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CONTRIBUTION

TO THE

STUDY OF TUBAL PREGNANCY.

BY

M. MURET, M.D.,

Lausanne, Switzerland.

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JOHN HEYWOOD,
DEANSGATE AND RIDGEFIELD, MANCHESTER.
2 AMEN CORNER, LONDON, E.C.
33, BRIDGE STREET, BRISTOL.

CONTRIBUTION TO THE STUDY OF TUBAL PREGNANCY.*

THE scientific knowledge of tubal pregnancy has so greatly advanced, and the number of published cases has so increased of late years, that it seems superfluous to augment the number of these contributions by recording observations of facts which are now widely known. On the other hand, so many points still remain unelucidated that an accurate description of cases which, for one reason or another, deviate from the ordinary course, may serve to enlarge the circle of our knowledge in this interesting domain. Such were the views which induced me to select certain cases from among the large number which came under my notice during some years in the Strasburg Hospital for Women, as possessing very special interest, and offering, as it seemed to me, an approach to the solution of many hitherto unanswered questions.[1] These cases, which concern early tubal pregnancy solely, are as follows :—

Case 1.—Tubal pregnancy of the right side; tubal abortion at the end of the first month; hæmatocele; carcinoma of the portio vaginalis; total extirpation of the uterus and removal of appendages of the right side and of the hæmatocele :—

Mrs. M., of Strasburg, æt. 37, was admitted into the hospital August 4, 1891. Nothing special in the family history. She had had typhus at the age of 12; pneumonia at 26. First menstruation at 15. Periods always regular, no pain, rather profuse, duration three to four days. Eight spontaneous and normal births, four abortions, childbed normal, the last four years ago. Last period eight days ago, very profuse and accompanied by clots, lasted six days; patient obliged to remain in bed on account of the profuse sanguineous flow. On the day of admission the patient was suddenly seized in the afternoon with violent pains in the abdomen during defæcation, and felt very faint. Similar paroxysms of pain occurred at intervals, and her condition became so serious that at 10 p.m. she was brought to the hospital.

Condition on Admission. — A strongly-built, well-nourished woman, with appearance of great suffering: features pinched, not strikingly pallid, but of sallow complexion. Extremities cold, temperature 96·4° F., pulse very small and frequent. The patient complains of very violent pain, increasing at times, and resembling

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[1] I am very much indebted to Professor Freund for so kindly placing these materials at my disposal, and I beg to return him here my best thanks.

labour pains, which seems to begin near the kidneys and extend forwards on both sides. Tongue not furred. No colostrum can be pressed from the breasts. Lungs healthy. Heart beats very faint and weak. Abdomen uniformly but slightly enlarged, tense and tender all over. No dulness anywhere. Hepatic dulness distinctly present, but diminished. A sanguineo-mucous, malodorous discharge from the vagina. Vagina capacious. Portio vaginalis apparently large, anterior lip very large, forming a tumour with uneven papillomatous surface which has already reached the laquear anterior, and shows the typical cauliflower excrescence. Posterior lip hard, not enlarged or ulcerated. Cervix rigid. Uterus slightly—but only very slightly—enlarged and anteverted ; to the left a thickening in the broad ligament ; to the right nothing abnormal can be felt. Douglas' pouch empty, no convexity of the posterior cul de sac. Examination is rendered very difficult by the thickness of the abdominal wall, the sensitiveness of the abdomen, and the highly constipated condition of the patient. Stimulants were administered and caffeine (0·1 gramme) injected subcutaneously, whereupon the patient revived a little, and temperature rose to 96·8°F.

August 5.—The patient still looks very ill. Temperature, 97·3°F. Pulse still very small and very frequent, 150. The pain is very violent at times, and the patient, who lies at other times in an apathetic state, becomes then very restless and groans. There is no icteric colouring of the features ; respiration very frequent and superficial. No sickness. Urine clear and pale ; specific gravity 1030. No albumen, but much sugar. After an injection of morphia the abdomen becomes less sensitive, so that it is possible to make a closer examination, but nothing new is learned from internal examination. The appearances, which are not at all those of acute anæmia, but rather those of severe shock, are difficult to interpret ; neither this condition nor the examination of the pelvic cavity favours the diagnosis of ruptured tubal gestation ; on the other hand many symptoms are absent which would indicate peritoneal perforation, hepatic or renal colic. The diagnosis is left in suspense, and in face of the possibility of severe intestinal colic copious injections are administered to remove the obstruction. After the bowels have been very freely opened the patient becomes surprisingly better.

August 7th, the patient looks quite refreshed and lively. Pulse slow and strong, and appetite very good. Yesterday a complete decidua without chorionic villi was expelled without pain. Urine still contains much sugar (3 per cent) and also lactic acid.

August 9th, patient looks quite well. No more sugar in the urine.

August 12th, examination under anæsthetic gives the following result : Mucous membrane of the vagina of a somewhat bluish colour. Anterior lip developed into a papillomatous superficially ulcerated tumour which has already reached the anterior cul de sac. The uterus, which is but slightly enlarged, is raised and displaced forwards ; behind it and filling Douglas' pouch is an elastic tumour rising up on both sides and reaching far above the fundus uteri, half way between the umbilicus and symphysis ; the upper limit is not sharply defined, but there is evidently much intestinal adhesion. On the left side the tube can only be traced for a short distance between the uterus and the tumour, while the right tube forms a swelling the size of a nut in front of the tumour, with which it is connected. Taking into consideration the expulsion of a decidua, and the condition now found on examination, the diagnosis is : hæmatocele retro-uterina, following a ruptured tubal pregnancy of the right side with carcinoma of the portio vaginalis.

The hæmatocele became gradually smaller under suitable treatment, consisting of rest in bed, hot injections, salt water compresses, iodide of potash, etc., etc., whilst the carcinoma made visible progress.

September 17th, menstruation recommenced and lasted three days, and was fairly profuse. No albumen or sugar in the urine.

October 15th.—To-day, on the termination of the period which commenced some days ago, the following condition is found: Carcinoma of the portio has increased, and extends on the left side, almost to the bladder, in which at this point a hard fold can be felt with a catheter. The uterus is displaced forwards; in Douglas' pouch is a firm tumour the size of a man's fist (the shrunken hæmatocele), which runs distinctly into the right appendages which form a soft swelling, while the left appendages are only slightly thickened. It was decided that Freund's operation, which evidently was the only feasible one in the circumstances, should be undertaken soon, and on October 31st it was carried out by Professor Freund in the following manner. Without an anæsthetic, the patient being on her left side, he first cut around the portio vaginalis, and with his finger separated the bladder from the uterus in front and at the sides, but was not very successful on the left side on account of the carcinomatous knot. Anæsthetics then administered without difficulty (ether and chloroform). Patient placed on her back in Freund's position with elevated buttocks. Incision in the linea alba from the umbilicus to the symphysis. Abdominal wall very thick and fatty. Upon opening the abdominal cavity the broad fundus uteri is seen behind the symphysis situated somewhat to the left. From the right cornu of the uterus springs an elongated bluish transparent structure, at the outer end about as thick as a thumb, adherent to the small intestines; this evidently represents the right tube. The entire posterior surface of the uterus is covered with a thick, hard, fibrinous layer, which is also firmly adherent to the intestines. Behind the tube, to the right, is felt underneath the adherent intestines a larger, firm, tumour-like mass, burrowing deep down. The intestinal adhesions are first carefully loosened, and then the whole hand is introduced behind the uterus and separates the adhesions, which reach to the bottom of Douglas' pouch; in this way a longish oval tumour, of a yellowish white surface, the size of a fist, connected with the abdominal end of the right tube, and being the tumour already surmised, is with difficulty successfully separated. After finding that the cæcum is nowhere adherent, the spermatic vessels are tied and a row of sutures brought through the base of the right broad ligament, after which the ligament is separated beyond the ligatures. The left broad ligament is very short, the uterus is therefore laid hold of with a large forceps and lifted up, by which means it becomes possible to tie the ligament. A transverse cut is made through the peritoneum of the front surface of the uterus above the bladder; separation of the latter by the finger is easily effected in front and to the right, but on the left where the carcinomatous knot passes over the bladder a piece of the latter has to be tied. After transfixing the bottom of Douglas' pouch and the posterior cul-de-sac with a blunt "tenette," ligatures are tied from there all round the base of the broad ligament, after which the uterus, with the right appendages still attached, is removed. These manipulations had in the meantime torn the hæmatocele from the abdominal end of the Fallopian tube. After cleansing the field of operation, all the ligatured stumps are inverted towards the vagina, a piece of iodoform gauze is laid from above in the vaginal orifice, the end of it brought through the vulva, and the peritoneal covering of the bladder stitched to the posterior wall of Douglas' pouch lying opposite, so that the abdominal cavity is completely closed up. Silver wire and silk are used for the abdominal sutures. Time of operation, 1½ hours.

Very little blood was lost during the operation, yet the patient's pulse is very bad. Temperature two hours after the operation, 95·5° F. Pulse very small, frequently barely perceptible, extremities cold, no pallor, the colouring being good.

These appearances recall vividly the patient's condition on admission. Hot water bottles applied, extremities well wrapped up, caffeine and camphor subcutaneously, hot coffee and Bordeaux clysters. Temperature rise slowly during afternoon, and the pulse improves. Three hours after the operation a large quantity of urine drawn off by catheter, specific gravity 1030. Contains much sugar, though it was normal on the preceding evening.

After 24 hours the patient has revived, and passed urine naturally. Urine still contains much sugar and lactic acid.

