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ON INTRAPERITONEAL HÆMORRHAGE INCIDENT TO ECTOPIC GESTATION.

THE BRADSHAW LECTURE

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IN a remarkable and fascinating essay on Matthew Arnold in the Literary Supplement to the *Times* for August 8, 1902, apropos of the diversity of Arnold's manifold claims to distinction, and of the direction in which, in the writer's opinion, he is most likely to achieve immortality, the essayist gives utterance to the following reflections: 'There is nothing,' he says, 'more thankless than the attempt to influence any field of public action or opinion. If you fail, you are a forgotten fool, but if you succeed you are by no means a remembered wise man. Everybody thinks as you once were alone in thinking; but everybody thanks himself, and not you, for the acuteness or wisdom of his thoughts; and no one can bring himself to believe that what is now the easy and obvious property of all was once the perilous and toilsome discovery of one.'

As I read this somewhat striking passage, I could not help applying it to matters medical, and more particularly to the subject upon which, in view of this lecture, my thoughts happened to be for the moment principally engaged. In the apparent obviousness of the

frequent and, indeed, almost constant association between pelvic hæmatocele and ectopic gestation, and in the wealth of clinical experience now available to illustrate that association, there is danger of our forgetting that it was to the enterprise and sagacity of a British surgeon, whom most of us have seen and known, that we and the whole medical profession are indebted for the simplification of what had hitherto been a very difficult, obscure and complicated subject, and for inaugurating a new era in the study and understanding of pelvic hæmatocele. Among the many and great achievements of Lawson Tait, I know of none to compare in their far-reaching beneficence with the revolution he effected in the knowledge and treatment of the hæmorrhages of ectopic gestation. He was the first to give us the basis of a true explanation of ordinary pelvic hæmatocele, and he was the first to make a serious attempt to save life in those terrible, and almost invariably fatal, cases of ruptured ectopic gestation with diffuse intraperitoneal hæmorrhage. Others had suggested opening the abdomen and stopping the hæmorrhage; Lawson Tait was, as I shall relate presently, the first to have the pluck to do it.

The subject I have chosen for my lecture is 'Intraperitoneal Hæmorrhage incident to Ectopic Gestation.' This covers both the limited and the unlimited effusions of blood due to this cause, but I have used the word 'hæmorrhage' in the singular designedly, in order to emphasize the fact that the difference is one of degree rather than of kind. Whether the blood poured out into the peritoneal cavity becomes encysted or remains free depends chiefly on the extent of the hæmorrhage and the rapidity with which the blood is poured out. In other words, it depends on the number, position, and size of the torn bloodvessels. If the hæmorrhage is considerable and takes place rapidly, as where one or more large vessels are torn, there is not time for the blood to surround itself with a wall of adherent viscera or a capsule of adventitious tissue and laminated fibrin; it escapes into the general peritoneal cavity and remains diffused amongst the abdominal viscera. Such diffuse intra-abdominal hæmorrhage occurring in a woman during the child-bearing age is usually due to a ruptured ectopic gestation. But before discussing its etiology I should like to draw attention to its diagnosis. There are no cases that test the diagnostic powers of the physician more severely than those which may be grouped under the head of acute abdominal cases. A patient is seized with sudden and acute pain in the abdomen, accompanied, perhaps, with vomiting, and very soon becomes alarmingly ill. There is probably no loss of consciousness.

There may be no rise of temperature. The physician is sent for, and at once recognises, from the suddenness and severity of the attack, and from the more or less marked collapse of the patient, that he is face to face with an unusually grave condition. What is it that has happened? The problem is not always an easy one, and yet the patient's life may depend upon its correct solution. I cannot, of course, within the compass of a single lecture pretend to give (even if I were competent to do so) the differential diagnosis of all the various accidents that may give rise to the symptoms just mentioned. But of the one with which we are at present specially concerned (diffuse intraperitoneal hæmorrhage due to ectopic gestation), I have seen a sufficient number of instances to enable me to speak of it from my own experience. For this reason, and also because some of its signs and symptoms are misleading, I purpose drawing your attention for a few moments to some of what I have been led to regard as the more important points in its diagnosis.

It may be stated at the outset that its signs and symptoms consist, speaking generally, of the signs and symptoms of an acute and sudden abdominal lesion *plus* those of severe internal or concealed hæmorrhage, and that whenever these are present in a female patient during the child-bearing age, the probability of their being due to a disturbed ectopic gestation should be vividly present to the physician's mind. The first symptom is the occurrence of a sudden and severe pain in the abdomen, accompanied very often with vomiting. The patient almost immediately expresses herself as feeling extremely faint and ill. She is quite conscious and remains so. The abdomen is often more or less distended and rigid, and it becomes excessively tender. There is soon noticed, along with the usual signs of collapse, a gradually increasing pallor of the surface. The pulse increases in frequency, without, at first, any corresponding rise in temperature, and becomes weaker and more compressible. Presently it is only now and then that it is perceptible, and finally it cannot be felt at all. The patient complains of feeling more and more faint; her pain perhaps abates; she becomes restless, sometimes vomits, often sighs deeply, yawns and exhibits other signs of weariness, and, if left untreated, gradually sinks, maintaining a perfectly clear intellect to the last.

Such is a picture, imperfect, as all attempts to describe such a condition in words must be, of the clinical aspect of a patient with diffuse intra-abdominal hæmorrhage. Now and then the bleeding becomes spontaneously arrested, the patient rallies, and, if no fresh

outburst occurs, the blood becomes gradually absorbed and the patient recovers. But the condition is one in which no such fortunate result can be counted upon, and in which the tendency is, not to recovery, but to death, and to very speedy death, for the majority of cases end fatally within forty-eight hours, and many within a much shorter time. In the case of the wife of a medical friend of my own, death occurred within three hours from the beginning of the attack.

