

CHAPTER XIII.

ECTOPIC OR EXTRA-UTERINE GESTATION: TUBAL; OVARIAN;
TUBO-OVARIAN; ABDOMINAL; INTERSTITIAL; CERVICAL;
ONE-HORNED UTERINE GESTATION.

FOR clinical purposes it is convenient to study ectopic gestation in connection with ovarian tumors. The diagnosis between them is often a pressing practical problem, upon the solution of which hangs the choice of the method of treatment.

Under the general term "Ectopic Gestation" I propose to include all gestations outside the cavity of the body of the uterus, the normal nidus of the impregnated ovum. The term "extra-uterine gestation" is defective and inaccurate. Gestation in the cervical canal is not strictly extra-uterine, but it is abnormal and ectopic. The same objection applies to the intra-mural gestations.

Ectopic gestations embrace 1. Tubal; 2. Ovarian; 3. Tubo-ovarian; 4. Abdominal; 5. Intra-mural; 6. Cervical.

1. *Tubal Gestation.*—Under various conditions the Fallopian tube may rupture or become perforated, when its contents suddenly thrown into the peritoneal cavity may cause shock, or peritonitis, and death. The best known of these conditions is the tubal form of extra-uterine gestation. The ovum may be arrested in any part of the tube. If caught in the fimbriæ, a sac is formed partly out of the dilated mouth of the tube, and partly by attachments to neighboring structures, especially the ovary, thus forming the tubo-ovarian gestation. The sac in this case usually assumes a rounded shape. If the ovum be caught in the middle of the tube, the shape of the sac is more ovoid. It may be caught in the uterine portion of the tube, and the gestation is then called "interstitial" or "intra-mural." It may be said, generally, that the sac bursts the earlier the nearer its seat is to the uterus. Thus the tubo-ovarian sac may not burst until near the ordinary term of uterine gestation; whilst the tubal sac or the interstitial sac usually bursts at dates varying from six weeks to three months. Kiwisch saw a case which burst in four weeks. Gestation may, however, go on for four, five, or even six months. Spiegelberg relates one case in which it went to term.

The tube, although consisting of a mucous and a muscular coat like the uterus, is ill adapted to keep pace in growth with the rapid development of the ovum. The adaptation is not simply, as in the case of uterine gestation, obtained by growth of the tube *pari passu* with its contents; the tube is stretched as well; and there comes a time when, the stretching exceeding the distensibility of the tube, the sac bursts, and the contents escape into the peritoneal cavity. Along with the ovum, or at least the embryo—for frequently the chorion remains attached to the sac—there almost invariably is poured out a large quantity of blood,

which proceeds from the torn vessels of the tube. It is a form of abortion. There is partial detachment of the ovum and hemorrhage from similar causes. Under the high tension of pregnancy exaggerated at the menstrual epochs, the vessels connecting the ovum to its sac give way, and blood-extravasation results. The greater danger is mainly due to there being no external outlet. The injury sustained is compound. There is the traumatic violence attending the rent, producing shock; and hemorrhage, producing anæmia. The symptoms are also twofold. Shock induces collapse. There is sudden intense pain following on a sense of something having given way in the lower part of the abdomen. The immediate effects of the shock are coldness, prostration, near extinction of the pulse, vomiting; deadly pallor supervenes, and in a short time, often not exceeding a few hours, the patient dies. To this assemblage of symptoms I have given the name "Abdominal Collapse." It is distinguished from the collapse which attends sudden injury or ruptures in the head by the preservation of the mental faculties, and from the like injury in the chest by the absence of that terrible anxiety of respiration which marks the chest collapse. The symptoms, coming as they do suddenly and destroying a woman, who up to the moment of the attack was in the enjoyment of good health, have often given rise to the suspicion of foul play by poison or mechanical violence. If the patient survive the shock, and reaction set in, the signs of hemorrhage become manifest; the anæmia is marked by the pallor of the body, the whiteness of the tongue, lips, and conjunctivæ, the hemorrhagic pulse, the distension of the lower abdomen, and sometimes by semi-fluctuation in a mass behind the uterus in Douglas's pouch, constituting what I have ventured to call a "cataclysmic" form of retro-uterine hæmatocele. Again, at this stage the patient is likely to sink under the exhaustion of the shock and loss of blood combined. But if she survive this stage, she has still a third and formidable danger to encounter. This is peritonitis. It usually supervenes rapidly. A few hours' time is often enough to light up almost universal peritonitis. Intense pain continues, the patient can hardly bear the slightest touch or the weight of the bed-clothes on the abdomen; the abdomen swells, becomes tense, the pulse is rapid and small, the temperature rises two or three degrees above the normal standard, the countenance puts on the anxious drawn expression characteristic of abdominal injury. Still the case may issue in recovery. The shock and hemorrhage may be not greater than the patient can bear, and the inflammation may be limited to the pelvic peritoneum; plastic lymph may be so thrown out as to surround and encapsulate the blood-mass.

