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E X T R A - U T E R I N E P R E G N A N C Y,

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E X T R A-U T E R I N E P R E G N A N C Y.

That pregnancy occasionally occurred outside the cavity of the uterus has been known for some centuries. A case has been recorded by Albucasis, an Arabian physician, who lived in Spain during the eleventh century. Several cases were recorded during the sixteenth century; but it was not till the century following that descriptions with any claims to exactitude were given, and that any distinction between the varieties was made. Dr. W. Campbell of Edinburgh in his work -"Memoirs of Extra-uterine Pregnancy"-enters very fully into the history of the subject, mentioning nearly all the cases which were recorded before his time. Even then the subject seemed to have attracted attention more because of the supposed extreme rarity of the condition, and the wonder and curiosity connected with its causation, than of the importance which it deserved from a clinical point of view.

1. New York Medical Journal, June, 1897.

2. American Journal of Obstetrics, Vol. XXXII, p. 321.

3. Glasgow Medical Journal, June, 1898.

Cases then began to be reported in increasing numbers, but it was not till the year 1883, when Lawson Tait performed his first successful operation in a case of ruptured ectopic pregnancy, that cases were reported in such numbers as to show that the condition is comparatively frecuent. Before this time operations for the relief of extra-uterine pregnancy had been performed -one case successfully by Dr.Thomas in 1875- but no attempt had been made to operate with the view of arresting the haemorrhage due to rupture of the sac.

What partly led to the belief that ectopic pregnancy was of rare occurrence,was the fact that the connection of that condition with haematocele was not recognised. Cases of haematocele were frequently reported long before 1883, and it seems to be certain that these cases were nearly all due to rupture of the sac. No doubt too, many cases supposed to be idiopathic peritonitis were really due to rupture of an extra-uterine sac. As Dr. S.L.Jepson says " The profession has learned from the very large number of cases of ectopic gestation published in recent years, that this is by no means a rare condition". Formad of Philadelphia found thirty-five ectopic gestations in a series of three thousand five hundred general autopsies, that is to say one per cent, while Dr. Kelly of Glasgow states that during a period of eighteen months ending March 1898, 5'3 per cent (sixteen out of three hundred) of the patients admitted to the Gynaecological ward(ward 30) of the Glasgow

Royal Infirmary suffering from pelvic disease.were the subjects of extra-uterine pregnancy. Eleven of the cases or 4 per cent of the total admitted were operated on and the diagnosis of extra-uterine gestation was thus confirmed.

The cases of ectopic pregnancy which directed my attention to the subject were two in number, and they occurred in my practice. The first case happened soon after I had begun practice.The patient Mrs. M. was about thirty years of age and the mother of three children, the youngest of whom was about eighteen months old when the symptoms occurred for which I was called in. Mrs. M. had menstruated regularly for some months after weaning her child till ten weeks before I was asked to see her. There was then an interval of six weeks, after which she had a discharge of some blood. This did not go on continously as at normal periods but now and again at intervals of two or three days, and it was accompanied by colicky pains in the hypogastrium. At the time I was called in the pains had assumed the character of labour pains, and the discharge was considerable. On examination, I found the uterus to be enlarged and the os slightly opened. Behind the uterus and to the right side was a small body about the size of a large walnut. It was moderately firm in consistence. I believed I had an ordinary case of abortion to deal with and that the body I felt was a cyst of the broad ligament. The pains and discharge went on at intervals for two days when the pains became very severe and were followed by a discharge of membrane, which came in a single piece. I had all the

discharges preserved and I examined them carefully but no embryo was found. It was only after the discharge of the decidua that it dawned upon me that it probably was a case of ectopic pregnancy with which I had to deal. Some bloody discharge continued for a few days after the decidua was expelled and I found that the tumour was becoming smaller and harder. These changes continued, and, when last I examined the patient, all that could be felt was a hard little body of the size of a small marble. It never gave rise to any trouble or inconvenience. Mrs. M. soon afterwards left my neighbourhood but I heard that since then she gave birth to a child after a normal labour which was followed by a good recovery.

On consideration of the case the view which I take of it is, that it was a tubal pregnancy, that the embryo had died probably from haemorrhage into the sac converting it into a haematocele and that this led to the favourable termination.

The other case which came under my notice had not such a satisfactory ending. It occurred in the practice of Dr. Russell a fellow practitioner in Klerksdorp and by him was sent to the hospital of which I am surgeon, Dr. Russell, however, being associated with me in the subsequent treatment of the case. The patient was a native woman of about eighteen years of age. She had been known to me for nine years previously, having been a servant in the family of a patient of mine. She was a healthy girl, well-developed and broadly built, a characteristic of her tribe. She had begun to men-

struate at eleven years of age, and had apparently been regular up to the time she had become pregnant. She had been married over a year before her admission to the hospital. She could not tell definitely when menstruation had ceased though she believed she was at the full time of pregnancy. She had suffered more or less pain throughout the pregnancy but there was no history of acute pain at any time. She had suffered more severely of late, the pain being in the upper part of the abdomen and of a nature which suggested that it was due to pressure. It was aggravated by movement of the foetus. It was because of this pain that she had consulted Dr.Russell, who, suspecting that it was a case of extra uterine pregnancy, had her removed to the hospital.

On examination I found the whole abdomen to be distended but especially above the umbilicus. Here the foetus could be made out distinctly the wall of the abdomen being very thin. The buttocks could be felt with the cleft between them and continuous with them, in a downward direction as far as the umbilicus of the mother, the back. Below the umbilicus nothing could be made out with certainty. The foetus could be moved freely from side to side. The foetal heart could be heard in the left side a little above the umbilicus, but no placental souffle could be heard. On vaginal examination the os was found to be slightly softer than normal while on passing the sound the uterus was found to be empty, and very

slightly enlarged. Movement of the abdominal tumour had no effect on the position of the uterus.

Being satisfied that an extra-uterine pregnancy existed, and that abdominal section offered almost the only hope of saving the patient this course was decided upon and the operation was performed on the following morning. Chloroform having been administered, an incision was made from a point an inch below the ensiform cartilage to over an inch below the umbilicus. The wall of the abdomen was very thin and the buttocks of the foetus presented at the incision. The back was towards the right side of the mother and the head in the lower part of the abdomen. The child was at once extracted by the feet and the umbilical cord ligatured. The infant was apparently at full time healthy and vigorous and cried as lustily on being extracted as if it had entered the world by the ordinary channel. The abdomen was now carefully examined to locate the site of the placenta. It was found in the lower part of the abdomen extensively attached to the intestines. As it was apparent that it could not be detached without considerable, possibly immediately fatal, haemorrhage it was decided to leave it undisturbed. Search was made for a sac and membranes but no trace of them could be found. No fluid escaped during the operation though possibly there may have been a little at the lower part of the abdomen. The abdominal incision was closed.

The patient never rallied from the operation and died

forty eight hours after, apparently from shock. I regret that a post-mortem was not obtainable. The child remained in good health for some months when it succumbed to some infantile disease.

Before remarking on the peculiarities of this case I think it desirable to consider the causes of ectopic pregnancy and to discuss the different varieties of it and their pathology.

The causes of ectopic pregnancy have been a subject of discussion for many years. The consideration of this branch of the subject gives rise to two questions for consideration. First- What is the normal place of impregnation of the ovum? and second- What is the normal place of the development of the ovum? As to the answer to the latter question there can be no difference of opinion the cavity of the uterus being specially provided for the development of the ovum. But as regards the former question, there has been considerable difference of opinion. The principal opinions may be merely stated: Lawson Tait at page 4. of his work on Ectopic Pregnancy[1] says "the uterus alone is the seat of normal conception," that, as soon as the ovum is affected by the spermatozoa, it adheres to the mucous surface of the uterus; that the function of the ciliated lining of the Fallopian tubes is to prevent spermatozoa entering them and to facilitate the progress of the ovum into the proper

1. *Lectures on Ectopic Pregnancy. p.4.*

uterine end

1. The Lancet, Vol.I. 1898., page 1448.

2. do. do. do.

3. Archiv fur Gynäkologie, Band 54, Heft 2, p.297.

nest; further that the plications and crypts of the uterine mucous membrane lodge and retain the ovum either till it is impregnated or till it dies or is discharged. But Hofmeier[1] found by examination of the freshly extirpated uterus, the direction of the movement of all the cilia to be in one direction - downwards from the fimbriated end of the tube to the cervix. This being the case then according to the opinion of Tait - that the ciliary movement is to prevent the entrance of spermatozoa into the Fallopian tube - no spermatozoa should enter the uterus at all. Mr. John W. Taylor[2] says "it has been directly proved that the active movements of the spermatozoa are quite sufficient to carry them against the current of ciliary movement." In the same lecture Mr. Taylor quotes Dr. Straussmann who writes as follows "Fructification, the union of the ovum with the spermatozoon, takes place in the Fallopian tube probably at the fimbriated end and immediately after the exit of the ovum from the follicle (Bischoff-His). Accordingly we may draw the conclusion that every pregnancy begins as an extra-uterine one and that an extra-uterine pregnancy is a consequence of retarded movement of the fructified ovum." This, Mr. Taylor says probably goes too far .....That the normal tube admits the entrance of spermatozoa but is not the special receptaculum seminis seems proved by the researches of Professor Dührssen[3] who in his "Vaginal Coeliotomies for Retroflexion in Married Women" states that he has fre-

quently pressed a cover-glass against the abdominal ostium and examined for spermatozoa. In most of his investigations he met with a negative result but in some, spermatozoa were recognized although degenerated and motionless. L.E.Frankenthal[1] thinks impregnation occurs in the tube and says "In the majority of cases the etiology of extra-uterine pregnancy can be established by a mechanical hindrance to the passage of the fecundated ovum from the tube to the uterine cavity." Mr. Taylor goes on to say the truth evidently lies between the two extremes. We may hold with reason that there is no evidence whatever for the belief that the seat of normal impregnation is limited to the cavity of the uterus, while the facts which are known concerning the invasion of the tubes by spermatozoa unmistakably point to the conclusion that normal fructification of the ovum may occur at any stage of its passage from the ovary to the uterus."

Taking this as the generally accepted belief regarding the site of the impregnation of the ovum, and supposing the ovum to be fertilised at or near the abdominal end or even in any part of the Fallopian tube, and that for some reason its progress to the uterus is obstructed, then we have conditions favourable to the development of an extra-uterine pregnancy. The definition of extra -

1. *American Gynaecological and Obstetrical Journal. Septr. 1896*

uterine pregnancy given by Dr.Howard A.Kelly[1] may be here quoted "When the fertilised ovum is arrested at any point between the Graafian follicle and the uterine cavity and there undergoes development we designate the condition as an extra-uterine or ectopic pregnancy.

The ovum may be arrested within the ovary or in any portion of the uterine tube, from its fimbriated extremity to its interstitial portion inclusive.

Extra- uterine pregnancy is primarily almost always situated in the tube, but may become tubo-ovarian. abdominal. or intraligamentous, or even uterine in the further course of its development. Ovarian pregnancy is one of the greatest gynecological varieties."

Till recently the classification of extra-uterine pregnancy was into Ovarian, Tubal and Abdominal with subdivisions. This classification was largely influenced by the belief prevalent regarding the physiology of impregnation. As has already been stated it was believed up to the beginning of the century that the spermatozoa found their way along the Fallopian tube to the ovaries and that fertilisation there took place, and it was therefore considered that most ectopic pregnancies were ovarian from the ovum being retained in the ovary. In other cases it was believed that the fim-

1. *Operative Gynecology by Howard A. Kelly.M.D., Vol.II page 428.*

1. *Medical and Surgical Gynaecology, Vol., II, p.244.*

2. *American Journal of Obstetrics, Vol., XXXI, p.265.*

3. *Liebrich der Gegurtshulfe, 1899. p271.*

4. *Bulletin de l'Academe de Medicin de Belge. 1899.*

briae of the Fallopian tube failing to grasp the fertilised ovum, as it escaped from the Graafian vesicle, the oosperm fell into the cavity of the peritoneum to some portion of which it attached itself and there developed. Such cases formed the abdominal variety of ectopic pregnancy. It was believed, till within comparatively recent times, that a considerable proportion of ectopic pregnancies arose in this way. The researches of Lawson Tait and others have shown the impossibility of such a causation. With our knowledge of the absorptive power of the peritoneum, it is extremely unlikely that an ovum situated there could escape rapid destruction. Yet there are some who believe that primary abdominal pregnancy sometimes occurs. Pozzi[1] asserts that several well-authenticated cases are on record, while Arthur Johnstone[2] says "There is a case recorded in which there was neither tube nor uterus and the foetus was developed in the peritoneal cavity fertilisation having taken place through a fistula in the vaginal roof." Winckel[3] also records a case of the same nature, viz. a case in which conception took place through a fistula in the vaginal fornix after supra-vaginal amputation of the uterus the ovaries being left behind. The evidence of this case however is second hand. A similar case has been recorded by Koeberle and Lecluyse.[4] These cases may be explained by supposing the ovum to be in contact with the abdominal

end of the fistula, and that it was not necessary for either ovum or spermatozoon to traverse any part of the peritoneal surface. Barnes, Bland Sutton and Rokitansky do not believe that primary abdominal pregnancy can occur. Berry Hart says "We know now that there is no primary peritoneal pregnancy -that is, no case known where the placenta has had the free peritoneal surface as its maternal portion."

The varieties of extra-uterine pregnancy have been by most writers classified into two great divisions, primary, when the oosperm develops at the spot where it was at first arrested, and secondary, when it has not remained at the original place of arrest but has changed its position by rupture of the tube or by its gradual development causing different surrounding relations. Dr.Howard A.Kelly[1] subdivides the primary form into Interstitial, Tubal, and Ovarian. From these the secondary varieties arise. From the Interstitial are derived Abdominal and Intraligamentary or it (the Interstitial) may become Intra-uterine; from the Tubal arise Tubal mole, Tubo-abdominal, Tubo-ovarian, Abdominal and Intra-ligamentary; while from the Ovarian may arise the Abdominal. Dr.S.L.Jepson[2] gives the following classification-

I.Tubal (a) tubo-ovarian, (b)tubo-uterine or interstitial, (c)tubo-

1.*Operative Gynecology. by H.A.Kelly, Vol.II. p.434.*
2.*American Journal of Obstetrics, Vol.XXXII., p.322.*

abdominal.

II. Ovarian.

III. Abdominal.

The ovarian variety is not believed to exist by Velpeau Kiwisch. Thomas and Bandl. Tait[1] while admitting its possibility when the fimbriated extremity of the Fallopian tube is glued on to the ovary states that he has never yet met with a single case. He says "its possibility I admit because I can easily imagine a Fallopian tube glued on to the ovary and deprived of its lining epithelium permitting the contact of the spermatozoa into a follicle burst within the area (of the ovary) of adhesion. Then the spermatozoa might infect the ovum before it escaped from the follicle, the ovum might adhere to the follicular wall and then develop. But, there are so many contingencies in such a case, that the doctrine of chances makes it so remote, that its occurrence may be regarded as likely as the birth of a blue lion or a swan with two necks, like a heraldic monstrosity - a mere pathological curiosity". Waltheu[2] says that in no case of what is known as ovarian pregnancy has ovarian stroma been microscopically demonstrated to be present in all parts of the sac, as would be the case in a gestation prim.-

1. *Lectures on Ectopic Pregnancy and Pelvic Haematocele, by Lawson Tait.p.13.*
2. *American Journal of Obstetrics. Vol.XXII.,p.788.*

1. Thomas: New York Medical Journal, June, 1895.
2. Pozzi: Medical and Surgical Gynaecology, Vol.II, page 244.
3. Martin: American Journal of Obstetrics, Vol. XXVII, page 4
4. Baldy: Amtrican Text-book of Gynaecology, page 618.
5. Beale: Transactions of the Obstetrical Society of London, XXXV, page 222.
6. Beale: Ibid. page 227.

arily ovarian. Thomas[1] thinks the so called ovarian pregnancies are cases in which the ovum was originally located at or near the fimbriated end of the tube, and so by their growth have caused a spreading out of the ovary on the wall of the gestation sac.

