In medicine and surgery even more attention than at present should be given to clinical teaching. In this matter it is not to be wondered at if students benefit more at the smaller than at the larger schools. In these they are more directly known to the teachers, who naturally come to have a more personal interest in their progress, and who are able frequently to give more continuous instruction at the bedside. It is obvious, too, that time saved from the general lectures could be devoted, much more profitably, to bedside study. Is it not, to say the least, strange that in a curriculum of five years, only two are required to be given to hospital instruction? Three years, that is, for what may be styled the scientific basis of professional knowledge, and only two to its practical application in real cases. Yet we are supposed to be training not scientists, not experts, not specialists, but ordinary medical practitioners; men who, directly on obtaining their qualifications, may be called upon to deal with any medical, surgical, or obstetrical emergency, requiring, it may be, the exercise of reflective power and self-control such as practice only gives. To say nothing of exceptional calls those who leave our hospitals should at least be capable of taking charge of the work of an ordinary practice. Surely for this purpose three years would not be too long a time for bedside studies, and two years to a youth equipped as we have suggested should be sufficient for all that is necessary of the earlier subjects. This address was prepared before that delivered at Carlisle by my distinguished fellow-student, Professor Sheridan Delépine,¹ at whose confirmation of my views I am most pleased.

For the purposes of clinical instruction, at least for a certain number of students, it has frequently been urged that the infirmaries attached to our Poor-law institutions should be available. That this should be so everyone will admit, and it is a great pity that they have not been put to such use for many years past. In support of this I need only give the example of the Wolverhampton Workhouse Infirmary with its 247 beds and 1,115 in-patients during the past year; of this I have the honour to be Chairman of the Management Committee.

With regard to the question of pupilage, having had the great advantage of being a pupil to a general practitioner, I am able to appreciate the value of such an experience. Every student should be compelled after passing his preliminary examination, including, if possible, elementary chemistry and physics, to spend a year as a pupil, either in a public institution under the care of a qualified medical man, or with a general practitioner where he could learn the ordinary routine of work, the dispensing, and see vaccinations performed, as well as operations in minor surgery, etc. Such a course would lead to the disappearance of the recently-qualified men, of whom we hear so much nowadays, who know everything theoretically and nothing practically.

You will not be surprised to learn that, in my opinion, examinations in medicine and surgery are no less unsatisfactory than the teaching in those subjects. The regulation that a student may pass the three parts of the first or the third examination of the Conjoint Board at different times is most absurd. A man is allowed to show his knowledge or want of knowledge in chapters, to drop one part as quickly as it has been "crammed up" in order that he may the more easily proceed to "grind" another. Given, under such conditions, a sufficiently long purse to continue enough years at college, and surely the greatest dullard could pass the portals sooner or later. To allow a student to proceed at all on such terms is a blunder. Let the authorities endeavour to decide upon a minimum of knowledge and capacity for members of the profession, a minimum which shall have regard to the progress of general knowledge, the increasing education of the people, and the evergrowing seriousness of our responsibilities and duties to the community, and let the regulations require and enforce that minimum.

For these reasons I cannot agree with Mr. Pridgin Teale and others who propose that the General Medical Council should inquire, "How far examinations and the occasions of rejection can be reduced in number?" Nevertheless, I consider the method of conducting the examinations, the tests applied, the extent of the knowledge required in many of the subjects, the want of fitness for their delicate and difficult

duties shown by some examiners—these are all capable of improvement. What use, for instance, is it to a busy practitioner to know the way in which, say, gallic acid is prepared? Then, again, examiners are but mortal, and in the final decision as to a candidate's success or rejection, the results of the periodical class examinations throughout the session, which should be compulsory on every student, ought to be taken into consideration, for these, taken together, are far more likely to give a fair idea of the student's progress. It would be well, also, if the examinations could be so framed as to test the "originality" of the candidates as well as their mere power of acquiring facts.

The vexed question of university degrees could be very simply solved if the existing bodies could be got to act together. All that should be required of a candidate would be to take, in addition to his Conjoint Board examinations, two extra subjects in his preliminary arts, a preliminary scientific, and a further clinical examination after his final. He would on passing these be entitled to the M.B. degree of the university to which his hospital was affiliated. The degree of M.D. would follow, as now, after a certain period of probation, under fixed regulations, and with the presentation of a thesis or other indications of further study.

There are many other topics I could wish to have touched upon, such as that of the General Medical Council, that of ethics and so forth, but I shall be more than rewarded if this address shall, in however remote a degree, stimulate all, or any of us, the members of the Staffordshire Branch, to renew our efforts to procure better training for our juniors, a higher standard of ethics for ourselves, and for all who are privileged to enter our profession.

