorrhage has given rise to alarming symptoms have been reported a number of times. Suppuration of the cyst during pregnancy is a very serious complication, and when the growth is small and not easily detected the diagnosis is a very delicate matter and oftentimes not made until the abdominal cavity has been opened.

Just as under certain circumstances the occurrence of pregnancy may exert an unfavorable influence upon an existing ovar-

ian tumor, so may the tumor itself influence unfavorably pregnancy, labor or the puerperium. The presence of the ovarian cyst may without any doubt produce premature labor, especially if, on account of the tumor, a retroflexion of the uterus results, or on the other hand, if, from the size of the cyst, development of the uterus is much interfered with. However, I am under the impression that perhaps too much stress has been laid to this factor, because in many cases the most peculiar displacements, of the uterus may occur and still pregnancy go to term.

I believe that it can be safely admitted that those cases in which pregnancy goes to term, in spite of the presence of an ovarian cyst, represent the majority. Frequently, the influence of the tumor on the pregnancy is merely represented by an increase of the physiological symptoms of pregnancy, a condition of affairs which causes the patient to consult a physician who then discovers the growth.

The disturbances during pregnancy may become so severe owing to the presence of a tumor that they certainly are an indication for ovariotomy and experience also teaches that the good results of operative interference in such cases have not been exaggerated, because, very frequently, the distressing symptoms, which up to that time had failed to be relieved by proper therapeutic measures have disappeared at once after the operation. However, just how much hyperemesis is influenced psychically by the operation is difficult to ascertain.

Very large ovarian cystomata may become a source of danger, in that they tend toward the production of dyspnea, albuminuria and edema, particularly toward the end of gestation. Labor, without doubt, can proceed spontaneously without any difficulty in spite of the presence of an ovarian cyst. This is made evident from the fact that the tumor is not infrequently discovered after birth.

While large growths may sometimes cause disturbances in the uterine contraction or displacement of the uterus, with a consequent abnormal position of the child and disturbances in the placenta, small tumors may cause serious interference during labor when they directly obstruct the birth-canal and cannot be reduced. In these cases everything depends upon the possibility of reduction of the growth into the abdominal cavity. To obtain this result many methods have been advocated which, even under the most difficult circumstances,

may possibly be crowned by success. If, in such cases, spontaneous rupture of the cyst occurs, there is still a certain amount of danger for the mother. The possibility of strangulation of the tumor during labor certainly should have great weight when considering the proper treatment to pursue, and also in those cases where the growth has never given rise to any symptoms and has only been discovered accidentally during pregnancy.

The puerperal stage is, generally speaking, the least affected by the presence of ovarian cystomata as long as torsion of the pedicle does not occur. Disturbances of involution are certainly quite possible and have been observed, but they are generally of slight importance if postpartum hemorrhage arising directly after labor as the result of insufficient uterine contraction is not considered here. In order to avoid the unpleasant accidents resulting from a twisted pedicle during the postpartum, absolute quiet and a well-applied abdominal binder have been recommended.

Regarding the diagnosis, it may be said that, differentially, errors are most likely to occur when a very large cyst exists with a pregnancy in its early stages, especially when absence of menstruation is looked upon as a symptom of a commencing menopause, or disturbances in the menstruation resulting from ovarian trouble, because palpation of a slightly enlarged uterus in connection with a large abdominal tumor may be very difficult or even impossible, especially if the tumor is intimately adherent to neighboring organs, thus interfering with the mobility of the uterus. Under these circumstances, the tumor is diagnosed, but not the pregnancy and a large number of such cases have been recorded where abdominal section was done for the ovarian tumor and the pregnant uterus only discovered at the time of operation. It is quite evident that the number of such mistakes must be large.

It has also happened that a pregnant uterus has been mistaken for an ovarian cyst and has been incised, when the true condition of affairs was discovered. When small cysts exist, which are closely adherent to the uterus, they may be easily diagnosed as extrauterine pregnancy. The soft, elastic ovarian cyst gives to the feel the impression of an impregnated tube, while the enlargement of the uterus which is always found in extrauterine gestation is naturally accounted for. The possibility of such an error is particularly probable when an ovarian

tumor of long standing, causes, by the suppression of the menses, symptoms of the beginning of pregnancy. Under some circumstances it is possible in these doubtful cases to come to a correct diagnosis only after repeated examinations have been made at intervals of two to three weeks, provided that serious symptoms do not compel the surgeon to interfere at once before the diagnosis is definitely determined.