Others believe that ovarian pregnancy has been proved. Pozzi[2] says that these cases are not impossible but are of rare occurrence. Martin[3] of Berlin, Baldy[4], Jaggard, H.A. Kelly and others also believe that ovarian pregnancy sometimes occurs. Such a case is reported by Mr. Arthur A.Beale[5]. At the necropsy a foetus one inch in length was found in the pelvic region. It was apparently buried in membrane which still hung from the left ovary. That membrane bore no substance like the wall of a gestation sac. No evidence of a gestation sac was found either in the right or the left tubes, and both the right and left meso-salpinx were normal, showing no signs that there had been rupture of a tubal sac. If this was not a case of primary abdominal pregnancy then the only explanation possible is, that the foetus originally developed in the tube close to the ostium, and becoming detached adhered afterwards to the peritoneum. Mr. Beale[6] thinks that what the pathologist demands, in order to prove primary abdominal gestation, is a specimen where a very early foetus lies ensconced in a sac quite free from the tube and far

1. Ian Tussenbroek: British Medical Journal, April 14th. 1900 p.

2. Jepson: American Journal of Obstetrics Vol. XXXII. p.328.

3. Lawson Tait: Lectures on Ectopic Pregnancy. page 4.

from its ostium. Several other cases are quoted by Mr.Beale which were stated to be abdominal or ovarian in their origin, but on minute examination no definite evidence in support of the statement can be found. Van Tussenbroek[1] gives a very minute description of a specimen removed by Konwer in 1893. The result of his examination showed a foetus 12 mm. in length, surrounded by amnion and chorion lying within the ovisac. The ovisac appeared to be a gravid Graaffian follicle and formed a tumour about the size of a hazelnut on the surface of the ovary. Numerous chorionic villi; some in contact with maternal tissue could be demonstrated between the chorion and the maternal wall of the sac. The opinion generally held however is that expressed by S.L.Jepson[2] when he says, "For practical purposes we may safely conclude, (the exceptions being so very rare even granting their possibility), that extra-uterine pregnancy is primarily tubal; that is, that the placenta is originally implanted within the tube, the situation of the placenta and not of the foetus determining the character of the gestation."

The varieties of secondary extra-uterine pregnancy will be discussed when the Pathology is considered.

As to lesions which may cause a hindrance to the progress of the oosperm to the uterine cavity, Lawson Tait[3], following on his belief that the uterus alone is the seat of normal conception, says

1. Taylor: The Lancet, Vol.I. 1858. Page 1449.

"The cause of ectopic gestation or tubal pregnancy will be any process or accident which has reduced the Fallopian tube, so far as concerns its internal lining surface, to the same condition as the uterus,"that is to say any cause which deprives the tube of its cilia, the object of which,Tait believes, is to prevent the entrance of spermatozoa into the tubes. To quote from Tait's book. "Desquamative salpingitis could at once put the mucous lining of the tube into a condition exactly similar to that of the uterus. and in that condition access of spermatozoa would be possible, retardation of the ovum in the tube would be inevitable, and its immediate adhesion to the tube-wall after impregnation would be as easy and as likely as its occurrence in the uterus."This opinion of Tait's seems therefore,to depend on the supposition that the oosperm requires the mucous membrane of the uterus to be denuded of epithelium, before it can settle and that this condition is obtained by the shedding of the epithelial coat in menstruation, and in the tubes by inflammation. Referring to this opinion of Tait's Mr. John W.Taylor[1] says, that in all his thirty-seven cases no certain evidence could be elicited of any pre-existing inflammation, and the patients were remarkably free from any suspicion of gonorrhoea or syphilis. In the same lecture Mr. Taylor quotes Mr.

1. *The Lancet,Vol.I.,1898,p.1449.*

1. Pozzi: Medical and Surgical Gynaecology, by Pozzi. Vol. II. p. 235.

2. Kelly: Operative Gynaecology by Howard A. Kelly. Vol. II. p. 433.

3. Freund: Samml. Klin. Vortrage, 1886, No. 323.

Bland Sutton as follows, "In many instances I have failed even after the most careful microscopic examination to find any evidence of old salpingitis or loss of epithelium." To again quote from Mr. Taylor's lecture "As Clarence Webster and Straussmann have pointed out menstruation is by no means a necessary precursor of pregnancy. Pregnancy may take place in a girl who has never menstruated, in a woman who is suckling and has not menstruated since her lying-in. in women who have amenorrhoea from other causes as from chronic phthisis and anaemia. Very occasionally too, we meet with fertile women who have only very rarely menstruated, and in whom no history of a period is found corresponding to the onset of a pregnancy. The very facts, or supposed facts, behind the theory are now disputed. It is very questionable whether the epithelium is removed to any extent by the menstruation and the more recent observations appear to show that no true wound-surface is provided by this process for the engrafting of the ovum."

Any direct obstruction in the tube preventing the fertilised ovum from reaching the uterus, has been proved to be a frequent cause of extra-uterine pregnancy. Among these may be mentioned tubal polypi.[1] a myoma at the cornu of the uterus described by Leopold and mentioned by H.A.Kelly.[2] A cause, mentioned by W.A.Freund,[3]

1. Williams: Journal of the American Medical Association. Vol.LXI..p.4

2. Robinson: Ibid..Vol. LXII..p.72.

3. Webster: **Ectopic Pregnancy**. pp. 11 & 13.

H.A.Kelly: Operative Gynaecology.Vol.,p.430.

is spiral windings of the tube with narrowing of their lumen that is to say a persistence of a foetal type of uterine tube. Dr.J.W. Williams[1] mentions diverticula in the mucous membrane. Robinson[2] mentions convolutions of the tubes causing whorls of tubal plicae. Constriction of the lumen of the tube by adhesions due to frequent attacks of pelvic peritonitis is a frequent cause. and the previous history of the case often gives indications of this. Webster[3] says, that extra-uterine pregnancy may occur by fertilisation taking place in the higher half and the decidual reaction, which he states does not necessarily occur at the site of the ovum, taking place in the lower (uterine) half and so blocking the tube. Another possible cause is an extra large ovum together with a slightly contracted tube. The following case is described by Dr. J.W. Williams and mentioned by Dr. H.A.Kelly[4] in his work on operative gynaecology. "The left uterine tube was the seat of two extra-uterine pregnancies. At its uterine end was a small sac containing the skeleton and calcified remains of a foetus which completely occluded that portion of the tube, and from the satisfactory history obtained, clearly represented the remains of an extra-uterine pregnancy which had occurred twelve years previously. while the later - al end of the tube contained the placenta and the membranes of a

1. H. A. Kelly: Op cit., p.430.

2. The Lancet: Vol.I. 1898, p.1456.

~~of a~~ four months pregnancy, which had ruptured allowing the escape of the foetus into the abdominal cavity, where it was alive at the operation. The left ovary was small and atrophic and presented absolutely no sign of a recent corpus luteum. The right tube presented signs of peri-salpingitis and endo-salpingitis: but its fimbriated extremity was patent, and the right ovary contained a corpus luteum corresponding in size to the duration of the pregnancy." The only possible explanation (the left tube being occluded), is that the spermatozoa passed through the right tube, fertilised an ovum from the right ovary, which then migrated to the left tube passed through its patent fimbriated extremity, and made its way onward until arrested by the lithopedion, where it developed." Dr. Williams[1] has been able to demonstrate external migration of the unfertilised ovum in five out of thirty cases."In each case the ovary on the pregnant side presented absolutely no evidence of a corpus luteum, while the ovary corresponding to the occluded tube contained a typical corpus luteum of pregnancy."Dr. Kelly with reference to these cases says that he has repeatedly found both tubes and ovaries lying low down behind the uterus, with the fimbriated end of the right tube in contact with the left ovary and vice versa. Mr. J.W.Taylor[2] mentions a peculiar case described by Professor

1. H.A.Kelly. Op.Cit. page 434.

Dührssen, where a tubal polypus was found on the uterine side of a tubal pregnancy, acting as a valve at the uterine end of the tube, the passage of the tube from the uterus to the ovary being free from difficulty, while that from the ovary to the uterus was absolutely stopped by the polypus. On the ovarian side of the polypus the pregnancy had developed.

I shall now return to the consideration of the varieties of ectopic pregnancy. Of the three varieties (tubal, interstitial and ovarian) into which extra-uterine pregnancies before rupture are divided, ovarian may be dismissed, being so rare. As to interstitial, early writers record a high percentage. Parry for instance is stated to have had thirty-one cases out of five hundred or 6'2 per cent, while Hennig thought that of one hundred and fifty cases 42 or 28 per cent were interstitial. Although the occurrence of this variety is established, yet, the observations of recent writers show that its frequency is not nearly so great as these figures would indicate. Martin found only one in seventy-seven cases, (i.e.1'4 per cent), while H.A.Kelly says that he has never found an example of it.Evidently mistakes must have been made by the earlier observers. For all practical purposes indeed we may consider that there is only one variety of early extra-uterine pregnancy,

1. " Intraligamentous-retroperitoneal" described by L.H.Dunning in the American Journal of Obstetrics. Vol.XXXII. p. 43.

2. Bovee: American Journal of Obstetrics..ol.XXXI,p.315.

3. Webster: Ectopic Pregnancy, p. 117.

namely tubal.

After rupture however it is different. The foetus and usually also the placenta may then take up one of many positions, and according to the position occupied by the foetus in relation to the surrounding maternal parts, is the variety usually designated. Thus we have such varieties as abdominal; intraligamentary; tubo-abdominal; tubo-ovarian; tubo-uterine; retroperitoneal; intraligamentous-retroperitoneal.[1] Probably J.Wesley Bovee[2] is correct in considering that for practical purposes such divisions are unnecessary, and that there are really only two varieties of full term extra-uterine pregnancy, viz., extra-peritoneal, and intra-peritoneal.

In considering the pathology of ectopic pregnancy I shall first deal with the changes which take place in the wall of the tube, and afterwards the changes which take place within the tube.

According to Webster[3] vascularity is increased at the site of attachment of the ovum, and thus in the first place thickening of the wall occurs. It has been clearly shown that the same early changes (hypertrophy and hyperplasia) occur in the tube, as occur in the wall of the uterus in a normal pregnancy. Later, the walls become thinner due to distension by the growth of the ovum, and the inroads of the chorionic villi. In the late months the muscle

1. Taylor: The Lancet. Vol.II, 1898. p.1481.

fibres are scattered, and indeed in some portions of the walls no muscle is left. Where it is left, atrophy of the fibres may have occurred. As to the peritoneum covering the tube an increase of its tissue takes place, it growing in proportion to the growth of the tube. Mr. John W.Taylor[1] says that in cases of early rupture, little or no change has taken place in the affected tube except at the exact seat of pregnancy and rupture, and that there is no evidence whatever of the slightest attempt at any compensatory growth surrounding the affected area. He thinks that it is highly probable, that some amount of non-development or atrophy of the tube is responsible for nearly all the cases of early rupture. While it is admitted, as regards the tube itself, that no attempt at compensatory growth is made, it would appear as if some such attempt was made by the peritoneum. On the surface of the portion of that membrane covering the tube are often found masses of cells, which are thought by some to be proliferated masses of the peritoneal cells. Webster says that he has in a few cases found small spaces lined with epithelium under the peritoneum. He considers these spaces embryonic in origin.

Having thus considered briefly the changes which take place in the wall of the tube, I shall now refer to the changes which take place within the tube. For a long time it was disputed

1. *Webster*: Op Cit. p.11.

if any decidua vera formed in the tube, but now it is generally admitted that a decidua always occurs, even though no trace of it may be discovered. In such cases however, it was doubtless present in it at an early stage; and though no traces of decidual cells can be found at one part of the tube, they may be at another.

To prove that the decidua can be formed at a distance from the seat of the ovum, Webster records a case in which, while a two-month's pregnancy existed in the tube of the left side, the tube on the right side was enlarged at a certain part of the ampullary portion. At another part the ampullary mucosa showed marked decidual formation, the large cells resembling those formed in the uterus in normal pregnancy. The left ovary contained a corpus luteum, while the right contained none. Webster says that this case proves decidual formation to be due to the influence of the fertilised ovum in the genital tract, that this influence can act at a distance, direct contact of the ovum not being necessary; that while in tubal pregnancy, the uterine mucosa always undergoes this change, the tube of the other side may also sometimes be similarly affected. He considers that this power of the ovum, to develop in the tube as well as in the uterus, points to a reversion in the tubal mucosa to an earlier type in mammalian evolution, the mucosa of

the tube being derived from the original Müllerian ducts.

As regards the ovum itself the differences in its development from that of a normal case are, as would be expected, in the maternal parts. The foetal parts are developed as in a normal case, but the maternal parts are deficient. Rupture of the tubo-chorionic vessels, which form a part of the maternal portion of the placenta, may occur as a consequence of this deficiency. The usual result is that the ovum separates from the tube, and haemorrhage into the sac takes place, rupture of the tube ensuing. The ovum thereby escapes into the abdominal cavity, or between the folds of the broad ligament, its vitality usually being first lost. This was I have no doubt the condition of things in the first case reported by me.

But if, as sometimes occurs, death of the foetus does not take place before or immediately after rupture of the sac, it may occur soon afterwards, the foetal remains being absorbed; or the gestation may go on for some time and death of the foetus ultimately occur, it undergoing mummification or remaining in the form of adipocere or of lithopedion formation; or suppuration may occur and the parts be discharged through the abdominal wall, rectum, vagina or bladder. But a third condition may occur: the foetus may continue

1. *Baldy: Text-book of Gynaecology, by J.M.Baldy, p.523.*

2. *Parry: Extra-Uterine Pregnancy, by J.S.Parry, 1876.*

to develop and actually reach full term as was the state of matters in the second case reported by me. This result may come about in various ways. Rupture may take place into the peritoneal cavity and the laceration being small, haemorrhage ceases. The placenta remains in the tube and spreads over neighbouring parts, the child going on to full term.

The haemorrhage may be between the folds of the broad ligament, the placenta changing its position slowly, so remaining adherent and keeping up the circulation, and then spreading into the peritoneal cavity. In such a case, the placenta still adhering to the broad ligament, the foetus may live to full term. Baldy[1] thinks this is the procedure in the majority of the cases in which the foetus is found among the intestines.

Haemorrhage into the peritoneal cavity due to rupture of the tube, may be sufficiently great to cause the death of the mother at once, in fact Parry[2] says that the almost universal opinion is that it is uniformly fatal. It may not be so in the first instance, but a secondary haemorrhage from rupture of the false sac may cause a fatal result. Modern observers are agreed however, that primary rupture is by no means uniformly fatal, but on the contrary that recovery is comparatively frequent.

Besides reaching the abdominal cavity by rupture of the

1. Boldt: American Journal of Obstetrics. Vol. XXXIX, p.614.

tube. the ovum may do so by dropping out of the fimbriated extremity of the tube, before its occlusion takes place. This must happen within eight weeks, except the ostium be closed in a faulty manner. To this the name "Tubal Abortion" has been given. It is caused by the separation of the ovum or a part of it from the tube-wall and its expulsion with haemorrhage into the abdominal cavity. The termination of such a case is either immediate death from haemorrhage, the formation of a haematocele, or peritonitis and suppuration.