REMARKS ON THE DIAGNOSIS AND TREATMENT OF EXTRAUTERINE FŒTATION, WITH NOTES OF A COMPLI-CATED CASE.¹

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THE development of an ovum outside the cavity of the uterus occurs so rarely that many experienced practitioners have never seen an example; but, notwithstanding this, the condition is worthy of our most serious consideration, because the accident may present itself for treatment at any moment, and because, when this complication does occur in its most acute phase, it gives rise to results of the most appalling and distressing description, alike to the friends of the patient and to the medical attendant. The importance of the subject is enhanced when we remember that the patient may appear to be, and may really be, in perfect health when she conceives, and even up to the moment when serious symptoms show themselves. She is, of course, in the child-bearing period of life, and she is often a young mother. My last, and perhaps the best, reason for selecting this subject as a matter for discussion is the fact that in a proportion of cases a most deplorable disaster may be turned into a surgical triumph if a rapid diagnosis be followed by prompt treatment.

In considering the subject of extrauterine gestation from a clinical point of view, it is desirable to bear in mind two main facts: namely, that a woman in this pathological state is pregnant, and that the foetus is not in the womb. The signs and symptoms observed are attributable to one or other of these conditions, but those due to the pregnancy and those due to the ectopic growth of the foetus develop more or less independently of each other. The signs of pregnancy may all be present except those found by a physical examination of the uterus. Amenorrhœa may be complete for nine months, quickening may be felt, milk may appear in the breasts, an abdominal tumour may be present in which the foetal heart and foetal movements are readily detected, and at the end of nine months a spurious labour may take place. In fact, the signs of pregnancy may be so complete and so uncomplicated by other symptoms that no thought of the existence of an abnormal condition is aroused until the gestation has continued beyond the usual period. On the other hand, the

¹ BRITISH MEDICAL JOURNAL, 1896, vol. II p. 312.

¹ Read before the East Surrey District of the South-Eastern Branch.

ectopic gestation may rupture and give rise to most alarming and even fatal complications when the signs of pregnancy are so little marked that the patient may not have the slightest suspicion that she has conceived. Every medical man knows that it may be difficult to form a definite opinion on the question of the existence of pregnancy in the earlier months of gestation. It has even been said that there is no absolutely certain sign of pregnancy except the beating of the foetal heart. In a case of extrauterine gestation the signs are, as a rule, still less definite than in the normal condition. Menstruation frequently occurs at irregular intervals, and a discharge may continue for three or four weeks at a time, perhaps only one period being missed or delayed.

The uterine mucous membrane develops to a certain extent as if the ovum were in its proper place; but, as the foetal structures do not become implanted on the maternal structures prepared to receive them, part of the mucous membrane is shed very much as it is at term, or in the case of the death of a foetus *in utero*. A complete cast of the interior of the womb may be expelled, or the decidua, when cast off, may be broken into more or less shapeless pieces. When a deciduous membrane is thrown off after an interval of amenorrhoea or irregular menstruation, the patient and her friends are very apt to believe that a miscarriage has taken place, and it may be stated by them as a fact that the patient has miscarried. Thus the symptoms of pregnancy may be complete and perfect, or they may be of the vaguest description.

Although signs due to the ectopic gestation of the ovum may not attract attention until it is found that the pregnancy does not terminate in the usual way by the birth of a child, yet, as a rule, serious complications arise before the end of the third month.

There is little doubt that in the condition under consideration the ovum commences its development in the Fallopian tube in the great majority of cases, if not in all, a view which was urged by Mr. Lawson Tait for many years before it was generally accepted. As my paper must be short, I shall speak as if the tube were the only place in which an ectopic gestation may begin, and I shall not refer to the peculiarities which may be found when the foetus is situated in that portion of the tube which passes through the uterine wall.

It has been surmised that an ectopic gestation never occurs except in a diseased tube in which, as a consequence of some inflammatory process, the ciliated epithelial cells have been replaced by non-ciliated cells, by which change the passage of spermatozoa up the tube is permitted, and thus the ovum becomes fertilised before it reaches the uterus. It has also been said that the ovum is frequently impregnated in the tube, and that the absence of cilia is the cause of its developing there. These seem to me merely theoretical assumptions.

The evidence offered is that in cases of ectopic gestation it frequently happens that the patient has never been pregnant, or has been sterile for a long period before the extrauterine gestation occurs. Clarence Webster has advocated the view that a tubal pregnancy is more likely to occur in a healthy tube, and in the case which I shall relate there was certainly no reason for believing that any previous disease of the tube had existed. The patient, who had considered herself, and was considered, perfectly healthy, developed a tubal pregnancy immediately after marriage.