The necessary gentleness in palpation, when one suspects a tubal pregnancy, is another cause of difficulty in making a diagnosis. The introduction of a uterine sound which has been recommended, but which, in my opinion is absolutely dangerous and should be proscribed, can at the most be only justified when intrauterine pregnancy has been excluded with certainty, a thing not easily done.

If an ovarian cyst is diagnosed during pregnancy treatment is based upon the decision as to whether the growth should be removed during pregnancy or after labor. Artificial interruption of pregnancy, which formerly was frequently advised, is at present rejected since it is well known that the prognosis of an operation during pregnancy is hardly more unfavorable than when this condition does not exist. The question is whether, according to the present status of operative interferences, abortion, that is, interruption of pregnancy during that period in which we can with some certainty expect to deliver a living child, is still to be seriously considered. Very recently this has been advised by Barner. Others advise resorting to this measure only in those rare cases of hard neoplasms and dermoid cysts which lie immovable in the small pelvis and would thus seriously interfere with labor. In such cases where the possibility of the passage of a full-developed child is considered impossible or at least very difficult, induction of labor toward the end of pregnancy is considered proper by some because of the greater probability that a living child will be born.

Löhlein, without contradicting the theoretic qualification of this question in general, considers the indication for premature labor only in a certain class of cases with complications of pregnancy, namely, when, aside from the ovarian cyst, severe symptoms due to other pathologic processes develop and which are entirely due to gestation, such as the nephritis of pregnancy complicated with an ovarian cyst. Such a complication of pregnancy would be an indication for artificial emptying of the uterus even without the presence of a cyst. Consequently, from

what has been said, it may be assumed that artificial premature labor has been abandoned in these cases. The reasons for this are apparent. In the first place, the prognosis of the fetus is always an uncertain matter, while, on the other hand, the mother is not relieved of her original trouble, the tumor, by merely emptying the uterus. The danger from the tumor, which is to be especially looked for in the postpartum, still remains, and sooner or later ovariotomy will be absolutely necessary.

Puncture of the cyst, which was so greatly advocated years ago, is to-day merely a matter of history, although a few writers have recently advised it for the relief of symptoms. It has probably been given up at the present time by the majority of operators, and rightly so, because in the first place, it does not cure the affection, as the cysts very rapidly refill, and also on account of the dangers, which are sometimes greater than abdominal incision. Infection of the cyst, which was formerly greatly feared, can, of course, be avoided by careful asepsis; but, on the other hand, injury to neighboring abdominal viscera, especially the gut, can often not be avoided, and therefore abdominal incision is to be greatly preferred even for diagnostic purposes. It should always be recalled that after a large cyst has been evacuated by trocart, hemorrhage, both intraabdominal as well as intracystic may arise, partly as the result of a direct injury to the larger vessels, partly as a result of a sudden diminution of the intraabdominal pressure. Torsion of the pedicle, due to the greater mobility of the growth after puncture, has also been observed, while escape of the cystic fluid into the abdominal cavity carrying along with it particles of the growth, when it has been a proliferating ovarian cyst, has resulted in the formation of metastases on the peritoneum. When in conclusion, one reflects that acute peritonitis may easily follow puncture of a suppurating cyst, there is reason enough to reject this procedure.

To my way of thinking, the only rational procedure is ovariotomy, and the favorable results which have been reported when this operation has been undertaken during pregnancy have conclusively demonstrated that gestation is no contraindication to the operation. I believe that this statement is generally admitted by all surgeons of any experience. Out of 266 cases the mortality was only 5.4 per cent. for the mother. As to the interruption of pregnancy due to the operation I find a percentage of 22.4 per cent. It is evident that a great number of cases, particularly the unfavorable ones, have never been reported,

and for this reason I merely submit the above figures for what they are worth without attributing to them any absolute value, but they certainly show that, as abdominal operations go, the prognosis should be considered very favorable, particularly for the mother and not so bad for the fetus.