An interesting case of tubal abortion is described by Dr.H.J.Boldt. He says, "The foetus was lying entirely free in the abdominal cavity among the intestines; no liquor amnii was present and no sac." The specimen was examined by Dr.Welch who made the following remarks as a result of his observations: " I understand that at the time of the operation there was no distinct evidence of rupture of either Fallopian tube, and that the tubes appeared intact save that the abdominal extremity of one was closed. I think that the most probable explanation of the condition is an entire separation of the abdominal part of the Fallopian tube, in which placenta and foetus had originally developed, from the uterine part of the tube. The abdominal end of the tube is connected with the detached placental mass. One can also think of the possi-

bility of an aberrant ostium of the tube and of a pregnancy developing in a diverticulum of the tube, but the explanation just given seems to me the more probable one. At least a part of the fibrous covering of the placenta is the wall of the Fallopian tube. The appearances indicate that a small part of the placenta protruded through the abdominal ostium of the tube into the abdominal cavity. As one passes towards the larger pole of the placenta evidences of tubal structure appear." In a specimen exhibited by Dr. Edebohls before the New York Obstetrical Society, the foetus with its membranes intact was seen in the process of abortion. one half of the ovum being free in the abdominal cavity, while the other half was firmly grasped by the dilated conical fimbriated end of the tube, like a bud in its calyx. But in some cases, the pregnancy within the tube is not extruded from the tube either by rupture or abortion. In these cases haemorrhage takes place into the membranes of the ovum, the embryo is injured or destroyed and a mole of pregnancy results in the same way as it does when a similar accident occurs within the uterus. In this case it is called a "tubal mole" or "apoplectic ovum". The mole, later on, may be extruded from the tube either by rupture or by tubal abortion. Usually however the mole remains attached at some part of the inner surface of the tube and this attachment may be the cause of considerable haemorrhage, as occurred in the following interesting case recorded by

J.B.Sutton: Transactions of the London Obstetrical Society, Vol. XXXII, p.342.

J.Bland Sutton. There was no swelling of the abdomen generally, but there were a tender swelling on the left side, and a larger one on the right side without tenderness. After chloroform had been administered, the swelling on the left side was found to be distinct from the uterus, which was not gravid. In the afternoon of the day of this examination severe pain with temperature of 103' occurred. On the next day the abdomen was opened when the intestines were found swimming in blood. The left Fallopian tube was enlarged, with the ostium widely dilated and containing blood. It was transfixed with silk, tied and removed. On the right side an ovarian cyst, the size of a large orange was found and removed. Patient recovered and left hospital fourteen days after operation.

On examining the left tube its ostium was found wide and open. On splitting open the tube a rounded body, which could be felt externally, was found adherent to the tubal mucous membrane. On the free portion of this body were small villous processes, the interior was a rounded cavity containing fluid. On examining a section under the microscope, it was found to be formed of blood-clot mingled with chorionic villi, that is to say it was an "apoplectic ovum". The following was apparently what had occurred:- There was first an impregnated ovum in the left Fallopian tube. The ovum became partially detached and filled with blood, this caused

1. *Tait: Op Cit. page 25.*

2. *Baldy: Op Cit. page 531.*

3. *M.Cameron: Abdominal Sections in the Western Infirmary Glasgow, from 1894 till 1897, by Murdoch Cameron. page 7.*

the first sudden pain. Next, when the tube was pushed up (during the examination under chloroform) further detachment with fresh bleeding occurred.

Effusion of blood into the peritoneal cavity has been called "haematocele" and the relation of this condition to extra-uterine pregnancy has caused much discussion. Although pelvic haematocele was described by Nelaton in 1850, and many lesions as rupture of varicose vessels in the pelvis were stated to be the cause, it was not until about 1880 that the one great cause was found to be extra-uterine pregnancy. Tait says that he has never seen an intra-peritoneal haematocele which was not due to a ruptured tubal pregnancy, yet he admits that it may arise from other causes namely, (1)by sudden onset of menstruation causing effusion of blood into the broad ligament, and (2)by pseudo-menstruation which occurs after abdominal operations, especially after operations on the broad ligament. Baldy[2] lays it down as a general rule (to which there are few exceptions) that ectopic pregnancy is the one cause of haematocele. Professor Murdoch Cameron[3] says "At present from observation and early operation,,we have established the fact that in those cases of intra-peritoneal haematocele not arising from some traumatic cause, the origin is most likely due to the rupture of an ectopic pregnancy." The rare exceptions are, the

1. Leit: Die "Eileiterschwangerschaft", Stuttgart, 1884, p.14.
(Ectopic Pregnancy by J.C.Webster, p.64.)
2. The Lancet, Vol.I, p1453.

oozing surface left after the enucleation of tumours of the tubes and ovaries, or removal of the tubes and ovaries themselves, or rupture of peritonitic adhesions, or of an ovarian haematoma, or excessive haemorrhage from rupture of a Graaffian follicle. Most of the cases of regurgitation of blood from the tube are believed to be instances of tubal abortion. Veit[1] says that in a great many cases of haematocele, the question of extra-uterine pregnancy is never considered and so he thinks the following percentage as being too small. -

In 66 cases of his own 16 were due to ruptured tubal pregnancy-

In 22	"	Jousset	9	"	"	"	"	"	"
In 17	"	Dubousquet	5	"	"	"	"	"	
In 36	"	Voison	9	"	"	"	"	"	
In 7	"	Engelhardt	1	"	"	"	"	"	
" 148	"	in all	40 or 28 per cent				"	"	

Mr. John W.Taylor[2] says that in women haematocele is almost always caused by tubal pregnancy, sometimes by rupture of the tube and sometimes by bleeding from the fimbriated end of the tube without rupture. He found that of 21 case of intra-peritoneal haematocele 14 were due to haemorrhage from the unruptured tube, and 7 to rupture of the tube. Dr.Cullingworth states that of 25 cases of pelvic haematocele in which an opportunity occurred of verifying by

1. Tait: Op Cit. p. 34.

actual inspection the source of the bleeding 23 were instances of haemorrhage from the open abdominal ostium of a pregnant Fallopian tube, and only 1 was due to rupture. The latter is the more common cause. The haemorrhage in these cases, though almost continuous or frequently repeated, is moderate in amount, and a well defined haematocele is the result.

While then, the cause of intra-peritoneal haematocele is almost always ectopic gestation, it is not so in extra-peritoneal haematocele. The latter may arise from sudden onset of normal menstruation or the pseudo-menstruation which occurs usually at the first menstrual period after abdominal operations. It may also occur from the arrest of normal menstruation, and occasionally after labour or ordinary abortion. The symptoms are sudden pain, faintness, with a rise of pulse and sometimes temperature. A boggy swelling which can be felt on examination pushes the uterus forwards. The swelling may even be felt above Poupart's ligament.

Lawson Tait[1] considers that large numbers of cases of extra-peritoneal haematocele occur from sudden arrest of menstruation, and that they get well without any treatment whatever; that it is a condition almost free from primary mortality, and has only a remote secondary mortality, when a thrombus breaks down and suppurates, and brings about the tedious condition of pelvic abscess."

1. Baldy: Op Cit. p. 531.

Baldy thinks that, as a venous congestion causing varix of the broad ligament is common, a slight accident may cause a blood effusion. But although extra-peritoneal haematocele arises from a cause apart from extra-uterine pregnancy, nevertheless the most common and at the same time the most serious cause of it is rupture of a tubal pregnancy into the broad ligament.

Intra-peritoneal haematocele may be formed in various ways. A tubal mole by setting up irritation and hyperaemia in the maternal tissues, may be the cause of repeated haemorrhages from the Fallopian tube into the peritoneal cavity, the closure of the tube in these cases being incomplete. Before this bleeding occurs, the portion of the tube containing or fixed to the mole by its weight, gravitates behind the uterus dragging with it the ovary and the free portion of the meso-salpinx. Bleeding taking place, the result is a mass consisting of tube, ovary, broad ligament and blood-clot, displacing uterus to one side while the haematocele occupies the other.

When the bleeding is more than this and invades the abdominal cavity, coming in contact with omentum and intestine, local peritonitis takes place. The result is that peripheral adhesions of the blood-clot to surrounding organs come about and an intra-peritoneal haematocele is formed. But though a haematocele

1. *The Lancet, Vol. I, 1898, p. 1455.*

is formed it is seldom ~~it is seldom~~ that haemorrhage ceases. The tube in the centre of the haematocele keeps on bleeding at intervals, this continuing until the outer coat of the haematocele ruptures from the inward pressure. The result is that the whole process of peritonitis and adhesions, with closing of the tear again takes place. the haematocele again being formed on a larger scale. In these cases there is a prominent tumour in the abdomen. Sometimes however, only thickening is found, stretching across the lower part of the abdomen. This marks the limit of a haematocele occupying the whole of the pouch of Douglas, which encroaches on the vagina and rectum. Mr.J.W.Taylor finds this state of matters to be quite exceptional, while others think it is the most usual condition in cases of haematocele arising in the manner described. When intraperitoneal haematocele is formed by later rupture of the pregnant tube, it generally takes place at any time from the first month to full term, being however most common from the second to the fourth month. Peritonitis may occur in these cases and adhesions are formed. Fresh haemorrhages occur however owing to detachment of the placenta, the result being that the haematocele bursts and fresh haemorrhage occurs into the peritoneum. This may be repeated several times. Mr. J.W.Taylor draws a distinction between the haematocele from tubal mole and that from later rupture. He says, " The haemorrhage in tubal mole is of quite a different character from that which occurs in

late rupture of the tube. In tubal mole it is a more or less continuous blood—drip from the fimbriated end of the tube, varied perhaps by an occasional little gush of freer bleeding at irregular intervals. In later rupture of the tube the haemorrhage is sudden and relatively copious, arising either directly from the tear in the tube, or from separation of the placenta, or from both combined. In tubal mole owing to the slower formation of the tumour, the outer layer of blood has time to consolidate and some measure of true encapsulation, however imperfect, is usually met with. In later rupture of the tube, on the contrary, any encapsulation is quite exceptional, and the haematocele is limited only by the inflammatory adhesions caused by the peritonitis which follows the haemorrhage. Finally the whole condition in later rupture of the tube is more "acute". The haematocele is larger at its onset and rapidly increases in size. It may often be visibly watched, enlarging and distending as fresh bleeding takes place beneath the thin limiting adhesions, and it is then accompanied by signs and symptoms proportionate to the severity of the condition."

The diagnostic distinctions between intra-peritoneal haematocele and extra-peritoneal haematocele may be stated as follows. In pelvic haematocele a distinct tumour is felt caused by the effusion of blood being limited by the folds of the broad ligament, while in the early stages of haematocele no tumour of any

kind can be detected, though later on a mass is made out in the posterior fornix. In extra-peritoneal haematocele the tumour can be felt above Poupart's ligament when it has lifted the peritoneum from the pelvis, and the rectum is surrounded by the tumour, which can be distinctly felt by palpation. Further distinguishing symp - toms will best be considered under those of extra-uterine pregnancy. As to the prognosis of extra-peritoneal haematocele, Lawson Tait says, "Save under three sets of circumstances, extra-peritoneal haematocele is an accident perfectly free from danger. These circumstances are:- (a)when a secondary rupture of the cyst occurs with continual bleeding into the peritoneum: (b) when it is merely a stage in the growth of extra-uterine pregnancy: (c) when it goes on to suppuration." But as to intra-peritoneal haematocele, Lawson Tait says, that it is fatal with almost uniform certainty, and that he has never seen a case of suspected rupture, or of one in which he suspected intra-peritoneal effusion of blood, recover if left alone. Later observations however do not justify such a grave prognosis.

As has been said a tubal pregnancy generally ends (if not by "tubal mole" or by "tubal abortion") by rupture taking place into the broad ligament, or into the peritoneal cavity. If the latter, the pregnancy then becomes abdominal. Lawson Tait, Bland Sutton, Cullingworth and many others believe that abdominal pregnancy can only arise from the rupture of an intraligamentary cyst. Bland

1. *Sutton: System of Gynaecology, by Albutt and Playfair, p464.*

2. *Baldy: Op cit. p 524.*

Sutton says:-"Observation has demonstrated the fact that in all tubal pregnancies, which survive the primary rupture and continue their development the gestation sac is formed in part by the expanded tube, but mainly by the layers of the meso-metrium. The proper appreciation of this fact has done much to simplify our knowledge of tubal pregnancy, and no one has more strongly insisted upon its correctness than Lawson Tait." Baldy[2] says that the amount of distension caused by an intraligamentary pregnancy, which the peritoneum forming the folds of the broad ligament will tolerate, is sometimes exceeded. and either one of two results may follow this event: (1)Profuse haemorrhage into the peritoneal cavity, with or without the escape of foetus, or foetus and placenta: (2) The partial escape of the foetus into the peritoneal cavity, with little or no haemorrhage, the placenta retaining its attachment within the broad ligament, and the foetus perhaps continuing its existence.

"The second result, escape of the foetus with continuance of its life is of great interest anatomically, as it explains the majority of the cases in which a foetus has been found free among the intestines, and has given rise to the erroneous impression of primary abdominal pregnancy." Lawson Tait considers that only one case of abdominal pregnancy in which the foetus was free among the intestines has ever been proved. That case is related by Mr.Jessop of Leeds. There was a history of acute abdominal pain, with swell-

1. *Tait: Op. Cit. p. 59.*

ing and vomiting when the patient was two months pregnant, after which she remained in bed for two months. Soon afterwards she felt the movements of the child and at the same time noticed a hard swelling on the right side of the abdomen. There was no history of secondary rupture, and Tait believed that it was one of the broad ligament pregnancy which had gone on till the seventh or eighth month, and that then a secondary rupture had taken place into the cavity of the peritoneum, "the tissues of the foetus by that time having arrived at a period of development which enabled them to resist the efforts of digestion which doubtless would be directed towards them." The foetus was free in the cavity of the peritoneum. A few bands of unorganised lymph of a very friable nature lying upon, but not adherent to, the intestines were readily removed by sponging, and about an ounce of a clear serum was found in the peritoneal cavity. The placenta covered the inlet of the pelvis, but extending some distance posteriorly above the brim, where it apparently had an attachment to the large bowel and the posterior abdominal wall. The second of the cases which I met with seems to have been of almost an exactly similar kind.

Lawson Tait while admitting Jessop's case to be one of abdominal pregnancy, does not believe that such a condition can only occur from the rupture of a broad ligament pregnancy, and before the seventh or eighth month when the foetus can resist the

1. *The Lancet. Vol. II.1898. p. 1515.*

digestive action of the abdominal contents. But new light has been thrown on this subject by Mr.JohnW.Taylor[1] who believes, that the above case and others recorded by Champneys, Webster, Cullingworth, Lawson Tait and himself, in which the foetus is described as being free in the abdominal cavity, were not really so, but were covered by a thin film passing from coil to coil of the intestine, and in fact forming a complete sac in which the pregnancy had developed. On the strength of this case Mr. Taylor asserts that a tubal pregnancy, which directly becomes abdominal, can, on account of the thin membrane resisting the efforts of digestion of the intestines, go on to full term. The case seems to me to be of such importance that I think it desirable to quote Mr. Taylor's report of it.