November 4, 1891. Temperature, morning 99·3° F.; evening 99·5° F. Patient is sleepy. Pulse good and strong. Flatus passed. Bowels opened to-day for the first time. Urine free from sugar.

The aftercourse, which was running smoothly, was then disturbed by extensive phlegmon of the abdominal wall, which caused a fair amount of fever; later a small exudation developed in the left side in connection with the appendages of that side, but it soon contracted. Through these causes the patient could not leave her bed until December 6th. On December 19th she was discharged cured.

Five weeks later the patient again presented herself and was found to have hard carcinomatous knots in the vaginal cicatrix as well as thrombus of the left femoral. The relapse was now very speedy, and carcinoma soon extended to the left parametrium and the bladder. The patient suffered very violent pain, especially in the right renal region. After some months the increasing carcinoma formed a large hard tumour, rising above the symphysis to the extent of a hand-breadth, and the patient died of marasmus, July 18, 1892. Post-mortem examination showed pronounced anæmia, universal dropsy, slight pleurisy, fibrinous pericarditis. The pelvic organs have completely grown together and form a tumour which extends a hand's breadth above the symphysis; large carcinomatous knots in this tumour. Much metastasis in the liver, peritoneum, and mesenteric glands. Large carcinomatous vesico-vaginal fistula. Hydronephrosis on both sides; to the right, nephritic and paranephritic abscesses. Nothing abnormal in the brain or pancreas.

Description of the Specimens.

The specimens consist of the uterus, with the appendages of the right side still attached, and the hæmatocele. The uterus is 9 cm. long, 6 cm. broad, and 3½ cm. thick. The thick body is separated from the voluminous portio by a narrow cervix. The anterior lip, as well as part of the anterior laquear, which was removed at the same time, have developed into a hard tumour, with papillomatous surface, from which the superficial portions are easily peeled off, while the perfectly normal posterior lip spreads out in crescent shape behind the tumour. A longitudinal cut through the middle of the posterior wall of the uterus shows that the growth represents a flat tumour, about 2 cm. thick, occupying the entire anterior lip, only reaching the surface at the external os, and forming the already described papillomatous swelling upon the outer surface of the portio and of the anterior cul-de-sac. The cervix is unaltered, narrow, 4 cm. long, and ending in the uterine cavity 3 cm. long; the latter shows on the front and back walls widely extended fringe-like luxuriant growths which fill the whole rather narrow cavity, while the sides only show a thickened mucous membrane. The uterine wall is 2 cm. thick at the fundus. The right Fallopian tube runs outwardly and quite normally for the first part, without any trace of thickening, but from the middle it increases in size somewhat suddenly, and attains the thickness of a finger at the outer end, the length being 9 cm.; the outer part describes a slight curve backwards and downwards. The ostium abdominale is wide open; shreds of tissue hang from it which might at first sight be taken for fimbriæ;

so much the more as a fold with fringed edge connects the ostium abdominale and the ovary; however, only one fimbria can be traced with certainty on the upper circumference, while the others are not to be found in the numerous fibrous pseudo-membranes. The hæmatocele was firmly adherent to the abdominal end of the Fallopian tube, and, as already mentioned, it was torn from the tube during the operation. The Fallopian tube, which at no point shows injury of the wall, is cut open longitudinally from the uterine end. It presents a normal appearance for the first portion, but 4½ cm. from the uterus the lumen becomes very narrow, and the channel takes a sinuous course. A probe is passed with difficulty to the extent of about 1 cm., when somewhat suddenly the enlarged ampulla is reached, which has a circumference of about 2½ cm. at the widest part, while the wall is 4 millimetres thick.

The ovary, which is about 4½cm. long, 2½cm. broad, and 1½cm. thick, is adherent to the back surface of the broad ligament and the Fallopian tube. There is a hæmatoma on the upper surface about the size of a nut. The hæmatocele forms a longish oval tumour the size of a fist—length, 7cm.; breadth, 5cm.; and thickness, 4cm. The upper surface was of a yellowish-white colour in its fresh condition, and showed roughness and torn adhesions. A section through the tumour proves it to consist of a whitish-yellow capsule, with uniform brownish-red contents flowing from it. The large coagulum, semi-solid in its fresh state, is without difficulty enucleated from the hard capsule as from a shell, and is throughout of the same consistence.

I am indebted to the kindness of my colleague, Dr. M. B. Schmidt, privat-docent at the University, first assistant in the Pathological Institute, for the microscopic examination of the specimens, and I here beg to return him my best thanks. His report runs as follows: "Microscopic examination of the outer end of the Fallopian tube, which is to the naked eye an apparently straight line, shows that the absence of fimbriæ has not been caused by a recent tearing or cutting. The mucous membrane projects slightly beyond the free end, which is smooth, and the wall shows here a slight cellular infiltration in all its coats, while in the other parts of the tube only clusters of cells are found scattered here and there around the vessels. Within the infiltrated portion some granular blood-pigment is strewn, which is not found in any other portion of the tubal wall. On all portions of the tubal mucous membrane subjected to examination, normal columnar epithelium is found, not flattened. Nowhere are decidua cells discoverable.

"The white capsule containing the red mass of coagulum is pretty sharply defined from the latter, but thin pieces remain attached to the whole of the inner surface after enucleation. The capsule, which is 3mm. thick, is shown histologically to be a membrane in process of organisation, with blood vessels passing from without inwards at pretty wide intervals, and in approximately perpendicular direction, and giving off small branches on all sides. The outer strata contain connective tissue, while the inner strata show more and more hyaline reticulated substance. Flaky pigment lies on all parts of the capsule; elastic filaments can nowhere be seen, not even upon applying specific colouring. Microscopically, the dividing line between capsule and coagulum is neither quite sharp nor straight; on the contrary, numerous blood vessels accompanied by new tissue pass everywhere from the former into the coagulated mass. The impression made is that of a progressive organisation of the coagulum from without inwards. The search for chorionic villi was negative, but it could only be undertaken with the hardened specimens.

"Microscopic examination of the deeply cleft anterior lip shows squamous epithelial carcinoma, the alveoli burrowing deeply among the muscle fibres. The mucous membrane of the rough part of the fundus is greatl thickened, which arises chiefly from increase of the glandular elements; here and there single gland tubes penetrate

between the bundles of muscles into the interior, but always retain the shape of regularly formed, hollow columnar tubes, and are generally surrounded by connective tissue rich in spindle-cells ; therefore it is not possible to consider this more than a remarkably deep-reaching, but at the same time non-malignant proliferation of mucous membrane ; the process must rather be regarded as endometritis glandularis hyperplastica."

Remarks.—This is a case of tubal gestation of the right side, terminating in abortion and hæmatocele and co-existent with carcinoma of the portio vaginalis. Neither chorion villi nor constituent parts of an embryo could be found ; but the expulsion of a decidua from the uterus, the formation of a hæmatocele and the changes in the Fallopian tube render the assumption of tubal gestation a certainty. Keller's[1] investigations have shown how difficult the demonstration of chorion villi often is, and have even proved that it may be impossible to find them after a certain lapse of time. In my case, nearly three months having intervened between the tubal abortion and the operation, there could, therefore, be little expectation of finding decidua cells in the tube. It is a fact to be taken for granted that a tube, which has been completely emptied of its contents, will after such a long period return to its normal condition.

The ovum had evidently lodged in the enlarged ampulla of the Fallopian tube. As the tube shows a wide open ostium abdominale, and there is nowhere a trace of rupture, it is to be assumed that when the severe symptoms occurred the ovum was expelled through the tubal orifice into the abdominal cavity, and the effusion of blood which occurred at the time also passed out by the same way, and led to the formation of the hæmatocele. This case, therefore, ranks with those tubal abortions first described by Werth[2] in his observations—similar observations having also been made by Veit[3], Westermark[4], Sänger[5], Orthmann[6], Sutton[7], Zweifel[8], etc. With all these cases, however, it is a question of imperfect abortion, of tubal moles, with open ostium abdominale, whereas in the case cited by me there was complete tubal

[1] Keller. "Zur Diagnose der Tubengravidstät," *Zeitschrift für Geb. in Gyn.*, 1890, Vol. XIX. See also Zweifel. "Vorlesungen über klinische Gynäko ogie." Berlin, 1892, s. 290.

[2] Werth. "Beiträge zur Anatomie und zur operativen Behandlung der Extrauterinischswangerschaft." Stuttgart, 1887.

[3] Veit. *Zeitschr. f. Geb. u. Gyn.*, Vol. XII. *Centralblatt für Gyn.*, 1885, p. 796. *Centralblatt f. Gyn.*, 1886, No. 24.

[4] Westermark. *Hygiea*, No. 6. See also *Centralblatt f. Gyn.*, 1885, No. 41 ; and *Lancet*, 1885 Vol. II., p. 302.

[5] Sänger. *Centralblatt f. Gyn.*, 1890, No. 25.

[6] E. G. Orthmann. "Ueber Tubenschwangenschaft in den ersten Monaten," etc. *Zeitsch. f. Geb. u. Gyn.*, 1890, Vol. XX.

[7] F. Bland Sutton. "Surgical Diseases of the Ovaries and Fallopian Tube, including Tubal Pregnancy." London, 1891.

