Remarks

ON

ECTOPIC GESTATION AND THE CONDITIONS FAVOURABLE FOR ITS ADVANCE TO THE FULL TERM.

By JOHN WARD COUSINS, F.R.C.S., M.D.LOND.,

Senior Surgeon to the Royal Portsmouth Hospital and the Portsmouth and South Hants Eye and Ear Infirmary.

THE fertilized ovum may be arrested within the ovary or in any part of the Fallopian tube in its passage to the uterus, and when this occurs it seldom escapes destruction amid the many dangers which threaten its vitality. During the first few weeks the ovum may be destroyed and absorbed without any symptoms sufficiently definite to indicate the real nature of the accident. Tubal arrest and tubal abortion may both take place before any marked symptoms of pregnancy have developed, and the transient disturbance attending them may be regarded only as a recurrence of menstruation. Even early rupture of the tube may take place without any definite indications. The shock attending the accident may be slight, and the evidence of haemorrhage obtainable by palpation and bimanual examination very unreliable.

Difficulty in Diagnosis of Early Tubal Pregnancy.

In the absence of abdominal tenderness and swelling and of well-marked signs and symptoms of pregnancy, it is certainly not surprising that early tubal gestation should sometimes be destroyed, and the patient speedily recover without any recognition of her real condition. It is quite certain that precision in diagnosis is not always possible, that ectopic gestations are often overlooked, and that any definite statement upon the relative proportion of ectopic to normal pregnancies is surrounded by insurmountable difficulty.

In some cases, fortunately, an early and correct diagnosis can be made and a successful operation performed before the life of the patient has been seriously imperilled. Whenever the symptoms of pregnancy are associated with the occurrence of fitful and irregular haemorrhage, obscure pelvic pains, the presence of a swelling adjacent to or continuous with the uterus, and well-marked changes in the breast, I think we have sufficient evidence of the existence of an unruptured tubal pregnancy to justify an abdominal exploration.

Early Signs of Ectopic Gestation.

Sudden rupture of the gravid Fallopian tube is in a large proportion of cases the first indication of this abnormal condition. Before this accident the symptoms are often very indistinct and quite insufficient to suggest the dangerous character of the gestation, and the patient may have considered herself normally pregnant. The diagnosis then of ectopic gestation rests upon the recognition of intra-peritoneal rupture and haemorrhage. There may be no appreciable enlargement, and the presence of blood can seldom be established by palpation and pelvic examination; so that our chief reliance must be placed upon the symptoms of sudden collapse associated with acute abdominal pain and tenderness.

Usual Terminations of Ectopic Pregnancy.

In some cases the gestation sac grows downwards and expands the folds of the broad ligament, and when this takes place the rupture is attended with less pain and faintness as the effused blood is limited by the resistance of the surrounding structures. Primary rupture in extra-peritoneal ectopic gestation is sometimes followed by secondary rupture into the peritoneal cavity with serious laceration of blood vessels and dangerous haemorrhage.

In every case, then, the urgency of the symptoms is in direct proportion to the suddenness and extent of the injury. When the rupture is followed by profound shock and severe internal haemorrhage, the only hope of saving the mother rests often upon immediate laparotomy. Fortunately, in a large proportion of cases of tubal rupture, the maternal danger is less urgent, and surgical interference is unnecessary; but when the accident is attended with little risk to the mother, it is generally followed by the death of the ovum, and when this happens during the early stage of pregnancy, the embryonic structures become enveloped in effused blood and fixed by protective exudation, and then in the course of

a few months the whole mass undergoes complete absorption.

It would be often a considerable help in practice if we were able to define the limit within which this favourable result could be anticipated, but this we are unable to accomplish, yet I think we can fairly venture to assert that complete absorption of a fetus may take place up to the middle or even the end of the third month of pregnancy. After this period it is not likely to occur, for the placenta is now distinctly formed, the centres of ossification are rapidly advancing, and the whole ovum has reached the average weight of about 4 oz.

After the death of the fetus an ectopic gestation may terminate in various ways. Suppuration sometimes takes place within and around the gestation sac, and this is followed by prolonged and dangerous septic disturbance. I have met with fetal remains in several cases of pelvic abscess, and others also have been successfully operated upon which were clearly caused by extrauterine gestation. The prolonged suffering of patients is often extremely painful to witness. During the last few months I have on several occasions seen a lady who for fifteen years has been discharging through the rectum portions of a fetal skeleton, and other small pieces of bone from a vaginal fistula. At other times the fetus undergoes a slow process of calcification, or passes into a mummified condition in which all the organs and structures are shrunken into a mass loaded with fat, margarine, and cholesterol. Occasionally the fetus is converted into a soap-like mass of adipocere formation in which the bones of the skeleton are enclosed. These strange transformations have been attributed to the absorption of nutritive fluids from the maternal blood through adhesions between the fetal structures and the walls of the gestation sac, after the cessation of the placental circulation; but their exact nature still remains to be unravelled. We can only affirm that these processes occur in tissues which are practically lifeless, although they are still surrounded and in contact with living structures.