When called to a woman suffering from an injury of this kind, reference to her previous history for the purpose of diagnosis is but trifling in the presence of a great emergency. Nice diagnosis of the cause of the injury and source of the bleeding would afford little help in treatment. The present state of the sufferer demands all our care. Historical investigation may be postponed. This is far from saying it should be neglected. What we want is such a perfect knowledge of the nature and course of a disease—and this remark applies with special force to the case under discussion—as will enable us to detect it in its incipient stages, to understand the changes that are in progress, and thus to acquire

indications for treatment in anticipation of the disasters which attend the climax. The hints we get that a tubal pregnancy is going on are commonly so obscure that they are easily overlooked. The subject herself may feel no disturbance of health, or observe no sign so unusual as to lead her to seek medical advice. She may be satisfied that she is pregnant in the ordinary way. The physician rarely indeed has the opportunity of studying these cases during their progress. He sees only the catastrophe. But phenomena sometimes present themselves, which, although not conclusive as to the existence of tubal gestation, are yet sufficiently important to dictate a careful local examination. I will not insist upon the suspension of menstruation, and the presence of the common subjective signs of pregnancy, further than to call to mind that if examination of the uterus lead to the conclusion, and this is not easy to arrive at, that the uterus is not the seat of the presumed pregnancy, we should consider the possibility of an extra-uterine pregnancy. One difficulty in gaining the first step in diagnosis—that, namely, of excluding uterine pregnancy—lies in the fact that the developmental force working in the tube extends to the uterus, causing considerable enlargement of this organ. Another obstacle is imposed by the hypothesis of pregnancy, which forbids the use of the uterine sound.

Two signs, singly or concurrently, justify exploration. These are pain and hemorrhage. These signs, of course, are far more likely to be connected with ordinary abortion, some disease of the uterus, or with dysmenorrhœa. But this probability does not detract from the expediency of examining. On doing this we may be able to exclude uterine causes. This is one step. The next is to obtain evidence of abnormality outside the uterus. If we find fulness of the vaginal roof on one side of the uterine neck, the uterus pushed over to the opposite side, if we can, by finger in rectum, and hand depressing the abdominal wall above the pubes, define a swelling between them, the presumption rises that there is extra-uterine pregnancy. Tubal gestation is distinguished from encysted abscess of the broad ligament or pelvic peritoneum by its smoothness, uniformly round or oval form, and by its mobility. The long axis of the oval tumor is parallel with Poupert's ligament. The presumption of tubal gestation is strengthened in proportion as we increase the evidence of pregnancy. Thus Huguier says, the violaceous coloration of the vagina has always been to him an indication of pregnancy, uterine or extra-uterine. Vaginal pulsation may be felt. Every Kennedy in one case detected the placental *souffle*.¹ Analysis of numerous cases proves one thing, namely, that in many, perhaps in most, distinct symptoms which may be regarded as premonitory, do occur before the final catastrophe. The pain, Goupil says, is constant. It is due, no doubt, to the stretching of the tube chiefly, and in part to the pressure of the enlarging sac upon neighboring structures. Kennedy's cases, my own,² and many others, show that pain occurs early and continues.

The hemorrhage is not less constant. I have several times pointed this out in the discussions at the Obstetrical Society. It strengthens the

¹ British Medical Journal, 1869.