If I were asked upon what points I should principally rely in diagnosing this condition, I should be disposed, in the light of my own experience, to enumerate the following, viz.:

1. The fact that at the moment of the attack the patient was in her usual health. This circumstance would render it highly improbable that the symptoms were due to gastric or intestinal perforation or to rupture of an internal abscess or suppurating cyst.

2. The gradually increasing pallor of the patient and the gradually rising pulse-rate (without corresponding rise of temperature), both being indicative of internal hæmorrhage.

3. The extreme tenderness of the abdomen. To this symptom I have learned to attach a very special value. It often misleads the medical attendant into supposing that there is acute general peritonitis. It cannot, therefore, be too strongly insisted upon that marked, and even excessive, abdominal tenderness does not necessarily indicate an inflammatory condition. It is met with, for instance, over ovarian tumours when, as the result of rotation of the pedicle, they have become the seat of hæmorrhages, intracystic and intramural. It is quite true that peritonitis is a not infrequent later result of this accident, but this marked tenderness may be observed when, on opening the abdomen, there is no visible sign of inflammation.

4. If a menstrual period has been missed or is overdue, the diagnosis of the case is greatly facilitated; but it does not follow that because menstruation has been regular rupture of an ectopic gestation may be excluded. For some of the most appallingly sudden cases of rupture occur (as I hope to point out later) at a very early stage of the pregnancy, even, it may be, before a single period has been missed. Hence arrested menstruation is not essential to the diagnosis, though when present it is a valuable help to it. If in addition to the arrested or delayed menstruation there is morning sickness, the diagnosis is even further facilitated. But, after all, these signs of early pregnancy do not prove very much. They do not even prove that the pregnancy, if present, is ectopic, or that,

whether it is or not, it has anything to do with causing the present illness. All that can be said is that, when symptoms are present that suggest the possibility of a ruptured ectopic gestation, these signs of pregnancy serve to confirm the suspicion.

These are, so far as I have been able to observe, the *main* helps to a correct diagnosis.

There still remain to be considered one or two other points of diagnosis of less importance than those just indicated.

It is frequently stated in text-books that when there is intra-abdominal hæmorrhage there will be the usual signs of the presence of free fluid in the peritoneal cavity. In a case of very extensive effusion, and in a patient without much fat in the abdominal wall, it may be possible to obtain evidence of fluctuation and of dullness in the flanks shifting on change of posture, but such evidence is not usually forthcoming.

Lastly, a word must be said as to the evidence obtainable by vaginal examination. Here, again, the signs are not very definite. There is no distinct circumscribed swelling to be felt, as in the case of encysted effusions (pelvic hæmatocele). All that can be made out is, in the words of my friend Mr. John W. Taylor, 'a full and boggy condition of the pouch of Douglas, suggestive,' to the experienced finger, 'of the presence of fluid or semi-clotted blood within the pelvis, but,' as he goes on to say, 'the symptoms denoting that a lethal hæmorrhage is actually taking place are of chief importance.'*

There is very often a slight hæmorrhage going on from the vagina, generally regarded by the patient either as due to the appearance of a delayed menstrual period, or, if she believes herself to be pregnant, as indicating the probability of a miscarriage.

Owing to the gradual subsidence of the pain, and the patient's freedom, as a rule, from anything like alarm about herself, the extreme gravity of the condition may easily be overlooked. In fact, as Mr. Taylor has pointed out, it is more frequent to find that the medical attendant has failed to appreciate the danger than that he has made an incorrect diagnosis.

I do not purpose on this occasion to enter at length into the general question of treatment. At the same time I cannot conclude my clinical picture of diffuse intra-abdominal hæmorrhage without a word of congratulation upon the unanimity that now prevails as to the absolute necessity, in such cases, for prompt surgical treatment.

* John W. Taylor, F.R.C.S., 'On the Diagnosis of Extra-uterine Pregnancy,' *Lancet*, September 17, 1892.

In the year 1875 Dr. John S. Parry, whose monograph on extra-uterine foetation, based upon the published records of 500 cases, presents an admirable example of patient labour and careful investigation, wrote in burning words of the helpless attitude of the profession at that time when confronted by this terribly fatal form of hæmorrhage. He spoke of it as an anomaly which had 'no parallel in the whole history of human injuries,' and made a powerful appeal to his professional brethren to adopt the only remedy that could possibly 'rescue a woman under these unfortunate circumstances.' For some years this appeal was practically disregarded. But in 1881 a notable incident happened. A general practitioner in the Midlands, a Mr. Hallwright, sent for Lawson Tait to see with him, in consultation, a patient who had arrived by train from London in a condition of serious illness, that illness having been diagnosed by Mr. Hallwright as probably hæmorrhage into the peritoneal cavity from a ruptured tubal pregnancy. With this diagnosis Tait agreed. The patient was blanched and collapsed, and Mr. Hallwright made the bold suggestion that Tait should open the abdomen and remove the ruptured tube. 'The suggestion,' says Tait, 'staggered me, and I am ashamed to have to say I did not receive it favourably. I saw the patient again . . . and again I declined to act upon Mr. Hallwright's request, and a further hæmorrhage killed the patient. A post-mortem examination revealed the perfect accuracy of the diagnosis . . . and I now believe that had I operated the patient's life would have been saved.' Taught by what he rightly calls 'this terrible lesson,' Tait was thereafter keenly on the alert, and when the next case presented itself—eighteen months later—he at once opened the abdomen, arrested the hæmorrhage, and removed the bleeding tube. Unfortunately this, his first case, was, to his bitter disappointment, unsuccessful. Nevertheless, he had at last inaugurated the only rational treatment, and the result has been that a large number of valuable lives have since been saved. For, notwithstanding its failure in the first case, this operation, both in Tait's own practice and in the practice of those who have followed his example, has probably been attended with more successful results than any equally important operation of modern surgery. A case that happened to myself shows under what apparently hopeless circumstances success may be achieved. A lady, aged twenty-seven, who had missed one menstrual period, and had reason to believe herself about a month advanced in pregnancy, was suddenly seized with very severe pain in the abdomen on rising from the act of micturition at 8.30 one