"On December 11th 1896, assisted by my colleagues, Mr. Martin, Mr. Jordan and Dr. Sturge, I opened the abdomen in the middle line and found that the peritoneum immediately below the incision was thickened and incorporated with some kind of sac containing a dead but non-putrid foetus. On opening this the child was found lying in the abdomen bathed in a small quantity of dark blood fluid. In this, some caseous particles were floating. The head of the child lay uppermost and formed the globular protuberance which had been noticed near the liver. The intestines were visibly covering the body of the child, and the great omentum.forming in one part a thick fleshy body of considerable thickness, passed across the

child to a broad attachment on the upper part of the placenta. The latter was situated at the lower pole of the pregnancy and covered the pelvis. The parts of the child nearest to the incision were the lower limbs, and after pulling the feet outside and enlarging the incision to admit of the passage of shoulders and head, the child was extracted. The cord was then divided and the child removed. On looking into the abdomen the peritoneal cavity appeared to be directly open as in an ordinary abdominal section. The coils of intestine, the lower part of the stomach and the great omentum, were all plainly visible, and separate loops of intestine could be brought out of the incision and examined. On very close observation it was first noticed by Mr. Martin, and afterwards confirmed by myself and Mr. Jordan, that a very thin transparent pellicle or membrane was reflected over all, or nearly all, of these viscera and that notwithstanding the apparent free exposure of the peritoneal cavity there was, in all probability, a thin filmy transparent sac enclosing the pregnancy, not capable of separation or differentiation from the peritoneum of any viscus over which it was reflected, except where passing from one to another as from one coil of intestine to another, or from intestine to placenta. Only under these circumstances was the membrane visible.

" On examination of the pelvis where the placenta had been, it was evident that the same arrangement of sac existed here as in

the upper abdomen- that is, a fine transparent membrane could be traced throughout and forming a limiting layer between the usual viscera of the abdomen, pelvis and placenta, on the one hand, and the child on the other. On replacing the placenta in position, this membrane could be traced below the placenta to the bottom of the pelvis on the right side: it was then reflected over the broad ligament and all its attachments to the under surface of the placenta. From this it could be traced all over the placenta except where intestine or omentum was adherent to its surface. Two-thirds (at least) of the placental margin was free, and this was consequently smooth, glistening, and everywhere covered by the thin membrane of the sac. Owing to this disposition of the sac within the pelvis, the outline of the normal pelvic viscera, the uterus, tubes and ovaries, was considerably obscured, so much so that it was impossible to say, whether the right ovary had been removed with the placenta, or whether it had been left in the pelvis below the reflections of the sac.

The after-progress of the case was satisfactory and uneventful except for some chronic suppuration in the lower part of the wound. The patient was discharged convalescent on January 25th, 1897.

The child weighs 7lb. and is a male foetus which has undergone full development within the abdomen of the mother. There are no signs of decomposition. Closely applied to the head of the

child is a perfect cap of membrane, and between this and the head of the child is a considerable quantity of caseous matter. This is the only part where any membraneous covering or sac can be distinguished. The shape of the placenta is peculiar: the bulk of it is circular with an excentric cord inserted near one border (the right). Beyond this and separated from it by a deep sulcus is a crescentic mass of placental tissue attached to the main placenta by its horns and lower surface. On the surface of this crescentic part is a pale red fringed mucous patch which appears to be the fimbriated end of a Fallopian tube. No further trace of tubal structure can be made out on microscopic examination, and on section of the mass it appears to consist throughout of placental tissue.

The pregnancy may be regarded as originally one of the right Fallopian tube, which by gradual erosion or giving way of the upper part of the tube has passed with unruptured membranes into the abdominal cavity. The deep sulcus on the upper surface of the placenta probably marks the line of separation in the tube where the ovum escaped upwards into the abdomen. From the spread out internal surface of the (ruptured) tube, the placenta has continued growing, and has so altered or taken up its structure in process of growth, as to render little but the fimbriated end recognizable. The placenta has derived its blood-supply from the

vessels of the broad ligament and from the great omentum.

The case is remarkable for possessing no history of any tubal rupture (or acute illness corresponding to this), throughout the whole course of the pregnancy. The conditions and opportunities for observation during the time of operation were unusually good, but in spite of this the exact state of the upper pole of the pregnancy and its relation to the abdominal viscera must be determined by circumstantial evidence, as it could not be directly seen from the incision. From the fact that the head of the child is closely covered by a cap of membrane, between which and the scalp is a copious deposit of caseous material, while below this any evidence of a membranous sac is wanting, (except the tear of separation round the forehead and occiput), it may be concluded I think, that the upper part of the amniotic sac- the membrane forming the extreme upper pole of the pregnancy - has been removed with the foetus: and that, so far as this is concerned, the abdominal cavity has been directly opened. Below this towards the centre of the pregnancy, the sac has become incorporated with the peritoneum, so that no separation could be made between the two and no indication of the presence of a sac could be seen except at its reflection from one viscus to another as already described. At a lower level still, (at the 'lower pole' of the preg-

1. Sutton: System of Gynaecology, by Albutt & Playfair. p. 464.

nancy) the sac was considerably thickened.forming. together with the peritoneum at the lower part of the abdominal incision. a membranous wall fully one-eighth of an inch in thickness. Even here however. no definite dissection could be made between the 'sac' on the one hand and peritoneum on the other."

Mr. Taylor thinks that the importance of this case cannot be overestimated, and that it effectually disposes of much of the theory now current on the subject of advanced uterine pregnancy. Mr. Taylor quotes Mr. Bland Sutton[1] "Observation has demonstrated the fact that in all tubal pregnancies which survive the primary rupture and continue their development, the gestation sac is formed in part by the expanded tube. but mainly by the layers of the mesometrium. The proper appreciation of this fact has done much to simplify our knowledge of tubal pregnancy, and no one has more strongly insisted upon its correctness than Lawson Tait." Mr. Taylor commenting on this statement by Sutton, thinks that the above describes a case of tubal pregnancy which has survived the primary rupture and continued its development but in which the gestation sac is formed by the amnion alone, or at most by the foetal membranes and tube, the layer of the mesometrium being intact, and the expanded tube being entirely taken up and metamorphosed by the growth of the placenta.

This case of Mr. Taylor may thus explain many cases which

before were inexplicable except on the theory that abdominal pregnancy could only occur by rupture of a broad ligament sac. Most probably the same condition of things as existed in Mr.Taylor's case, was present in the one I have described, and in which a full term child was extracted. In my case no thin film stretching between the folds of the bowels and forming a sac, was observed, but the abdominal walls being so thin, and the foetus being come upon so quickly, no minute examination for such a membrane was made. In many cases which have been recorded, Mr. Taylor points out conditions which would lead to a supposition that in them an enclosing membrane such as he discovered was present, although not recognised as such at the time. Thus in Dr. Chamonney's case "the layer immediately covering the foetus was a dull-white membrane" and, "on the child's vertex a patch of thin sodden looking membrane was seen, and except a shred of similar material removed from the wound, (probably torn from the head during delivery) no membranes were seen or felt." He also quotes from Mr. Jessop's case in which it is said:"the peritoneal lining, though natural on its free surface, appeared thick and velvety in section," and, "a few bands of unorganised lymph of a very friable nature lying upon, but not adherent to the intestines were readily removed by sponging and about an ounce of a clear serum was found in the peritoneal cavity"

1. Boldt: American Journal of Obstetrics, Vol. XXXIX, p. 614.

2. Neugebaur: Centrablatt für Gynäkologie. July 30th. 1898.

3. Taylor: The Lancet, Vol. II, 1898, p. 1518.

Other cases are recorded in which it is asserted that the foetus was found free in the abdominal cavity without any previous evidence of rupture. Dr.H.J.Boldt[1] describing a case says- "The foetus was lying entirely free in the abdominal cavity among the intestines", and he says, " I understand that at the time of operation, there was no distinct evidence of rupture of either Fallopian tube."

Another case is recorded by Franz Neugebaur[2] in which an operation was done. The child lacked twenty-four days of full maturity. It was entirely free in the abdominal cavity....Only around the edge of the placenta some remnants of the membranes were found. The child in this case, as in the one I have related was extracted living.

In Neugebaur's case the exact site of the placenta was not discovered. Taylor[3] says there are four different relations of the placenta to the main gestation-sac in abdominal pregnancy, which need some differentiation. He differentiates them as follows- " In the first group of cases the placenta is practically within the gestation-sac and covered by reflexions of the amnion. In the second it has a foetal and maternal surface of nearly equal dimensions as in normal pregnancy, the foetal surface being covered by the amnion and in immediate relation to the sac.while the maternal surface is growing from the spread-out remnants of the tube

and from the peri-tubal tissues, also the back of the uterus, the broad ligament, and the pelvic wall being favourite sites for such extensions of attachment. In the third, the placenta remains within the tube which is still recognisable, and the maternal attachments are confined to the tube itself. In this case there may be a double gestation-sac, the one containing the foetus, the other the placenta. In the fourth, the placenta is attached to the upper wall of a broad ligament sac outside the peritoneum, and the cord passes to the child through a hole in the ligament.

Broad Ligament Pregnancy. As has already been pointed out, rupture takes place in a limited number of cases into the broad ligament, that is through the lower part of the tube instead of the upper part. Before the rupture takes place, the enlargement of the tube has most likely separated the two layers of the mesosalpinx, and the tube, being thus deprived of the support of the peritoneum, often bursts into the intra-ligamentary space. Considerable haemorrhage and rupture of the ovum may also occur, and the layers of the broad ligament are still further separated. In the cases in which the ovum ruptures, the foetus of course speedily perishes. The haemorrhage forms an extra-peritoneal haematocele, which may increase by repeated bleedings from the tube or may be aborted, being

1. Dunning: American Journal of Obstetrics, Vol. XXXVI, p.43.

2. Taylor: The Lancet, Vol.II, 1898, p.1521.

assisted to that end by the pressure of the broad ligament. Instead of the foetus perishing however, it may live and develop in its new position between the layers of the broad ligament, which have formed a sac for it. This sac may in its turn rupture,(secondary rupture), or it may go on to full term without rupture. In the latter case the peritoneum must be gradually displaced to make room for the continued growth of the foetus. This displacement of the peritoneum has given rise to two subdivisions of broad ligament pregnancy, according as the anterior fold has been displaced the posterior fold remaining normal, or the posterior fold displaced and the anterior remaining normal. The last of these subdivisions is the same as that described by Dr. L.H.Dunning[1] as "Intra-ligamentous - retroperitoneal".

The pathology of these different forms I will consider separately.

According to Mr.Taylor[2] it is the posterior fold of the peritoneum which is most often displaced, being raised from the side and back of the uterus, from the pouch of Douglas, from the rectum, and from the posterior pelvic wall as far as the sacral promontory. The anterior peritoneum is quite undisturbed. On opening the abdomen it is found that everywhere it covers the pregnancy, and it is not until the hand is passed behind the sac of pregnancy that one realises that the base of it fills the pelvis on the side

1. Dunning: American Journal of Obstetrics, Vol., XXXVI, p.43.

from which it is springing, and that the peritoneum is reflected from above the pelvis directly on to the body of the pseudo-uterus. Dr. Dunning[1] in describing this form says that the chief characteristic is , that the ovum with its envelopes projects free into the abdominal cavity, the abdominal portion being entirely enveloped by a peritoneal covering. This peritoneal covering is derived from the folds of the broad ligament, and portions of peritoneum from the following structures and regions,viz. the Fallopian tube, one lateral pelvic wall, the posterior surface of the uterus, the cul-de-sac and the posterior parietal peritoneum. It is intraligamentous in the sense that after the primary rupture, the ovum develops for the most part, between the folds of the broad ligament, and at full term these ligaments form a large part of the ovum. It is retroperitoneal, in that the growing ovum has lifted up, and received as a part of its investments more or less of the posterior layer of the pelvic peritoneum. The naming of this form of extra-uterine pregnancy in which the anterior parietal peritoneum is undisturbed."intraligamentous-retroperitoneal" Dunning thinks is absolutely necessary, as it conveys a distinct idea, while "sub-peritoneo-abdominal" really means that at full term the foetus or placenta occupies a place between the anterior abdominal wall and the parietal peritoneum. This position is rare compared with that

designated by the name Dr. Dunning has given to those in which the anterior parietal peritoneum is found intact, in fact the majority of tubo-ligamentary pregnancies belongs to the latter sub-division. Sometimes it is the anterior fold of the peritoneum which is disturbed in this class of tubo-ligamentary pregnancies. In this subdivision the peritoneum is raised from the back, side and front of the uterus, it is entirely lifted away from the bladder, it is raised from the anterior and latter abdominal wall. and so a considerable portion of the pregnancy comes to lie in front of the peritoneum, so much so that it may be opened from the outside of the abdomen without the necessity of incising the peritoneum, as I have seen done in the Glasgow Western Infirmary lately.

In both these subdivisions it is noticed that the upper part of the pregnancy is really intra-peritoneal, and especially so in the intraligamentous-retroperitoneal.

As regards the placenta in these cases it is, (as the tube in these cases ruptures downwards,) most likely to be found fixed to the tube higher up than the foetus, although sometimes on account of the sac developing anteriorly or posteriorly to the tube according to the subdivision, it may afford room for the child to pass in front of or behind the placenta.

1. Tait: Op Cit., p.47.

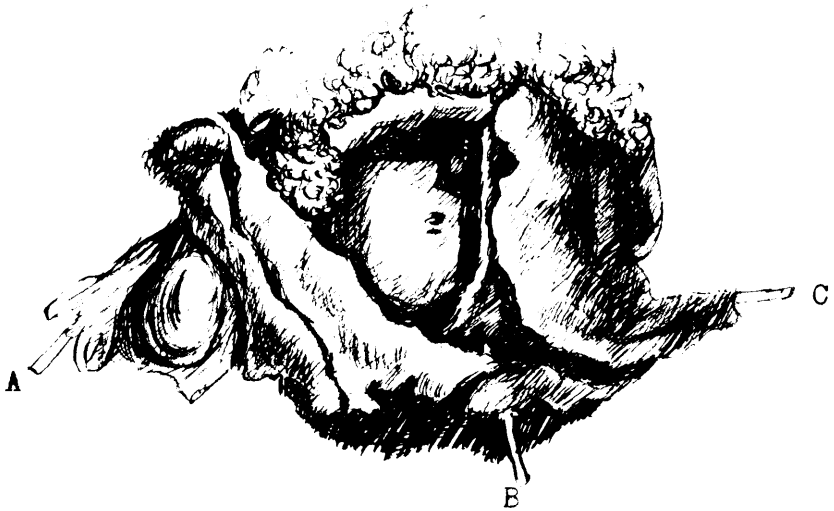
Interstitial Pregnancy or Tubo-Uterine Pregnancy. The variety of tubal pregnancy which occurs in that part of the tube embraced by the uterine tissue has been called Interstitial or Tubo-Uterine.