² See St. Thomas's Hospital Reports, vol. i., 1871, Pelvic Hæmatocele.

analogy with abortion. Goupil says, metrorrhagia is an almost constant phenomenon. Lesouef, in the most valuable monograph on extra-uterine gestation with which I am acquainted, declares that hemorrhage is the initial fact of the fatal accidents, and that when the foetal sac bursts, blood had already for a long time been poured into it distending its walls. Lesouef does not insist clearly upon the escape of blood externally in the form of metrorrhagia. But I believe this phenomenon is so frequent that it may be regarded as indicative of what is going on in the sac. The blood which flows by the vulva is to a certain extent the overflow. It no doubt postpones the climax in rupture. It should serve as a warning of the impending danger.

A point deserving of the most earnest attention is that in many cases the fatal catastrophe does not come in one single stroke. One or more minor attacks, evidently marked by rupture and effusion of blood, occur several days before the final blow is dealt. The symptoms of these preliminary strokes are those of hæmatocele. The first rupture is probably small, the ovum perhaps remains entire. If we could seize this moment to puncture the sac, we might avert the fatal rupture.

Diagnosis.—The physical signs taken alone might not enable us to distinguish an early tubal gestation from a small ovarian cyst or a tubal dropsy. But add to these physical signs, so similar in both cases, the history and signs of pregnancy, the pain and the hemorrhage, and we get an accumulation of evidence which in some cases at least amounts to a very high degree of probability in favor of tubal gestation.

Three conditions there are which are most likely to be a source of difficulty. Retroversion of the gravid womb; a small ovarian cyst; retro-uterine hæmatocele. The first and third of these conditions will commonly cause retention of urine, an accident which seems comparatively rare in tubal gestation. In the first, almost constantly there is a history of pregnancy, and the characteristic signs of it; in the third also there may be a history of pregnancy. Retroversion may be distinguished by tracing the firm rounded body of the uterus by vaginal and rectal touch and by its other characteristic signs. Retro-uterine hæmatocele may be the result of abortion. It will, like tubal gestation, be attended by external hemorrhages. But the mass of blood behind the uterus will have followed on severe symptoms suddenly produced, and the uterus will present a degree of development much less than that commonly observed in tubal pregnancy. Although a small ovarian cyst may also cause retention of urine, it does not cause suppression of menstruation. We may always negative pregnancy.

Lesouef cites a case in his Memoir (No. vi.) of an extra-uterine gestation mistaken for a retroversion of the womb at the fourth month. Puncture was made, and attempts at reduction. Two days later the foetus passed by the rectum. There had been almost complete suppression of urine, and stoppage of feces. The case was seen by Dupuytren, Antoine Dubois, Lisfranc, and Maygrier. I have also seen cases of gestation in Douglas's pouch which gave rise to the same symptoms and erroneous diagnosis. One is recorded in St. George's Reports, 1877.

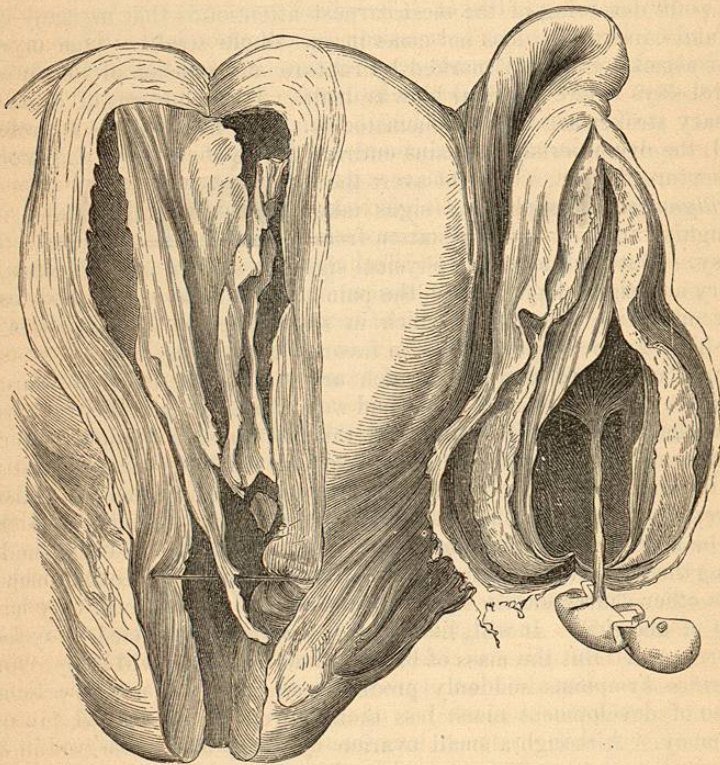
Fig. 82 is a good illustration of a tubal gestation, the cyst bursting at about the third month. The uterine decidua is dissected up, and is

remarkably developed. The tube is brought forward for the purpose of demonstration. In life it would get behind the uterus.