The walls of the Fallopian tube containing the developing ovum show little or no tendency to hypertrophy. If the foetus lives the tube invariably ruptures, and this usually occurs before the end of the third month of gestation. The mode of rupture determines whether the patient's life is to be put into immediate danger, or whether she is to go on to a further stage of the disease. There seems to be no irritation due to the presence of the foetus up to the time of the rupture. Therefore the Fallopian tube does not become adherent to the adjacent structures, and if the rupture takes place at any point where the tube is covered by peritoneum, there is nothing to prevent the torn tissues from pouring their blood freely into the peritoneal cavity. Hence the rupture, in addition to a sudden severe pain in the pelvis, induces a state of more or less profound collapse. The patient may faint or remain unconscious for a considerable time. Sweating is profuse, the pulse is small and rapid, the temperature is low, and death from hæmorrhage may occur within an hour or two.

Sometimes, however, the tear in the Fallopian tube is so small that the bleeding is spontaneously arrested and recovery takes place. The disturbance may indeed be so slight that the patient does not mention it, or remarks on it merely as a matter of curiosity. She is only in safety, however, for a time. Another, and perhaps a third, hæmorrhage may occur, and death may be induced rapidly in any of these attacks. This hæmorrhage from rupture of the Fallopian tube into the peritoneal cavity constitutes the chief and most urgent danger of an ectopic gestation. I will therefore recapitulate the conditions which lead one to suspect that this accident has occurred. The patient may have had pelvic trouble, or may have been perfectly healthy. She may have borne children or she may not. Some of the early signs of pregnancy, but perhaps only some irregularities of menstruation, have usually been noted within three months of the attack for which advice is sought. At the stage of gestation at which the tube ruptures there is no marked change in the breasts. Very often a decidua has been expelled from the uterus. The urgent symptoms consist of an acute pain referred to the pelvis and the evidences of a sudden internal hæmorrhage which may be slight in amount or so severe as to kill the patient in a very short time. The attack may be induced by some exertion, but this is not a necessary point in the history.

On examining the pelvis of a patient in whom a tubal pregnancy has ruptured into the sac of the peritoneum, some thickening, or a distinct enlargement of one of the Fallopian tubes, will be found; but the blood effused, being free in the peritoneal cavity, is not appreciable to palpation, and it is rarely present in sufficient quantity to give rise to fluctuation on percussion of the abdomen. The uterus is freely movable, and is usually slightly enlarged.

When these conditions are present, and the collapse is so marked that the patient's life is in danger, there is very little doubt that an extrauterine gestation has ruptured into the peritoneal cavity, and the only proper treatment is a prompt arrest of the hæmorrhage by opening the abdomen and ligaturing the broad ligament. I am not an advocate of the view that abdominal surgery is an easy branch of practice. I may, perhaps, be permitted to say I consider it more important in this field than in most that the surgeon should gain experience by assisting others, and by seeing work done by others, before he undertakes to operate himself. Not that a simple ovariectomy, for instance, is necessarily an operation requiring a special education, but the diagnosis of abdominal conditions, even sometimes of a simple ovarian tumour, is often uncertain, whilst the more difficult operations are very dangerous, and may quite unexpectedly tax the resources of the operator to the uttermost. Nevertheless, an ectopic gestation which has ruptured into the peritoneal cavity, so far as the necessity for immediate operation is concerned, is on a par with cases of profuse hæmorrhage in other parts of the body. The medical attendant must act promptly, however small his experience may be, just as he must perform tracheotomy when he cannot otherwise relieve a case of obstruction of the larynx, and must cut down on an acutely strangulated hernia.

Fortunately, at the stage of the disease under consideration, the operation is often an easy one, so far as the manipulations are concerned. In its simplest form it consists of making an opening into the abdomen through the linea alba, transfixing the broad ligament about its middle, well below the ovary, by means of a needle armed with a double aseptic silk ligature, and tying these ligatures, one on the outer and one on the inner side of the ovary and Fallopian tube. Care must be taken that the two pieces of silk twist round each other at least once before they are tied, so that when tied they shall form one figure of 8 ligature and the tube and ovary shall be completely shut off from the rest of the circulation without any danger of the broad ligament being split, an accident which may give rise to serious hæmorrhage. The parts excluded from the circulation must be cut away about a quarter of an inch beyond the ligatures, and for greater security another piece of aseptic silk should be placed and firmly tied in the groove formed by the ligatures already adjusted.