[8] Zweifel. "Ueber Extrauterinegravidstät und retrouterine Haematome."—*Archiv für Gynäkol.*, Vol. XLI.

abortion with expulsion of the entire ovum. Similar cases of perfect tubal abortion may be frequent in the early period of tubal gestation, but escape observation, being hidden by the presence of a hæmatocele which does not appear to call for further interference. At any rate, I have found no such cases amongst those tubal abortions described in literature, though Veit[1] and Sutton[2] also speak of the expulsion of the ovum from the tube. This occurrence should rank with spontaneous perfect abortion in uterine gestation, whilst cases of mole formation in the tube should rather be compared with protracted imperfect abortion. (*Sutton.*)

My case, therefore, in opposition to the clinical aspect of incomplete tubal abortion, was followed by a single attack lasting scarcely two days. Here the clinical aspect was certainly very remarkable, and differed totally from the acute attacks usually observed and described in extra-uterine gestation, for which reason diagnosis was impossible at the commencement. Such symptoms as subnormal temperature, small, frequent pulse, sunken features, anxious, painful expression, unaccompanied by striking pallor, are not the appearances of acute anæmia, as seen in rupture of the pregnant tube, but are really those of shock, as observed after severe operation, peritoneal perforation, injury of the abdominal organs, and also in severe colic. The hæmorrhage, indeed, cannot have been very extensive, as the patient recovered so quickly, and the hæmatocele formed by the effusion was but small.

Special attention is called to the severe labour-like pains which occurred; although Frankenhäuser and Kuhn[3] regard them as typical of hæmatoma peri-uterinum, according to my experience, as also set forth in this case, and emphasised by Zweifel[4], they are by no means rare in intra-peritoneal hæmorrhage. In this particular case these pains may partly be traced to contractions of the tube, and it is but a step further to put them in a causal relation with the shock. It is a matter of knowledge that severe pain, especially when of a colicky nature, can produce similar appearances, and I would call attention to the highly nervous appearances resembling shock which are occasionally observed at the commencement of uterine abortion or dilatation of a stubborn cervix. I would observe, at the same time, the impossibility in this case of such a reflex influence as a consequence of the expulsion of the decidua through

[1] Veit. "Behandlung der Extrauterinschwangerschaft."—*Verhandlungen der Deutschen Gesellschaft für Gynäkologie.* Dritter Congress in Freiburg, Leipzig, 1890.

[2] *l. c.*

[3] Kuhn. "Ueber Blutergüsse in die breiten Mutterbänder und in das den Uterus umgebende Gewebe."—*Inaug. Dissert.*, 1874, Zurich.

[4] Zweifel. "Zur Behandlung der Blutergüse hinter der Gebärmutter."—*Archiv für Gynäk.*, Vol. XXII.

the carcinomatous cervix, as this did not take place until two days after the attack. How great the influence of pain is, however, in bringing about such appearances[1] was made clear to me lately by a case of hæmatocele which came under my notice. The patient became suddenly ill with all the appearances of internal hæmorrhage and with violent pains in the abdomen. I found an effusion of blood closed up in Douglas's pouch, and an extraordinarily small frequent pulse. After injecting morphia, which put an end to the pain, the pulse became strong again, and the severe symptoms soon passed over.

However important pain may appear to me as a cause of symptoms of shock, I do not explain the clinical aspect solely with reference thereto, but must also take into consideration the undoubted mechanical influence of hæmorrhage through the ostium abdominale into the peritoneal cavity. That irritation of the peritoneum may greatly conduce to the appearance of symptoms of shock, seems to me so much the more probable, as in my case exactly the same symptoms occurred after laparotomy. Thus Schwarz[2] seeks in the same way to explain the rapid death of a patient from shock caused by a similar action of effused blood on the ends of the nerves of the peritoneum ; a hæmatocele had burst, and the post mortem did not show a high degree of anæmia. I believe moreover that in every case of internal hæmorrhage occurring in ruptured tubal gestation, appearances of shock are present which intensify the symptoms of acute anæmia, but are themselves concealed by the latter. This explains in my opinion how it is that patients recover in apparently desperate cases, and often even very quickly, and how they are saved by laparotomy which is often not performed until many hours afterwards. In such cases anæmia does not exist in so high a degree as the clinical symptoms would appear to indicate in the first instance, and indeed the degree can only be rightly determined after cessation of the accompanying symptoms of shock. The above-mentioned case of hæmatocele in which the pulse improved after injection of morphia belongs to this class of cases. In the same manner may be explained, as in Schwarz's case, how death may sometimes result from the effect of hæmorrhage into the peritoneum without a high degree of anæmia. The following experience also shows that the mere presence of blood effusion in the abdomen may produce appearances of shock resembling symptoms of acute anæmia which disappear upon removal of the coagula. Following an ovariotomy performed by Professor Freund shortly before menstruation, hæmorrhage of the pedicle occurred, causing collapse ; it therefore became necessary to reopen the abdomen and to stitch the bleeding points, the numerous coagula being

[1] *See* Gröningen. "Ueber den Shock." Wiesbaden, 1885.

[2] Schwarz. "Verhandlungen der deutschen Gesellschaft für Gynäkologie."—2 Congress at Halle. Leipzig, 1888.

allowed to remain designedly in the abdominal cavity. As the patient did not revive laparotomy was performed for the third time, and no further hæmorrhage was discovered. This time the coagulated blood was carefully removed, when the serious symptoms soon abated, and the pulse improved, and the patient revived and recovered.

It is now intelligible that in tubal abortions symptoms of internal hæmorrhage, which are mostly very pronounced in tubal ruptures, should be only slight, whilst they are often succeeded by tubal colic and tubal pains, and the hæmorrhage is often by no means extensive. Under such circumstances, any symptoms of shock will be all the more strongly marked. Without wishing to represent these latter as pathognomonic of this process, and without denying that a highly irritable state of the nervous system must be assumed to explain the same, it seems to me very remarkable that these appearances of shock should occur in such a marked degree precisely at the expulsion of the ovum from the tube, as evidenced in the case I have described, and which furnishes in this respect an interesting contribution to the symptomatology of this process.

The appearance of sugar and lactic acid in the urine is also to be noted in this case as accompanying symptoms of shock. This appearance occurred twice transitorily. Firstly, after the symptoms of shock at the expulsion of the ovum from the tube and the formation of the hæmatocele; secondly, after the operation, when the same symptoms recurred. The excretion of sugar each time lasted for some days, while frequent examinations of the urine in the intermediate period gave a negative result. The sugar varied between two and three per cent. This interesting observation led me to examine the sugar in the urine in each case of ruptured tubal gestation with internal hæmorrhage and of acute hæmatocele, and only in one case could I find a similar condition, namely, in a woman æt. 32, who had always been healthy, had given birth to six children, and who, suddenly on August 7th, 1892, was attacked with vertigo and violent pain, resembling labour pains, in the abdomen, although there had been no menstrual irregularity. The patient was extraordinarily pale, and had a very weak, small pulse. I found a very sensitive tumour enclosed in Douglas's pouch, which appeared to originate in the right Fallopian tube, and was without doubt to be regarded as a hæmatocele of acute origin. The urine contained three per cent of sugar. The patient recovered very quickly, and twenty-four hours later sugar had disappeared from the urine.

How is this interesting occurrence to be explained? In the first place, the question may be raised, was it caused by intermittent diabetes or some slight form of this disease, when sugar only occurs under certain

conditions ?[1] This supposition may, I think, in all probability be dismissed ; for in the second case sugar never occurred again in the urine, even after partaking freely of carbo-hydrates ; and in the first case in which this diet was not tried, the urine remained free from sugar with the ordinary hospital diet, which is, however, very rich in amyloids.

The question, therefore, is of a passing glycosuria connected in some way with the acute attack, and recalling similar symptoms which have occurred after injuries of the head, apoplexy, concussion of the brain, epileptic attacks, severe operations, contusions of the whole body, emotional attacks, etc., etc.[2] The interesting investigations of Aracki[3] should also be mentioned here, who has noted the presence of lactic acid and sugar in the urine owing to a deficiency of oxygen. By his latest researches, not yet concluded, but which he has most kindly communicated to me, and for which I here warmly thank him, he shows that in dogs sugar and lactic acid are constantly present in the urine when a large quantity of blood has been drawn off, and that the quantity of sugar excreted is in relation to the amount of blood withdrawn.

It does not seem to me, however, that these highly interesting results can be regarded without further investigation as applicable to human beings, for precisely in cases of ruptured extra-uterine pregnancy with very severe internal hæmorrhage, I have found sugar to be absent from the urine, whilst in the two cases mentioned above, where the hæmorrhage was small, its presence was to be observed in a high degree. I willingly admit that in cases of shock, accompanied by characteristic dyspnœa, as in my case, a disturbance of the oxygen supply and a certain degree of deficiency of oxygen may be produced which would explain the appearance of sugar in urine. However alluring this assumption may be, I do not consider it sufficiently proved, and would remark that whilst in Aracki's experiments the excretion of sugar only occurred for some hours, in my case it was observed for several days. It appears to me more reasonable to closely connect this appearance with the pronounced symptoms of shock which each time accompanied it, and to regard the passing glycosuria as a part of the nervous symptoms, although, it is

[1] Naunyn. "Ueber die diätetische Behandlung des Diabetes."—*Volkmann's klin. Vorträge*, No. 349-50.

[2] Auerbach. "Ueber Diabetes und Nervenaffectionen."—*Deutsches Archiv für klin. Medicin*, Vol. XLI., p. 484. Gröningen, *l.c.* Frerichs. "Diabetes." 1884. "Mellituria, Diabetes."—"Eulenburg's Encyclopædia." Nuzzi (G.). "La Glicosuria efemera nella affezione chirurgische." *Morgagni*, Ottobre, 1889. See *Jahrb. von Virchow-Hirsch.*, 1889. Bd. I., p. 226. Fischer, "Commotio cerebri."—*Volkmann's Sammlung klin. Vorträge*, No. 27.

