

Fitz (R. H.)

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## TUBO-UTERINE OR INTERSTITIAL PREGNANCY.

By R. H. FITZ, M.D.

(Read before the Boston Society for Medical Observation.)

[WITH TWO WOOD-CUTS.]



CASES of interstitial pregnancy are so rare that each specimen which might suggest itself as one of this class should receive the most careful attention. This becomes all the more necessary as the criticism of previously recorded cases, by subsequent observers, shows that the term has been loosely applied in many instances, especially to the earlier cases, though some of those more recently reported have been found equally open to the same charge. The very term suggests the seat of the ovum within the muscular structure of the uterus, and an empty uterine cavity with an adjoining, even a neighbouring sac, have often suggested the idea to be maintained. Such a specimen being thus named, theoretical explanations were hastily sought for, as that of Breschet, who suggested that the egg must have made its way into the open mouths of veins in the mucous membrane lining the cavity of the uterus; or that of Cazeaux, who could imagine a bifurcation of the Fallopian tube within the uterine wall, or a passage of the ovum into the canal of Gärtner.

An anatomical basis for the first of these conditions has never been observed, and, as the existence of the latter near the fundus of the adult human uterus may well be doubted, better grounds are required. Even did Gärtner's canal remain permanently open, it would be difficult to imagine the presence of the ovum within it, but such a possibility being granted, the anatomical relations with the adnexa of the uterus would be such that the question of tubal pregnancy rather than the interstitial form would have to be considered.

Of the various forms of extra-uterine pregnancy the present may be considered the rarest. English authors have generally made use of the term interstitial, supposing the ovum to have developed within the uterine wall. The term tubo-uterine implies primary development within the tube, and is of more general application.

The theories of origin previously alluded to being unsatisfactory, what should cause the detention of the ovum in its passage to the normal nidus? Psychological causes have been imagined, as surprise during coitus, fear of surprise, or fear as to the result. Burdach and Lallemand<sup>1</sup> have recorded three such cases, where the inference seemed justifiable to them.

More clearly established mechanical causes are sought for than a muscular paralysis thus brought about, or a cessation of ciliary movements so produced. Observation and analogy find many such obstructions to the passage of the ovum, such as might be produced by strictures from within or without, or from pellets of mucus in the tube. The first thought would be that similar conditions should prevent impregnation. Yet this might not necessarily follow. Litzmann<sup>2</sup> suggests that exfoliation of the ciliated epithelium would hinder the onward movement of the egg. That such a condition should result from inflammation of the lining membrane of the tube seems quite plausible, and might be considered in a case of simple tubal pregnancy. But to permit tubo-uterine gestation the ovum must reach that portion of the canal intervening between the cavity of the uterus and the insertion of the tube into its wall. The catarrhal process which should affect the one part of the tube would be very likely to act upon the other. A too rapid growth of the ovum has also been suggested, ulcers, and swelling of mucous membrane of the tube, etc. In short, the ingenuity of the individual observer has been taxed to account for what is now generally considered to be the result, the detention of the impregnated ovum within that portion of the tubal canal seated within the muscular wall of the uterus. It would seem of trifling importance whether the uterine openings were closed early or late; that such may eventually occur, and in the indisputable cases must occur, is evident. Klebs<sup>3</sup> would explain this occurrence by demanding a diverticulum communicating with the tube in which the ovum must lodge.

Hecker<sup>4</sup> and Baart de la Faille<sup>5</sup> have collected the cases of this curious condition, in part, for the purpose of educing such influences as might be suggested by comparison. Hecker's paper appeared in 1859, up to which time he states that twenty-six cases had been published. Baart de la Faille, in 1867, eliminates from this series ten, which he considers incorrectly classified, leaving only sixteen to which the term could be properly applied.

To these he adds one by Junge,<sup>6</sup> and another observed by himself.<sup>7</sup> A third is described by Poppel<sup>8</sup> in 1868, who also calls attention to the case

<sup>1</sup> Czihak, Scanzoni's Beitrage, vol. iv. p. 75.

<sup>2</sup> Czihak, loc. cit., p. 77.

<sup>3</sup> Handbuch der Path. Anat., p. 909. Berlin, 1873.