Conditions Favourable for Advance to Full Term.

When we consider the great risks which surround tubal gestation, it is certainly not a matter of surprise that so small a number of these cases ever reach the third or fourth month, and that only a very few attain an advanced stage of development. It is evident that there must be some special and favourable conditions occasionally present which powerfully aid in maintaining the development and vitality of the fetus. What, then, are these conditions? Their consideration, I think, opens up many interesting questions.

1. During the early stage of ectopic pregnancy the ovum is very movable, and as the expansion of the tube proceeds it continues to develop outside the peritoneum and opens out the loose structure of the broad ligament. It may occupy in the pelvis very variable positions. Sometimes it is in front of the uterus, or it may be on one side of that organ, or it may be deeply lodged in the pouch of Douglas. As the pregnancy advances the uterus may remain in the pelvis, or it may be drawn upwards by the ascent and expansion of the gestation sac. Mobility of the sac is generally well marked during the early months, and in favourable cases the ovum continues to be a movable swelling through all the stages of its development. On the other hand, if this essential mobility is hindered by its impaction in the pelvis, or by adhesions to the surrounding organs, the chances of continuous growth and vitality are greatly reduced.

2. Another favourable condition consists in the gradual expansion of the gestation sac. In advancing cases the symptoms of rupture of the sac are very indistinct, and sometimes they are altogether absent. Its wall appears to undergo a slow process of stretching without any marked laceration of its fibrous structure. It is a remarkable fact that the ovum undergoing an evolution of such rapid and delicate changes can ever escape destruction; but we may be certain that its occasional safety is the result of the gradual expansion of the normal coverings of the embryo, and the support they obtain from plastic exudation and fibrous consolidation. Whenever slight rupture takes place, it is, with very few exceptions, extraperitoneal, and the openings are soon securely plugged without any serious haemorrhage or disturbance of the placental circulation.

3. Favourable cases of ectopic gestation are marked by the early ascent of the gestation sac towards the abdominal cavity. The direction it may take is variable. It may advance almost vertically, or it may early assume an oblique position, and as it ascends it carries before it the peritoneal

covering of the pelvic viscera, and then the peritoneum of the anterior abdominal wall. Sometimes the sac becomes firmly encysted in Douglas's pouch, or fixed by adhesions in the pelvis, so that its ascent is entirely prevented. In other cases the upward movement is incomplete and partial, and the sac gets stretched backwards towards the spine, and the broad ligament around it becomes condensed and thickened by the irritation of the growing ovum. The expansion may also take a downward direction towards the pelvic floor, and when in this position urgent symptoms are often excited, accompanied with displacements of the uterus and of the other pelvic viscera. As a general rule, every case of ectopic gestation, in which from any cause the sac becomes locked in the pelvis and stopped in its ascent towards the abdominal cavity, seldom advances beyond the fifth or sixth month, as the fetus is destroyed by the compression of the surrounding structures, and by interference with the placental circulation.

4. It has long been recognized that the advance to the full term of an ectopic gestation is greatly influenced by the position of the placenta. After the arrest of the ovum in the tube it becomes attached to the internal surface, and the vascularity of this spot undergoes a rapid increase. The tube wall gradually expands, the chorionic villi soon surround the ovum, and the future position of the placenta is fixed, but, as the fetal development proceeds, this organ passes through much shifting and stretching caused by the expansion and elevation of the gestation sac, and during these changes there is the risk of haemorrhage and rupture of the sac, or of a blocking of the placental circulation, followed by destructive changes within its substance.

Now for the purpose of illustrating my remarks it will be quite sufficient to recognize three positions which the placenta may occupy in relation to the gestation sac: (1) It may be situated below at the bottom of the sac. (2) The organ may be uppermost and attached to the upper part of the wall of the sac. (3) The placenta may be laterally incorporated with the sac, and elongated and displaced upwards for many inches into the abdominal cavity.