Causes of Tubal Gestation.—These are interesting, as illustrative of the morbid conditions to which the Fallopian tube is liable.

It is remarkable that, in a considerable majority of cases, it is the left tube which is the seat of gestation (*Campbell, Hecker*). This may possibly be explained by the fact that the left tube is more liable to displacement and compression by the sigmoid flexure, which lies in close relation to it, and is often disturbed by feculent accumulations.

FIG. 82.



Gestation in the Left Fallopian Tube. The Sac Ruptured; the Embryo Suspended by its Cord: the Uterine Mucous Membrane Developed to a Thick Decidua (R. B.). (St. Thomas's Museum. H. H. 19, nat. size.)

The essential condition of tubal gestation is obviously arrest of the impregnated ovum in the tube. We have, therefore, to consider what are the conditions which may lead to this arrest? Naturally we look to some mechanical obstruction, and in some cases this is found. Amongst these are—

a. Inflammatory adhesions.—Hecker¹ believes this to be a common

¹ Monatschrift für Geburtskunde, 1859.

cause. He supports this opinion by eight dissections, showing adhesions impeding the free course and connection of the tubes with the ovaries; by the fact of the frequent sterility antecedent to tubal gestation; by the well-known sterility of prostitutes which follows upon colic—the *colica scortorum*. It has been remarked, that in many instances the subjects of tubal gestation had, up to the time of such gestation, been sterile. There is sufficient reason to admit this as a frequent cause, but many cases are known in which the course of the tubes appeared to be free; and in some cases, in which adhesions have been found, these were probably not antecedent to, but the consequence of, the tubal gestation.

b. Obstruction of the ostium uterinum by polypi.—Breslau¹ relates two cases in which polypi were found at the uterine end of the tube. In one, that of a woman, aged thirty, who died of abdominal hemorrhage six months after marriage, a cyst, containing chorion and blood, occupied the left tube. The cyst was close to the uterine mouth of the tube. Inside the uterus, close to the mouth of the tube, was a mucous polypus, not quite obstructing the passage of a small sound.

This position of polypus is not very uncommon. I dissected a uterus in which a polypus the size of a filbert was attached to the mouth of each tube and occluded it.

Fibrous tumors in the uterus have been found in several cases. A very interesting one is related² by Dr. Magrath, of Jamaica. In University College Museum is a specimen (No. 4275) of tubal gestation, the sac having burst at the fifth month. The uterus contained several large fibroids. These tumors so distort the form and relations of the uterus, that obstruction to the passage of the ovum may readily occur. Extra-uterine gestation, then, may be looked upon as one of the penalties a woman having fibroid tumors in the uterus may incur if she marries.

It has struck me as remarkable, how often, in tubal gestation, twins have been found. May it not be that the two ova may obstruct each other in their passage along the tube?

c. Another fact deserves notice. In the great majority of cases of extra-uterine gestation, the subjects have been women *exposed to hard work*. In many cases the women themselves have assigned this as the cause of their misfortune. It is quite possible that great bodily exertion during the first days after conception may so alter the relative position of the ovaries, tubes, and uterus, as to impede the due transit of the ovum; or great congestion of the organs may be induced, causing tumefaction of the mucous membrane. Coste conjectured that shock, moral or physical, might cause extra-uterine gestation.