If these figures are to be taken into serious consideration, it is necessary to weigh the question carefully whether in all cases where an ovarian tumor is found one should operate at once. The opinion that every ovarian growth found during pregnancy is an indication for immediate operation is, perhaps, most universally agreed to by operators. Since it has been pretty conclusively proven that the cases operated upon during the first few months of pregnancy usually go to term, it seems evident that an early operation should be undertaken, as the prognosis for the chlid is far better. If one recalls the causes which bring about uterine contraction after ovariotomy, it is not surprising to see that better results are obtained when the operation is undertaken in the early months of pregnancy. These are the mechanical irritation caused by the manipulation of the uterus and its adnexa, and the sudden cooling of the peritoneal cavity, which relaxes the muscular structure of the uterus, resulting in expulsion of the fetus.

The preparation of the patient for the operation during the second half of pregnancy may, in itself, stimulate the uterus sufficiently to cause a miscarriage. Then, again, during the operation, the uterus towards the end of pregnancy would bulge into the abdominal incision and has to be manipulated far more in order to get it out of the way so as to reach the growth. It may be, too, that the sudden cooling of the peritoneal cavity may have a different effect upon a much enlarged uterus, especially when the organ has been manipulated considerably in order to reach the tumor. The irritation produced from the lowering of the temperature should not be underrated, as it is well known that the application of cold to the abdomen is often resorted to in cases of postpartum hemorrhage in order to cause the uterus to contract.

It is quite evident that the favorable results obtained during the first few months of pregnancy are not merely accidental, and, what is more, under certain conditions, a timely ovariotomy may even prevent a threatened miscarriage, several instances of which have been reported.

Advising an operation as soon as possible in cases of ovarian

tumor during pregnancy, in order to avoid the complications which may occur during labor, pregnancy or postpartum seems to me justified. It is unnecessary to discuss the need of operation in those instances where the growth gives rise to very troublesome symptoms, as well as for those tumors lying in the small pelvis which may seriously interfere with the progress of labor. In those cases, however, where the growth has not caused any symptoms, and where, in all probability, they need not be feared, it might be of interest to the child to temporize, provided that there are no evidences of the growth being malignant. Fehling prefers to temporize in cases of first pregnancy or where the women have had few children with the hope of obtaining a viable infant.

However, the difficult point in these cases is to decide what shall be done when the patient is first seen during the middle of pregnancy, because it seems a pretty well-settled matter that when operation is done at this time miscarriage is more frequent. Therefore, under these circumstances, if no serious symptoms are manifest, operation may be deferred as long as possible.

At the end of pregnancy ovariotomy is the least serious, because the prognosis for the child is good, and even if it is undertaken during the ninth month and labor follows immediately upon the operation, it is probable that a living child may be born, provided that other conditions are favorable. As far as the mother is concerned, it is evident that by the removal of the tumor the complications resulting from it are removed.

It would appear that there are no special difficulties to be expected during labor, because many instances have shown that even during the period of expulsion the abdominal wound is not disturbed. However, if labor occurs before the patient has fully recovered from the effects of the anesthetic, one should be prepared for a rather profuse hemorrhage during expulsion of the placenta. For this reason it is perhaps preferable to remove the placenta manually as soon as the child has been extracted.

Bilateral ovariotomy has also been done during pregnancy, and it would appear that this interference is practically no more serious than when disease exists on one side only. Under these circumstances, however, an early operation is more imperatively called for, because when bilateral growths exist they not infrequently are of a malignant nature. Premature labor does not occur, apparently, with any greater frequency in these cases because the operation does not usually present any more diffi-

culty than when one ovary is alone the seat of the trouble. It has been stated that, after bilateral ovariotomy, more serious hemorrhage occurs during labor and the postpartum on account of the effect of castration on the uterine mucosa, but I merely mention this fact and make no comment on it, having had no personal experience in the matter. I would, however, say that the relationship, as yet insufficiently understood, between the ovaries and the non-pregnant uterus in its normal condition, can also be applied to the pregnant uterus, and since it is generally admitted that during gestation ovarian activity ceases it may quite properly be assumed that when, after ovariotomy interruption of pregnancy occurs, this is due to the direct irritant action of the operation on the uterus.

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