[3] Aracki. "Ueber die Bildung von Milchsäure und Glycose im Organismus bei Sauerstoffmangel."—*Zeitschr. für physiol. Chemie.* Von Hoppe-Seyler, 1891, Bd. XV., Heft. 3 and 6. Erste und zweite Mittheilung.

true, we remain ignorant of the mechanism of the glycosuria. Similar observations are not wanting, as already mentioned, though for the greater part they occur in injuries of the head or the brain. The physiologist also well knows that peripheral nerve irritation can produce glycosuria by reflex action, which may not be without importance in explaining my case.

The production of sugar being, however, so complicated, many factors may play a part, and besides those already mentioned, reduction of temperature,[1] emotion, and finally also a certain degree of deficiency of oxygen, may have exercised some influence in producing the glycosuria. The great similarity of the symptoms which accompanied the appearance of glycosuria, both in the tubal abortion and after the operation, points, I am convinced, to one and the same cause, so that I have not considered it necessary to deal specially with the glycosuria which occurred after the operation.

This case is unique through the occurrence of extra-uterine gestation with carcinoma of the uterus; to the best of my knowledge this complication has never yet been described. The sole description somewhat resembling it is given by Martin.[2] In that case, however, the uterus became carcinomatous 19 years after the occurrence of ovarian pregnancy, which was still recognisable at the time of operation. It is clear, however, that this case was of a different nature, and only resembles mine to a certain extent by the difficulties of the operation.

In my case, determining the indications and deciding the right moment for operation were rendered exceptionally difficult through the peculiar complications. Whilst the speedy total extirpation of the uterus was urgently indicated by the carcinoma, the hæmatocele, which gave no indication for surgical interference, promised to render the proposed operation complicated and difficult. Having regard to these conditions, Freund's operation was alone possible. This was, indeed, contemplated from the beginning, but we resolved, in the first instance, to wait, hoping that the diminution or absorption of the hæmatocele would render the operation less complex and extensive. But the carcinoma increased surprisingly quickly, possibly through the presence of conditions similar to those of childbed, or it may have been that through the absorption of the hæmatocele an increased quantity of blood was conveyed to the pelvic organs; in any case, this rapid growth of the new formation no longer admitted of delay, and the operation was carried out three

[1] Boehm. "Ueber Wiederhelebung nach Vergiftungen und Asphyxie," and Boehm und Hoffmann, "Beiträge zur Kenntniss des Kohlehydratstoffwechsels.—*Archiv für experimentelle Pathologie und Pharmakologie*, 1878, Vol. VIII. Aracki. "Ueber die Erhwirkung der Künsttichen Abkühlung."—*Zeitschrift für Physiol. Chemie.* von Hoppe-Seyler, Vol. XVI., Heft 6.

[2] Martin. *Centralblatt für Gynäkologie*, 1892, No. I., p. 16.

months after the tubal abortion, the hæmatocele being the size of a fist. It was very difficult, on account of the various complications, but, thanks to the accurate diagnosis, it could be carried out as preconcerted. It was rendered easier through the peculiar and rare condition of the hæmatocele, which it was possible to enucleate from Douglas' pouch, the capsule being so thick, and the adhesions not very firm. May I be allowed to take this opportunity of calling attention to the advantage of inverting the stumps in the vagina, and completely closing the abdominal cavity by suturing the peritoneum of the bladder to the anterior or posterior layer of Douglas' pouch, a method recommended by Freund[1] in 1878, and which, according to our experience, works especially well in total extirpation of the myomatous uterus.

I should like, finally, to call attention to the interesting clinical experience in this case, that the first period after tubal abortion occurred just six weeks after that event, exactly the same time intervening as after a normal delivery. I shall take occasion, in my Case III., to refer again to this behaviour of the catamenia after interruption of tubal gestation.

Case 2.—Tubal pregnancy of the left side; rupture of the tube in the sixth week; hæmatocele; salpingectomy and enucleation of the hæmatocele:—

Mrs. M., æt. 26, of Dieuze, was received into hospital May 6th, 1892. Nothing special in the family history. The patient was never seriously ill before. Until within the last four years the periods have always been regular, without pain, and of medium quantity. A period suddenly ceased four years ago, after a chill, and the patient was taken ill with acute pelvic peritonitis, which lasted several weeks. Since then she has never been well. The period occurs every fortnight, accompanied by severe pain, and has become much more profuse. After menostasis, lasting 6 weeks, the patient was seized with severe pains in the abdomen in February, 1892, and suddenly became collapsed. Her doctor's diagnosis was peritonitis. The patient was again confined to bed for weeks, and until a few weeks ago was troubled with an almost constant flow of blood from the genitals. She still suffers frequently from pains in the lumbar region and abdomen, especially during some occasional bleedings, and she has become very nervous.

Condition on admission.—A strongly built woman with healthy colouring and in good condition. No fever, pulse strong, chest organs normal. Abdomen not distended nor sensitive. Externally no tumour can be felt. Infantile condition of the external genitals, vagina large, copious sanguineo-mucous discharge; cervix far back, thick, long, soft; portio vaginalis much swollen, os circular, open, pointing backwards and downwards. Body of uterus small; much anteversion; immediately behind it and firmly adherent to it is a protuberant sensitive almost fist-sized tumour, extending to the left and in a manner continuing the fundus upwards, the lower surface being level with the os internum; it is not all of the same consistency, being in one

[1] Freund (W. A.). "Ueber eine neue Methode der totalexstirpation der Uterus." *Volkmann's klin. Vortrag*, 1878.

place soft, almost cystic, in another somewhat harder. The tumour appears to be adherent to the sigmoid flexure. It is impossible to separate the left appendages as the tumour runs into them, while on the right the ovary can be felt low down. Urine normal.

The diagnosis wavers between a cystic dermoid of the left ovary, and an early rupture of a tubal gestation of the left side: the consistency, the adhesions of the tumour, the preceding attacks of pelvic peritonitis and the infantile condition of the genitals would indicate the former; while the 6 weeks menostasis, fainting and collapse at the commencement of the last abdominal inflammation, as well as the atypical floodings, point to the latter.

The patient's condition had not improved after three weeks of absorbent treatment, and on June 1st, 1892, it was necessary to resort to laparotomy.

Operation by Prof. Freund.—Injection of morphia and atropine followed by administration of ether and chloroform. Elevated position of the buttocks, according to Freund. Examination of the bladder immediately before laparotomy shows that its fundus reaches almost a hand's breadth above the symphysis. Incision in the middle line commencing a finger's breadth below the umbilicus and reaching to the symphysis. Upon opening the abdominal cavity the omentum is seen to be adherent to the bladder, and the intestinal adhesions conceal the organs in the pelvis. After careful separation of these adhesions a yellow almost fist-sized tumour is seen on the left side, and behind it an elongated body almost the thickness of the little finger, suggesting the Fallopian tube. The larger tumour is universally adherent, of a longish oval shape, with rough surface, and situated on the left side. It is enucleated with much difficulty, it being necessary to work deep down in the pelvis, and it is eventually removed with considerable loss of blood. On its under and posterior surface are two projections which connect it with the elongated body, which is the left Fallopian tube inclining to a curve and adherent to the sigmoid flexure; on the convex side, corresponding with the outer end of the middle third of the tube, is a fissure with ragged edges about the size of a shilling; this was the connecting point with the tumour which shows a raw brown surface at the corresponding part. The tube is raised with much difficulty, and the uterus which, with the adherent hæmatoma, lay underneath is seen for the first time. Ligatures are now brought under the Fallopian tube through the broad ligament and close to the left side of the uterus, and then the tube, with its corresponding ovary, is removed. Blood flows from the adhesions on the fundus uteri, on the posterior surface of this organ, and also from the loosened omental adhesions. With the help of sutures, Paquelin and a hot sponge, the bleeding is stopped. The stump of the left broad ligament is then cauterised and lowered. Abdominal sutures of silver wire and silk. The after course ran very smoothly till the eleventh day, but afterwards for some days patient's temperature was raised to 101·3°F. in consequence of a small exudation of the stump near the sigmoid flexure. On the 22nd day she got up for the first time, and on the 29th day was discharged, the exudation having disappeared except for a slight thickening of the stump.

Description of Specimens.

These consist of the left Fallopian tube and ovary, and of the hæmatocele. From the uterine to the abdominal end, the tube, of the thickness of a little finger, describes an arch, with the concavity backwards and inwards. On the highest convexity of the arch, 3½ cm. distant from the uterus, is a nut-sized swelling, showing on the hinder and also, in part, on the upper surface a round opening about the size of a shilling, with uneven, torn edges, where the hæmatocele had been. The outer edge

of the fissure is 1·7 cm. distant from the ostium abdominale. The fissure opens into a small cavity, 2 cm. high and 1½ cm. broad, the mucous membrane being in folds. Surrounding the fissure are masses of coagula which, in part, jut out from the opening. The walls of the cavity are everywhere thick, even in the vicinity of the fissure, the average thickness being 5 mm., whilst in one part of the upper wall, forming a projection into the cavity, it attains to 1 cm. The lumen of the uterine end of the tube, which is normal, opens into the upper part of the cavity, which represents a sudden widening of the tube, whilst the outer end of the cavity becomes gradually narrower, the channel of the tube as far as the open ostium abdominale remaining somewhat wider than normal. The walls of the Fallopian tube are everywhere very much thickened. The hæmatocele was also firmly connected with the abdominal end of the tube, so that it only came into actual contact in two places, here and at the point of rupture.