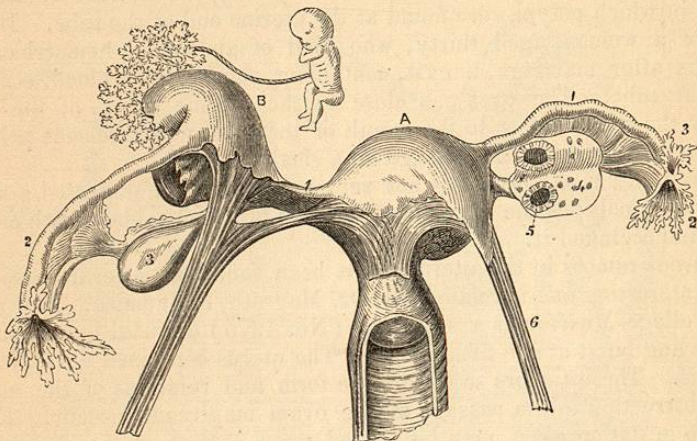
d. Oldham was, I believe, the first to observe that occasionally the corpus luteum was found in the ovary of one side whilst the ovum was developed in the tube of the opposite side. How could this contradiction be explained? The ovum must have travelled by an unusual route. The problem has given rise to the theory of the *transmigration of the ovum*. This theory offers two routes which the ovum may take.

¹ Monatschrift für Geburtskunde, 1863.

² Obstetrical Transactions.

The extra-uterine transmigration.—Oldham and Wharton Jones found, in a left interstitial gestation, the corpus luteum in the right ovary; the right pavilion was obliterated, and both observers believed that this obliteration was of old date, so that the ovum could not have passed by it. The uterine portion of the left tube was drawn towards the posterior wall of the uterus by false ligaments, which were also found at the far extremity of this pavilion, which was thus brought into contact with the right ovary, and had directly received the ovum from it.

FIG. 83.



Gestation in a Rudimentary Horn of the Uterus—Front View—(after Luschka).

A, the developed horn of the uterus (right); B, the rudimentary horn with a rent, through which the foetus has escaped (left). 1, the Fallopian tube (right); 2, the Fallopian tube (left); 4, 5, right ovary and corpus luteum; 6, round ligament.

Rokitansky found in a woman, who had died after a uterine pregnancy, the yellow body on the left; the abdominal portion of the left tube, for a space of two inches, was thinned, impervious, its pavilion adherent to the sigmoid flexure above the brim of the pelvis; the right tube was mobile. He believes that the conception took place after these adhesions had been formed, and that the ovum had passed into the uterus from the left ovary by the right tube.

In these two cases, then, it seems difficult to avoid the conclusion that the fertile ovum travelled from its ovary to the opposite tube. Klob and Kussmaul showed, what any one may see on the dead body, how easily the fimbriated extremity of the right tube may be applied to the surface of the left ovary, and *vice versa*. But Kussmaul does not regard this contact as necessary. He invokes observations made on amphibia, in which it is certain that actual contact between tube and ovary does not take place. And Müller and Becker have described a *vibratile current* running from the ovary to the tube, which may sweep the ovum over the intermediate space into the tubes. Maurer's case is another illustration of the extra-uterine transmigration.

A case that seems decisive as to the possibility of the extra-uterine transmigration, is related by Luschka.¹ A woman died under the usual signs of rupture of a fruit-sac when about ten weeks pregnant. It was found that the fruit-sac was in the rudimentary horn of a one-horned uterus, whilst the corpus luteum was in the opposite ovary. No communication could be found between the sac of the rudimentary horn and the cavity of the developed half of the uterus, so that intra-uterine migration is necessarily excluded in this case. It is convenient to give Luschka's figure here; the reader can refer to it when studying the subject of pregnancy in a rudimentary horn further on (Fig. 83).

In several other cases in which the corpus luteum was found in the ovary of the same side as the fruit-sac, the rudimentary horn containing it had no communication with the cavity of the developed horn. Here we may conjecture that the spermatozoa found their way through the developed horn and its tube, being thus conveyed across outside the uterus to the ovary of the opposite side; unless, indeed, we conclude that, at the time of the conception, a communication between the cavities of the two horns did exist, which became closed during gestation.

Schultze² relates a case of a tubo-uterine gestation, carried to term. The gestation was on the right side, the corpus luteum on the left. The right tube was impervious at both ends. This would appear a case of extra-uterine transmigration.

In the London Hospital Museum (E. h. 28) is a specimen in point. It exhibits the uterus and ovaries of a woman who died very suddenly, and was suspected to be poisoned. There is a tubular conception and ruptured sac on the left side; the corpus luteum is on the opposite side. Indeed, cases of this kind appear to be not very uncommon.