The blood effused into the peritoneal cavity should be removed, and it is usually recommended that this should

be done by washing with boiled water or with a 6 per cent. aseptic solution of chloride of sodium at a temperature of from 100° to 104° F. The washing is most conveniently accomplished by means of a long tube conveying the water from an elevated vessel by a siphon action, the end of the tube being placed in turn in the various deep recesses of the abdominal cavity and the water being allowed to flow freely from the wound until it returns quite clear. But a suitable tube and a properly prepared lotion may not be at hand, and it is then well to remember that the peritoneum is capable of absorbing aseptic blood clot in very large quantities. I consider it safer to leave much clot in the belly cavity than to remove it with a lotion of doubtful asepticity. On one occasion I left a very large quantity of blood clot rather than wash out the peritoneal cavity, and the patient made a complete recovery. Unless it is very clean the pelvis should be drained by means of a Keith's tube, whether washing out has been resorted to or not. The wound should be sewn up in the usual way. The chances of success in operating depend mainly on prompt action, care in preventing septic contamination, and the avoidance of unnecessary interference with the intestines, which may lead to an ileus or a pseudo-ileus during convalescence.

The question must arise as to how to distinguish the conditions indicating rupture of an ectopic gestation into the peritoneal cavity and requiring immediate operation from those of the severe fainting attacks which sometimes occur in pregnant women. This may be difficult, but I do not think an error should occur. In slighter cases of hæmorrhage there is always time for consideration, and in cases of doubt a second opinion may be called in. But when a woman is dying of internal hæmorrhage there is no doubt as to the urgency of her condition, and, if the history and physical signs tally with those of an ectopic gestation ruptured into the peritoneal cavity, the abdomen should at once be opened. The question of waiting for the state of collapse to pass off can only arise if the patient's condition is clearly improving. When she is going from bad to worse, nothing will do any good but the immediate arrest of the hæmorrhage. This, of course, is to be followed by strychnine injections, the administration of brandy by injection or by the rectum, the application of warmth to the skin, and transfusion of saline solution if the state of the patient indicates such treatment.

The symptoms of an extrauterine gestation which has ruptured into the peritoneal cavity may, however, run a course which is much less alarming than that I have indicated. It not rarely happens that the effused blood forms a clot which becomes partially organised into a kind of living blood tumour, the outer layers of which are tough enough to prevent further effusion. In many such cases the blood seems to escape from the fimbriated extremity of the Fallopian tube at such an early period of gestation that no sign of an ovum is found. A tumour is formed which is fairly easily removed, its adhesions being readily separated. Such an effusion may of course be absorbed, but there seems to be a tendency to persistence in these clots.

In the following case some of the dangers and difficulties which may arise from an effusion of this kind are illustrated:

On March 21st, 1896, I was asked to see a patient, 23 years of age, who had been married on December 24th, 1895, at which time she considered herself in every way healthy. Her menstruation had been quite regular, not profuse and not painful, the last period before marriage having begun on December 11th, and ceased on the 15th. In January she did not menstruate, but on January 25th she began to have a very slight show, which appeared every day for four weeks. On February 21st she fainted when out shopping, and on the 22nd she was supposed to miscarry. Substances "like bits of flesh" came away with some blood from the vagina, but these were not seen by any medical man. The patient lost blood for ten days, and then, whilst taking her breakfast in bed, she was suddenly seized by severe pain in the lower abdomen, became very sick, and fainted, it being an hour or more before she recovered. The pain persisted, and she continued to feel faint and sick at frequent intervals. A few days after the first onset of pain and faintness the skin became yellow, but it gradually resumed its natural colour. The bowels were constipated, and there was considerable tympanites, but both conditions were greatly relieved by enemata.

When I saw the patient on March 21st, eighteen days after the most severe attack of pain and faintness, there was slight fullness of the abdomen, which was everywhere resonant. There was a tender swelling rising out of the pelvis, and extending two-thirds of the distance between the pubes and the umbilicus on the right side, and not quite so high on the left. The sound passed 2½ inches into the uterus, which lay in front of a very tender mass filling the pelvis. The uterus was slightly movable from side to side, and I judged that the swelling was in Douglas's pouch,

and not in the broad ligament. If it had been in the broad ligament the uterus would have been more fixed, and either pushed over to one side if the disease had been unilateral, or surrounded by the abnormal tissue if both broad ligaments had been affected. The breasts did not show any of the signs of pregnancy except that the areolæ were slightly darker than is usual in a virgin. This might, however, have been due to the fact that the patient's complexion was naturally dusky.

I expressed the opinion that the patient had an extrauterine foetation which had ruptured, and she was admitted to the Samaritan Free Hospital on March 23rd. On that day one of my colleagues saw the case with me in consultation, and his view was that the symptoms were insufficient to justify my diagnosis. In the evening of the same day at a debate on extrauterine foetation at the Medical Society I shortly stated the foregoing facts and opinions, because they seemed to illustrate the practical difficulty of making an exact diagnosis in cases of this kind.

The patient continued in much pain, especially when the bowels moved, which only occurred after laxative medicine or an enema had been given. Her temperature ranged between 98° and 100.6° F., and her pulse varied from 88 to 100 per minute.