The ovary is 3½ cm. long, 2½ cm. broad, and 1½ cm. thick, lying near the fimbriated orifice of the tube.

The hæmatocele, which is 8½ cm. long, 6 cm. broad, and 3½ cm. thick, showed a yellowish-white surface in its fresh condition, the whole coagulum being enclosed, as in Case 1, in a white capsule from 2mm. to 3mm. thick; the hæmatocele presents two small eminences at the points where it was actually connected with the tube, the capsule being altogether absent at these points, so that the coagulum projects.

The microscopic examination was again kindly undertaken by Dr. M. B. Schmidt. He communicated to me the following:—"No fœtus, nor any portion of such, is to be found in the coagulum enclosed in the firm white capsule; but in the sanguineous membranes surrounding the edges of the tubal fissure widely ramifying chorion villi can be detected; the same are also to be seen in the microscopic sections through the tube at the point of rupture lying upon the mucous membrane. But in the remainder of the cavity no more can be found, even in closest proximity to the rupture. At the abdominal part of the tube the mucous membrane is very rugous and rich in cells, not, however, in the nature of a decidua, but rather infiltrated with round cells, and in many places destitute of epithelium; it is also permeated by numerous hæmorrhages around the enlarged vessels.

"The capsule of the hæmatocele, which is about 2 mm. thick, consists of organized connective tissue, somewhat poor in vessels, the chief constituent part forming broad, shining homogeneous bands, which run across the surface and connect themselves into a net by very long, narrow meshes. In these latter are long-drawn spindle cells, single or in groups; in the latter case they often surround the small blood vessels which come off on all sides from the small branches which pierce the wall in a slanting direction. The wall is of the same construction throughout up to the red coagulum, but near this latter the capsular tissue is permeated with a very considerable quantity of brown, flaky pigment. The division between coagulation and capsule is pretty sharp and smooth; at any rate, no long continuations of the former penetrate into the latter. No elastic fibres are to be found in the connective tissue of the capsule, even with the help of specific colouring."

Remarks.—In this case we have to do with rupture of the pregnant tube in the sixth week of gestation, and formation of a hæmatocele. The peculiar and interesting part of this case appears to me to lie, first in the relation of the Fallopian tube and the hæmatocele to each other. The latter lay for the greater part above the tube and over the uterus. This remarkable position of the hæmatocele may well be explained by the pelvic peritonitis from which the patient had suffered. This illness

probably led to the destruction of Douglas' pouch and the formation of such adhesions between the pelvic organs that when the rupture occurred the blood which escaped could only find room above and in the immediate vicinity of the tube. The same may be the cause of the cessation of the hæmorrhage and its enclosure at this spot. For this reason, also, the pains were so severe after the acute attack that peritonitis was assumed in the report sent to us; but it is very questionable if peritonitis really occurred after the tubal rupture.

Again, as in Case 1, the condition of the hæmatocele differed quite from the usual thing in being surrounded on all sides by a thick connective tissue capsule which had been formed through the organisation of the peripheral strata of the coagulum as shown by microscopical examination. Under what conditions does such an organisation arise? Is this condition the outcome of the character of the hæmorrhage —*i.e.*, of its occurring slowly or quickly? These questions are as yet unanswered, and the condition of the hæmatocele as here described must in any case be regarded as unusual.* It is also to be remarked that the formation of such a hard capsule must be prejudicial to absorption of the coagulated blood. In accordance with this the hæmatocele in Case 2 remained stationary, showing no diminution from the day of admission up to the day of operation. In Case 1, after decreasing to a certain size, it afterwards remained stationary.

The fact that the hæmatocele was connected with the tube, not only at the point of rupture, but also at the ostium abdominale, and that the capsule was deficient at both these places, renders it probable that the blood also passed through the wide open ostium abdominale into the abdominal cavity, the more so as the peripheral part of the Fallopian tube was enlarged from the cavity to the abdominal end. In any case, it is here a question of rupture of a pregnant tube, with open ostium abdominale, which is also a rare occurrence, at any rate when the ovisac is pretty near the abdominal end of the tube. As regards the mechanism of rupture in such cases, I would call attention to Case 3, and only now emphasise the fact that the rupture probably occurred at the spot where the ovum was fixed to the tube, as chorion villi were only found at the fissure and the remainder of the tubal mucous membrane was perfectly normal.

It may further be observed that no conclusions can be formed regarding the mechanism of rupture from the condition of the edges of the fissure, as regenerative action had already commenced here.

Case 3.—Tubal pregnancy of the right side. Tubal abortion at the end of the second month. Tubal mole and hæmatocele. Salpingectomy.

* See the literature of Hæmatocele.

Mrs. Z., æt. 25, of Strasburg, was received into hospital on July 11, 1892. Family history of no importance. Patient generally healthy hitherto. First menstruation at the age of 14 ; periods irregular and painful up to 16, when she suffered from chlorosis. After 16 menses regular and of the four-weekly type, fairly profuse, always accompanied by slight pain. November, 1890, spontaneous normal birth of a child at the full term ; childbed normal. When in January, 1891, the period returned, severe pains were experienced in the abdomen, which led the patient to visit the hospital. Painful swelling of both ovaries was found ; the right ovary lay deep in Douglas' pouch surrounded by rugged masses, the corresponding Fallopian tube appearing somewhat thickened. The acute symptoms soon disappeared, the remaining ovarian neuralgia being cured by faradisation of the ovary. After that the patient remained healthy, the periods being regular and normal. She married in October, 1891, and the last menses occurred middle of May, 1892. On July 3, upon lifting a sewing machine, the patient was suddenly seized with violent pains in the right side of the abdomen which seemed to start in the lumbar region, extending forwards ; vomiting and faintness supervened at the same time, so that she was forced to lie down. The pains ceased after some hours. On July 7 the same pains recurred in the middle of the night, accompanied by vomiting, and lasted two hours. Another attack on the day of admission, July 11.

Condition on admission :—Middle height ; well nourished woman ; no striking anæmia. Temperature normal ; pulse strong ; colostrum in mammæ. Thoracic organs not abnormal. Abdomen not distended ; soft ; somewhat sensitive above the right Poupart's ligament. Vaginal mucous membrane of a bluish colour. Uterus enlarged, soft, answering in size to a two months' gestation. The right thickened Fallopian tube describes a concave bend downwards and inwards, the peripheral end in Douglas' pouch being connected with a longish oval body, probably the ovary. The first part of the tube is somewhat thinner than the remainder. The left tube, on the contrary, is pretty thick at its commencement, becoming thinner towards the outside. The left ovary is in the normal position. No albumen or sugar in the urine.

Diagnosis :—Pregnancy of two months. Whether an intra-uterine gestation, with chronic salpingitis, or tubal pregnancy must for the present be left undecided, as the uterus is surprisingly large, and the tubes unusually small for tubal gestation, whilst the symptoms appear to point rather to ectopic pregnancy.

Rest in bed :—Opium.

Three days after admission slight hæmorrhage occurs, accompanied by labour-like pains, slight giddiness and vomiting. The os is somewhat open, and a structure is detected in the vagina which is soon recognised as a decidua without chorion villi. The patient is rather pale, and there is some dulness on both sides of the abdomen.

Icebags and opium.

During the following days the patient had attacks of giddiness and vomiting, also pains in the abdomen. A soft swelling larger than a hen's egg is found to the right of the uterus continuous with the right border of the uterus and extending into Douglas' pouch. No sugar in urine.

The attacks occur frequently, and it soon becomes possible to detect a soft swelling filling up Douglas' pouch, and also dulness a hand's breadth above the symphysis. There is no doubt that it is a case of formation of hæmatocele arising from tubal pregnancy of the right side.

During the next four weeks the attacks occur several times, after each of which the swelling decreases and the patient improves. During this time, therefore, expectant-symptomatic treatment is continued. Meantime, however, the patient has become very pale and thin.

August 17.—The patient is so well that she tried to get up without leave. The consequence is that she has become worse, and in the evening her features are very pallid ; the pulse very small and frequent ; labour pains and vomiting re-appear, and the hæmatocele has considerably increased in size.

August 20.—After recovering remarkably quickly, the patient has had to-day another attack, with shivering and fever. Temperature, 101·1° F. The uterus lies to the front and somewhat on the right side. Douglas' pouch is filled with an elastic swelling, depressing the posterior *cul de sac* greatly and rising up out of the pelvis as high as the umbilicus. The patient's condition is so bad and the pulse so small that it is decided to perform laparotomy at once. This had been already contemplated several times and given up again on account of the improvement in the patient's condition.