<sup>4</sup> Monatschr. f. Gebuskde., xiii. 98.

<sup>5</sup> Ibid., xxxi. 459.

<sup>6</sup> Ibid., 1865, xxvi. p. 241.

<sup>7</sup> Loc. cit.

<sup>8</sup> Monatschr. f. Gebuskde., xxxi. 208.

of Schultze,<sup>1</sup> in all twenty cases. Since this time Hicks,<sup>2</sup> Lott,<sup>3</sup> Edgar,<sup>4</sup> and Malmburg,<sup>5</sup> have recorded cases where *post-mortem* examinations have been made. The last three cases, as reported, are not freed from the possibility of error in judgment. Twenty-one cases then remain, from which Vomdorfer's<sup>6</sup> may be eliminated as suggesting the probable retention of the fœtus in the uterine cavity. Further, Pöppel is inclined to omit the cases of Schultze and Baart de la Faille from the list. Eighteen cases, with the present, nineteen, include those which have thus far been recorded, and to which the term may be unquestionably applied. The necessity for so much elimination indicates the difficulties in the way of diagnosis—a point which will be spoken of at greater length hereafter.

Through the kindness of Dr. A. T. Davison, of South Boston, in whose practice the following case occurred, and who has generously presented the accompanying specimen to the college museum, also through the politeness of Dr. M. F. Gavin, who has furnished me with an account of the autopsy, I am enabled to record this additional case.

Dr. Davison writes :—

"Mrs.———, æt. twenty-six, is the mother of one child, aged six years. She has never had miscarriages, and has enjoyed good health until April, 1873, with the exception of vague pains in the right side for the past two years.

"Her first labour was very severe, lasting two days; a normal convalescence resulted. She considers herself to have become pregnant early in April, from the condition of the catamenia, and the subsequent occurrence of vomiting, together with pains referred to the right iliac region. This pain has been more or less constant since the time of supposed impregnation. Menstruation did not absolutely cease in April, a slight 'show' occurring at this time as well as in May.

"My first visit was made June 15, 1873. She was lying upon her back in bed, the face flushed, knees drawn up, and an expression of agony depicted on her face. She stated that she had been suffering excruciating pains in the uterus for two hours previous to my arrival, and considered that a miscarriage was taking place.

"A vaginal examination being made, there was no dilatation of the os, nor flowing, a slight degree of enlargement of the uterus alone being ascertained.

"Sulphate of morphia was ordered to be given at intervals of one hour till her pain should be relieved.

"The following morning I again saw the patient. She occupied the same position as at the previous visit, and begged not to be moved. Pulse 100. She stated that after three doses of the medicine, each of one-fifth of a grain, she was relieved, and rested well during the night. At 7 A. M., while attempting to rise, the pain returned in the same place, and more severe than ever. She took two doses of the morphia, relief being obtained immediately before my visit, at 10 A. M. Five hours after I again visited her.

"She had not suffered from pain during the interval, but I found an extreme pallor of the face and lips, and a condition of marked collapse.

"The stomach refusing to retain anything, I gave an injection of brandy. She sank rapidly, however, and died soon after, twenty-seven hours from the beginning of her symptoms.

<sup>1</sup> Wurzburg. Med. Zeitschr., iv. 1863, p. 178.

<sup>2</sup> Trans. of Obstet. Soc. 1868, p. 57.

<sup>3</sup> Sitzb. d. Ver. d. Aerzt. in Steiermark.

<sup>4</sup> St. Louis Med. and Surg. Journ. 1871.

<sup>5</sup> Hygeia, 1871, p. 436.

<sup>6</sup> Oest. Jahrb., Jan. 1848. Seanzoni's Beitr. 4, 107.

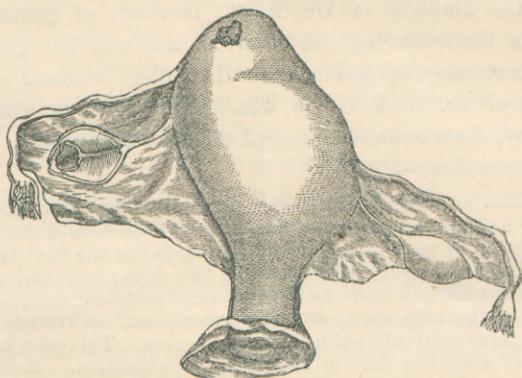
"Suspecting the case to be one of interstitial pregnancy, I obtained permission for the autopsy, which was made seventeen hours after death.