Mr. Stirling, of the Edinburgh University, informed me (1875) that in eight out of twenty sheep the ovum was found in the opposite horn to the corpus luteum; and that in five out of twenty sheep a double corpus luteum with only one lamb was found.

The intra-uterine transmigration.—Tyler Smith, I believe it was, who started the hypothesis that the ovum might be received into its appropriate tube, enter the uterus, cross the cavity, and penetrate the opposite tube, where it might become developed. There are facts which support this idea. That the ovum does wander in the uterine cavity is proved by the cases of placenta prævia, where the ovum gets to the cervical zone, and also in some rare cases even into the cervical cavity, constituting cervical gestation. Klob,³ however, disputes the possibility of intra-uterine migration.

But it must be remembered that in a considerable proportion of cases of tubal gestation, the corpus luteum is on the same side as the embryonic sac, and that no obstruction by adhesions or tumors can be found. Here we may suppose that a temporary flexion of the tube may present a spur or valve at some point on the uterine side of the ovum and block its onward course.

¹ Schwangerschaft i. d. rechten rudimentären Horne, etc., M. f. G., 1863.

² Würzburger Med. Zeitschrift, Band iv.

³ Wochenblatt d. Ztschr. d. k. k., Ges. d. A. in Wien, 1861.

I will now describe what I believe is the exact order and course of events in the greater number of cases of tubal gestation. The ovum is impregnated either in the ovary, as Coste thought probable, or after its reception in the tube. Arrested there, it grows, developing its chorion into placenta, and distending the walls of the tube into a sac, until the time arrives—seldom postponed beyond three months—when the growth of the ovum outstrips the growth and stretching of the tube which contains it. The great majority of cases terminate in rupture within eight weeks (*Hecker*). Dr. Roper observed that the rupture occurred at a menstrual period. This increases the analogy I have pointed out between tubal gestation and placenta prævia and abortion. The tube does not burst at once; if it did there would be no premonitory hemorrhage. This hemorrhage I account for on the same hypothesis as that by which it seems to me certain that the hemorrhage in placenta prævia is explained. In both cases the gestation is *ectopic*, that is, proceeding in an abnormal locality which is unfit for the office imposed upon it. The Fallopian tube, like the lower segment of the uterine cavity, has only a limited capacity of growth. This is soon overtaken by the growing ovum, which, not finding the room it requires, excites spasmodic contractions of the sac. Hence partial detachment of the ovum is caused, and some hemorrhage ensues. In the case of tubal gestation, partial detachment is very easy, owing to the scanty development of decidua. This hemorrhage, in cases both of placenta prævia and of tubal gestation, may escape externally. In the first case, the os uteri offers a ready exit; in the second case, the exit is not so easy, and the sac is comparatively feeble. Hence a large proportion of the blood poured out by the severance of relation between placenta and sac is retained in the sac. The distension becomes extreme. Renewed spasmodic action of the muscular wall is excited, and the sac bursts. The ovum itself does not always burst, and, probably, rarely does until the sac has done so. The accumulated blood in the tube, together with fresh blood proceeding from the torn vessels of the tube, is now poured into the abdominal cavity, causing the shock and other phenomena that mark the climax.

The influence of extra-uterine gestation upon the uterus is an important point to consider. The remark of Velpeau that the sexual organs show little departure from their ordinary state when the foetal sac is not in the tube, and do not contract adhesions with the uterus, is generally true. But in every museum which can show specimens of tubal gestation will be found ample evidence of enlargement of the uterus, and of the development of the mucous membrane into decidua; and this is entirely in accordance with physiological knowledge. The uterine mucous membrane swells and undergoes development into decidua under the mere stimulus of ovulation. This development is a necessary preparation for the reception of the ovum. It is not a necessary condition for its formation that the ovum should reach the uterus. But why, it may be asked, is the decidua so constantly found in tubal gestation preserved so long as three months when it is not wanted? And why is it not observed in many cases of abdominal gestation? The explanation is found in the remark, before cited, of Velpeau. In tubal gestation, the engorgement of the uterus and the physiological stimulus are maintained by the proximity of