1. In the first position the placenta can undergo very little elevation and displacement. The gestation sac may be supported by the expanded tube and a layer of connective tissue, or it may be sustained only by the peritoneal covering of the pelvic organs and lower abdominal region as it rises out of the pelvis. It is remarkable how thin a covering is sometimes sufficient to support the sac at an advanced period of gestation. An interesting case of this kind is recorded in the *Journal of Obstetrics and Gynaecology* by Drs. T. R. Smith and Herbert Wilkinson. The fetus was enclosed in a large spherical sac attached to the uterus by a pedicle near the base of the left broad ligament. The tumour was almost wholly covered by peritoneum, and it advanced to the full term without any indication of rupture or haemorrhage. When the placenta is in this position the gestation sac is always liable to suffer serious laceration with the escape of its contents into the peritoneal cavity. If the rupture is gradual the well of the sac slowly bulges and forms a protrusion which at length gives way, and the fetus, partially enclosed in its amniotic covering, is carried into the abdomen. Some years since Jessop, of Leeds, operated on a case of ectopic pregnancy in which the sac ruptured in this fashion, and the child was found free in the peritoneal cavity. The patient recovered from the operation. In this case it is probable that the fetus escaped alone, and that the placenta was retained at the bottom of the sac.

2. When the placenta is uppermost it forms the upper portion of the gestation sac, and in this position it undergoes both displacement and compression, as the organ is exposed on one surface to direct pressure from the development of the fetus, and on the other surface to the varying tension of the surrounding viscera, and this continuous and increasing pressure generally terminates in destructive changes. The life of the fetus may be endangered by sudden haemorrhage and blood extravasation, or it may succumb to the draining away of the liquor amni into the peritoneal cavity or the loose cellular structure of the broad ligament, and this loss is soon followed by collapse of the sac, compression of the fetus, and slow destruction of the placental structure. Sometimes the impacted sac extends downwards towards the floor of the pelvis, disturbing the position of the uterus and bladder, and getting into close relation with the bowel, so that in addition to the risks I have mentioned we must add the dangers arising from septic absorption, suppuration, and septicaemia.

3. When laterally situated in relation to the gestation sac the placenta occupies the most favourable site for maintaining the vitality of the child. In this position it aids in supporting the wall of the sac, and it obtains a free and direct current of blood from the large vessels which supply the pelvic organs. The early movement of the gestation sac towards the abdominal cavity assists in the elongation and stretching of the placental structure, and in promoting through the organ a free circulation; at the same time it reduces the risk of haemorrhage and blood extravasation. During the latter months of pregnancy the expansion and elevation of the placenta must be regarded as greatly contributing to the complete development of the fetus.

The favourable conditions to which reference has been made may now be arranged in the following table:

1. Early and continuous mobility of the ovum.
2. Slow subperitoneal expansion of the gestation sac.
3. The absence of urgent symptoms indicating intra-peritoneal or extraperitoneal rupture.
4. Early ascent of the fetus towards the abdominal cavity.
5. The lateral position of the placenta in relation to the gestation sac and its upward expansion and elongation.

ILLUSTRATIVE CASES.

CASE I. Subperitoneo-abdominal Gestation: Operation: Recovery.—M. B., aged 30, married thirteen years, one child 9 years of age, came under my care in May, 1900, suffering from an abdominal tumour.

History.—In 1893 she had an attack of fever, but with this exception her health had been good. Signs of pregnancy occurred again in May, 1899, and from that time she had not been well, and had been troubled with constant pain and sickness. In September the abdominal swelling was well marked, her breasts became full and tender, and distinct fetal movements frequently occurred. On December 28th some vaginal haemorrhage took place, and continued irregularly for two weeks. After this attack she had much increased abdominal pain and persistent fever. Before her admission to the Royal Portsmouth Hospital in March, 1900, she had been confined to her bed for some months.

Condition on Examination.—The patient had a worn and anxious appearance. The abdomen was enlarged and hard, and the swelling extended as high as the umbilicus. There was no fluctuation. The dullness reached across from the crest of one ilium to the other, and on palpation the whole area felt solid and resisting. The uterus was firmly fixed behind the pubic arch, and the pelvic structures were firm, but no definite swelling could be discovered. The bladder was irritable and micturition painful.

Operation.—Abdominal section was performed on March 15th, 1900. The abdominal wall was very vascular, and when the mass was exposed it was found covered with adherent omentum and intestine. The sac was then opened and a dead fetus removed; it contained about an ounce of dark-coloured fluid. After peeling away the placenta, which occupied the upper surface of the sac, the abdomen was carefully cut off by sutures and the sac cleaned out and packed with iodoform gauze.