Laparotomy by Dr. M. Muret.—Ether. The bladder reaches to the upper limit of the pubes. Incision in the middle line from the umbilicus to the symphysis. Upon opening the abdominal cavity, the omentum and intestines are found to be adherent to the broad fundus uteri, which reaches above the symphysis. After separating the adhesions by the finger a hard membrane is seen, which represents the upper wall of a tumour which entirely fills up and rises far above the pelvis : black blood issues from a small fissure. It being impossible to enucleate the tumour, it is opened with the finger, and large masses of black coagulum which fill up the whole cavity and penetrate to the deepest part of Douglas' pouch are removed. Upon removal of clots a hard tumour is felt to the right, about the size of a small apple, which cannot be removed immediately as it is attached to a long pedicle. The cavity is limited in front by the uterus, at the sides by the broad ligaments, the cæcum, and sigmoid flexure, and at the back by the small intestine. On the right side the thin normal Fallopian tube can be traced from the right cornu outwards for about 4 cm., but at this point it is torn asunder, the rent having evidently just taken place ; ligatures close to the uterus and beneath the Fallopian tube through the broad ligaments. The peripheral end of the tube is not to be seen at first ; further search shows that it runs into the tumour already mentioned ; this latter is then drawn up, the pedicle which is adherent to the cæcum is ligatured, and the whole thing corresponding to the ovisac removed. The ovary, which is enveloped in pseudo-membranes, is removed with the first portion of the Fallopian tube. The left Fallopian tube, which is not enlarged, is covered with organised fibrin, but being quite normal is left *in situ*. The cavity is now thoroughly cleansed, and ligatures tied in some of the appendices epiploïcæ on account of hæmorrhage. The walls of the cavity are covered in places with an organised lymph which cannot be removed, and there is a deep rent below the cæcum. The walls of the cavity join together well, and the cavity itself is thoroughly closed off by the intestines near the uterus. The bottom of Douglas' pouch is now perforated into the vagina with a blunt "tenette," the cavity padded with thymol gauze, a strip of which at the under end is brought out through the vagina. Abdominal sutures of silver wire and silk.

The operation only lasted a short time, but the patient collapsed at the end of it. Subcutaneous transfusion of 500 grammes of saline solution. Camphor subcutaneously and Bordeaux and coffee enemata alternately, the patient reviving after some hours.

For some days after the operation the patient was very weak and anæmic, and only recovered slowly. Her temperature kept high (103·4°), but there was no indication of peritonitis. Flatus passed on the second day, and the bowels were opened on the fourth day. After removal of the padding on the second day the drainage opening closed up by agglutination, and the cause of fever was found to be a retention in Douglas' pouch. On the seventh day the cavity was washed out with

Fritsch's double catheter, and a good deal of pus came away. A drainage tube was then inserted from which there was a puriform discharge for two days, after which the temperature fell to normal. Convalescence was further retarded by the appearance of a deep bed sore over the sacrum. The patient, however, got up on the seventeenth day recovered very quickly and was discharged on September 30. The first period occurred in the seventh week after the operation, and the patient has remained well until now.

Description of Specimen.—The specimen consisted of the two halves, viz., the normal commencement of the Fallopian tube with the ovary and the ovisac. In my opinion the rupture of the tube in a perfectly normal portion of it, and at a certain distance from the ovisac (about 1½ cm.), has no connection with the extra-uterine gestation, but probably occurred during the operation upon the removal of the hæmatocele, as the ovisac lay deep down in Douglas' pouch, and the rest of the tube was held fast by the adhesions, and in manipulating these the tube might easily be strained. (Orthmann mentions a similar rupture during operation.) The inner portion of the tube which appeared to be normal was unfortunately afterwards lost, so that a description of the ovisac only can be given. The tube runs outwardly in normal size and thickness for about 1½ cm. from the point of tear, developing suddenly into a round hard body about the size of a hen's egg, showing at the outer end a wide opening surrounded by the spreading fimbriæ, the whole resembling an open tulip on its stalk. The ovisac is 4 cm. long and 3½ cm. high. A section through the enlarged ampulla of the tube shows a wide cavity containing a solid mass of coagulum about the size of a pigeon's egg, firmly fixed to the upper wall, and occupying about half the surface of the wall; it terminates in a black clot which projects from the wide open ostium abdominale like a polypus. The coagulum is 3½ cm. long and 3 cm. high. The remainder of the wall is free, so that between the free surface of the coagulum and the lower wall of the tube there is a pretty wide space. The cavity narrows so suddenly towards the uterus that it is difficult to find the commencement of the lumen of the tube in the ampulla, but when found a probe can be passed. At the ostium abdominale are numerous firm bands which come from the exterior surface of the tube; the exterior surface of the ampulla is completely enveloped in coagulated blood, some of it fresh, the rest older and more firmly adherent; these organising clots run into the band already mentioned which are attached especially to the lower surface of the ampulla.

My colleague, Dr. Aschoff, Assistant at the Pathological Institute, was good enough to examine the specimen, for which I owe him many thanks. I quote the following from his circumstantial report: The examination of coagulated blood, forming the hæmatocele, shows no undoubted remains of placental tissue. The rest of the tube joining on to the ampulla is of normal diameter, and no special alteration can be discerned microscopically. The lower wall of the enlarged ampulla is quite clear, and shows unimpaired columnar epithelium.

The coagulum fixed to the upper wall shows on section numerous light red, in part almost white, cords whose meshes are filled with dark coagulated blood. As seen microscopically these cords consist of fibrin, but contain here and there distinct chorion villi. At the point of connection with the wall of the ampulla pronounced granulations appear in the masses of fibrin, and also numerous spindle cells already surrounded by vessels. Microscopically the wall of the ampulla shows great attenuation at the summit of the fibrinous swelling, which is in the middle of the upper wall: a slender white line bordering it can alone be discerned with the naked eye. The diameter of the whole surface occupied by the ovum measures in the hardened condition of the specimen about 40mm. Microscopic examination shows that

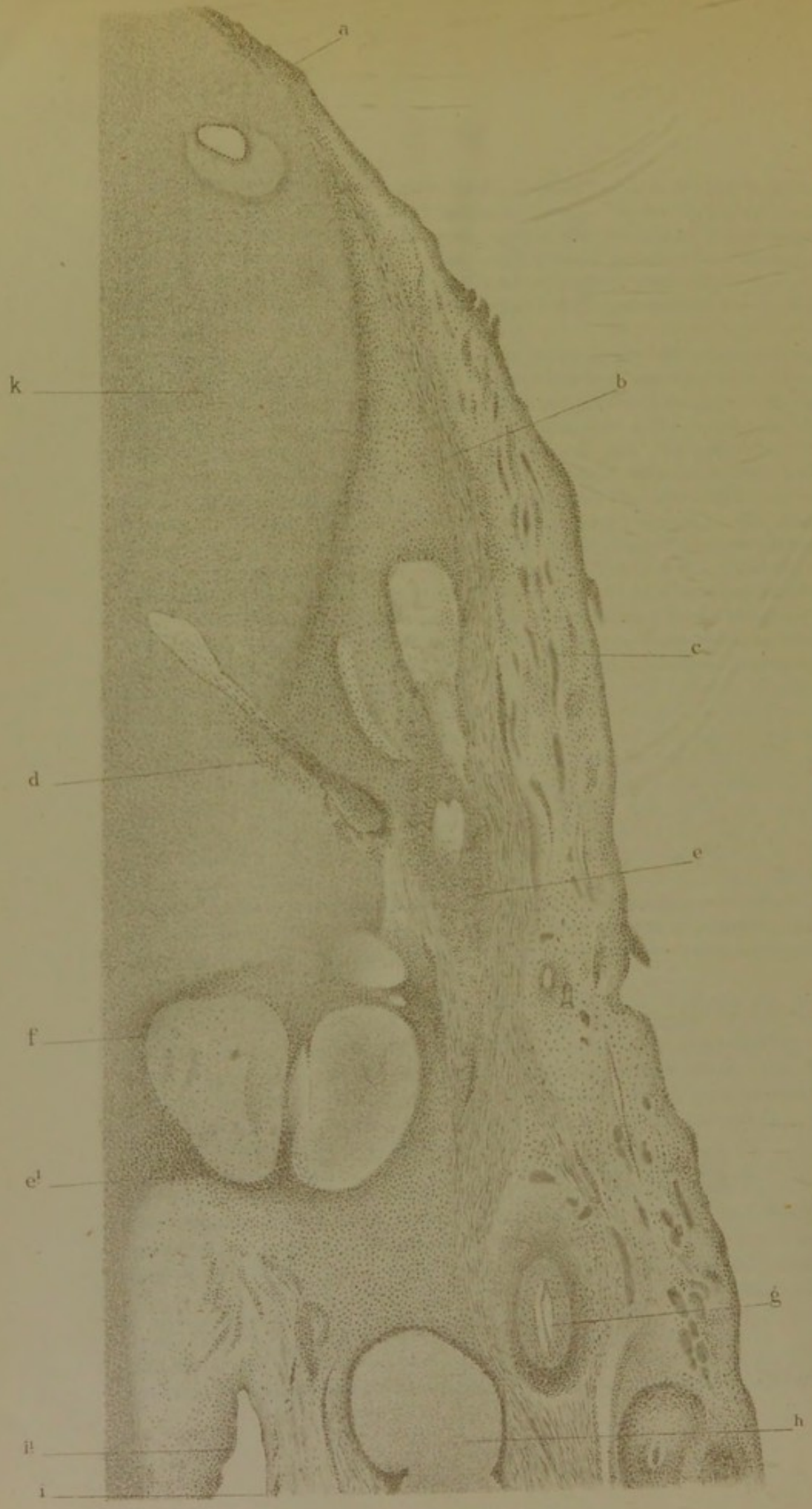

PLATE TO ILLUSTRATE CASE 3.

in the middle of this zone mucous and muscular layers are wholly wanting in a space about 30mm. in diameter, a sheath of connective tissue alone existing there. This latter is also covered on the exterior surface with fresh granulation tissue. Round the edge of the place of insertion of the tumour (see drawing of microscopic specimen) gradual attenuation of the whole parietes is found up to the point where the covering of the ovum consists solely of serous membrane and the newly developed tissue. The dimension of this zone of attenuation in the parietes, reckoning from the edge of the ovum, is about 5mm. The peripheral edge of this surface appears thickened; this thickening is caused by decidua-like proliferation of the connective tissue of the mucous membrane, and by great development of the venous vessels. At the insertion of the ovum the mucous membrane folds over it from outwards about 1mm., being furnished for a short distance with scanty muscular fibre. The above mentioned transformation of the edge into decidua tissue affects not only the sub-mucous connective tissue, but also deeper-lying strata in muscular tissue. Hence it arises that the muscular fibres appear to be forced apart by the growing decidua tissue with its large vessels. This separation is, however, restricted within narrow limits. The decidua formation decreases rapidly towards the attenuated portion, and the muscular and mucous membranes become similarly attenuated without showing any distinct break in the continuity. The sheath of the ampulla and adhesional bands consists exclusively of granulation tissue and accumulations of pigment, or masses of fibrin with corpuscles.