Tait was of opinion that these cases were uniformly fatal by primary rupture before the fifth month, but Webster and others believe that they can go on to the full term or that they may rupture in one of the directions which I shall mention shortly, or that death of the foetus may take place and that it may then remain in the sac and undergo changes similar to what takes place in other forms. This form of ectopic pregnancy is very rare, and the most dangerous of all forms. Its rarity may be judged from the fact that only six pathological specimens can be found in London museums. The obstruction being at the uterine ostium, the ovum grows and burrows into the uterine tissue. The wall of the gestation sac thickens, while the foetus enlarging, the uterus is, as it were, pushed out of place, so much so, that the Fallopian tube on that side seems to enter the uterus, at a lower point than it should. In fact the uterus appears lop-sided, the tubes apparently entering at different levels. A typical case of this condition is described by Lawson Tait, and as the drawing illustrating it shows well the great cement of one tube, I here give a rough copy of the drawing along with an extract from Lawson Tait's remarks concerning it.-- " The cavity in

1. H.A.Kelly: Operative Gunaecology, Vol., p.437.

2. J.M.Baldy: Text-book of gynaecology, p.526.

3. Taylor: The Lancet, Vol. I, 1898, p.1523.


C
A
C
B

which the foetus is situated is separated from the true uterine cavity by a strong septum of uterine tissue springing from each side of the uterine walls. The under surface of the septum and the rest of the uterine cavity is lined by hypertrophied mucous membrane (decidua) (B). The stump of the right Fallopian tube (C), is attached to what appears to be the lower angle of the uterus, but what is really the much displaced upper angle. This displacement however, is only apparent, and arises from enormous development of the left cornu of the uterus. A fine probe may be passed from the true uterine cavity into this stump. The left Fallopian tube, (A) on the contrary, communicates with the cavity in which the foetus and placenta lie, and the rupture has taken place in the upper and back part of the left uterine cornu."

As in this form of ectopic gestation the walls of the sac become thicker, (like the uterine wall in normal pregnancy), rupture takes place later, not occurring usually until the end of the fourth month, and sometimes even later. This rupture may take place according to Howard A.Kelly[1] in one of three directions:(1)Into the uterine cavity, (2) into the abdominal cavity,(3)between the layers of the broad ligament. According to Baldy,[2] it may occur in either of two directions: (1)into the abdominal cavity,or (2) into the cavity of the uterus, and according to J.W.Taylor,[3] in one direction only. Mr. Taylor says "The only rupture that is known to occur, is rupture

1. *Transactions of the Obstetrical Society of London, Vol. XXVIII. p. 100.*

Extra-Uterine Pregnancy by J.S.Parry, p. 266.

into the abdomen,(or into the abdomen or uterus simultaneously). "Rupture downward into the cavity of the uterus" he says, "is a highly probable occurrence, and if it occurred, would presumably be followed by spontaneous healing of the wounded tissue and normal delivery at term, but in spite of the slenderness of the bridge of tissue usually existing between the sac of the pregnancy and the cavity of the uterus, we have no positive demonstration that this has ever taken place alone."

From the fact that a case rupturing into the cavity of the uterus, probably thereafter follows the course of a normal pregnancy, direct evidence of the occurrence of such cases is not readily obtainable. Cases are on record however, which leave little doubt that rupture into the cavity of the uterus really takes place.

All the symptoms of extra-uterine pregnancy up to full term, may be those of normal pregnancy. In some cases, symptoms may occur which, although in themselves of little value, are very suggestive when taken in conjunction with others. It will be advisable to consider these symptoms which occur in extra-uterine pregnancy apart from those caused by pregnancy generally. To begin with the symptoms given by the patient:- There is usually a history of a more or less lengthened period of sterility. This symptom in itself

1. McCormack: American Journal of Obstetrics. Vol. XXXI, p.61.

is not of much value, thus in the first case which occurred in my practice the youngest child of the patient was only a little over a year old, while a case described by Dr.A.T.McCormack had only been married eight months. The first symptom mentioned by the patient is connected with menstruation. The patient misses one period but the flow begins again in one, two, or three weeks, accompanied with pain. This character of the menstruation in itself is not of any diagnostic value, but followed by certain other symptoms it is very valuable. It may be followed by labour pains and the discharge of decidua, which may be in one piece as occurred in my case, or in several pieces or even in shreds. In whatever form it is necessary to be satisfied that the membrane is really decidual, and that it is not an ordinary abortion with which we have to deal. The combination of a bloody discharge, pain, a decidual discharge and a tumour felt in the broad ligament form complete evidence of the nature of the case. But even without the occurrence of labour-pains or discharge of any kind, it may be possible to arrive at a correct knowledge of the state of matters. When the pain is caused by rupture of the tube, it is usually of an agonising description, so much so as often to cause unconsciousness. With such symptoms, associated with a history of menstrual suppression or irregularity, a diagnosis of ectopic pregnancy could be made almost with certainty. In these severe cases, the extent of

the internal haemorrhage is indicated by the great pallor of the patient, the rapidity of the pulse and the abdominal distension. In the worst cases the patient may die at once from bleeding. In the cases where the patient recovers from the first bleeding, the symptoms may occur a second time either in a few days or a few weeks with a fatal result, or the fatal termination may only result after a third or fourth attack. On the other hand the haemorrhage may be small and may not recur, and in such cases the effusion is absorbed and the patient recovers.

A physical examination shows various symptoms according to the severity of the case and the period of the gestation. In a severe case there is distension of the abdomen, great tenderness over lower abdominal region and signs of fluid in flanks. Tenderness also in one or both vaginal fornices, with often a swelling and almost always a sense of resistence. The mass which is felt may be small as occurred in one of my cases, or it may be large and bulging. Sometimes the foetus is felt. If a badly-defined mass is found in one fornix only, the uterus being pushed to one side, then probably the haematocele is between the folds of the broad ligament, at the side at which the mass is felt. In some cases rupture follows on violent exertion, or on sexual intercourse. An instance of the latter occurred in the practice of my brother Dr.Robert Allan of Ardrossan. The patient was about forty years of age and the mother

1. Darin: Transactions of the Obstetrical Society of London, Vol., XXIV, p.87.

of three children, the youngest being about ten years of age. The last menstrual period was six or seven weeks before the illness occurred for which my brother was called in. During sexual intercourse she had the feeling that a bag of some kind was burst in her pelvis. The pain was excruciating, causing her to scream loudly at the time. When my brother saw her next morning, he found a large boggy swelling in the posterior fornix, tender to touch and evidently caused by blood in the pouch of Douglas. By the following day the tenderness was much less and the swelling was somewhat harder and smaller. In the course of a week, beyond a slight denseness at the part, no traces of the swelling could be discovered. Though no actual proof could be given, it is a reasonable supposition that this was a case of primary rupture of an ectopic pregnancy into the peritoneal cavity.

When the foetus remains alive by the placenta remaining attached or only gradually changing its position, as described when discussing the pathology of the subject, then other symptoms appear. They mostly resemble those of ordinary intra-uterine preg - nancy, except that, as was found in the second of my cases, the foetus is usually more distinctly made out through the walls of the abdomen, there being no uterine walls intervening.

Dr.Dakin[1] and some other authorities believe that con-

1. Taylor: The Lancet, Vol.II, 1898, p.1673.

tractions are not found in an extra-uterine sac, and they consider the absence of such to be an important symptom when spurious labour is in progress. This symptom will be more fully discussed when diagnosis comes to be considered. Another very important symptom is of course an enlarged and empty uterus. While enlarged, it retains the shape of the non-pregnant uterus. But this enlargement and emptiness, as demonstrated by an examination with the sound, cannot be relied upon, as in many cases the uterus has actually been found to contain a foetus after such an examination, and a diagnosis of empty uterus has been made. This error can easily be fallen into when the pregnant womb is antiflexed. In such cases, the cervix remains thin, is lengthened, and lies behind the tumour of the pregnancy as far as the finger can reach. Mr. Taylor says that under such conditions, he has known a sound passed to the top of the lengthened but undeveloped cervix give almost or quite the normal uterine measurement, produce no abortion and in this way afford to the practitioner who used it, confirmation of his (mistaken) opinion that the pregnancy was outside the uterus.

An important symptom is the position of the uterus. It is distinct from the pregnancy, and this can be demonstrated by bimanual examination aided by the sound. But in interstitial pregnancy no distinct sac can be definitely made out, it is simply part of the uterus. Perhaps the tumour may be discovered to project

1. Smith: New York Medical Record, Septr. 9th. 1899.

more on one side than the other, the uterus forming a hard projection as it were, on one side of the tumour(the pregnancy). In interstitial cases usually no symptoms present themselves until the sudden and fatal haemorrhage takes place into the abdomen. The following case related by Mr. Charles Smith of Des Moines is the usual course of these cases:- The patient was found in a state of collapse. She was 24 years old and married one year. Menstruation had been regular until the past two months. since which time she had seen no show. nor had there been any discharge of any kind from the vagina. On the previous night the patient went to a ball, danced all night and ate a hearty supper. Next day she worked hard. washing, baking and scrubbing and then walked nearly a mile, when she was taken with abdominal pain and faintness. This soon passed away, and she walked home. Several stools were passed in the evening; defaecation was painful. The abdomen was tympanitic and tender, pains as in threatened abortion occurred. The uterus was about double the normal size, with a soft, flabby cervix, the cervix not dilated. The pains were suspected by Smith to be due to indigestion. Shortly after he left the patient went to the closet, screamed and became faint: other attacks followed, at length attended with convulsions, after which she became more conscious and died. The peritoneum contained three quarts of blood, mostly fluid. The uterus was extensively lacerated posteriorly, and just to the right of the median line. The tubes, ovaries, and liga-

1. *Tait: op cit., p. 46.*

ments were perfectly normal, except that the right tube and ovary were drawn a little higher by the greater development of the uterus on that side. a ruptured amniotic sac was found containing chorionic villi, which had no connection with the uterine cavity where, on the other hand, a decidua was found. The cervix contained a mucous plug. The tissue around the rent in the interstitial sac showed advanced fatty degeneration.

The following is another case somewhat similar but interesting in that the patient had been previously operated on by Lawson Tait for a tubal pregnancy. This tubal pregnancy had reached the third month. Eighteen months after she had been operated upon for it, she was confined at full term and everything passed off satisfactorily. Fifteen months after, she again became pregnant, and up to the fourth month had no extraordinary symptoms, except that she thought she felt the child more plainly than she had ever done at the same time in former pregnancies. While performing her household duties, and in the act of stooping, she was seized with acute pain and a feeling of faintness. Notwithstanding all efforts to restore her, the patient died in an hour and a half after the attack of pain and faintness. A post-mortem examination was made, when the abdomen was found full of blood clots and fluid blood, a large clot was adherent to a portion of the placenta which protruded from the uterine wall, and when this clot

1. Dunning: American Journal of Obstetrics, Vol. XXII, p. 754.

was separated it had a quantity of villous placenta attached to it. In this case we have the almost incredibly strange instance of a woman suffering from tubal pregnancy twice, with the still stranger fact of her having a normal pregnancy between the two occurrences. From the first of her disasters she was saved by prompt surgical interference, and she might even have been saved from the second, but there can be no doubt that the poor woman's doom was sealed before surgical assistance reached her, and there was no time then to effect the interference which was necessary."

The following are the symptoms of a case in which an operation to stop the bleeding was attempted by Dr.L.H.Dunning. At 4-30 pm. on the day preceding that on which a physician was called, the patient "was suddenly seized with intense pain through the uterus and became weak." When the doctor arrived, he found the patient prostrated "but not very anaemic." There was no bloody flow from the uterus, but there were intermittent pains. The uterus was enlarged and seemingly pregnant. No tumour could be felt in the pelvis. An opiate was given. The following morning at 8 am. the doctor found the patient nearly pulseless . The abdomen was distended, and a boggy feeling was elicited by digital examination per vaginam. Operation was commenced the abdomen being opened at 9-45 am. A rent was found in the upper and posterior portion of the walls of the uterus. The patient died during the operation.The

1.Taylor: The Lancet: Vol.I.1888,p.1686.

2.Baldy: Op cit.p.527.

3.Tait: Op cit.p.48.

4.Jepson:American Journal of Obstetrics, Vol.XXXII,p.434.

5.Ross: Ibid, Vol.XXXII,p.567.

6.McCcomack: Ibid., Vol.XXXVI,p.60.

7.Ross: Ibid, Vol.XXXII.p.570.

patient thought that she was two months pregnant. From these cases it would seem that rupture in the interstitial variety occurs at a later date than primary rupture of tubal pregnancy. Thus, in the case quoted, (Lawson Tait's) rupture occurred at the 4th. month, while in the case recorded by H.L.Dunning, the rupture was at the 2nd. month, this being also the time of rupture in the case related by Charles Smith and already referred to. Mr. Taylor[1] says that the usual time of rupture in this form, is from the second to the 4th. month..Baldy[2] says that it may occur at any time between the 3rd. and the 20th. week, more often in the 4th. month. As to tubal cases Lawson Tait[3] says that there is no evidence as yet of any instance going beyond the 12th, or 13th. week before primary rupture. Baldy says that rupture occurs some time between the 3rd. and 12th. week more often near the 8th. While Jepson[4] says "it is believed to be most common between the 8th and 12th weeks and to almost always occur within 14 weeks ", Parry found the time of rupture to be between the 4th. and 12th. week. J.W.F.Ross[5] states the average period of rupture to be the 10th. week of gestation, while Dr.A.J.McCormack[6] says that the 6th. week is the average time of rupture.

Thus while the opinion as to the time of tubal rupture varies very much, it may be considered as taking place at any time from a very early period up to the 13th. week, or even later when the pregnancy is interstitial. In the case related by Dr.J.W.Ross[7]

1. Archives Medicales de Toulouse, Feby. 1st. 1895.

and already referred to."the pregnancy " he says " could not have been of longer duration than 2 weeks. Another case related by Stieber, and an extract of which is given in the American Journal of Obstetrics for September 1895, shows a tubo-interstitial pregnancy to have remained to the 6th. month without rupture. As this case is unusual I have made the following extract:- "The patient was married in November 1891. Menstruation, previously regular, ceased in May 1892, and later her breasts and abdomen showed the usual signs of pregnancy. In December 1892 pains in the head and abdomen ;breasts became hard, painful, and secreted a quantity of milk. This lasted eight days, then foetal movements had ceased. In February 1893 painful uterine contractions with a small flow of blood and membranes, and secretion of milk. The abdomen diminished in size and gradually became hard. In March the menses reappeared accompanied by pains in the loins and thighs.

On August 20th.the patient, a primipara aged 20, entered the clinic. Examination disclosed a median ovoid tumour the size of a foetal head at term, tender, irregular and of varying consistence, one portion, hard another elastic. Moving the cervix laterally did not disturb the tumour, pressing the latter forward moved the uterus also. Median laparotomy by Jeannel on August 25th. showed an unruptured cyst of the right tube. The tumour was separated from the adherent omentum and opened.It contained a reddish sebaceous magma and

1. Boldt: American Journal of Obstetrics, Vol. XXXII, p. 434.

a foetus. Total extirpation of the tubal cyst and right ovary, also cystic, was followed by rapid recovery.

The cornu was normal, as was also the insertion of the round ligament into the uterus, not into the wall of the cyst. The excision of the cyst did not open the uterine cavity. These points and the fact that tubo-interstitial pregnancies have been known to continue until near term without causing rupture, confirm a diagnosis of tubo-interstitial pregnancy lasting fourteen months, with death of the foetus at six months, rather than that of a pregnancy in the uterine cornu. The absence of rupture is explained by the attachment of placenta to the uterine flank of the infero-lateral wall of the cyst."

While the symptoms described are almost always constantly present in extra-uterine pregnancies, yet cases devoid of subjective symptoms sometimes occur. Such a case is recorded in the Transactions of the New York Obstetrical Society by Dr.H.J.Boldt. The case had advanced to the tenth week. The specimen removed by operation showed a tubal abortion in progress, while the embryo was found free in the peritoneal cavity. Dr.Boldt says "The patient did not have a single one of the characteristic features of tubal gestation. The diagnosis was based entirely upon the pressure of a tumour beside the uterus and slight enlargement of this organ, extreme an-

1. Bovee: American Journal of Obstetrics, Septr. 1895, p. 390.

2. Tait: Op cit. p. 18.

aemia with feeble pulse." Dr.J.Wesley Bovee[1] relates a case in which he operated and found a ruptured tube containing foetal membranes, though an examination of all the material removed from the patient's abdomen failed to reveal the foetus. The symptoms in this case were pallor and nausea, Pulse 140. Temperature 102'6. Other symptoms pointed to septic infection of the uterus and its appendages, resulting from an attempt at criminal abortion, which had been made. No symptoms pointing to extra-uterine pregnancy were present.