Progress.—The patient made a slow and uneventful recovery. The cavity steadily contracted, and was cleaned out daily with gauze swabs and a solution of dilute sulphurous acid. She left the hospital at the end of two months. Her health was good in April, 1903, and the uterus was normal in size and freely movable.

The fetus measured 12 in. in length; the skin was wrinkled, and the nails slightly projected beyond the fingers.

CASE II. Subperitoneo-abdominal Gestation: Operation: Recovery.—M. G., married ten years, aged 28, two children, the youngest 7 years.

History.—Her third pregnancy commenced in September, 1901, and during the early months she suffered constant abdominal pain and tenderness with frequent vaginal haemorrhage. In November she was received into the Female Military Hospital, Portsmouth. The abdomen steadily increased in size, and she underwent an examination under chloroform, and was informed by the medical officer that she was pregnant. In February, 1902, she much improved and left the hospital, but in April she was readmitted for increasing pain and swelling. During May and June she took morphine to relieve her sufferings. The fetal movements were constant.

Condition on Examination.—The patient came under my care on July 8th, 1902; she was then extremely ill, and her acute suffering compelled her to implore for immediate relief. The abdomen was irregular in shape and very tense. On the left side at the level of the umbilicus there was a round swelling which could be seen to undergo severe contraction every few minutes. On the right the abdomen was very prominent, and marked dullness on percussion extended from the pelvic region to the crest of the ilium. Below the costal arch on the left side a small portion of the surface was soft and elastic on palpation. No fluctuation could be detected in any part. The uterus on pelvic examination could not be felt; the vagina was much elongated, and the pelvic structures were full and oedematous.

Operation.—A catheter was passed into the bladder, and the incision extended 3 in. above to 3 in. below the umbilicus. The edge of the placenta was exposed and drawn to the right side, the sac opened, and three pints of dark-coloured and inodorous liquid were evacuated. The incision in the sac was then enlarged and the child extracted, but in doing this the thin wall of the sac ruptured and the intestines slipped into the wound. After careful washing with sterilized water they were replaced,

and the sac with the edge of the omentum was sutured to the parietal peritoneum. The cavity was then cleaned out and packed with gauze. The placenta was not disturbed, and the right half of the abdomen looked as if it were distended with a solid tumour. The uterus at once sank down towards the pelvis. The body of the child was quite fresh. It weighed 7½ lb., and in length it measured 20 in. The hair on the head was ½ in. in length, and the nails projected well beyond the tips of the fingers. The body and limbs were plump, and the face had lost its wrinkles.

Progress.—Great relief followed the operation, and all pain ceased at once. The cavity gradually contracted, the placenta separated slowly, and after the first week detached portions were daily removed, and the cavity regularly deodorized. The wound completely healed in three months, all induration disappeared, and the abdomen looked symmetrical and normal. In April, 1903, the patient was in excellent health.

The cases that I have briefly narrated contain several points of interest. The first patient became pregnant about May, 1899, and the death of the fetus appears to have taken place in December, and this was soon followed by septic absorption and fever, attended by constant abdominal pain and great depression of the system.

No symptoms occurred at any period of the pregnancy indicating internal haemorrhage and rupture. At the time of the operation the placenta was found to be in a necrotic condition, and it was easily peeled off with very little haemorrhage. The fetus was soft and flabby, and the bones of the skull were loose. Its death was probably caused by pressure, the result of pelvic impaction, chronic inflammatory changes in the broad ligament and escape of the liquor amnii. The placenta, moreover, was situated on the upper surface of the gestation sac, and it was in an unfavourable position for shifting and expanding with the advance of pregnancy.

In the second case pregnancy took place about August, 1901. During the early months a correct diagnosis was attended with difficulty, and the patient suffered much from pain, abdominal tenderness, and occasional haemorrhage, but no definite symptoms occurred at any time of rupture of the gestation sac. When she was admitted into the Royal Portsmouth Hospital, the existence of advanced ectopic pregnancy was easily recognized. On the right side of the abdomen the lateral position and upward expansion of the placenta was very evident, and a loud *souffle* was audible over a large area; but the sounds of the fetal heart could not be detected. The pains of spurious labour had then been increasing in severity for many days, and the agony suffered by the patient during the uterine contractions was extremely distressing to witness. Her limbs were rigid, and the uterus could be seen contracting and rising up against the abdominal wall. It really seemed probable that rupture of the sac or separation of the placenta might take place during the severe straining; but accidents of this kind rarely occur in cases which have reached the full term, and this can be attributed to the strength and thickening of the connective tissue around the sac, and also to the support of the adjacent organs and the diffused pressure of the abdominal wall.