the foetal sac; whilst in abdominal gestation the developmental stimulus and the vascular system supplying the sac are remote from the uterus. Still, in many cases where the sac adheres to the uterus and presses upon it, this organ is greatly enlarged, and its mucous membrane is highly developed. As to the formation of decidua in the tube itself, it might be, *à priori*, supposed that the tube having a mucous membrane, and the physiological necessity for a decidua being present, a decidua would be formed. But Oldham,¹ Kiwisch, and Virchow have shown that it is not so. The mucous membrane in the tube is deficient in the utricular glands which the uterine membrane possesses. A careful examination of specimens confirms Virchow's observation. The chorion-villi seem to be implanted directly upon the mucous membrane. The condition of the mucous membrane of the tube has been investigated by Poppel,² who says that even if a decidua vera be formed, there is certainly no serotina. Hennig has also studied the question.³ He shows greater similarity between the behavior of the uterine and tubal mucous membranes under gestation than was before suspected. If, he adds, there be no serotina in tubal gestation, the placenta is developed on a different plan to that of the normal uterine placenta; it is developed according to the plan which governs the normal gestation in rabbits, cats, and dogs.

This slender attachment may serve to explain the facility with which separation and hemorrhage take place. Also, in abdominal gestation, there is no true decidua in the sac. The placenta is attached directly to the surface of the uterus or of some abdominal organ.

The Treatment.—A careful study of the history, course, and premonitory symptoms of tubal gestation, will encourage the hope that we may in some cases at least avert the ultimate catastrophe. In the early stages, before hemorrhage has occurred, if pain and local distress have led to an examination, and the detection of fulness in the vaginal roof a little on one side of the uterus, which we conclude to be, on grounds described under "Diagnosis," due to a tubal cyst, we have, I think, a sufficient indication to act decisively. Lesouef said that every woman who has become the subject of an extra-uterine gestation, is doomed to more or less speedy death. This is eminently true of tubal gestation. Error of diagnosis is the only justifiable ground for hesitation. And for what is a tubal gestation likely to be mistaken? Most likely for a small ovarian cyst. Now here is a case of which we have many analogous examples in medicine. Whichever view be right, the same treatment applies; and hence the error entails no harm. The indication in both cases is to arrest the growth of the cyst.

This can be done by *tapping* it; and tapping through the vagina or rectum by means of the fine aspirator-trocar is infinitely less dangerous than letting the disease go on to its ordinary and almost inevitable termination.

In the case of tubal gestation, there being no available outlet, we are precluded from the induction of labor. But the embryo may be killed, and thus the development of the sac cut short.

¹ Guy's Hospital Reports, 1843.

² Monatschrift für Geburtskunde, vol. xxxi.

³ *Ibid.* 1869.

Electricity.—Dr. Bacchetti¹ described a case in which two needles were passed into the tubal sac, and then a current of electricity was passed through by means of a Bunsen's pile. Two shocks were administered. The growth of the tumor was arrested, and the patient did well. Of course it may be doubted whether there was really a tubal gestation; but in any case it is proved that the puncture may be safely made. Duchenne, consulted by Lesouef, suggested resort to electricity in the state of tension by a Leyden jar. He ascertained that the discharge of a Leyden jar produced a profound local stupor, and that for a certain time the capillary circulation and calorification were diminished in the tissues operated on. The method he recommends is, to cover the stem of the exciters with a thick coating of wax, leaving only the terminal ball bare. One excitor is then passed into the rectum, endeavoring to place it in contact with the postero-superior side of the tumor. The lumbosacral plexus must be avoided, else the mother will receive the shock. The second excitor is passed into the vagina, and the ball is applied to the antero-inferior wall of the cyst. Thus arranged, the rectal excitor is put in communication with the external armature by a chain suitably isolated. It then only remains to bring the internal armature in contact with the vaginal stem by a glass stem excitor. The electricity will recombine itself across the foetal cyst, and it seems inevitable that the stream must traverse the embryo.

This mode of applying electricity seems preferable to that of Bacchetti, inasmuch as no wound is inflicted. Indeed, Bacchetti's plan may be excluded on the ground that, having made the puncture, electricity is superfluous.