"Dr. Gavin states: 'Body well nourished but exceedingly pallid. Rigor mortis well marked. The abdomen slightly swollen. The peritoneum transparent and free from all signs of inflammation. Its cavity filled with clotted blood, of recent origin, intermingled with the small and large intestines. A large quantity of dark-coloured, liquid blood filled the pelvic cavity. In all six tin basinfuls of fluid and clotted blood were removed before the organs were examined.

"The stomach, intestines, spleen, liver, kidneys, and bladder were free from morbid changes. The other organs were not examined. I send the uterus and appendages.'"

I received the specimen in admirable condition on the following day.

Fig. 1.



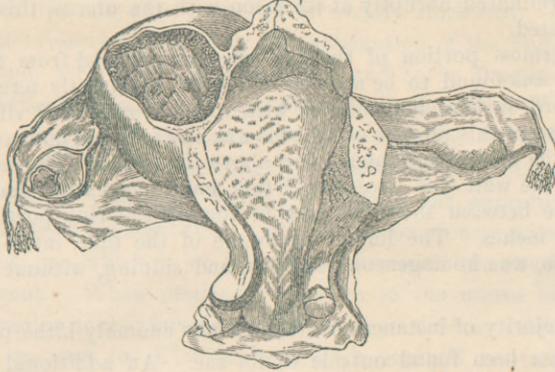
The uterus was considerably enlarged, more or less kidney-shaped (see Fig. 1); apparently composed of two portions; the upper oval, rather larger than a hen's egg, inclined to the left, the lower presenting the general appearance of a uniformly enlarged uterus. On the right the distinction between the two portions was distinctly marked, on the left, however, there was merely a continuous surface and border. The peritoneum was continuous over the two portions, the muscular wall seemed also continuous, there being no line of demarcation. The cervix elongated and hypertrophied, the os externum open, appearing as a transverse slit. The lips enlarged. At the extreme upper portion of the mass, towards the posterior surface, a circular hole existed nearly one-half of an inch in diameter, the edges jagged, everted, exceedingly thin. Directly beneath this opening there was seen a foetus (the back) inclosed within the membranes (see Fig. 2); also several villous masses. The peritoneal surface in the immediate vicinity of this opening was injected and covered with a delicate false membrane.

The relation of the Fallopian tubes and ligaments to the uterus was striking. They were attached much higher on the left side than on the right, to the upper third. On the right side they were united at the junction of the middle and lower thirds of the mass.

The insertion of the left round ligament was at the outside of the uterus and fetal sac, separated at this point from the insertion of the Fallopian tube by a space of one and one-quarter inches. The corresponding distance on the left side was three-quarters of an inch.

The organ was exceedingly pale, containing but little blood; numerous fibrous adhesions were formed about the ovaries and tubes, especially on the right side. In the left ovary a recent corpus luteum was found.

Fig. 2.



Before the uterus was opened the following measurements were taken. The length of the entire mass,  $6\frac{1}{2}$  inches; the shortest distance between the attachments of the Fallopian tubes, 5 inches. The left tube  $5\frac{1}{2}$  inches long, the right, 6 inches. The left ovarian ligament 1 inch, the right,  $1\frac{1}{2}$  inches in length.

The greatest transverse diameter of the uterus, 4 inches. From the middle of the anterior lip of the uterus to the attached portion of the right tube, 4 inches; to that of the left,  $5\frac{3}{4}$  inches. These are to be understood as surface measurements. The organ was opened from behind by a longitudinal incision extending to the fundus of the uterus, from the termination of which two lateral cuts were made in the direction of the attachments of the Fallopian tubes; that to the left passed directly over the fœtus, which was found enveloped in the membranes.