Diagnosis. For the general practitioner this is a very important branch of the subject, because as a rule, medical advice is not sought at all in the early stages, but when it is sought, it is the family physician who is consulted, and it is on him that the responsibility lies of diagnosing the case, and if need be of securing the necessary immediate treatment. Something has already been said of the difficulties of diagnosis when discussing the symptoms of ectopic pregnancy, but on account of its importance I think it advisable to consider it more fully. The subject of diagnosis is usually divided into diagnosis before rupture, and diagnosis after rupture of the tube.

Different opinions are held of the liklihood or even the possibility of being able to diagnose cases before rupture. Lawson Tait[2] says that no diagnosis is possible before the period of rupture, for the patients make no demand upon us. He again says at p.24

1. Price: Medical and Surgical Reporter, Septr. 30th, 1893.

2. Wyllie: American Journal of Obstetrics, Vol. XXII, p. 1292.

3. McMurtry: Ibid. p. 1087.

4. H. A. Kelly: Op cit. p. 443.

5. Baldy: Op cit., p. 532.

6. Busey: American Journal of Obstetrics, Vol., XXII, p. 867.

7. Hanks: Ibid. Vol., XXI, p. 1060.

8. Ross: Ibid, Vol., XXXII, p. 567.

of the same lectures. "The diagnosis of tubal pregnancy before rupture of the tube is not easy..... What symptoms there are, as in the solitary case where I had a chance of making a diagnosis, are merely those of tubal occlusion and distension- matters very easy to diagnose " He says that he has never diagnosed a case prior to rupture, and adds "Under these circumstances I think I may be excused for maintaining a somewhat sceptical attitude concerning the correctness of the diagnosis of those who speak so confidently of making certain diagnosis in cases of tubal pregnancy before the period of rupture." Others who are of the same opinion are Price, Wylie and McMurtry, all of whom have had large experience of such cases. Price[1] says, "exceptionally, if ever, is the trouble recognised before rupture" Wylie[2] says, "I wish to emphasize the great difficulty of diagnosis; usually when a positive diagnosis is made it proves erroneous" McMurtry[3] says "No man can diagnose a case previous to the time of rupture"

Other equally distinguished observers, hold quite a different opinion. Howard A. Kelly[4] considers the diagnosis usually very easy. Baldy[5] says that under certain circumstances the diagnosis has been made a number of times and its correctness verified by subsequent operation. Busey[6] says "The diagnosis should be made in at least 85 per cent of the cases. Hanks[7] says, "95 per cent can be diagnosticated before the end of the third month." Dr.J.F.W.Ross[8] of

1. Taylor: British Medical Journal, May 3rd 1890, p.1043.

Toronto says," In my experience I have been able to diagnose unruptured ectopic gestation." Mr.John W.Taylor in replying to Mr. Lawson Tait's opinion about the possibility of diagnosing tubal pregnancy before rupture says "I can hardly conceive a tubal pregnancy which could not be felt as a tubal tumour by the 5th. or 6th. week: and I believe it will be found, as experience increases, that a tubal pregnancy in its early stages is to be diagnosed with less difficulty, than at a somewhat later period, when, through rupture, the tumour has lost its distinctive character."

The great attention which has been paid to extra-uterine pregnancies lately, especially to the pathology of the subject has given more clear and definite data to go upon in making a diagnosis, than was known at the time Barnes, Parry and Lawson Tait wrote, and diagnosis before rupture may now be reckoned as by no means a rare occurrence. At the same time many errors, even by eminent gynaecologists, have been made, and some of these will be referred to later on.

In considering the diagnosis of ectopic pregnancy before rupture, an important point is the history of the case. While in itself it is not of much value, yet, combined with the signs obtained by examination it is in many cases sufficient to form the diagnosis. The history of the case will usually be that of normal pregnancy plus additional symptoms. If the patient has been confined

1. Dakin: The Clinical Manual, Vol.V.p.235.

2. H.A.Kelly: Op. cit.Vol.II, p.443.

before, then she may suspect something wrong from the feeling being in some respects different from her former experience. She may have pelvic pains which were not present in former pregnancies, irregular discharge from vagina, the discharge occurring after amenorrhoea and being darker than the blood of the usual menstruation, and, it may be, shedding of a decidua or of parts of one. On examination of the uterus it is found empty, and behind and to one side of it, a tumour is found, which, if it is examined from time to time is found to grow larger. In a normal pregnancy the womb may be fixed to one side for a time by former perimetritis, and there may be difficulty in deciding whether the tumour is uterine or extra-uterine. If in such a case the tumour is found to contract, then according to Dr.Dakin[1] it is certain to be a normal pregnancy, for a pregnant tube cannot, he says, so far as is known contract. Concerning the importance of this symptom he adds "Contractions are a most valuable sign, and should always be looked for in cases where the gravid uterus is possibly constituting the greater part of the tumour: you do not get contractions in an extra-uterine sac." On the other hand H.A.Kelly[2] says, "This sign is fallacious as distinct contractions have been noted in the extra-uterine sac." While admitting that contractions of the sac do occur, this fact does not seem to materially impair the importance of the symptom emphasized by Dakin. The muscular tissue contained in the sac, (excluding cases of interstitial preg-

1. Routh: *Transactions of the Obstetrical Society of London.* Vol.XXIV. p. 87.

nancy), is necessarily so small that the contractions must be very feeble, and in no way comparable to the contractions of the uterus which take place in normal pregnancy.

A very important symptom in early cases is the character of discharges if they are present. The occurrence of haemorrhage in itself is not a symptom of much value, but if such discharge is by examination shown to contain decidua, then this symptom taken with the history is very valuable, in fact it is thought by some to be pathognomonic of extra-uterine pregnancy. Dr.Routh says "Wherever you had a growing abdominal tumour, while a complete decidua had been voided per vaginam, that was a case of extra-uterine foetation." He also recommends (at p.157 of same vol.) that, in doubtful cases the os should be dilated and a little portion of the supposed decidua withdrawn and examined under the microscope.

It is important that any cast or shreds which may be expelled from the uterus, be examined carefully to ascertain if it is really decidua of an extra-uterine pregnancy and not that of an abortion. In the latter case if the ovum has been found, of course there is no difficulty, but if no ovum is discovered, then a microscopical examination is necessary to find if chorionic villi are present. If they are present it is a case of abortion.

Shreds of decidua may be also confounded with discharge

1. Baldu: Op cit., p.534.

2. Transactions of the Obstetrical Society of London, Vol. XXXVIII. p.385.

from a case of membranous dysmenorrhoea. In these cases it is the history which must be looked to, to give the necessary diagnosis. In dysmenorrhoea, we would have the frequency of such attacks described by the patient. Baldy[1] says, that the decidua resulting from an extra-uterine pregnancy, can be distinguished from that of the normal by being all decidua vera, and so has a smooth inner surface and a shaggy outer surface which was attached to the uterine wall, the smooth inner surface being unbroken by the attachment of an ovum. But a case recorded by Dr.W.R.Dakin,[2] shows that this cannot always be relied upon, even when decidual cells are also found under the microscope. In this case there was also a swelling found on one side of the uterus. The case is very valuable, in showing that a positive diagnosis cannot be made, even when we have three apparently diagnostic features present, viz.(1)a swelling on one side of the uterus, (2)a complete decidual cast with a smooth unbroken inner surface, and (3)decidual cells found under the microscope. The particulars of the case,(which I give almost in full,as it is an important one,) are as follows:- "Age of patient 27. A cast was passed having the appearance of a complete lining of the uterine cavity and triangular in shape, measured 3½ inches along the sides, and 1¾ inches across the base,(i.e.across the fundal part). Average thickness $\frac{3}{16}$ of an inch. Attached surface shaggy, free one smooth.No sign of implantation of an ovum. "It was obvious

ly a cast of the endometrium. and since the history agreed well with the diagnosis of ectopic gestation. that idea appeared the most likely explanation." On abdominal examination she was found to have tenderness in both ovarian regions. and a mass- the fundus uteri - was felt behind the pubes, rising just above the pelvic brim. Bimanually the uterus was found to be enlarged to twice its usual size, and was freely moveable. The left side of the pelvis was normal. except for some tenderness and slight resistence. In the right side of the pelvis there was a lump as large as a hen's egg. freely moveable, and not very tender. which seemed to correspond to the outer third of the tube, and the inner part of the tube could be distinctly traced to this lump from the right cornu. There was serum in both breasts. On microscopic examination the cast was found to be decidual in character. It now appeared almost certain that the tube was occupied by an ovum." Dr.C.J. Cullingworth agreed with Dr. Dakin that it was a case of tubal pregnancy, and the treatment should be abdominal section.

On abdominal section the lump was removed, with a portion of the broad ligament and the tube adjacent to it. The lump consisted of a thin-walled cyst apparently in the hilum of the ovary. and it peeled out without difficulty. The following is the report of microscopical examination. "The cyst is lined with granulation tissue. which contains some blood pigment; the remains of past

1. Barnes: British Medical Journal, Vol. I. 1890, p.1043.

haemorrhage. More externally there is a layer of large cells, epithelial in character, and separated into columns of fibrous tissue. These cells are not unlike those of the supra-renal body or liver, and are perhaps relics of the Wolffian body. More externally there is a layer of fibrous tissue. The cast is composed of large cells with nuclei staining well, and resembling decidual cells. There are numerous spaces, probably blood-channels, and in places the remains of gland tubes."

" "The present case emphasized the fact that the passage of a decidual cast, or rather of a cast having the character of a decidual cast, though, as a rule, very valuable evidence of pregnancy was not to be absolutely relied on as proving the existence of an ovum in the genital passages of a woman, even though a swelling were found on one side of the uterus."

"When the patient was last seen the uterus was of quite a normal size, and the pelvic organs were normal. She was now menstruating normally."

This case also shows, that the statement made by Barnes[1] that a diagnosis made at the 7th or 8th week on the following symptoms, cannot absolutely be relied on:-(1)the ordinary symptoms of pregnancy,(2)pain more or less acute in the pelvic region of a spasmodic character,(3)more or less haemorrhagic discharge from the uterus, and vagina, (4)the uterus found pushed to one side of pelvic

1. *Taylor: The Lancet. Vol. II. 1898, p. 1670.*

brim, and on opposite side an extra-uterine swelling of ovoid shape. (5) all these conditions occurring in a short period in a subject hitherto free from symptoms of pelvic distress.

Mr. J.W.Taylor says that a very constant and valuable sign is the presence of pulsating vessels felt in the vaginal vault on the affected side, this pulsation not being so marked when it is caused by inflammatory affections. Other diagnostic symptoms can also be found from vaginal examination,-for example the condition of the os, and the presence of a tumour usually to one side of and apart from the uterus. The os is usually soft, some writers say the same as in normal pregnancy; while others profess to be able to distinguish between the softness due to extra uterine pregnancy and that due to intra-uterine pregnancy. It is not a sign of much diagnostic value. But it is otherwise with the presence of a tumour outside the uterus. This is an important diagnostic feature, and it is necessary to consider its shape, position and mobility.

The tubal tumour which can sometimes be detected by vaginal examination is usually ovoid in shape, but if bleeding has occurred within the tube, then the tumour may be elongated and hard, the blood distending the whole tube.

As to the position in which the tumour is found, it may be situated almost anywhere around the uterus. The usual site of it is laterally and posteriorly, but it may be situated directly behind

1. *American Journal of Obstetrics, Vol. XXIX, p. 84.*

2. *Taylor: The Lancet, Vol. II. 1896, p. 671.*

the uterus or even in front of it, as in a case reported in the American Journal of Obstetrics.[1] At first the tumour is freely moveable but as it grows it becones fixed and displaces the surrounding viscera. The vaginal examination can usually be conducted without causing any pain to the patient, for until rupture occurs the tubal pregnancy is quite insensitive.

When discussing the pathology of ectopic pregnancy, it was mentioned that a haematocele may be formed before rupture has occurred, by a bleeding taking place from the tubal ostium, and that another tumour is thus formed, which sometimes obscures the tubal tumour and often makes bimanual examination impossible, on account of inflammation set up by the blood. In those cases a diagnosis of haematocele can be made.

During the bimanual examination the position of the uterus should be ascertained, as it is an important point when differential diagnosis is considered. In extra-uterine pregnancy it is usually found to be displaced forward or to one side on account of the pressure of the tubal tumour or a haematocele, and in cases where bleeding has taken place into the pouch of Douglas it may be displaced upwards. The uterus will also be found to be increased in size, but not exactly as if pregnant. It is more elongated and Taylor says[2] "The enlargement bears a strong resemblance to that of the subinvoluted uterus after confinement." This enlargement must

if possible be made out. and also a decision formed as to whether the uterus is empty or not, without the use of the sound, it not being employed in any case until normal pregnancy is excluded.

To shortly recapitulate the signs and symptoms which contribute towards forming the diagnosis of extra-uterine pregnancy before rupture, they may be given as follows.-

(1)A patient in whom pregnancy is likely to occur

(2)Ordinary signs of early pregnancy preceded by

(3)a period of sterility extending to many years.

(4)A belief by the patient that she is pregnant.

(5)History of amenorrhoea (one or more menstrual periods having been missed.

(6)History of a pre-existing salpingitis.

(7)Colliciky pains often shooting down the thigh with a faint and weak feeling.

(8)Irregular discharges of blood from vagina. Distinguished from ordinary menstrual blood by being darker in colour and coming at irregular intervals in gushes and with pain. followed by.

(9)Tenderness at one or other side of ovum.

(10)Passage of a membrane or shreds during the irregular bleedings.

(11)Presence of a tumour in lower part of abdomen.

1. Transactions of the Obstetrical and Gynaecological Society of Baltimore, January 14th and February 11th 1890.

These are symptoms which the patient herself may have noticed and be able to communicate to the physician.

The signs to be made out by examination are the following:

(12)A slightly enlarged uterus.

(13)Os soft and cervix patulous.

(14)A small tumour in region of a Fallopian tube at first not painful to touch but later

(15)the tumour enlarged and sensitive to touch. and growing larger after each attack of colicky pain.

(16)Pulsating vessels are felt on vaginal roof on one side of uterus.

(17)The uterus may be found to be displaced.

(18)The uterus empty.

As illustrating the diagnostic symptoms, I may quote the following case which was reported as the first case of unruptured pregnancy diagnosticated, and operated upon in America.

Dr. Howard A.Kelly was the operator and the following were the signs on which his diagnosis was based. Cessation of the menstruation for several months, some enlargement of the uterus, the formation of a cystic tumour lateral to the uterus, the appearance of milk in the breasts, the expulsion of a membrane resembling a cast from the uterus, unusual pains in the lower abdomen, a shrinkage of the sac while under observation.-"a group of signs which is."

1. Baldy: Op cit., p.537.

Dr.Kelly says. "found in no other condition than extra-uterine pregnancy." "The operation revealed a right-sided unruptured extra-uterine sac. 10½ centimetres long. developed in about the middle of the uterine tube. The sac on being cut open. extruded a shrunken but well-formed foetus. 12 centimetres long from vertex to rump."

