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Hæmatoma of the Ovary, with Reports of 18 Cases.

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HÆMATOMA of the ovary is a subject on which very little has been written, and most of the text-books of gynæcology pass it over without mention, but it is an important one, not only because it is a comparatively common disease of the ovaries of women during the child-bearing period, and is frequently bilateral, but because the signs and symptoms to which it gives rise are ambiguous and closely resemble those of other conditions, such as chronic salpingitis, tubal gestation, uterine fibroids and appendicitis.

It is one of the causes of chronic pelvic pain which is so frequent a symptom in gynæcological work. The pain is often indefinite in position, the swelling of the ovary may be small in amount, and unless a thorough examination is made there is a danger of attributing the symptoms to "neurosis." The danger is increased by the fact that so many of the women are unmarried, and for that reason a vaginal examination may be avoided for some time, and, if made, may be difficult.

The condition, too, when once established appears to be progressive, so that it is important to make an early diagnosis and thus save the patient perhaps years of discomfort or pain.

For these reasons I feel that the disease deserves greater consideration, especially from its clinical aspect.

This paper is based on 18 cases, and in recording them at some length I hope to bring out the main features of the condition.

My attention was directed to the subject by the occurrence of ten cases which I have had the opportunity of seeing during the past 18 months; four of these were in the private practice of other operators, and six in the gynæcological wards of St. Thomas's Hospital.

The series I am now recording is entirely from the gynæcological department of St. Thomas's Hospital during the last 10 years, and

I am indebted to Drs. Tate and Fairbairn for their help and permission to use their cases, and to the former for handing over to me the patient upon whom I operated.

Definition.

By hæmatoma of ovary I mean a condition in which the ovary is enlarged and contains fluid resembling old altered blood of a brown colour and oily or tarry consistence; in the fluid there may be a number of brown solid particles, varying in size from that of a pin's head to a grain of wheat, which crumble when pressed between the fingers.

The ovary is always attached to surrounding structures by peritoneal adhesions which are usually extremely dense.

Collections of blood in the ovaries are of normal occurrence in the process of development of corpora albicantia from Graafian follicles; in these the blood is normal in appearance, and is often coagulated when the removed ovary is cut across; the collections vary considerably in size.

I have excluded from this series all cases in which the blood in the ovary was normal in appearance or clotted, even when in apparently abnormally large amount because of the difficulty of separating these from the normal condition. In a case in which I operated for salpingitis and removed the adherent appendages of one side there was a solid clot in the ovary, spherical in shape, and measuring $1\frac{1}{4}$ inches in diameter. This I excluded, although I think it possible that it may have represented an early stage in the development of hæmatoma of the ovary. I have also excluded all such conditions as cysts containing blood from torsion of the pedicle or other injury, and those containing thin blood-stained fluid so commonly seen in cirrhotic ovaries or associated with pelvic inflammation.

CLINICAL FEATURES.

Age. Hæmatoma of the ovary is a disease of the child-bearing period of life in the great majority of cases.

The youngest patient in this series was 24, and the oldest 53; with these exceptions all were between the ages of 28 and 48; the average age was 38·2.

One patient (13) had reached the menopause three years before admission; and two others (4, 6), aged 47 and 48, had had indications of its onset; otherwise in all cases the menstrual function was still active.

Marriage. The great majority of women above the age of 20 or 25 are married, but in this series it is noteworthy that 8 of the 18 were unmarried. These unmarried patients were socially much superior to the ordinary run of hospital patients, and, with the

exception of one, there was no reason to suspect any possibility of infection from the vagina.

Pregnancy. The number of pregnancies amongst these patients is remarkably small; of the 10 married women, four had never been pregnant, one had had 3 children, another 2, three had each had 1 child and 1 miscarriage, and the remaining patient had had 1 child. None of the single women had been pregnant. The average number of pregnancies amongst the married women is therefore only 1·2, so that hæmatoma of the ovary, and apparently the conditions which lead to it, are associated with a marked diminution in fertility.

Menstrual disorders. Menstrual disturbances are common with hæmatoma of ovary; in 9 of these cases there was definite menorrhagia, and in 2 others the periods were said to be profuse, but there were uterine fibroids in 5 of them, which may have been the cause of the increased loss. Intermenstrual bleeding was observed in one only (15), and in it the time of the onset of bleeding and of the pain over the affected ovary coincided.

A coloured discharge between the periods was noticed in 4 cases, in 3 of which (8, 15, 16) it was brown and similar to that seen in many cases of tubal gestation; it had started in one case (8) a year before and had persisted for 6 months, in another (15) it had been present for 4 months, while in the third (16) it was noticed first after admission to the hospital.

One patient (6) had had a pink intermenstrual discharge for 2 years.

Two patients (17, 18), aged 28 and 32, had amenorrhœa when admitted, one for 2 months and the other for 3; in the former case pain over the lower part of the abdomen started soon after the first period was missed.

Pain at the periods is a symptom commonly complained of by these patients, but on investigation its type, severity and time of onset are found to vary very much in different cases.

In 5 of the cases (6, 14, 16, 17, 18) there never had been any menstrual pain, and in one of these (6) the continuous pain which had been present for years was always relieved by the flow.