morning. She lay down again, but the pain became worse, and before an hour had elapsed she was in a state of collapse. When her medical attendant reached her at 11.30, the pain had somewhat diminished, but she was pale, cold, restless, and pulseless. I saw her about four o'clock in the afternoon. It was evident that the case was one of ruptured tubal gestation, and that there was intraperitoneal hæmorrhage. As the patient was still pulseless, it required some courage to advise an immediate operation. Nevertheless, I did so, feeling satisfied that the risk of waiting was greater than the risk of operating. Consent was obtained, the necessary preparations were made as quickly as possible, and at 5.30 the abdomen was opened. Two and a half pints of blood were found free in the abdominal cavity. In the right Fallopian tube there was a small rent, with fragments of tissue and clot adherent to its edges. The operation lasted half an hour. No pulse could be felt during the whole of that time, or for three hours afterwards. Then it began again to be perceptible, and from that time the patient made an uninterrupted recovery.

Before speaking of the morbid anatomy of *diffuse* intraperitoneal hæmorrhage, I wish to say something of the *non-diffuse* or *encysted* form—in other words, of pelvic hæmatocele.

A majority—probably a very large majority—of cases of pelvic hæmatocele is due to ectopic gestation. As it is with these cases alone that I have to deal in this lecture, the rarer cases, due to some other cause, may for the present be left out of consideration. It is evident, therefore, that in regard to the question of diagnosis it will be necessary to take note of the signs and symptoms of pelvic hæmatocele, together with the characteristic features of early ectopic pregnancy, and especially of early ectopic pregnancy that has been interrupted.

Pelvic hæmatocele is ordinarily characterized by irregular uterine hæmorrhage, and by attacks of pain, more or less severe, and often accompanied with vomiting, followed by the development of a distinctly circumscribed swelling, which may either be limited to the region of the uterine appendages on the affected side, or may more or less fully occupy the whole of the posterior part of the cavity of the pelvis, and encroach upon the lower part of the abdominal cavity.

The irregular hæmorrhages and the pain are almost equally constant symptoms. Thus, amongst the thirty cases that, during the last five years, have been verified in my own practice as due to ectopic gestation, twenty-five are recorded as having had both pain and

hæmorrhage, two as having had hæmorrhage alone without pain, and three as having had pain alone without hæmorrhage. In other words, hæmorrhage is recorded as having been present in twenty-seven out of the thirty cases, and pain in twenty-eight out of the thirty. When both symptoms are present, the onset of the two may be simultaneous, but either of them may precede the other by periods varying from a few hours to several days. With regard to the character of the discharge, it is, for the most part, dark in colour, moderate in amount, fairly thick in consistence, and, while it lasts, steady in its rate of flow. There are in some cases occasional gushes of bright red blood, but the general characters of the discharge are such as I have described them. This uniformity in its physical characters gives to the discharge, in my opinion, a considerable diagnostic value.*

The appearance of the decidua in the vaginal discharges helps to confirm the diagnosis, though, unfortunately, it often escapes observation. This membrane may be expelled, either entire or in fragments. It differs from that expelled in membranous dysmenorrhœa only in being thicker, and in the fact of its expulsion being an isolated, not a periodical, phenomenon.

The pain is usually sudden in its onset, and at first very severe. It soon abates, however, and in a few hours may, for the time, pass off altogether. It not unfrequently follows some strain. Its ordinary situation is one or other iliac region. It often recurs, the recurrences appearing to mark fresh internal hæmorrhages.

Amongst the less constant symptoms may be enumerated the following, viz., faintness, which occurred in about one-third of the thirty cases; nausea and vomiting, which occurred in about one-sixth; rise of temperature, which is recorded as having been present in about the same proportion; and retention of urine, which was met with in two cases.

No symptom is more misleading than the vomiting. It is constantly accepted as proof that the mischief is in the appendix vermiformis, or, at any rate, that it is intestinal.

The only other symptom that calls for special mention is the occa-

* There is, for example, no condition for which a disturbed ectopic gestation is more frequently mistaken than a threatened or incomplete uterine abortion. The physical characters of the blood discharged *per vaginam* often help to distinguish the one condition from the other. In contrast with the features I have above described as usually characterizing the blood discharged in cases of pelvic hæmatocoele, the discharge, in uterine abortion, is often very copious, fitful in its rate of flow, and variable in its colour and consistence. Gushes of bright red blood are apt to be both more abundant and more frequent, and these alternate with the passage of clots.

sional rise of temperature. From observations that I have been able to make, when the symptoms of a case of pelvic hæmatocele are in an acute stage—*i.e.*, during the first attack of pain or during subsequent attacks indicative of fresh hæmorrhages—I am inclined to think that the proportion of cases in which there is some rise of temperature is, in reality, much greater than that represented by the figures here given. I believe, in short, that it is rare to meet with a case of pelvic hæmatocele without at least temporary rises, and sometimes the rise extends to several degrees. In one of my earlier cases, in which the patient was under observation for five days before operation, the temperature during that time was never below $99^{\circ}6'$, and it was generally much higher, frequently reaching 102° , and on several occasions mounting to 103° and $103^{\circ}4'$. Yet the case proved to be an ordinary hæmatocele, with only the usual amount of adhesive peritonitis, and with no evidence of putrefactive or other morbid alteration of the effused blood. Alluding to this point in an address delivered in 1897, I spoke of it as somewhat remarkable that this question of the temperature had not hitherto received attention, and I recorded my belief that it is the non-recognition of this liability for the temperature to rise when internal hæmorrhage is going on 'that leads to so many cases of tubal gestation with hæmatocele being erroneously diagnosed as cases of pelvic peritonitis. The abdominal pain, the extreme tenderness, and the distension tend further to mislead' the medical attendant, 'and the gradual development of the swelling caused by the formation of the hæmatocele is regarded as' an inflammatory exudation.