The conditions with which an extra-uterine pregnancy may be confounded before rupture are numerous. and the differential diagnosis will require to be considered. The following may be taken as including most of the conditions likely to lead to error in diagnosing an extra-uterine gestation. -

(1) **Pyo-salpinx** or Sero-salpinx. This is the condition which is most likely to be mistaken for an extra-uterine gestation. Here the history is most important. Was the patient in ill-health before? In **pyo-salpinx** usually there is a history of regular menstruation or menorrhagia and so these cases are not so easily confused with extra-uterine gestation, but in double pyosalpinx amenorrhoea sometimes occurs lasting for three or four months, and in these cases the signs and symptoms simulate to a great extent those of extra-uterine gestation. The greater vascularity and boggy feeling of a pregnant tube may, according to Baldy, enable one to differentiate it from a pyo-salpinx. But in these cases the history is what must be most depended on. If the patient gives a

1. Taylor: The Lancet. Vol. II, 1898, p.1672.

history of a former attack of pain a few years previous. and of slight pain in the same place since then. then a recurrence of an old affection may be suspected, and if there is a history of purulent vaginal discharge preceding the present trouble, under these conditions pyo-salpinx is probable.

(2)Myoma. Here again it is the history which is to be depended on mostly. The history usually extends over a longer period, the symptoms have come on more gradually, there is no discharge of decidua and there are usually no symptoms of early pregnancy, though there may be serum in the breasts and the os may be softened. A myoma is usually harder and more closely connected with the uterus than an ectopic gestation. Mr.J.W.Taylor relates a case in which he made a mistake in diagnosis from neglecting the history. The case was diagnosed as a myoma, and on operation it proved to be a peri-tubal haematocele around an early tubal pregnancy.

(3)Abortion. The diagnosis from this condition has already been referred to. It may be here added that the history of the case is very important, and that often it is all there is to go upon. The shape of the uterus may also help. The miscarriage may not yet be complete and in that case, the womb may be to a certain extent globular, differing from what has already been described as the shape of a uterus in a case of extra-uterine gestation.

(4)A retro-flexed fixed pregnant uterus of the second or third month.

There are seldom haemorrhages in intra-uterine cases, while in extra-uterine pregnancy haemorrhage is a common symptom.

In a retro-flexed pregnancy, bladder troubles will probably be present and the mass is in Douglas's pouch. In extra-uterine pregnancy a distended tube may lie in Douglas's pouch, and simulate the fundus of the uterus. It is very important therefore that the fundus should be clearly distinguished. If it is not the fundus which is in the pouch of Douglas, then whatever it is that lies there must push the uterus forwards, the result being that the fundus is felt above the pubes, while the cervix looks straight downwards. In the reverse case, when it is the fundus which is in the pouch of Douglas then by bimanual examination the cervix may be found continuous with the tumour, while no fundus is found above the pubes.

(5)An anteflexed pregnant uterus. In these cases often severe pains are found in the early months of pregnancy, and this symptom taken with the fact that, the cervix is stretched, thin and lies behind the tumour, makes such cases often confusing and difficult to diagnose. If the round ligament is felt on each side of the tumour then it makes diagnosis easy as proving it to be an anteflexed pregnant uterus. In those cases in which the diagnosis is not

1. Taylor: The Lancet. Vol.V, p.1678.

2. H.A.Kelly: Op cit.. p.443.

3. Transactions of the Obstetrical Society of London, Vol.XXIV, p.157.

absolutely certain. a careful observation should be kept up, and the patient kept in bed. for as long as there is no uterine discharge there is no need of immediate interference.[1]

(6)Tumours of the ovary and of the tube. In these there is more usually an unoccupied space between the uterus and the tumour than in cases of extra-uterine pregnancy, but it is mainly on the history of the case that we can rely in forming a diagnosis.

With regard to the diagnosis of a case in which the foetus has died without rupture of the tube, H.A.Kelly[2] says,-"The absorption of the amniotic fluid causing a rapid diminution in the size of the sac, is almost pathognomonic."

Diagnosis after Rupture. Although diagnosis after rupture does not as a rule exhibit so much difficulty as that befor rupture, still there are numerous conditions for which it may be mistaken, and many mistakes have been made. For example from the suddenness of the symptoms,a wrong diagnosis of poisoning has been made, as was the opinion in the well-known case of the actress[3] who suddenly fell dead in a restaurant while taking refreshment. A post mortem was made in the expectation of discovering a poison, when by mere accident a ruptured tubal pregnancy was discovered to be the cause of death. Twisting of the bowel, or of the pedicle of an ovarian cyst, or of a broad ligament cyst. or even the ruptur

of an aneurism, or the presence of a pelvic abscess, have all been confused with ruptured tubal pregnancy.

In diagnosing a case of extra-uterine pregnancy after rupture besides having the symptoms already considered when treating of diagnosis before rupture, we have others of the greatest value. Of these the most important are:-a sudden onset of severe pelvic pain with great abdominal tenderness, and collapse of patien with feeble or imperceptible pulse and possibly uterine haemorrhage These symptoms would lead to an immediate examination of the pelvis, with the result, that in a case with the above severe symptoms a pelvic tumour would probably be found, of any size up to that large enough to completely surround the uterus and project above Poupart's ligament; though if the blood is free in the abdominal cavity, only an indefinite mass might be felt either at one side or posterior to the uterus. Sometimes however even that may not be present. The uterus may be found enlarged, and the cervix soft, while on enquiry the usual history of amenorrhoea, decidual discharge, and other symptoms already mentioned as occurring in cases before rupture, may be obtained and a diagnosis arrived at. When a succession of haemorrhages occurs the symptoms are generally more severe with each recurrence. If the patient recover from the first rupture, then after some time adhesions form among the intestines, and a doughy mass

1. H.A.Kelly: Op cit., p. 443.

2. A.T.McCormack: American Journal of Obstetrics, Vol. XXXVI, p.61.

impressible by the finger is found, though there is no pitting. This may also be felt by a rectal examination.

Thus the earliest diagnosis of an extra-uterine pregnancy is made at the time of rupture. Dr.Howard A.Kelly[1] says:- "The collapsed anxious appearance, the thready pulse and the extreme pain and abdominal tenderness are characteristic, even though there is no tumour or perceptible uterine enlargement." Dr.A.T.McCormack[2] says that great tenderness in one or both fornices with a sense of resistence or a mass at one side or behind the uterus, "with an anachronous bloody vaginal discharge and a very rapid, soft almost gaseous pulse, and prostrating pain referred to pelvic region, is almost pathognomonic."

"An error in the diagnosis of a ruptured extra-uterine pregnancy in the early months is most likely to occur in the case of a pelvic abscess". Dr.H.A.Kelly relates that in one of his cases, there was a cessation of menstruation, and an irregular return, with sudden severe pain in the right side, followed by similar attacks. The patient was compelled to go to bed, and showed a decided pallor. There was a slight elevation of the temperature. The examination revealed an irregular tender mass to the right of the uterus, free from the density usually found in pelvic abscess; a diagnosis of extra-uterine pregnancy was made, but the operation proved the case to be one of simple pelvic abscess.

When the child, being extruded into the abdominal cavity, continues to live to the later months, the diagnosis resolves itself mainly into a question of whether an intra- or an extra-uterine pregnancy exists. The differential diagnosis between these conditions will now be considered.

In an extra-uterine pregnancy during the later months the foetus is very easily recognised through the abdominal wall by palpation, and often by inspection, parts of the child can be made out. One or more of the limbs can often be grasped through the abdominal wall between the finger and thumb of the examiner, as could be done in the second of my cases, in which the legs could be distinctly made out. The position of the child can usually be altered by palpation, and there is no sign of contractions indicating that a containing sac is present. On vaginal examination the uterus may be discovered in the pelvis distinct from the child and slightly enlarged, this being the most important of all the signs. A small quantity of amniotic fluid, with thin uterine walls has frequently caused a case of intra-uterine pregnancy to be mistaken for an extra-uterine one.

In all cases of suspected extra-uterine pregnancy at the later months, it is most important to decide if the uterus is distinct from the pregnancy, before any resort to operation is had

1. H.A.Kelly: Op cit., p. 443.

Dr.H.A.Kelly recommends the following procedure to obtain this information. An anaesthetic is first administered, the cervix is then grasped with forceps and the uterus carefully drawn down towards the vaginal outlet while palpating its outlines from the rectum. If the entire uterus can be distinctly outlined in this way. the ovum is clearly extra-uterine. If, on the other hand. the fundus uteri or the uterus itself cannot be found apart from the pregnancy, then it is highly probable that the case is intra-uterine. An attempt should then be made by careful palpation to detect if uterine contractions occur. If contractions of the sac are obtained then the great probability is, that it is an intra-uterine sac. A diagnosis is also to be made from a pregnancy in one horn of a bicornuate uterus. In this condition the uterus is lop-sided. Such cases usually end by the child being born as in an ordinary case, but at other times, there is no perfect communication be - tween the pregnant horn and the cervix. and then operative measures are required.

Diagnosis must also be made from pregnancy in one half of a double uterus, but this is a very easy matter. The speculum shows the double cervix, and a sound can be passed into the non-pregnant uterus.

Cases of ovarian cyst have been operated on for extra-uterine pregnancy. The mistake is most likely to happen in the

1. J.W.Taylor: The Lancet, Vol. II, p.1675.

cases of dermoid cysts, which have a somewhat solid feeling, and which may contain plates of bone simulating the feeling given to the hand of the examiner by a foetus. Careful examination however on the lines given should prevent such a mistake.

In extra-uterine cases in which the child is dead, the diagnosis is considerably more difficult than when they are tubo - ligamentary, but when tubo-abdominal the death of the child does not materially increase the difficulties of diagnosis. In the tubo-ligamentary forms, if several months have elapsed since the death of the foetus, careful questioning of the patient as to the history of the swelling is necessary and in nearly all cases a history of pregnancy will be obtained.

Mr.John W.Taylor relates a case in which he made a wrong diagnosis, operating for an extra-uterine pregnancy, and finding a malignant tumour of both ovaries. The particulars of the case are as follows:-"The patient had a large abdominal tumour which had been forming for twelve months. Menstruation had ceased from the first appearance of the tumour. The patient considered herself pregnant and prepared for the birth of the child. The medical man was engaged for the confinement, and at the end of nine months some kind of spurious labour (or what was taken for such) undoubtedly took place, but no child was born. When I saw her some three months later she had rapidly emaciated, there was evening pyrexia,

1. J.W.Taylor: The Lancet, Vol. II, p.1680.
2. H.A.Kelly: Op cit., p.443.

and the abdomen was greatly distended by an irregular tumour more marked on one side of the body. On vaginal and bimanual examination the uterus was found to be independent of the tumour and empty, and on palpation in the pouch of Douglas the finger after displacing fluid felt two solid bodies which resembled the feet and ankles of a foetus at full term. At the operation there was malignant tumour of both ovaries with localised ascites and two moveable malignant nodules floating in the pouch of Douglas. In difficult cases the evidence may be insufficient to warrant a certain single diagnosis, but it should be sufficient to offer an alternative selection, and to guard the surgeon from any unpleasant surprises or difficulty after opening the abdomen.

Diagnosis of Interstitial Pregnancy. The diagnosis of this form of pregnancy offers very considerable difficulties, in fact Mr.J.W.Taylor says that it is impossible during life. The characteristics of this form are pain, enlargement of the body of the uterus especially in the early months, and the fact that rupture takes place later than in tubal pregnancies; according to Taylor[1] sometimes as late as the fourth month, and to H.A.Kelly[2] as late as the sixth month.

Complications often occur in extra-uterine cases which

1. *Transactions of the Obstetrical Society of London, Vol. XXXIX.* p. 394.

lead to great difficulty in diagnosing them and even to wrong diagnosis being made. The following is an account of a few suchs cases recorded at various times by different surgeons with remarks. Dr.Arthur E.Giles and Ewan J.McLean give the following particulars of a case in which they made a wrong diagnosis. There had been two attacks of pain and vomiting. There was no brown or red vaginal discharge, and there was no lateral swelling on examination; on the contrary the swelling was median and hard, and extensive enough to cause a relative intestinal obstruction. Further the temperature chart was much more suggestive of pelvic cellulitis than of tubal gestation. Temperature was 104' on admission at 6 p.m. while pulse was 122. Abdomen greatly distended and tympanitic. Vagina hot and dry. Cervix soft and low down compressed against the pubes. The pelvic brim and cavity appeared to be filled by a hard mass, situated chiefly behind the cervix, and pressing both on this and on the sigmoid flexure. Fundus of uterus could not be recognised, owing to abdominal distension.

Diagnosis :- pelvic cellulitis probably complicated by retroflexion of gravid uterus increasing the pressure effects. For some days temperature at 101' but in seven days rose to 103'(September 17th.)

Treatment.. Attempt to push up mass behind cervix, failed. On September 24th decided to empty uterus and so sound passed. It passed

three inches and uterus found empty. Diagnosis now extra-uterine pregnancy with pelvic inflammation. Patient too ill for operative interference. Died at 12'30 p.m. next day.

On post mortem "No coagulated blood in the general peritoneal cavity, but a recently formed clot of walnut size found lying loose near the sigmoid flexure.

The true pelvis is mainly roofed in by a thick layer of inflammatory lymph of blue -black colour; its cavity is tightly packed by the presence of an ectopic pregnancy of the left tube. The relation of the parts is as follows:- The uterus is pushed to the right front of the pelvis; the ectopic gestation sac of the right tube has developed in the posterior pelvis and hollow of the sacrum, the left ovary being thus sandwiched between the sac and the left posterior surface of the uterus. The right tube terminating in a fluctuating swelling is also bent backwards, and the corresponding ovary is compressed between the swelling and the right posterior surface of the uterus. The gestation sac of ovoid form 12 by 9 centimetres with thick placental tissue superiorly and posteriorly. On opening the cavity 2½ oz. of slightly blood-stained amniotic fluid escaped, and a well formed foetus 12 centimetres in length. The ovary is much contorted by its compression between the uterus and sac. No abnormality of structure is evident to the naked eye, and there is a corpus luteum corresponding to the

pregnancy."

In this case the difficulties of diagnosis were undoubtedly great though even with them, a correct diagnosis was apparently possible. Sufficient consideration does not seem to have been given the two attacks of pain and vomiting, which symptoms might have suggested rupture of the tube of an ectopic pregnancy. None of the other symptoms described were incompatible with that condition. The fact that the swelling was median seems to have influenced Drs.Giles and McLean in forming their first diagnosis, but as has been pointed out such a position is sometimes occupied by an ectopic pregnancy. Similarly as regards the intestinal obstruction, the temperature chart and the condition and position of the cervix, which were the other symptoms upon which the mistaken diagnosis was made, all of these symptoms were as likely to be occasioned by an ectopic pregnancy with inflammatory mischief going on, than by cellulitis complicated by retroflexion of intra-uterine pregnancy. The fear of interrupting a normal pregnancy seems to have been the reason why a uterine sound was not passed at the first examination. Had the sound been used then however the diagnosis would probably have been correctly made as was done at the later examination.

A case of wrong diagnosis in the early months in which Dr.H.A.Kelly diagnosticated a case of simple pelvic abscess to be

1. H.A.Kelly: Op cit., Vol. II. p.443.

2. Damas and Armand: Epitome of Current Medical Literature. October 28th. 1899.

3. British Medical Journal. Vol. II. p.370.

a case of extra-uterine pregnancy, has already been referred to. But he relates another case[1] in which he made a wrong diagnosis. The symptoms were sudden cessation of menstruation with severe pain in the right side. An elastic tumour 5 centimetres in diameter was present to the right side of the normal uterus. The stoppage of the menstruation was due to phthisis, Dr. Kelly diagnosticated the case to be one of extra-uterine pregnancy, but the tumour on removal proved to be a corpus luteum cyst.