In further consultation with my colleagues the majority agreed with me, so on March 27th I opened the abdomen in the middle line below the umbilicus, and found that it was not possible to pass the finger into any part of the pelvis because of adhesions of the intestine to the pelvic peritoneum. The lowest part of the most prominent coil of adherent gut had the ashen grey appearance of the cyst wall of an ovarian tumour when its pedicle has been recently strangulated by twisting, and there was a well-defined line marking off the discoloured from the healthy portion of the gut, so that I at first thought I might be looking at a cyst adherent to bowel. A careful examination showed that the discoloured tissue was intestine, and on separating its attachments, which were very strong, from the bladder wall, I opened a cavity from which there flowed a considerable quantity of thin serous fluid of a rather light colour, but neither truly purulent nor offensive. With very great difficulty I separated other strong adhesions of the intestines, the walls of which proved tougher than their appearance led me to expect. A rounded coil behind the right broad ligament was exposed and easily removed; but the ovary and Fallopian tube were matted together and held so firmly down that it was difficult to make a pedicle. There were some tough adhesions towards the outer part of the broad ligament which I could not break through. After tying and dividing them, I found that I had cut off the tip of the vermiform appendix. I at once cleaned the divided mucous membrane, and, after placing a pair of forceps on the proximal end, I removed the tip. I was then able to separate the broad ligament freely on its outer edge and to pull up, tie off, and remove the right ovary and Fallopian tube. On returning to the appendix, I found that the forceps which had been placed on its mucous membrane had by their weight drawn the mucous coat out of the other coats. This made it extremely easy to remove the appendix by the plan recommended by Mr. A. E. Barker, namely, by tying the mucous coat close to the bowel, pushing the ligatured portions inwards and closing the wound in the other coats separately. There was still much inflammatory adhesion of the bowel deep in the pelvis, but, considering the obviously-damaged vitality of the gut, I did not think it wise to do more towards separating the adhesions than was required to free the left ovary and Fallopian tube, which were otherwise healthy. I put a short glass drainage tube in Douglas's pouch, the deep end being placed to the left side, where it seemed to press least on the intestines.

The patient was put to bed in fairly good condition, and the severe internal pain from which she had suffered was immediately and completely relieved by the operation. The highest temperature following the operation was 101.2° F in the vagina on the fourth day; the highest pulse was 128 the next night. There was no trouble in any way during convalescence, but the condition of the discharge from the drainage tube caused me great anxiety. The amount of discharge was always slight. After the first day, however, its odour was distinctly fecal. As usual, a sponge wrung out of a solution of carbolic acid, and enclosed in a rubber sheet, was placed over the end of the glass drainage tube, the flange of which was passed through an opening in the rubber sheet. It was remarkable that the discharge collected in this sponge was free from odour, whilst that sucked out of the glass tube by means of a syringe and small rubber tube was extremely offensive; and yet, before the dressing was finished, this also was free from odour. It seemed to me that the bowel was not ruptured, and that the odour was due to the passage of gases, or bacteria, through the damaged wall of the gut. I felt certain that the removal of the vermiform appendix was not the cause of the offensive odour of the discharge, because there was a layer of fairly healthy tissue over the ligatured mucous membrane, and no leakage could have taken place from the bowel at this part without causing very serious constitutional disturbance. It had, moreover, been evident at the operation that part of the bowel wall was almost sloughing, and so in a condition to favour the escape of its gaseous contents. Obviously, it was not desirable to keep a hard glass drainage tube in contact with this gut; but, on the other hand, I judged it imprudent to put in a much smaller tube, and it was possible that if I took the glass tube out with a view to putting in a rubber one of the same size, I might not be able to get the new tube into the proper channel, and might do much damage by the change. I therefore left the glass tube in until, after the lapse of nine days, there was hardly any discharge, and this not always offensive. I then inserted the largest rubber tube that would go through the glass tube, and drew out the latter over the former. For a few dressings after this the discharge was as offensive as it ever had been, but, as before, the odour only continued for a minute or two after the discharge was removed from the tube by suction. The tube was gradually shortened, and the discharge ceased to be offensive after April 14th. The tube was finally removed on April 25th. The lower 2 inches of it and all the interior were quite black from the action of decomposing material on the red rubber. The patient went home on May 6th; menstruation returned in June and has been regular ever since. I saw the patient this morning. She considers herself quite well, and looks very well. She has no trouble from the bowels, no pain and no tenderness in the abdomen. The uterus is much more free in the pelvis than I should have thought possible.

Mr. Targett kindly examined the specimen removed. There was no foetus found amongst the clot or in the fluid. The Fallopian tube was ruptured about an inch from its fimbriated extremity, the abnormal openings being less than an inch apart. The wall of the sac with which they communicated showed degenerated chorionic villi imbedded in laminated blood clot.