As in the case of the diffuse form of intraperitoneal hæmorrhage, the diagnosis will be much facilitated if the patient is known to have missed one or more menstrual periods.

I pass on now to the physical signs of pelvic hæmatocele. In a typical case the swelling is situated centrally, and as regards the two sides of the pelvis is symmetrical. But typical cases are rare in medicine, and certainly in this instance they are, in my experience, quite exceptional. Looking over the notes of my last thirty cases, for example, I find only one or two that can be said to correspond with the usual text-book description of a retro-uterine hæmatocele. The ordinary condition of things met with in the pelvis on bimanual examination in the majority of cases that have come under my notice was as follows: There was an irregular, tender, fixed swelling, usually at first of the consistence, in the greater part of its extent, of soft blood-clot, but sometimes almost entirely of fluid consistence, situated behind the uterus, pushing that organ forwards and perhaps

to one side, distending Douglas's pouch, depressing the vaginal vault, bulging into the rectum, and extending laterally into, and filling more or less completely, one or other of the posterior pelvic fossæ. If the quantity of blood effused was at all considerable, the swelling was found to have reached upwards into the abdomen, the height to which it extended varying, of course, according to the size of the mass. It often reached to a considerably higher level than the top of the fundus uteri, and not infrequently extended up to or within a very short distance of the umbilicus. The upper limit of the swelling was usually higher on one side than on the other, and was irregular, owing to the adherent viscera that helped to form its roof. The outline of the swelling is difficult to make out at first, owing to the general abdominal distension, the rigidity of the muscles, and the extreme tenderness of the swelling itself. But in a few days these conditions are altered, and it becomes much easier to distinguish the outlines and consistence of the swelling. The general intestinal distension will by that time have somewhat subsided, the tenderness of the swelling itself and the rigidity of the abdominal walls will have become much less marked. At the same time the peripheral portion of the mass will in all probability have become hardened and better defined, owing to the deposit, upon the inner surface of the wall of the sac, of layers of fibrin derived from the blood-mass of the hæmatocele. The uterus itself is generally a little enlarged as well as being displaced forwards, and is adherent posteriorly. A pulsating vessel may often be felt in one or both of the lateral fornices of the vagina. Often one part of the swelling will feel more or less hard and nodular, usually the lower surface of the lateral portion. This irregular hardness is caused by the thickened, distorted, and adherent uterine appendages, or other pelvic viscera, forming part of the enclosing wall. It is not uncommon to find the swelling even more distinctly one-sided than I have here described it, and I have seen not a few instances in which Douglas's pouch, so far from being distended, has been empty. For the position of a hæmatocele depends not so much upon the influence of gravitation, as upon the position that happens to be occupied by the Fallopian tube at the time of the formation of the hæmatocele. It is not by any means unusual to find that a hæmatocele of comparatively small dimensions has been formed immediately around the aperture through which the blood is escaping. This is especially apt to be the case where the blood escapes very slowly, drop by drop, and where the whole quantity effused is inconsiderable.

The conditions from which pelvic hæmatocele requires to be

distinguished, and for which it is most frequently mistaken, are : retroversion of the gravid uterus, ordinary abortion, inflammation of the uterine appendages with or without a new growth, and unsuspected ovarian cyst, with sudden twisting of the pedicle.

The presence in Douglas's pouch of a fixed mass, about equal in size to that of the pregnant uterus at the end of the third month, taken together with a history of missed menstruation, and perhaps some other signs and symptoms of early pregnancy, not unnaturally suggest retroversion of the gravid uterus. If retention of urine—a rare, but still an occasional, symptom of pelvic hæmatocele—be present, the mistake is still more likely to be made. The history of severe attacks of pain, with more or less persistent hæmorrhage from the vagina, should put the observer on his guard. If the uterus can be clearly made out to be but slightly enlarged, and to be lying in front of the swelling, the difficulty is at an end ; the case is obviously not one of retroversion. But, as the use of the sound is, save under very exceptional circumstances, contra-indicated in these cases, and as without it it is often extremely difficult to be sure whether the smaller body felt in front of the swelling is the entire uterus, or is merely the sharply-defined, hard, and perhaps elongated cervix of a pregnant and retroverted uterus, of which the body is comparatively soft and flaccid, this sign is not always available. Hence it is necessary to have other means of distinguishing a retroverted gravid uterus from a pelvic hæmatocele, and such means will be found (1) in the consistence and (2) in the rhythmic contractions of the pregnant uterus. If the swelling be fairly soft in its consistence and well defined in its outline, it is almost certain not to be a hæmatocele, and if it can be felt alternately to contract and relax, it is quite certain not only that it is not a hæmatocele, but that it is the pregnant and retroverted uterus.

It is very important that the distinction should be made, for there is always the liability in cases of pelvic hæmatocele for fresh hæmorrhage to take place, with the result of the giving way of the hæmatocele and the escape of blood into the general peritoneal cavity. But even without the intervention of fresh hæmorrhage, nothing is more likely to bring about such a disaster than manipulations undertaken with a view to the elevation of the mass, under the supposition that it is a retroverted pregnant uterus.