A case is related by Damas and Armand[2] (L'Obstet., July 15th. 1899.) in which an intra-uterine pregnancy was mistaken for an extra-uterine gestation. A tumour smooth and apparently cystic reached to the umbilicus and was much deflected to the right. The tumour consisted of a hydramniotic uterus mounted on a very much elongated cervix from which it was separated by a deep groove. The bladder rose high above the pubes, it was thick-walled from disease and its fundus had been mistaken for the fundus of an empty uterus with a normal but slightly distended bladder below it. The abdominal wound was closed, pregnancy went on to term and labour was normal.

An extraordinary case of wrong diagnosis is related in the British Medical Journal.[3] This case occurred in Sydney, N.S.W. The sound was used and entered the uterus the usual distance. The

1. Glasgow Medical Journal. Vol. XVIII. p.229.

2. Diseases of Women by Bernutz and Goupil. The New Sydenham Society. Vol. XXVIII. p.272.

patient was operated on for extra-uterine pregnancy at about the eighth month of gestation, and died two days after from Peritonitis. The post mortem examination showed that an intra-uterine foetus had been removed and then the uterus and both ovaries. The The upper part of the vagina was ligatured.

It was related by a member at a meeting of the Glasgow Medico-Chirurgical Society, that Gusserow while remarking on the ease with which an extra-uterine pregnancy could be diagnosticated, proceeded to operate on what he thought to be such a case, but which turned out to be a three-months' intra-uterine pregnancy with dextroflexion. Numerous other cases have been recorded of wrong diagnosis and they impress the surgeon with the necessity of using, even in apparently simple cases, every means of verifying a diagnosis before proceeding to operate.

Prognosis. The earlier writers on extra-uterine pregnancy considered the prognosis very unfavourable. Coupil[2] writing in 1866. after considering the views of Murat, Cazeux, Chailly. Jacquemier and Bianchi comes to the conclusion that "all the cases

1. Parry: Extra-Uterine Pregnancy, 1896.

2. Bandl: American Journal of Obstretics. Vol. XXXII, p. 328.

3. Schauta: Ibid. XXVII, p. 472.

4. Buford: Ibid. XXIV, p. 1296.

5. Werder: Ibid. " p. "

6. Jepson: Ibid. XXXII, p. 327.

7. McCormack: Ibid. XXXVI. p. 59.

of intra-peritoneal haemorrhage arising from extra-uterine oregnancy end in death." Parry[1] found a mortality of 52'6 per cent among 188 unoperated cases. Bandl[2] found that 331 cases collected by Kiwisch, Hecker and Hennig gave a mortality, uninfluenced by treatment of 75 per cent. Of 241 unoperated cases collected by Schauta[3], the mortality was 68'8 per cent. Veit reckons the mortality, in cases in which a haematocele has formed, as high as from 25 to 28 per cent. But when he come to later writers we get more hopeful views as to prognosis. In 1891 H.T.Byford[4] said:- The first considerable haemorrhage nearly always kills the foetus and but seldom the mother,"and he thinks the danger of death from haemorrhage to be very slight if the patient be kept quiet in bed for a long time. Werder[5] thinks a large percentage recover even after intra-peritoneal rupture. Jepson[6] records two recoveries out of 9 unoperated cases.

In the intra-ligamentary variety the prognosis in secondary rupture must be considered bad, while in abdominal cases operated on at time of first rupture the prognosis is good, in fact Dr.A.T.McCormack[7] considers that all such cases should recover unless seen too late and that all cases of the intra-ligamentous variety should recover if properly treated. After the second or third haemorrhage, when the placenta becomes attached to the surrounding viscera, the percentage of recoveries is of course

smaller, and these cases are always serious.

Until the full time is reached, tubo-ligamentary pregnancy is more serious than the tubo-abdominal variety, for in the former case, the placenta owing to its high attachment in relation to the foetus is more liable to become detached.Thus it is, that while in the tubo-abdominal variety the patient is comparatively free from danger after the foetus has left the tube until full term, in the tubo-ligamentary variety secondary rupture and fatal haemorrhage are likely to occur at any time.

About the fourth month is a critical time in all varieties for it is then the foetus leaves the pelvis and invades the abdomen, and in the tubo-ligamentary variety pushing the placenta still higher in front of it . In the early months the most likely cause of death is of course haemorrhage, while later it is septic peritonitis.

From the data given above the mortality according to Schauta is 68'8 per cent of all unoperated cases. But this does not include those mild cases which undoubtedly frequently occur and are put down to colic or other ailments. If all cases were considered the number of recoveries would no doubt be much higher than one - third.

1. Tait: Op cit., p. 19.

2. Dakin: The Clinical Journal, Vol. I, p. 239.

3. McCormack: American Journal of Obstetrics, Vol. XXXI, p. 62.

Treatment. With the advancement in abdominal surgery, the treatment of extra-uterine pregnancy has undergone great change. While the fear of opening the abdominal cavity prevailed, little operative treatment was undertaken for the cure of this disease. As late as 1881 Lawson Tait[4] refused to operate for ruptured tubal prgnancy. He says that the bold suggestion staggered him. Since then opinion has so much advanced that operations for the relief of extra-uterine pregnancy are now undertaken with as much confidence as other operations on the abdomen. It is generally agreed that the treatment is essentially operative. Some writers indeed think that medical treatment should have no place whatever in the consideration of this disease. Dr.W.R.Dakin[2] says:- " As a matter of fact it (the treatment) is in principle, simplicity itself. Directly you make a diagnosis of extra-uterine gestation you must operate, whatever the condition of affairs is. I think it may be said that there is no exception to that rule." Dr.A.T.McCormack[3] is of the same opinion, he says:- "All cases of ectopic gestation should be operated on as soon as diagnosis is made- before rupture if possible- and in no cases should it be delayed after the first rupture has made diagnosis certain."

In forming a judgment on those opinions we must consider that many cases undoubtedly recover under medical treatment only. Many observers are inclined to consider those cases of haematocele

1. M. Cameron: Glasgow Medical Journal, Vol. XLIX, January 1898.

2. Taylor: The Lancet, June 25th. 1898. Vol. II, p. 1789.

which under medical treatment and without operation recover, as not being due to tubal rupture, because owing to the difficulty of diagnosis the tubal pregnancy was not recognised before rupture Theoretically there does not appear to be any reason why intra-peritoneal rupture should invariably prove fatal, and it seems unreasonable to conclude that because a case ends in recovery that it was therefore not a case of ectopic pregnancy. Dr.Murdoch Cameron[1] has seen scores of cases of haematocele get well under medical treatment, and although he did not consider them all due to extra-uterine pregnancy, he evidently is of opinion that a certain proportion of them resulted from that condition. Mr.John W. Taylor[2] has seen five or six cases of ruptured tubal pregnancy recover without operation and he says: "There could be no doubt of the genuineness both of the disease and of the recovery, indeed, in one of these cases the rupture of the tube and the traces of the old haematocele were plainly visible in opening the abdomen some two years later." The experience of these two observers is I think sufficient to warrant medical treatment being adopted in certain cases and under certain circumstances.

Probably non-operative treatment would be the most prudent course (especially by the general practitioner when no surgeon is obtainable) under the following circumstances :- When a

1. The Lancet, Vol.II.1898. 1729.

2. Winckel: Annals of Surgery, June 1892.

3. American Journal of Obstetrics, Vol. XXIV, p.1236.

haematocele having formed, the pain is diminishing, the swelling forming the haematocele is not increasing in size and the pulse etc. shows that no further bleeding is continuing. These were the conditions in the case of Dr.Robert Allan which I described and which recovered without operation.

The operative treatment is usually divided into that before and that after rupture, though some writers as Mr.J.W.Taylor[1] treat the subject under the two classes of (1)operations in the earlier half of pregnancy, and (2)later operations. I think the division of operations before and after rupture is more distinctive and has not the same liklihood of causing the classes to overlap. I shall therefore adopt that division in considering the operative treatment.

Treatment before rupture. The object of this treatment is to prevent rupture. With this end in view various methods have been employed, having for their object the destruction of the life of the ovum.

Puncture of the gestation sac and withdrawal of the fluid, injection of poisonous substances into the sac and electrical puncture have all had their advocates. Winckel[2] recommended morphia injections, and reported five successful cases and two deaths[3]. He advocates injections in preference to laparatomy during the first

1. Barnes: Diseases of Women, p.353.

2. American Journal of Obstetrics, Vol. XXIX. p.56.

3. Buckmaster: Ibid. Vol. XXIII. p.339.

few months of extra-uterine pregnancy, because both ovaries and tubes are left remaining, and the contents of the tube might even be absorbed so that the organ could perform its function. If the patient complained afterwards of pain,,laparotomy could then be performed. In the two months previous to writing, (September and October 1891), he had cured two cases by morphine injections into the amniotic sac. The patients had neither pains nor aches afterwards. One injection only was made in each case. This method, he considered, especially recommended itself to the general practitioner unaccustomed to performing laparatomy.

Barnes[1] recommended puncture of the sac, or electricity. The objection to the treatment by puncture is the risk of peritonitis or haemorrhage from injury to large vessels. The treatment by electricity has had more advocates than that by injection of poisonous fluids, and numerous statistics of its successful employment have been published.[2]

The foetus having been killed by these methods, the products of conception become absorbed, this process being hastened by the electrical current. If the operation is not successful then no harm has been done and another operation can be performed. Buckmaster[3] says:"There is no case on record where the proper use of electricity has been followed by bad results." While Brothers

1. *Strahan: Extra-Uterine Pregnancy, p.77.*

2. *Transactions of the Obstetrical Society of London, Vol.XXIX, p. 503.*

reports 90 cases with only one death, and in that case haemorrhage had occurred before treatment. In two of the cases the electrical treatment was abandoned and coeliotomy was performed, one case proving fatal. "In none of these," says Brothers "can the electrical treatment be accused of doing any harm." The method employed was seldom by electrical puncture, only eight being so treated. The majority of cases were treated by faradism, some by galvanism, and seventeen by both currents. Galvanism is recommended in preference to Faradism, because it better aids in promoting the absorption of the products of gestation.

The principal objection to the use of electricity is, that after the death of the foetus a mass is left that may inflame and suppurate. Such a result of the use of galvanism within three months has never been reported. Strahan[1] says that this argument has not much weight against killing the foetus before rupture, or even shortly after, for we know that as a rule foetus and blood are alike absorbed.

To another objection, that the death of the foetus does not always prevent haemorrhage, Strahan replies that he cannot find any data to prove this statement. Another objection is that the placenta may continue to grow, and Tait[1] who believed that such is the case asks, "If the life of the foetus were destroyed and the

1. Tait: On cit., p.72.

2. Hart: Manual of Gynaecology by Hart and Barbour, 1883, p.562.

3. American Journal of Obstetrics, Vol. XXV, p.733.

placenta continued to grow, what advantage could we gain?" Tait gives several cases[1] to prove that the placenta continues to grow, and Hart[2] also gives a case which he thought showed growth of placenta after death of foetus, but he on further investigation changed his opinion, believing that the increased bulk was not due to growth of placental tissue, but to organization of blood-clot from repeated haemorrhage into the substance of the placenta.

The case reported by Brothers which succumbed to haemorrhage has been quoted as proof that electricity may cause rupture of the tube. But in this case the sac was found intact, and haemorrhage had commenced before the employment of galvanism.

The operative treatment in cases before rupture, other than those forms discussed, consists in a choice between vaginal coeliotomy and abdominal section. The advantages in favour of coeliotomy are supposed to be the following:- less shock, greater safety, peritoneal cavity not opened, drainage secured at lowest point. Its chief disadvantages are -(1)occasional insufficient space for doing the operation, and(2) the liability of injury to the enlarged and softened uterus in the dragging of it down to ligature the tube. The advocates of abdominal section assert, that, as it is now an operation the safety of which can be depended on in nearly every case, and[d] therefore just as safe as coeliotomy, and as greater room

1. McCormack: American Journal of Obstetrics, Vol. XXXVI. p.62.

2. H.A.Kelly: Operative Gynaecology, Vol. II, p.450.

3. M.Cameron: Transactions of the Glasgow Obstetrical and Gynaecological Society, Vol.I. p.50, or Glasgow Medical Journal, Vol. XLIX, p.63.

4. Taylor: The Lancet, Vol.II.1898, p.1741.

and freedom in operating can be secured, there is no need to operate in such a narrow space as the vagina. These considerations seem to indicate that abdominal section is the preferable operation under ordinary circumstances, and it is the operation most in favour at the present time.

The operative treatment after rupture, is also either by vaginal section or by abdominal section. The objections to coeliotomy in cases before rupture, apply also here, but there is another objection. After rupture we have a haematocele to remove and although we may easily get at the tube from the uterus, the haematocele may separate and there may be difficulty in finding it. It will probably become ultimately absorbed, but this process is sure to protract the convalescence and is not without risk.

The two operations so far as safety goes being practically the same, most gynecologists adopt abdominal section. Among those advocating this course are Dr.Arthur T.McCormack[1], Dr.Howard A.Kelly[2], Professor Murdoch Cameron[3], and Mr.John W.Taylor[4]. The last mentioned says :- "By abdominal section the extent and connections of the haematocele can be accurately explored, the limiting adhesions to omentum and intestine can be carefully separated or broken through, and the whole of the operation from beginning to end can be performed under the most favourable conditions for manipulation and

1. *Taylor: The Lancet, Vol. II. 1898, p.1741.*

cleanliness." Nearly all writers agree that the operation in itself is a simple one, and this is especially the case when the foetus is at or near full term. While the operation per se, may be simple yet many complications may occur. as is shown by the reports of such cases, and often great presence of mind and expedition are required in performing it. Great judgment is also required in dealing with the placenta. While the majority of gynecologists advise that the placenta should be left, some advise that a careful but thorough attempt should be made to remove it. Mr.John W.Taylor[1] says that in all cases of true abdominal pregnancy it is wise to remove the placenta.

Another important point in treatment which has led to much discussion, is the proper time for operating. In cases where the child has already reached the seventh month and is living, some recommend delay until the ninth month, with the object of saving the child's life. If the child should die during this time then immediate operation is advised. Delay has also been advised until death of child, on account of danger from haemorrhage, but very few now recommend this, as the risks from putrefactive changes are as great as from haemorrhage.

Operative treatment after rupture in the early months I have already referred to. It is generally agreed that it should be at once adopted in all cases with serious symptoms, and continuous

1. Dunning: American Journal of Obstetrics. Vol.XXXII. p.757.

bleeding.

As to the treatment of interstitial pregnancy, there is not much to say. This condition is rarely diagnosed before rupture. If it is, Lawson Tait recommends that the cervical canal should be dilated, the septum separating the uterine from the gestation cavity divided, and the foetus delivered by the normal way. In cases of rupture then the greatest haste should be made to at once get to the site of bleeding, Tait recommends the removal of the uterus as the only effectual chance of saving the patient. Dunning recommends that after the seat of rupture has been reached, and the foetus and placenta have been extracted, the membrane separating the uterine cavity from the gestation cavity should be incised, thus forming a communication between uterus and abdominal cavity. The rent in the wall of the uterus should then be sewn up, after drainage tubes have been inserted reaching from the gestation cavity to the vagina. In rupture of interstitial pregnancy, what is most required is expedition in operating and rapidity in deciding the proper method of treatment in accordance with the state of matters found when the seat of haemorrhage has been reached.