The course of a case of extrauterine gestation may turn in still another direction when rupture of the Fallopian tube takes place. This tube marks the upper part of the broad ligament, and is surrounded by the peritoneum forming that ligament in exactly the same way as the peritoneum of the mesentery surrounds the bowel. The greater part of the circumference of the tube is therefore free in the peritoneal cavity. But the site of the rupture is supposed to depend on the position of the placenta, which eats into and weakens that part of the wall of the tube to which it is attached. Hence, it may happen that the rupture takes place into the cellular tissue between the folds of the broad ligament. The liability to rupture in this direction is doubtless increased by the enlargement of the tube which takes place before it bursts, and which must separate the layers of the broad ligament to some extent. When rupture occurs into the cellular tissue the symptoms induced are less serious than when the peritoneal cavity is opened. The symptoms due to the pregnancy are of course of the same indefinite character referred to above, but the amount of hæmorrhage is limited to the capacity for rapid distension of the cellular tissue, and the accident is rarely immediately fatal. On making a bimanual examination the conditions found are quite different in the two cases. When the blood is in the broad ligament a well-marked tumour is found which pushes the uterus forwards and to the healthy side, and fixes it in that position, the greater part of the pelvis being filled by a hard mass, which may be felt also above the pubes. In the management of this condition there is usually time for consideration as to the best line of treatment to adopt, and it is said that many patients recover without operation, the effused blood and the foetus with its membranes being absorbed. When a cure takes place without operation, however, there is always room for doubt as to the diagnosis, and it seems to me that whenever an extrauterine foetation is clearly diagnosed it should be removed whether it has ruptured into the peritoneal cavity or into the cellular tissue. Even if it were proved that many cases recover without operation, it is certain that a woman's life is not safe with a dead foetus in the connective tissue of her broad ligament. Although, on the one hand, complete absorption of the foetus, its membranes, the placenta, and the effused blood may take place; on the other hand, suppuration may be induced, and the abscess formed may burst into the vagina, bladder, rectum, or small intestine. The risks of such a termination are obviously very great, and if the patient survives it can only be after a prolonged period of exhausting febrile disturbance.

The dangers are also great if, as sometimes happens, the foetus continues to develop after the rupture of the tube. This may occur when there has been distinct evidence of a rupture, but the tube seems sometimes to give way so gradually and gently that no symptoms are induced. It is in such cases that the pregnancy may go on to term without giving any cause for consulting a physician on the part of the patient. Of course the longer the foetus lives the more definite are the evidences of pregnancy.

When the development of the foetus goes on between the layers of the broad ligament, it would seem that its relations to neighbouring structures may vary exactly as those of an ovarian or broad ligament cyst vary. On the one hand, the sac containing the foetus may have a distinct pedicle formed by the broad ligament, and in some such cases it has been said—perhaps rightly—that the foetus is not between the layers of the broad ligament, but that it has developed in the ovary itself from the beginning. On the other hand, the developing foetus may separate the layers of the broad ligament, and raise the whole peritoneum of one side of the pelvis and much of this membrane on the other side completely away from its proper connections, so that it is reflected from the posterior abdominal wall on to the sac containing the foetus well above the pelvic brim, and from the anterior wall at a level half way between the navel and pubes.

At any time inflammatory changes may be induced in the sac of an ectopic gestation. Its walls may become so attenu-

ated that their blood supply is dangerously diminished, and then, as in the case of an ovarian tumour, either a rupture takes place or more generally adhesions form to neighbouring structures.

If the foetus dies it may be absorbed. Very rarely its fluid parts are absorbed, and the solid parts are preserved in the tissues, retaining a more or less normal appearance for an indefinite period. As a rule it causes suppuration, and finds an exit for itself through some of the adjacent hollow viscera or into the vagina, causing, of course, great danger before a cure can finally take place.

The vagina and rectum offer comparatively safe lines of egress. On the other hand, I have seen two cases in which the sac of a full-grown foetus had become adherent to everything it touched and a rupture had taken place into the small intestine. It is hardly possible for a patient to have a more hopeless complication. If the chances of the development of inflammatory changes are considered, and also the fact that, whilst the placenta and the sac containing the foetus are small, the probability that the surgeon will be able successfully to remove them is greater than at a later period, it seems to me that in the later stages, as in the earlier stages, of an extrauterine foetation, whenever it is diagnosed an operation for its removal should be undertaken as soon as possible, and no attempt should be made to wait till the child is viable. The dangers to the mother are too great to warrant any such delay. If the child is already viable when an extrauterine pregnancy is discovered, of course every effort should be made to save both mother and child.