The cases in which a disturbed tubal pregnancy with hæmorrhage and hæmatocele is taken to be an ordinary abortion are in everyday practice probably more numerous than those in which it is taken to be a retroverted gravid uterus. The latter is the mistake of the

painstaking practitioner, who at least takes the trouble to make a vaginal examination. The former is the blunder of the busy routinist, the man with so large a number of patients that he has to hurry through his work. He hears of a missed period, of irregular hæmorrhage, and of attacks of pain, and, without making any internal examination, he jumps to the conclusion that the case is one of threatened abortion, and advises the patient accordingly. Presently some portions of membrane are perhaps shown to him as having been passed in the vaginal discharge, when, not finding any embryo, and hearing that the patient is still having attacks of pain, he explains that the ovum has not entirely come away, and that the pains may be expected to continue until that has happened. And so the case passes unrecognised until some more serious attack alarms both practitioner and patient, or until the patient becomes weary with fruitless waiting. *Then* is done what ought to have been done at the outset. An examination is made, the abnormal pelvic swelling is discovered, and the idea that the case is one of ordinary abortion is dispelled. I have already alluded, when describing the character of the blood discharged *per vaginam* in cases of disturbed ectopic gestation, to another point of difference between them and cases of ordinary abortion, viz., the fact that the latter is almost always attended with a large amount of hæmorrhage and with the passage of clots, which is seldom the case in a disturbed ectopic gestation.

Inflammatory conditions, suppurative or non-suppurative, of the uterine appendages, especially if the condition be associated, as it very often is, with some enlargement of the ovary from early cystic disease, often simulate, in the physical signs to which they give rise, a pelvic hæmatocele. The suspicion of pelvic hæmatocele is possibly confirmed by the arrest of the menstrual function. Here our principal safeguard against blunders is to be found in the patient's history. When such inflammatory conditions are present, there is almost invariably a history either of past or recurrent attacks of pelvic inflammation, or of chronic pelvic pain, or of a purulent discharge from the vagina. But here again there are exceptions, of which I had two remarkable instances under my care this last summer at St. Thomas's Hospital. In both of them the physical signs were equally compatible with the diagnosis of inflamed and enlarged uterine appendages and with that of pelvic hæmatocele, while the clinical history seemed to be only compatible with the latter. Thus, in the first case, that of a married woman, aged thirty-two, the patient stated, and persistently adhered to her statement,

that she had had no previous illness, that her present symptoms began less than a month before with slight hæmorrhage that lasted a fortnight, and that it was only after this had ceased—viz., twelve days before her admission—that she was seized with sudden and severe pain in the lower part of the abdomen. Yet, notwithstanding this history, it was found when the abdomen was opened that the case was one of chronic suppurative inflammation of both Fallopian tubes, with extensive adhesions seriously implicating the large bowel. There was no sign of tubal gestation or of hæmatocele.

The second case was admitted whilst the first was still in the ward. The history was, if possible, even more misleading and more difficult to understand than in the first case. The patient, aged twenty-six, had been married seven years, and had never been pregnant. She had always menstruated regularly. Three weeks before her admission, after two months' amenorrhœa, which she naturally thought was due to pregnancy, she had some loss of blood *per vaginam*, lasting two days. Since that she had for the first time suffered from pain, never very severe, in the left iliac region, and some rise of temperature. On one occasion she was said to have had a temperature of 104°. This history, if not exactly typical (for there had been no persistent hæmorrhage *per vaginam*), was, to say the least, strongly suggestive of tubal gestation with hæmatocele, and certainly seemed to exclude any chronic suppurative inflammatory process in the pelvis. Nevertheless, the case proved to be a double tubo-ovarian abscess. There was an inflamed and suppurating Fallopian tube on each side, and each tube was in direct communication with the interior of a suppurating ovarian cyst. The two swellings were intimately adherent to the uterus and to each other, the whole forming a single mass. There was no hæmatocele, and there was no tubal gestation. Here, as in the preceding case, it is difficult to explain the absence of any history of pain or ill-health until the three weeks immediately preceding the patient's admission. The two cases together well illustrate the difficulties of diagnosis that are occasionally met with.

My friend Mr. Taylor has called attention in his monograph to the similarity in symptoms and physical signs between pelvic hæmatocele and an ovarian cyst with intracystic hæmorrhage from twisted pedicle. I can from personal experience fully corroborate his statement that the one may easily be mistaken for the other. 'The sudden abdominal pain,' writes Mr. Taylor, 'which characterizes the final twist of an ovarian pedicle, when the return circulation is obstructed, the vomiting and faintness which accom-

pany this, and the rapid formation of a prominent and tender tumour, are all suggestive' of a tubal pregnancy with hæmatocele, and when accompanied (as axial rotation of an ovarian pedicle sometimes is) 'with menstrual irregularity, the history also may favour the suspicion. . . .' When a tumour is known to have existed, the diagnosis is comparatively easy. But in many of these cases the existence of a tumour has not previously been suspected, and it is in these cases that difficulties are likely to arise.

In differentiating the one condition from the other, Mr. Taylor places the chief reliance upon the fact that an ovarian tumour is seldom so closely connected with the uterus as a tubal pregnancy would be. To this point of difference I should be inclined to add another, namely, that whereas in twisting of the pedicle a tumour can be found at once and can be observed quickly to increase in size, in tubal gestation with hæmatocele a tangible tumour is not formed at once. It is usually a few days from the onset of the attack before anything very definite in the shape of a swelling can be made out.