Drawing off the liquor amnii.—The sac deprived of this element will naturally collapse, the ovum will in all probability perish, and atrophy by absorption ensuing, cure will be attained. If the aspirator-trocar be used, the liquor amnii can be easily drained off.

It had already been proposed by Basedow to puncture the cyst through the vagina, to drain off the liquor amnii, and thus to kill the embryo. This method was advocated by Kiwisch,² who recommended to pass a small trocar into the cyst by the vagina.

Professor Friedreich³ of Heidelberg relates a most interesting case in which, having detected a tubal cyst which gave rise to great pain, and was increasing so rapidly that bursting was apprehended, he made three *injections of a solution of morphia* into the cyst. He based this proceeding on the known susceptibility of the infant organism to opium. Complete success followed. The tumor shrank to a small hard knot, and all the distressing symptoms vanished. It is not, however, clear whether the same result might not have been obtained by the punctures alone, the morphia injections being superfluous. Some degree of inflammation is pretty sure to follow puncture. This would entail the death of the foetus. But the necessary drainage of the cyst would alone be efficient.

Dr. Greenhalgh⁴ describes a case in which he arrested the development

¹ Gazzetta medica toscana, 1853.

² Klinische Vorträge, Prag, 1849. 11 Abtheilung. S. 275.

³ Virchow's Archiv. 29, 1863.

⁴ Lancet, 1867.

of a tubal gestation by puncture through the vagina. Professor E. Martin¹ relates a case in which he pursued the same method.

The late Professor Simpson² related a case in which a patient who had suffered rupture of an extra-uterine cyst was punctured by the vagina "to evacuate the liquor amnii, to effect death of foetus and subsequent decomposition and expulsion." Death occurred through peritonitis. The sac was formed by the enlarged uterus, broad ligaments, pelvic walls, and sigmoid flexure. The foetus was of six months' development. Thomas relates a most instructive case.³ A woman had suffered several acute paroxysms of pain in the left iliac fossa. The uterus measured three and a half inches from os externum to fundus; it was in right oblique anteversion, and not so movable as normal; to the left of the uterus was a tense elastic cyst which filled the whole iliac fossa, pressing the uterus to the right, and extending down to a little below the level of the os internum. He detected *ballotement* in this cyst, and diagnosed tubal gestation. He opened the cyst through the vaginal roof by the galvano-cautery knife. A straw-colored, slightly-colored pinkish fluid was ejected with such force as to fly into the operator's face. A finger passed into the cyst felt a foetus. This was extracted. Severe hemorrhage attended extraction of the placenta. He thereupon injected a solution of persulphate of iron into the cyst. The bleeding was instantly checked; but a bit of placenta was left behind. Septicæmia ensued; but under repeated injections of carbolyzed water subsided. The bit of placenta came away on the fifteenth day. The patient recovered. The foetus measured six and a half inches.

The proceeding is worthy of adoption. It may, however, be doubted whether it would not be better to leave the placenta for gradual elimination, keeping open the communication of the cyst with the vagina.

Dr. Rupin⁴ relates a case of twin-pregnancy outside the uterus. A cyst was felt projecting in the roof of the vagina, which was punctured, and liquor amnii drained off; a foetus of four months escaped. The patient died of violent hemorrhage three days afterwards. On autopsy, a second foetus was found in a sac deep in the pelvis. Probably this was not a tubal gestation.

Can we arrest embryonic growth by means of agents introduced into the blood?

M. Delfraysse⁵ relates instances of retardation of the growth of the foetus by continued doses of iodine. Many attempts in ancient and modern times have been made by starvation and drugs to accomplish this object. I do not insist upon them, because I have no faith in their efficacy. It is possible, however, that *strychnine* carried so far as to produce minor toxic symptoms in the mother, might destroy the embryo. Syphilis has more power than almost any poison we are acquainted with over the foetus, almost always either killing it, or impeding its development. Might it not be justifiable in such a case as we are discussing to practise syphi-

¹ Monatschrift für Geburtskunde, 1868.

² Edinburgh Medical Journal, 1864.

³ New York Medical Journal, 1875.

⁴ Gazette des Hôpitaux, 1860.

⁵ Comptes rendus de l'Académie des Sciences, 1850.