The operation necessary must vary with the relations of the sac containing the foetus. If there be a well-marked pedicle, the operation may be as easy as a simple ovariectomy. But if the foetus develops under the peritoneum, and if this membrane is reflected on to the top of the abnormal gestation some inches above the pubes, it is better, if possible, not to open the peritoneal cavity at all, but to extract the child by an incision between the reflection of the peritoneum and the pubes. The foetal membranes must be removed, and a drainage tube should be placed in the wound. In other cases, when the peritoneal cavity must be opened, it is often possible to stitch the edges of the incision into the gestation to those of the abdominal wound, and thus to provide efficient and safe drainage.

There is room for a difference of opinion as to whether the placenta should be removed at once or left to separate and come away later. On the one hand, there is the risk of hæmorrhage; on the other, the risk of septicæmia. The surgeon must be guided by the circumstances of the particular case as to which plan he should adopt, and he should chiefly note whether it is likely to be possible to prevent hæmorrhage from the parts to which the placenta is adherent by ligatures or by the application of pressure. If so, the placenta should be removed. If the prospects of being able to arrest hæmorrhage appear small, it may be safer to leave the placenta to separate and come away later. When the peritoneal sac is not opened, or if the incision in the sac containing the pregnancy can be fixed to the incision in the abdominal wall, the cavity from which the foetus has been removed may be packed with iodoform gauze, and a large opening may thus be preserved for the exit of the placenta.

It is impossible in a short space to attempt more than an indication of the mode of dealing with these cases; and, indeed, my own experience would lead me to the belief that there are few pathological conditions which produce such varied effects as an extrauterine gestation. Except in cases of emergency, therefore, I think this is one of the abdominal conditions which most requires experience before the surgeon attempts to deal with it.

Recently the early stages of an extrauterine gestation have been classed amongst those conditions suitable for treatment by abdominal section through the vagina. So far as my experience goes, the operations required in cases of ectopic gestation may differ so greatly in detail and may be so complicated that the fullest possible exposure of the parts to sight is essential for the safe performance of the necessary manipulations. The vaginal method of approaching operations on the broad ligaments seems to me only available in cases in which it is extremely doubtful whether there is any justification for operating at all. The method is specially

unsuitable for a condition like an extrauterine gestation—for such a case, for instance, as the one I have related to you in some detail.

I have not mentioned attempts to kill the foetus by puncture of its sac or by means of electricity, because I consider such methods far more dangerous than an exploratory operation.

A CASE OF SUDDEN DEATH DUE TO EMBOLISM OF ONE OF THE CORONARY ARTERIES OF THE HEART.

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FROM a clinical and pathological point of view the coronary arteries are chiefly of interest in connection with angina pectoris and fibroid disease of the heart. In discussing the influence of the coronary circulation on the heart, Cohnheim¹ says that cases are on record where the sole cause of death was found to be embolism of the coronary arteries. That this result is rare is shown by the fact that there is no example recorded in the *Transactions* of the Pathological Society. Embolism of the terminal twigs of the coronary arteries often occurs in pyæmia, giving rise to pyæmic abscesses. Dr. Hebb² has described embolism of the left coronary artery giving rise to myomalacia cordis in a case of ulcerative endocarditis; this condition of anæmic necrosis, due to blocking of the coronary arteries, Osler³ considers to be a common cause of sudden death in medico-legal cases. It is probably much commoner as a result of endarteritis and thrombosis than of embolism, of which the following case is an example:

A boy, aged 17, was admitted to St. George's Hospital on March 4th, and died April 27th, 1896. He was under the care of my colleague, Dr. Penrose, but in his absence from April 14th, until the patient's death, I took charge of the case. He had had two attacks of rheumatic fever—three and two years ago. On admission he was found to be anæmic, short of breath on exertion, and orthopnoic. The heart was dilated and hypertrophied, the apex beat being in the sixth intercostal space, two inches outside the nipple line, and the impulse somewhat diffused. The cardiac dulness began at the fourth rib. There was epigastric pulsation. The heart sounds were short and very rapid, varying during his stay in the hospital between 130 and 175. There was no cardiac murmur. The pulse was small, irregular, and of rather increased tension.

There were signs pointing to pleural effusion on the right side, but paracentesis was performed without any result. There was a cloud of albumen, varying in amount, in the urine. Oedema of the legs, and subsequently ascites and cedema of the scrotum and penis developed. He was treated with cardiac tonics and rest in bed, but his condition in no way improved, and on April 17th, paracentesis abdominis to thirteen pints was performed with considerable relief.