Having endeavoured to draw a clinical picture of intraperitoneal hæmorrhage resulting from an interrupted ectopic gestation, and having called attention to the principal points in diagnosing the condition (1) where the hæmorrhage is diffuse, and (2) where it is more or less completely encysted in the form of a hæmatocele, I now pass on to speak of the disturbances to which an ectopic gestation is specially exposed, and of the manner in which these disturbances produce intraperitoneal hæmorrhage. It has long been known on the authority of the post-mortem room that diffuse intraperitoneal hæmorrhage occurring in the female subject during the child-bearing age is most commonly associated with one or other form of ectopic pregnancy. Our knowledge of the almost equally constant association of pelvic hæmatocele with the same condition is comparatively much more recent. Most of my hearers will remember the feeling of despair with which they arose from the perusal of the chapter on pelvic hæmatocele in the text-books of their student days. The account of its etiology was nebulous and unconvincing. The array of possible sources of the hæmorrhage was formidable in its length and ingenious in its variety, but in regard to many of these the evidence was exceedingly slight, and the acknowledged rarity of most of them did not fit in even with the imperfect knowledge we then had of the frequency with which pelvic hæmatocele occurs. Even Bernutz, with his admirable series of well-recorded cases and observations of post-mortem appearances,

was tempted to build up a theory which would not bear criticism. I allude, of course, to his theory on the subject of menstrual regurgitation.

I have already spoken of the obligation we are under to Lawson Tait for advancing and simplifying and placing upon a sound basis our knowledge of the etiology of pelvic hæmatocele. He it was who, supplementing clinical observation by actual inspection and handling of the parts concerned, came to see how much of the current teaching on the subject was conjectural, and to recognise the fact that in the vast majority of cases pelvic hæmatocele, like diffuse intraperitoneal hæmorrhage, is due to some disturbance of an ectopic, generally of a tubal, pregnancy. The particular disturbance to which for some time both these varieties of intraperitoneal hæmorrhage, when connected at all with ectopic gestation, were held to be invariably due was rupture of the gestation sac. The rupture was supposed to be brought about by the Fallopian tube becoming stretched and thinned by the growing ovum until the thinning of the tube at that part became so extreme that a comparatively slight strain sufficed to cause it to give way. But it gradually became evident that this simple explanation of the liability of an ectopic gestation to undergo rupture did not take into account all the factors that were usually concerned in the production of rupture. Observers both at home and abroad (amongst whom ought to be specially mentioned the names of Werth in Germany and Bland-Sutton in this country) began to call attention to the frequency with which rupture was found to have been preceded by the occurrence of hæmorrhage within and around the ovum itself. Later still it was realized that intraperitoneal hæmorrhage in connection with ectopic gestation might occur without rupture, the blood escaping, not through a rent, but from the free end of the pregnant tube. And eventually it was found that whereas diffuse intraperitoneal hæmorrhage was in the majority of cases due to tubal rupture, and only occasionally to leakage from the open fimbriated end of the tube, the encysted form of intraperitoneal hæmorrhage, or pelvic hæmatocele, was most frequently due to leakage from the mouth of the tube, and only in a comparatively small number of cases to rupture. In other words, it was observed that the ordinary result of tubal rupture is a diffuse and highly dangerous intraperitoneal hæmorrhage, whilst the ordinary result of bleeding from the open mouth of the tube is the formation of a hæmatocele.

Before speaking of the changes that take place in and about the

ovum prior to these catastrophes, it may be useful to give a brief sketch of what is at present known as to the more usual train of events during the weeks that immediately follow the abnormal arrest of a fructified ovum on its way to the uterus.

In the vast majority of cases of ectopic gestation the gestation begins in the Fallopian tube. Up to a very recent date the statement that every ectopic gestation is, or began by being, tubal would have been accepted as correct. But within the last few years several indisputable instances of ovarian pregnancy have been recorded, so that such a statement can no longer be made. Nevertheless, it remains true that, with very few exceptions, an ectopic gestation means a tubal gestation.

The fertilized ovum may be arrested in any part of the Fallopian tube. The arrest takes place most frequently in the wider or more curved portion known as the *ampulla*, but the ovum may also lodge in the *infundibulum*—i.e., at the fimbriated end; or, more rarely, in the narrow, straight portion, known as the *isthmus*, at the uterine end; or, most rarely of all, in that part of the tube which, lined by mucous membrane, but no longer surrounded by any other distinct coat, tunnels its way through the uterine wall, and opens into the uterine cavity.*

The subsequent fate of the fertilized ovum is largely determined by the site of the gestation. When it is arrested, for instance, within the uterine wall, its comparatively early death appears to be all but inevitable, and when it is arrested immediately outside the uterus its life appears to be almost equally, if not more, precarious. In the middle and outer portions it has a better chance, but even here it succumbs, in the great majority of cases, to one or other of the dangers that threaten it, and it is rare for its development to continue long enough for the foetus to become viable, and still rarer for it to continue up to full term.

In whatever part of the tube the fertilized ovum lodges, a localized swelling is produced, slight at first, but gradually increasing in size with the size of the ovum. Simultaneously there occurs a general hyperæmia of the pregnant tube and of the parts in immediate connection with it, all the vessels of the neighbourhood undergoing an increase in size. The tube wall seldom becomes hypertrophied. The usual result, indeed, is for it to become attenuated,

* It was because, in this last variety, the gestation could not with strict accuracy be said to be extra-uterine that Robert Barnes proposed to substitute the term 'ectopic,' so as to embrace every instance of gestation situated elsewhere than in the uterine cavity—its normal seat.

as it is expanded by the growing ovum, which, of course, it completely and closely surrounds. But the chief interest centres in the mode of attachment of the ovum. Though everywhere in contact with the tube wall, it only becomes actually attached to it over a limited area. This area forms the site of the future placenta, the chorionic villi, which at first completely surround the ovum, becoming specially developed there, and penetrating the tube wall even up to its outer coat. The result of this in-growing of the chorionic villi is that the muscular fibres become separated, and the tube wall becomes at that spot sensibly weakened. The separation of the muscular fibres is still further increased by an infiltration of large nucleated cells. Clarence Webster, in his interesting monograph on ectopic gestation, describes a decidua vera and decidua serotina as being formed in the pregnant tube. This interpretation of the microscopic appearances has not been generally accepted, but, whether it be the true one or not, it is certain that the mucous membrane and sub-mucous tissues over a definite area undergo alterations which enable them to fulfil the functions of a decidua serotina, however imperfectly.