EXPLANATION OF ILLUSTRATION.

Case 3.—Section through the surface of insertion of the ovum in the tube:—*a*—Serosa and granulation tissue; *b*—muscularis circul.; *c*—muscularis longit.; *d*—chorion villi in blood coagulum; *e*—decidua tissue; e^1—decidua tissue; *f*—fibrin attached to decidua; *g*—artery; *h*—vein; *i*—mucous membrane epithelium of Fallopian tube; i^1—tubal mucous membrane folded over ovum on outer surface; *k*—blood coagulum (mole).

Remarks.—Tubal pregnancy of the right side in the second month terminating in abortion, formation of a tubal mole and hæmatocele, are treated of here. The ovum effected a lodgment within the ampulla of the right tube upon the upper wall. After premature death of the fœtus hæmorrhage occurred in the ovum and in the Fallopian tube, which led to the formation of a tubal mole, and through the exit of the blood through the open ostium abdominale into the abdominal cavity to the formation of a hæmatocele. The clinical course accordingly was as follows: Firstly, pains in the right side of the abdomen radiating from behind forwards, and occurring at intervals, evidently, therefore, tubal colic; tubal labour pains without demonstrable alteration of the local condition; next, expulsion of a decidua from the uterus, then a renewed attack of pains, this time accompanied by symptoms clearly pointing to internal hæmorrhage. And, in fact, hæmorrhage had now taken place in the ovum and in the tube, and a circumscribed swelling arisen in the region of the tube. This is followed by repeated attacks of acute anæmia with labour-like pains. By tubal contractions the effused blood is evidently emptied each time through the open ostium abdominale into the

abdominal cavity, whereby the gradual formation of a large hæmatocele is traced. The patient recovers each time, but the attacks become worse and worse, until finally a high degree of anæmia and debility is established. These occurrences recall forcibly the appearances during protracted uterine abortion where, so long as any things remain behind, or placenta polypus, or blood mole, are present in the uterus, typical hæmorrhages of long duration occur, which may greatly reduce the patient and render her anæmic. While in this case the blood empties from time to time into the vagina, in protracted tubal abortion it empties in paroxysms into the abdominal cavity. (Sutton.) In this regard it is instructive to compare this case with Case I., which also treats of tubal abortion, but with complete evacuation of the Fallopian tube; the clinical course was accordingly quite different there, terminating after one single attack; this again quite resembles uterine abortion where no further hæmorrhage occurs after complete expulsion of the ovum. The symptoms observed in Case III., firstly, tubal labour pains, expulsion of a decidua, the gradual formation of a hæmatocele increasing in size after ofttimes repeated attacks of internal hæmorrhage, not to mention the atypical external floodings, these are all so characteristic that I would designate them as typical of protracted tubal abortion with open ostium abdominale. In the cases of rupture of the pregnant tube, on the contrary, the symptoms are much more acute, and are generally from the very beginning much more severe than the first symptoms of protracted tubal abortion where, it is true, a high degree of anæmia may result, but only later and after repeated attacks. It was an especially favourable chance that allowed me to follow closely such a case of protracted tubal abortion from beginning to end. Though cases of the kind are by no means rare[1], it is easily understood that this is not often possible, when it is borne in mind that through the relative mildness of the earlier symptoms patients usually seek medical aid only in the later stages, and laparotomy is often performed after a very short period of observation, often indeed after a single examination, while also many attach but little weight to clinical observation. Most cases of the kind to be met in literature cannot therefore be turned to account with regard to special diagnosis of protracted tubal abortion with help of the above criterions, and yet I could recognise this typical clinical aspect in some of these observations, especially in a case of Werth's[1]. It remains, however, to be shown as yet by further accurate observations, if the given *ensemble* of symptoms is really pathognomonic of this special form of tubal abortion. At any rate, I believe that close clinical observations in a number of cases would render diagnosis of this condition possible.

[1] Werth, Sutton, Veit, Zweifel, Orthmann, etc., *l. c.*

The comparison of tubal abortion with uterine abortion is important not only with regard to diagnosis but also with regard to treatment. It is well known that in protracted uterine abortion hæmorrhage continues from the uterus until the entire ovum or mole is removed, and it is precisely in such cases that cleansing or scraping of the uterus is so eminently successful. In like manner the goal and ideal of treatment in protracted tubal abortion might be described as removal of the mole, and cleansing or even scraping out of the tube without removing it, while, at the same time, removing the hæmatocele. I well believe that such conservative treatment might be adopted with success in suitable cases, and as proof that such methods are quite within the bounds of possibility I quote from two cases of Orthmann's[2], in which the blood mole was so loosely placed in the open abdominal end of the Fallopian tube that it fell out from the ostium abdominale at the operation; and further from a case of Veit's[3], in which the ovum was likewise found in the ostium abdominale. In such cases preservation of the Fallopian tube would certainly be possible. Usually, it is true, such procedure would be out of the question, partly because the ostium abdominale would be too narrow, partly because of the difficulty in so rapidly mastering the situation while the operation was proceeding, and greatly also because the adhesions and alterations round the tube would be too far advanced Thus, in the greater number of cases, removal of the whole Fallopian tube will be necessary. Laparotomy is under all circumstances the only operation indicated in protracted tubal abortion, and operation by the vagina must be rejected, as it is impossible in this way to remove the tube or mole. Just in such cases, and for such reasons, Zweifel[4] was obliged to perform laparotomy immediately after elytrotomy. In this direction also more accurate diagnosis would be valuable.

If we now turn to consideration of the removed Fallopian tube, the most striking point in the specimen is the high degree of attenuation in the tubal wall at the point of insertion of the degenerated ovum. Mucous and muscular membrane have entirely disappeared, and the wall consists solely of the peritoneum. What does this remarkable fact signify, and how is it to be explained?

The theory that expansion of the tubal wall was caused by the growing ovum may at once be rejected; this usually occurs only in the more advanced stages of tubal gestation, and especially in the intra-ligamental form[5]. Equally untenable is the assumption of a diverticulum formation

[1] Werth, *l. c.* [2] Orthmann, *l. c.*

[3] Veit. "Verhandlungen der Deutschen Gesellschaft für Gynäkologie." 3rd Congress in Freiburg. Leipzig, 1891.

[4] Zweifel. "Vorlesungen über klin. Gynäkologie." Berlin, 1892.

[5] Werth, *l. c.* Ziegler. "Lehrbuch der pathol. Anatomie," 1887, s. 889. Küstner. "Uber Extrauterinschwangenschaft" in *Muller's Handbuch der Geburtshülfe*, Bd. II.

in the tube with attenuation of the parietes, as described by Klebs[1] and Klob[2], and of which Klein[3] has given an excellent example. Simple examination of the tube disproves any such diverticulum formation. Neither does the tube show any pronounced infantile character (Freund[4]), and, moreover, it must also be remembered that demonstration of such an inherent anomaly could not be proved on strict lines on account of the long standing displacement of the tube caused by the previous inflammation of the pelvic peritoneum. It seems more reasonable in this case to regard the diseased state of the pelvic organs as the cause of the tubal gestation. The other recognised causes which might lead to parietal attenuation, such as myxomatous degeneration of the chorion villi (Freund and von Recklinghausen[5]), or penetration of the tubal wall by normal villi,[6] are also not present in this case. Endless doubts and difficulties arise, if it be sought to explain the expansion of the tubal wall by hæmorrhage in the tube, in the same way as Klob[7], Veit[8], Orthmann[9], Sutton[10], etc., have done for the cases of rupture of the Fallopian tube; for in the cases of these writers it was a question of a cavity shut in on all sides whose walls must necessarily be expanded by the enclosed effusion of blood, whereas in my case there was a large cavity not wholly filled up by the mole even in its fresh condition, and which communicated with the abdominal cavity through a widely open ostium abdominale.

I believe, indeed, that in this case attenuation of the wall was only brought about after death of the fœtus, and really in consequence of the hæmorrhage, but in a very peculiar manner, which allows for the special circumstances just mentioned. It seems to me that at first hæmorrhage occurred at the insertional point of the ovum. Taking for granted that the blood could not escape at the sides, and could not cause immediate rupture of the ovum, the hæmorrhage must have led to a local expansion of the wall at the point of insertion of the ovum, exactly as occurs through hæmorrhage in the much thicker uterine wall on the premature

[1] Klebs. "Handbuch der pathol. Anatomie," 1869, Vol. I. s. 906.

[2] Klob. "Pathol. Anatomie der Weiblicher Sexualorgane." Wien, 1864.

[3] Klein. "Zur Anatomie der Schwangeren Tube."—*Zeitsch. für Geburtshülfe und Gynäkologie*, 1890, Bd. XX.