The cause of the condition of dilation and hypertrophied heart was by no means plain, but on the whole it was thought to be subsequent and secondary to rheumatic fever, and to be due to advanced mitral regurgitation; the absence of any characteristic murmur being explained by the extremely dilated condition of the heart. On the other hand, the tension of the pulse, and the absence of any definite signs of organic valvular disease, made it necessary to consider the possibility of the disease being primarily renal and secondarily cardiac. The varying amount of albuminuria, however, was quite compatible with the view that it was merely the result of chronic venous congestion.

The treatment with digitalis, strophanthus, citrate of caffein, and diuretics, in various combinations, being unsuccessful, and the patient's condition becoming steadily worse, it was determined to give a trial to Schott's method. Dr. Bowles very kindly undertook to direct, and indeed himself performed, the manipulations, which were limited to gentle movements of the arms in various directions for periods of quite short duration. He considered that the very serious

condition of the patient did not warrant any treatment by baths. Schott's treatment was begun on April 21st and continued till the end of that week. The patient expressed himself as feeling better, which indeed he looked; his breathing improved, and his pulse diminished somewhat in rapidity.⁴

On April 27th, two days after the last occasion on which Schott's movements had been practised, he was quite suddenly seized with great shortness of breath, and became cyanosed, and in spite of the administration of oxygen and a subcutaneous injection of ether he died ten minutes after the commencement of the attack, apparently from pulmonary embolism.

As it happened, Schott's manipulations had not been performed for forty-eight hours, Sunday intervening, and there does not appear to be any connection between them and the fatal result from coronary embolism. Had the patient lived a few hours longer they would, in the natural course of events, have been repeated, and if embolism had then occurred it might have been thought, in the absence of an necropsy, that they had, by exhausting the already-dilated heart, led to cardiac failure. It is important, therefore, that a careful *post-mortem* examination should be made in any fatal case previously treated by Schott's method, so as to prove whether or not there is any relation between the two.

The *post-mortem* examination performed by Dr. Ogle showed that the pericardium was natural. The heart weighed 28 ounces, and showed hypertrophy and dilatation of both ventricles—especially the left. The auricles were slightly dilated. All the cavities of the heart contained *post-mortem* clots. The valve segments themselves were healthy, but the mitral and tricuspid orifices were enlarged as a result of dilatation of the ventricles, and more especially of the rings from which the auriculo-ventricular valves arise. There was no anæmic necrosis or appearance of an infarct, and both to the naked eye and microscopically the myocardium was healthy. There was an adherent thrombosis near the apex of the left ventricle. The orifices of the coronary arteries and the aorta were healthy, but on slitting open the coronary arteries an *ante-mortem* clot, similar in appearance to that seen in the left ventricle, was found impacted in the left coronary artery, about three-quarters of an inch from its origin, just before the septal branch came off. The vessel wall appeared healthy, except for a few specks of atheroma, and both the distal and proximal parts of the artery were free from any *ante-mortem* clot. This, then, was a case of coronary embolism, occurring—as is said to be most frequently the case—in the left or anterior coronary artery. The heart was shown as a card specimen at the Pathological Society on Tuesday, May 5th, 1896, by Dr. Cyril Ogle.

The right lung was everywhere covered by pleural adhesions, and over the lower lobe, where the visceral layer of the pleura was markedly thickened, there was a localised pleural effusion of small size. The lower lobe showed considerable fibrosis, with some dilatation of the bronchial tubes. There was some obsolete tubercle at the apex. The left lung showed to a slight degree the effects of chronic venous congestion, and contained no tubercle. The lungs were not cedematous. Cohnheim, after experimental ligature of the coronary arteries, never found cedema of the lungs, but Michaelis did, both in dogs and in rabbits.⁵

The left kidney weighed 1 ounce, was occupied by tubercle in a quiescent condition, and contained no secreting substance.

The right kidney weighed 8 ounces, showing considerable compensatory hypertrophy. There were scars of former infarcts and two recent ones. To the naked eye the kidney in other respects appeared healthy. Microscopically there was some increase in fibrous tissue along the lines of the vasa recta and around the glomeruli, but not sufficient in amount to explain the hypertrophy of the left ventricle. The spleen was cardiac, but did not contain any infarcts. The brain and vessels at the base were quite healthy.

Remarks.—That embolism of the coronary arteries has long been recognised as a cause of sudden death, is due rather to

¹ Lectures on General Pathology, vol. i, p. 86, New Sydenham Society.

² Trans. Path. Soc., vol. XXXV, p. 140.

³ Principles and Practice of Medicine, 1895, 2nd edition, p. 676.

⁴ Compare Dr. Bowles, *Practitioner*, vol. lvii, p. 30, July, 1896.

⁵ *Zeitsch. f. klin. Med.*, xxiv, s. 270, quoted in *Twentieth Century Practice of Medicine*, vol. iv, p. 438 (article, Angina Pectoris, by Dr. Whitaker).