Meanwhile, a membrane, which all authorities agree in regarding as a *membrana decidua*, is being formed in the uterine cavity, and the uterus itself is undergoing enlargement. This enlargement continues, if the ovum lives, for the first two or three months much as it would do if the gestation were intra-uterine. But about the end of that time the uterus appears to find out that it has been cheated, and ceases to grow, though, as long as there is a living and growing ovum in its neighbourhood, it does not retrieve its blunder—does not, in other words, commence to undergo the process of involution.

It will be easily understood that rupture of the gestation sac is specially apt to occur at the spot where the tube wall is weakened, and where it is often not only weakened, but much thinned. Cases have been observed where nothing intervened between the ovum and the peritoneal covering of the tube wall but a little newly-organized connective tissue, together with some of the cellular elements already mentioned. One case is described where a partially organized blood-clot lying in the intervillous space, and covered by peritoneum, was all that remained to represent tube wall at the seat of rupture. It is evident, from what has been said, that processes are at work which greatly predispose to rupture. A little extra strain upon the capacity of the intervillous spaces containing the maternal blood, or the occurrence, by no means infrequent, of an interstitial hæmorrhage, is quite enough to bring about a catastrophe. In some cases the

catastrophe is for a time averted by the formation of an inflammatory deposit on the outer surface of the peritoneum over the placental area, but this is seldom more than a temporary safeguard. Such a layer of adventitious tissue is not sufficiently elastic to bear any considerable amount of stretching, and before long it, too, gives way and the rupture is complete. Probably owing to the lumen of the tube being at that part excessively fine, and its wall dense and inelastic, so that its limits of expansion are soon reached, rupture is apt to take place with special frequency and at a particularly early stage of gestation in cases where the ovum is arrested in the straight portion of the tube just external to the uterus.*

Another factor in the etiology of intraperitoneal hæmorrhage—a factor which has not until the last few years been fully appreciated—is to be found in certain accidental changes which are apt to occur in the ovum itself.

The ovum in tubal gestation is specially prone to become the seat of hæmorrhage, and to have its bulk enlarged thereby and its vitality destroyed. Sometimes the result is the formation of something so like the well-known carneous mole of uterine pregnancy that it may be appropriately termed a tubal mole. At other times the amniotic cavity is so much compressed by the hæmorrhagic effusion between the membranes that it is flattened and practically obliterated, the embryo being destroyed, and the ovum, whilst retaining its shape and often retaining its attachment, becoming a mere mass of clot and débris. This is, in my experience, a much more frequent result than the formation of a typical mole, with its distorted or blighted embryo, its distinct amniotic cavity, and its little rounded bosses of blood-clot projecting beneath its lining membrane. Not infrequently the covering of the ovum gives way, and the tube becomes filled with clot and débris, all trace of ovum being lost. This constitutes one of the varieties of hæmatosalpinx.

The sudden increase in the bulk of the ovum due to this hæmorrhage is very often a factor in the bringing about of rupture. But hæmorrhage into the ovum—apoplexy of the ovum as it is called—does not always result in the production of rupture. It does not

* Surprise is often expressed at the great volume of blood that is often poured out into the abdominal cavity as the result of rupture. The explanation seems to be (1) that the mouths of the tubal vessels from which the blood flows into the intervillous spaces are not, as in the uterus, surrounded by uninjured muscular tissue, ready to contract, and, in contracting, to close them; and (2) that the peritoneal cavity is a practically unlimited space. The restraining effect of a limited space is shown in the more moderate extent of the effusion in those cases in which the blood escapes into the tissues of the broad ligament instead of into the peritoneal cavity.

even do so in the majority of cases. The more usual result is a trickling of blood from the abdominal end of the Fallopian tube. Now, such a trickling exactly fulfils the conditions necessary to the formation of a hæmatocele. The blood flows so slowly and in such moderate amount that it has time to collect in the pelvis and to become encysted. Of course, there are exceptional cases, in which, even although there be no rupture, the blood flows fast and furiously, and in these exceptional cases a diffuse intraperitoneal hæmorrhage is the result; but the ordinary result of bleeding from the open fimbriated end of a pregnant Fallopian tube is the formation of a hæmatocele.

The capsule of a typical pelvic hæmatocele is formed partly by the peritoneal surfaces of the various surrounding parts (broad ligament, uterus, ovary, appendages of the opposite side, intestine, omentum, and the walls and floor of the pelvis), and partly by an adventitious cyst wall. This latter bridges over any gaps that there may be between the various structures above named. Sometimes the whole hæmatocele is surrounded by such a cyst wall, the cyst wall in that case intervening between the contents of the hæmatocele and the visceral and parietal peritoneum hemming it in, and, if not too fragile, enabling the hæmatocele to be enucleated entire. The nature of this cyst wall was for a long time the object of much conjecture. It is smooth on its outer surface (where non-adherent), has a grayish or yellowish-brown colour, and is easily disintegrated. It consists of a delicate connective-tissue basis, upon which successive layers of fibrin have been deposited from within, *i.e.*, from the contents of the hæmatocele. The wall, thus constituted, tends to become firmer and harder day by day, and it was this solidifying and gradual hardening of the periphery that led to the old supposition that the hæmatocele, soft and elastic, if not, indeed, actually fluid, at first, coagulates *en masse*, and gradually hardens until it becomes for all practical purposes a solid tumour. As a matter of fact, the inner and main portion of the hæmatocele almost invariably remains either in a fluid condition or in the condition of soft clot. Much has been written about the various shapes that different hæmatocèles assume, but these shapes are so largely, so almost entirely, dependent on the character of the boundaries of the space into which the blood trickles, that the question is not an important one, except to this extent, that we must not expect to find hæmatocèles all alike, or even to find the majority of them conforming in shape or size to one particular pattern.