The severity of the uterine contractions continued up to the hour of the operation, and although the urgent symptoms of spurious labour had been progressing without any marked intermission for at least ten days, only a small quantity of dark-coloured discharge had escaped from the vagina. In many cases, however, free haemorrhage has taken place, and sometimes this has been associated with pieces of decidual membrane. The formation of a uterine decidua in all cases of ectopic pregnancy must be regarded as an unsettled question; still there are many cases on record in which a decidual structure had been expelled from the cavity of the uterus.

Spurious Labour.

There is often considerable difficulty in estimating the exact age of an ectopic pregnancy, and the onset of the symptoms of spurious labour cannot be regarded as evidence that the full term has been reached. Spurious labour may occur at any time during the last months of pregnancy, or it may be delayed some weeks beyond the normal period of gestation. We can, at all events, be sure that it appears with more or less distinctness in all cases of advanced ectopic pregnancy, and that the pains and contractions which accompany it are of very variable duration. In some cases the symptoms last only a few hours, while in others they are extended over a period of many days. The child never long survives the onset, and its death is caused by the disturbance of the placental circulation and haemorrhage into the gestation sac. It appears probable that contraction of the sac wall and the pressure of the abdominal muscles may contribute in producing asphyxiation of the child.

Etiology of Ectopic Gestation.

Many explanations have been put forward to account for the occasional arrest of the fertilized ovum, but the difficulties which surround the causation have not been overcome. The existence of internal and external disorders of the tube may prove an important factor in the production of ectopic gestation, and obstructions may be associated with displacements and adhesions of the tube, the presence of kinks and constricting bands, the results of bygone inflammation, and the obliteration of its lumen by endosalpingitis. It is very difficult to estimate the real influence of any form of mechanical causation, as there are no outward signs by which we can detect the incipient changes. The arrest may occur suddenly, or it may be the gradual result of irregular contraction of the tube, and the complete absence of symptoms at this early stage is certainly not surprising when we consider that the fertilized ovum in normal pregnancy reaches the cavity of the uterus about the eighth or tenth day, and at that time it is only a small mass of jelly-like substance about the size of a large pea. It can then be fairly assumed from our knowledge of the special function of the Fallopian tube that changes in the lumen may seriously hinder the onward movement of the ovum, and that its final arrest may at least be partly dependent upon some form of mechanical obstruction excited by morbid conditions within or around this organ.

But it is now generally admitted that there are other essential factors in the production of ectopic gestation. It has long been known that very early in normal pregnancy the uterine mucosa undergoes decidual changes. The observations of Clarence Webster and others have, however, clearly shown that although these changes usually take place only in the uterine mucosa, yet in some cases the mucous lining of the tube responds more or less to the genetic influence. Now the extension of the deciduous structure into the tube promotes the fixation of the fertilized ovum, and renders possible the maintenance of its vitality. Clarence Webster has pointed out the importance of the relationship between this tubal formation and the progressive development of the embryo. The extension of the decidual structure into the tube is probably "a developmental fault—a reversion of structure or reaction tendency of the tubal mucosa to an earlier type in mammalian evolution."

The occasional development of a tubal decidua in the human female in association with gestation has recently received singular corroboration. An extension of a decidual formation under genetic influence, far beyond the genital tract, has been published by Schmorl and also demonstrated at a recent meeting of the Dresden Gynaecological Society. On the organs of a woman who died of puerperal eclampsia he found a remarkable condition, which he had also observed in other cases. The serous coat of the uterus and ovaries was covered with numerous decidual growths, and some were found on the peritoneum in Douglas's pouch. He stated, moreover, that 70 such cases had been recorded. In a case of extrauterine pregnancy Prochownik had detected in the omentum decidual formations. Now all these independent records possess great interest, as they clearly indicate a widely diffused development of a structure exhibiting deciduous characters under the influence of the growing embryo.

Up to the present time we must admit that the causation of ectopic gestation is surrounded by many unravelled difficulties; still, it is not too much to assume that the following conditions can be taken as a basis for future investigation:—

1. The fertilization of the ovum sometimes occurs within a tube in which the lumen has been distorted by chronic changes within or around it.
2. That in addition to some form of mechanical obstruction the tubal mucosa may be transformed under genetic influence into decidual tissue, and that this structural change is essential for the vital attachment and development of the embryo.

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PETER I, the recently-elected King of Serbia, has appointed as his physician in ordinary Dr. Kosta Dietrich, who took part in an attempt to upset the Obrenovitch dynasty. For this he was condemned to penal servitude, but escaped and went to the Congo, where he was well-known among the members of the Belgian colony.