The uterus was seen to be considerably enlarged and symmetrically so, excluding the portion containing the fœtus. The cervical canal,  $1\frac{1}{2}$  inches, the uterine cavity  $4\frac{1}{2}$  inches long. From the inner opening of the right tube to the fœtal membranes, at a right angle, to the longitudinal axis of the uterus,  $2\frac{1}{4}$  inches. The greatest thickness of the uterine wall was  $\frac{2}{3}$  of an inch. The length of the ovum,  $2\frac{1}{2}$  inches. The lining membrane of the uterus was very much swollen, pale, and soft. The surface roughened, often folded, velvety. The cervix contained a viscid hyaline mucus, the arbor vitæ indistinct.

The uterine wall about the fœtus is less than two lines in thickness, moderately translucent. That portion intervening between the uterine cavity and the membranes was composed of spindle-shaped muscular cells, and contained numerous venous sinuses.

The wall of the fœtal sac was made up of involuntary muscular tissue, and large veins, sinuses, were cut across in making the section previously spoken of. The inner surface of this wall was roughened, connected here and there with the chorion by villi. Nothing resembling a decidua was observed.

The posterior surface of the chorion was bald, elsewhere bearing numerous villous tufts. The head of the fœtus was directed towards the ute-

rine cavity, in the direction of its breech, the inner opening of the tube. The size of the foetus corresponded with that of one of ten weeks. Clotted blood was found between the villi in the immediate vicinity of the hole in the uterine wall.

The canal of the extra-uterine portions of both Fallopian tubes patent. The left terminated abruptly at its union with the uterus, this end being slightly dilated.

The innermost portion of the left tube was opened from the uterine cavity. It was found to be an inch in length, apparently terminating in a fibrous cord, intimately connected with which were several villi.

The course of this portion of the tube was upwards and outwards, in that portion of the uterine substance lying above the foetus. The inner, lower portion of the wall was exceedingly thin, continuous with the foetal sac. The distance between these two ends of the intra-uterine portions of the tube was 2 inches. The lining membrane of the tube, intra- as well as extra-uterine, was homogeneous, smooth, and shining, without a trace of decidua.

In the majority of instances of this curious anomaly hitherto reported, the foetus has been found outside of its sac. An additional interest is therefore derived from the present specimen, and too detailed an examination could hardly be made. That the diagnosis is not without difficulty, has already been shown by the necessity of elimination in the previously recorded observations.

The question would arise whether this might not be a case of tubal pregnancy, or one occurring in a rudimentary horn? An argument in favour of the former view might be derived from the fact that the tube on this side was shorter, by one-half an inch, than its fellow. It is to be remembered, however, that a like dissimilarity exists with regard to the ovarian ligaments. It is also well known that such relations often exist, in many instances to be attributed to conditions occurring during foetal life, deviations of development. Pathological changes might be offered as an explanation were it to be considered that the irregularity occurred after birth. Evidence of such is lacking.

Positive testimony against the view is derived from the evident continuity of the uterus and the foetal sac, and the presence of muscular tissue in the latter, also from the relations of the round ligament. Hyrtl has shown that this is a true prolongation of the uterus, and Kussmaul<sup>1</sup> has called attention to the necessity of its being between the uterus and the foetal sac in tubal pregnancy, while in interstitial pregnancy it would arise from the surface of the sac, at the outside, as in the present instance. So simple as this means of differential diagnosis may seem, it is yet universally conceded as sufficient.

Why, then, is this not an impregnated rudimentary horn?

In a uterus of this character one might expect to find evidence of ir-

<sup>1</sup> Von dem Mangel, der Verkummerung und Verdoppelung der Gebärmutter, etc. Würzburg, 1859. Poppel, loc. cit., p. 209.

regular development as regards the shape of the uterus, the insertion of the ligaments, indications of an incomplete septum, all of which are lacking. The cavity of the uterus is apparently normal, the ligaments are symmetrically attached, making due allowance for the presence of the ovum. The walls of the uterus too are symmetrically thickened. Of greater weight is the evidence furnished by the examination of the Fallopian tube. The inner end, very much elongated, is found to be directly continuous with the uterine cavity, and to pass outwards in the tissue of the uterus, forming the envelope of the fœtus. Hence one has the cavity of the uterus entire, with its two Fallopian tubes symmetrically communicating, and in the proper position. Of equal value is the appearance of the lining membrane of the right tube. Poppel<sup>1</sup> has previously called attention to this point, one which is of like importance with the relations of the round ligament. When pregnancy goes on in the uterus bicornis, the decidua formation takes place as in the usual conditions. At least such is probably the case, for Klob<sup>2</sup> states that in most, if not in all cases of pregnancy in the one horn, the mucous membrane of the other is likewise developed as a decidua.