The abdominal end of the tube is differently affected according to

whether the ovum has lodged in the inner or outer part of the tube. When the isthmus of the tube—*i.e.*, the inner straight portion—is the seat of the gestation, the fimbriated mouth of the tube is sufficiently far from the scene of activity to remain, as a rule, unaffected. But in the much more common event of the gestation occurring in the outer portion of the tube, the abdominal ostium remains open until from the sixth to the eighth week, and sometimes becomes abnormally expanded. After that time it usually becomes closed, or nearly closed, by adhesions, provided the gestation has continued to that date without interruption.

It is during those earlier weeks, when the abdominal ostium is still patulous, that a hæmatocele is most apt to be formed, for it is during the first two months of gestation that hæmorrhage within and around the ovum is most liable to occur, and, the abdominal ostium remaining patent, the blood extravasated around the ovum usually finds vent in that direction. But, owing to the changes that I have described in the tube wall, rupture may take place, and does not infrequently take place while the abdominal ostium is still open, and not a few cases have been recorded in which bleeding has occurred both from rupture of the tube wall and from the mouth of the tube. It will also be easily understood that under the pressure of recurrent hæmorrhages, or from any undue strain, the sac of a hæmatocele may give way, and bleeding may take place into the general peritoneal cavity. In other words, a case of encysted intra-peritoneal hæmorrhage may suddenly become converted into the more dangerous diffuse form. This should be borne in mind during the bimanual examination of such cases for diagnostic purposes, especially when such an examination is conducted under anæsthesia. I have seen several cases in which this accident has happened, and in which there was no reasonable doubt as to its having been caused by diagnostic manipulation. I have already, when speaking of diagnosis, called attention to the risk of rupturing the hæmatocele when forcible attempts are made to raise it out of the pelvis under the mistaken impression that it is a retroverted pregnant uterus.

Time will not permit of my following at any length the fortunes either of a pelvic hæmatocele or of a diffuse, but non-fatal, intra-peritoneal hæmorrhage. The tendency in both cases is to gradual absorption of the extravasated blood and to the recovery of the patient. But there are pitfalls in the way, and of these the two most important are the liability to fresh hæmorrhages and the liability to bacterial infection of the blood already poured out.

Whenever an apoplectic ovum is retained and adherent within the Fallopian tube, a woman is exposed to the constant risk of recurrent hæmorrhages. Occasionally the ovum becomes separated from the tube wall and is expelled along with the stream of blood that issues from the open mouth. This is spoken of as a *complete* tubal abortion. An instance occurred in my own practice in which, on opening the little firm clot found just outside the mouth of the tube, an amniotic cavity was exposed, and lying within it was a three weeks' embryo. Of course, when the abortion is complete, and the ovum with its envelope of blood-clot has been separated and discharged from the tube, the hæmorrhage from the tube ceases.

With regard to the second source of danger of which I spoke, I may mention that within the last two years three cases of hæmatocele, in which I had advised non-interference, developed symptoms pointing to septic absorption, and in each case the result of the operation that was thus rendered necessary was to show that the effused blood had undergone more or less decomposition, and had acquired a distinctly foetid odour.

It has been my aim in this lecture to present some of the results of my own clinical experience of intraperitoneal hæmorrhage, and to give some idea of the direction and of the results of recent work on the subject, and especially of its bearing upon diagnosis.

It would, I think, scarcely be an exaggeration to say that, whereas the characteristic ambition of the surgeon is to attain perfection of treatment, the characteristic ambition of the physician is to attain perfection of diagnosis. The developments of gynæcology in a surgical direction have led many to doubt whether the time is not approaching when gynæcology should be regarded as a special branch of surgery rather than of medicine. The question is a large one, and cannot, of course, be adequately discussed on this occasion. But one thing I should like to say, and it is this—namely, that if there is in British gynæcology any of that striving after perfection of diagnosis of which I have just spoken, it is traceable, in my opinion, to the traditional association of gynæcology with medicine. The instinct of the surgeon—I say it in no spirit of disparagement—is, at any rate in gynæcological work, to be satisfied with just so much of a diagnosis as will enable him to decide upon a line of treatment. With the *refinements* of diagnosis he does not greatly concern himself. The physician, on the contrary, trained and accustomed to the patient solving of difficult diagnostic problems, is not content with what I may call a mere utilitarian

diagnosis. He wants to find out all that possibly can be found out, just as he does in the chest and other regions that are his own undisputed territory. In other words, he recognises that in scientific medicine the first essential is accuracy of diagnosis, and that until an accurate diagnosis has been made all treatment must be haphazard and unscientific. Those have been the best clinical physicians who have held this opinion, and have systematically acted upon it, availing themselves of every opportunity, whether in the post-mortem-room or the operating theatre, of ascertaining how far their diagnosis is borne out by facts. If gynæcology is to advance in a scientific direction, this is the spirit, it seems to me, in which its work must be carried on. Hence, I should view any step towards the severance of gynæcology from medicine with very great misgiving. That gynæcology is becoming more surgical is very true—it is inevitable that it should be so; but that is all the more reason why medicine should still keep a hold upon it, to exercise a wholesome restraint upon its surgical enthusiasm, and to continue to inspire it with that reverence for accuracy of diagnosis which otherwise it might be apt to lose.

I desire, Mr. President, to thank you very sincerely for the honour you have done me in asking me to deliver this lecture. It is, I believe, the first time since the Bradshaw Lecture was established, twenty-one years ago, that the honour of delivering it has fallen to an obstetric physician. I trust that I may interpret this mark of your favour as an indication that this college has at present no intention of disowning either obstetrics or gynæcology, or of removing them from an influence which I, for one, believe to have been extremely beneficial.

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