[4] Freund (W. A.). "Ueber die Indicationen zur operativen Entfernung der erkrankten Tuben."—*Volkmann's klinische Vorträge*, No. 323.

[5] Freund and von Recklinghausen. "Sitzungsberichte des Naturwissenschaftlich Medic. Vereins zu Strasburg," 1889, and W. A. Freund. *Centralblatt für Gynäkologie*, 1889, No. 40 in "Bericht über die Verhandlungen der Gynäkologischen Section der 62 Versammlung deutscher Naturforscher zu Heidelberg," 1889.

[6] Klebs, *l. c.* Leopold. "Tubenschwangenschaft mit äusserer Ueberwanderung des Eies."—*Archiv für Gynäk.*, Vol. X. s. 248.

[7] Klob, *l. c.*

[8] Veit, *l. c.* "Verhandlungen des deutschen Gesellschaft für Gyn. in Freiburg."

[9] Orthmann, *l.*

[10] Sutton, *l. c.*

detachment of normally situated placenta. As seen by the specimen, this purely local expansion has changed the surface, which, in its normal condition, measured 10mm. in diameter into a surface of 40mm., whilst in the centre every element of the wall has disappeared, except the serous membrane. Rupture of the ovum can only have occurred subsequently through further hæmorrhage, the blood then escaping from the tube through the open ostium abdominale into the abdominal cavity. The necessary condition for producing local tension was in fact present in this case, that is to say, the ovum being firmly affixed to the tubal wall all round the expanded surface, so that the blood could not escape, as shown by the microscopic examination (see illustration of microscopic specimen). For at the edge of the insertion of the ovum there is a growth of decidua, a decidua wall which has clearly not been passed by the hæmorrhage. The thinning of the different strata of the tubal wall from the edge to the centre is very gradual, as must be the case in expansion.

Similar attenuation of the wall at the point of insertion of the degenerate ovum has been described and illustrated in some of the observations on tubal mole with open ostium abdominale (Orthmann, Werth). In one case of Werth's,[1] for example, the wall was so thin at this place that the brownish coagulated blood lying underneath could be seen through it. That inherent weakness or pre-existent great attenuation of the wall where the ovum is affixed to it may play a large part in many cases is by no means in opposition to my theory, and appears to me, according to an observation of Orthmann's,[2] to be very probable; for his case of tubal mole with pronounced parietal attenuation at the point of insertion of the ovum was, according to the illustration, a good example of the infantile "undulating" Fallopian tube. It is a remarkable fact, and in favour of my explanation, that in those cases of tubal mole where parietal attenuation is described, this always exists at the point of insertion of the ovum, while in cases of tubal rupture the point of rupture may, as is well known, be in some other part.

I consider it very probable that expansion and attenuation of the wall at the spot where the ovum is affixed, and which has been produced in the manner described, should by a further increase lead to rupture of the tube at this place, even with wide-open ostium abdominale, and yet among those cases where the ovum has become affixed to the peripheral part of the tube or the ampulla, or where the lumen has become dilated from the ovisac to the open ostium abdominale (and cases of this description are, of course, alone under consideration here), I have found no typical case. Whether my Case II. is relevant here or not I must leave undecided; it is

[1] Werth, *l. c.* [2] Orthmann, *l. c.*

true it was a question of rupture of a pregnant tube with open ostium abdominale, but the ovisac was situated at a certain distance from the peripheral end of the tube, and though the ovisac gradually passed into the distinctly enlarged periphery of the tube, it is questionable if the condition of tension so far inside the tube may not have differed from that of the cases above alluded to. In any case, the possibility of rupture having been brought about in the manner already indicated is not to be rejected off-hand, the more so as many facts in the case speak in favour of the blood having emptied itself through the open ostium abdominale.

We have seen in Case I. that the menses did not return until six weeks after tubal abortion. Similarly, they only returned in Case III. in the seventh week after the operation—that is, after the termination of protracted abortion. That it is common for the period to occur at this interval after early interruption of tubal pregnancy and not in the very first weeks I have had occasion to observe several times. This was the case, for example, when, about a year ago, in a case of very early ruptured tubal pregnancy (the period had not even ceased) I successfully performed laparotomy upon a woman at the point of death, twelve hours after the commencement of the acute attack. In this case the first period occurred just six weeks after the operation, and continued regular afterwards. I can also quote two cases to be met with in the literature of the subject where the date of return of the period is mentioned, and these are in full agreement with my own observation. One case of Veit's[1] is that of a woman hitherto perfectly healthy, who, during a country excursion, suddenly showed every symptom of collapse, accompanied by slight menorrhagia after eight weeks menostasis. Veit diagnosed ruptured tubal pregnancy, and saw the patient recover under expectant treatment. The period returned five weeks after the acute attack. In the second case, of Wyder's,[1] a decidua was expelled after seven weeks' menostasis. Wyder made the following diagnosis :—"Tubal gestation, ovisac probably ruptured without having led to much hæmorrhage into the pelvis." Here, also, the catamenia returned six weeks after expulsion of the decidua, and were afterwards regular. It seems to me important to remark that in these cases, as in my Case I., the condition of the menses was in no way influenced by any operative action.

The fact that the period only returns some weeks after the interruption of tubal pregnancy would seem to indicate that the process of involution is only completed at the end of this time in the uterus and Fallopian tube (at least in non-operated cases). In other words, the duration of childbed after interrupted tubal pregnancy appears to be of the same length as in physiological childbed. I would, moreover, by

[1] Veit. *Centralblatt für Gynäk.*, 1884, s. 803.

no means over-estimate the importance of this observation, and believe that, just as certain irregularities are met with in regard to return of the menses after childbed and after ordinary abortion, deviations from the process described may in like manner occur after interrupted tubal pregnancy. It would certainly be interesting and important for the more accurate knowledge of tubal pregnancy if extended observation could establish the fact that the catamenia follow this course in the majority of cases. In so doing, however, regard must be had to the fact that childbed in cases of protracted tubal abortion only begins on the day when the abortional remains or the tubes are removed, and not on the day when the decidua is expelled.

Meantime I believe that such a condition of menstruation, following clinical symptoms which give rise to a suspicion of tubal pregnancy, would make the diagnosis certain, assuming that it is possible to exclude ordinary abortion.

Conclusions.

In concluding this work I would sum up the results of my investigations as follows :—

(1) It will be found useful, in accordance with the course taken by the abortion, to distinguish between simple complete tubal abortion, where the entire ovum is expelled from the tube, and imperfect protracted tubal abortion, where portions of the ovum remain in the tube (tubal mole).

(2) Complete tubal abortion, accompanied by more or less severe non-recurrent symptoms, leads to the formation of hæmatocele, which may take any of the known courses.

(3) Symptoms of acute internal hæmorrhage are less marked in complete tubal abortion than in rupture of the pregnant tube ; but appearances of severe shock may occur which may be explained partly by the painful tubal labour pains in very excitable nervous systems, and partly by the influence of the blood upon the peritoneum. Sugar may occur incidentally in the urine in the acute attack.

(4) In imperfect tubal abortion hæmorrhage leads to destruction of the ovum, and to formation of a mole in the tube. When the ostium abdominale is open the blood effused into the tube passes by it into the abdominal cavity, where it leads to the formation of hæmatocele. So long as the degenerate ovum or any portion of it remains in the tube it leads, as in protracted uterine abortion, to increasing recurrent hæmorrhage, resulting in enlargement of the hæmatocele. The clinical aspect consists, firstly, in tubal labour pains and expulsion of a decidua, then

[1] Wyder. "Beiträge für Lehre von der Extrauterinschwangenschaft," etc.—*Archiv für Gynäk.*, 1886, No. 28, s. 325 (Case V.).

in often-recurring attacks of labour-like pains with symptoms of internal hæmorrhage, whilst locally, firstly a swelling of the tube, then the formation of a gradually increasing hæmatocele can be traced. During the attacks symptoms of acute anæmia may appear in a high degree, but the most characteristic feature is frequent recurrence of the attacks.

(5) Occasionally with tubal moles a high degree of attenuation of the tubal wall is found at the point of insertion of the degenerated ovum, even when the ostium abdominale is wide open, and without there being much distension of the tube. This attenuation of the tubal wall may best be explained by a purely local expansion of the wall, caused by the effusion of blood lying originally only between the wall and the ovum. It is probable that an increase of expansion and attenuation of the wall thus produced may occasionally lead to rupture of the tube at this place, even when the ostium abdominale remains open.

(6) In protracted tubal abortion, with open ostium abdominale, the removal of abortional residue or the tubal mole, with conservation of the Fallopian tube, is to be regarded as the goal of treatment; in the most cases, however, removal of the whole Fallopian tube will be a necessity. Therefore, when protracted tubal abortion is diagnosed laparotomy is the only operative treatment possible, as every operation by the vagina is to be rejected.

(7) Upon certain occasions and under conditions which are not thoroughly explicable, hæmatocele extrauterina may be so constituted that it can be enucleated like a tumour. In laparotomy an attempt at enucleation should always be made before opening a hæmatocele.

(8) The first period after interrupted tubal gestation occurs in the course of the first 6—7 weeks following the complete termination of abortion or removal of the tube (in protracted tubal abortion). Subsequent diagnostic conclusions can occasionally be drawn from this condition of the catamenia.

In conclusion, I wish to offer my best thanks to the translator of this paper, who wishes to remain anonymous; to my friend, Dr. Des Vœux, who most kindly revised the translation; and to Mr. Butler-Smythe, to whom I am very much indebted for the interest he took in it.

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