The same author states<sup>3</sup> that in tubal pregnancy a true decidua reflexa does not occur, though the mucous membrane becomes developed into folds, apparently for the reception of the villi. Should a decidua of this character form it must rapidly disappear, as neither in the case of Poppel nor in the present one does any evidence of such exist.

Further, that portion of the tube to be distinctly recognized as such, bears a membrane in no way differing in appearance from that occurring in the unimpregnated conditions.

It can be easily seen that the openness of the uterine end of the tube lessens this difficulty, as in the more obscure cases of fœtation in a rudimentary horn no communication with the uterine cavity exists.

This observation can be regarded as applying alone to that portion of the tube lying within the uterine wall, as a decidua has been noticed in connection with tubal pregnancies, and Scroeder<sup>4</sup> agrees with Hennig<sup>5</sup> that the tube may form a dense decidua.

Klob<sup>6</sup> speaks of the presence of a peritoneal fold in uterus bicornis, extending from the anterior wall of the rectum, between the two halves of the uterus, to the fundus of the bladder. This fold has been previously noticed, and should be sought for in cases of suspected interstitial pregnancy. Nothing of this nature is to be seen in the present specimen.

<sup>1</sup> Loc. cit., p. 215.

<sup>2</sup> Path. Anat. der Weibl., Sexual Organs, p. 31. Wien, 1864.

<sup>3</sup> Loc. cit., p. 524.

<sup>4</sup> Lehrb. d. Geburtshulfe, p. 211, Bonn, 1871.

<sup>5</sup> Monatsschr. f. Geburtskde. 33, p. 265.

<sup>6</sup> Op. cit., p. 31.

Baart de la Faille<sup>1</sup> has deduced, from the comparison of the seventeen cases collected by himself, that the pregnancy occurred nine times on the right side. In eleven of the cases the women had previously borne children. A fatal termination occurred in all; in two between six and twenty-four hours; in five after twenty-four hours. The duration of the pregnancy was—

6 weeks	. . . . .	in one case
8 "	. . . . .	" "
10-12 "	. . . . .	" six cases
16 "	. . . . .	" one case
Longer than 16 weeks.	. . . . .	" five cases.

The fatal termination in the vast majority of cases results from rupture of the sac and hemorrhage—the latter usually intra-abdominal. Hicks's case shows that the fœtus may be expelled through the natural passages, a communication between the uterine cavity and that of the sac being established.

Much more frequently, however, the fœtus escapes into the abdominal cavity, its subsequent history not differing from that of other forms of extra-uterine pregnancy. The difficulty of diagnosis during life is so apparent that the expediency of operative measures would be governed by similar rules to those applied to ordinary cases of abdominal pregnancy. An opening in the sac might be made from the peritoneal cavity or from that of the uterus. The condition of the wall between the sac and the uterus would suggest the probability of dangerous hemorrhage were it opened. Expulsive efforts on the part of the sac might be attended with rupture of the exceedingly thin wall and subsequent intra-abdominal hemorrhage, as occurred in the case reported by Hicks.

This result would not militate against perforation from within, as rupture may have taken place before the communication with the uterine cavity had been made. A further method of operation has been suggested by Friedreich,<sup>2</sup> and successfully carried out by him. Having established the diagnosis of tubal pregnancy, he made repeated injections of morphia into the sac by means of the subcutaneous syringe, with the hope of destroying the ovum. A favourable result followed; the tumour diminished in size, and the patient left the hospital well. The diagnosis, unfortunately, was inferential, formed by exclusion; the result of the method of treatment, however, was most satisfactory.

<sup>1</sup> Loc. cit., p. 463.

<sup>2</sup> Virch. Arch., xxiv. p. 312.