In 4 cases (2, 4, 10, 15) there had been well-marked dysmenorrhœa from puberty; in 2 of these there had been no change in its character or severity, while in the other 2 it had ceased in one instance 7 years and in the other 4 months before admission.

In 5 cases (5, 7, 8, 9, 12) there was said to be "some" pain at the periods; in 2 it was unchanged; in 1 it had ceased some years previously; while in the other 2 it had increased—for 3 years in one case, and for 5 months in the other.

In 4 cases the dysmenorrhœa was acquired; in one of these (13) the patient had reached the menopause, and had suffered from painful menstruation for 2 years before the change. Of the other

three (1, 3, 11), two had had severe pain for 1 year, and one pain, though of a less severe type, for 4 months.

Pain.

Pain was the most prominent symptom in all these patients except two (2, 4), who were operated upon for uterine fibroids; in one of these there was a history of an attack of severe abdominal pain four years previously which had persisted for about a month; while in the other there was only discomfort in the abdomen and back.

The character of the pain and the history of its onset vary in different cases.

In seven (7, 9, 12, 15, 16, 17, 18) the first symptom was a sudden severe attack of pain usually in the lower part of the abdomen accompanied in some cases by vomiting, retching or fever. In some cases the attack was followed by frequent or occasional ones of the same character at intervals varying from a few days to several months, in some by severe dysmenorrhœa, and in others by a continuous dull aching pain.

In 3 cases (1, 3, 11) the pain first came on at the periods and recurred at subsequent periods; in 1 of these, after some months dysmenorrhœa, the pain became constant.

In the remaining 6 cases (5, 6, 8, 10, 13, 14) the onset of symptoms was not marked by a severe attack, nor was there dysmenorrhœa; the patients complained of a persistent dragging pain in the lower part of the abdomen and back, which, in one case (6), had been present for as long as 12 years.

Physical Signs.

The physical signs produced by hæmatoma of the ovary vary with the size of the collection of altered blood and the thickness of its surrounding wall, with the acuteness or chronicity of the inflammation and with the amount of peritonitis and cellulitis around the affected ovary.

On examination of the abdomen many of the patients complained of tenderness in one or other iliac region or over the whole of the lower part of the abdomen. In some cases semi-solid tumours could be felt.

Tenderness was acute in 3 cases (9, 16, 17), and the abdominal wall was held rigid over the tender area.

On bimanual examination in all these cases, with the exception of three, in which the uterus was enlarged by fibromyomata, swellings, varying from the size of a hen's egg to that of a cocoanut, were found in the pelvis.

The fixation of these masses was a striking feature in all but two of the cases (13, 14); in 4 the tumours could be moved to a slight extent, and in the remaining 9 they were markedly fixed.

In 4 cases (1, 7, 11, 15) there was evidence of inflammation of the pelvic cellular tissue, and in one case (15) this was so marked on rectal examination that the patient was sent to the hospital with the diagnosis of carcinoma of the rectum; in several other cases cellulitis was noted at the operation.

The temperature on admission to the hospital was raised in only 3 cases, and in these ranged between 99.4° and 100° up to the time of operation; in two others there had been temperatures between 103° and 104° following previous attacks of abdominal pain.

PATHOLOGY.

A hæmatoma of the ovary is always firmly fixed to surrounding structures by peritoneal adhesions; these are often so dense that they have to be cut through in the removal of the ovary. The hæmatoma nearly always ruptures in the separation, and this occurred in all the cases of the series, but three (3, 12, 13). The fluid contained in the ovary is always thick, black or dark-brown altered blood of the consistency of olive oil, it is usually quite odourless; in one only (6) was it at all offensive.

The disease may involve both or only one ovary; in 9 cases of this series the condition was unilateral, and in 6 bilateral, while in the remaining 3 (6, 8, 17) both ovaries were probably affected; in the first (6) the mass removed from one side was so ragged towards the abdominal end of the tube that it was not certain that the ovary was represented in it; in the second (8) the appendages of one side were very adherent, and were not removed, and in the third (17) the patient, who 3 years previously had suffered from pain similar to that for which she was admitted to St. Thomas's, had had the appendages of one side removed in a Russian hospital.

Naked Eye Appearances.

When removed from the body the external surface of the ovary is seen to be roughened by the remains of the divided peritoneal adhesions, the ovary is enlarged to a variable extent, and after the hæmatoma has discharged its contents the walls still remain uncollapsed around its cavity.

The walls are tough, and vary in thickness, in some parts being as much as $\frac{1}{2}$ to $\frac{1}{4}$ inch, and in others no thicker than paper. In the walls small cysts containing tar-like blood are seen in many cases, and these sometimes project on to the external surface or into the main cavity..

Internally, there are circular depressions large enough to admit the tip of the finger, bounded by well-marked ridges indicating the original positions of separate cysts; in these situations the wall is usually thinned. In one case (18) these features were particularly well marked, and there was also a cord of tissue crossing the main cavity in one of the ovaries.

In some cases there are several small cavities containing clotted blood, and in others small serous cysts are seen in the wall of the hæmatoma.

Microscopical Anatomy.

Smallwood Savage,¹ in a paper "Hæmatoma of the Ovary and its pathological connection with the ripening and retrogression of the Graafian follicles," reported seven cases and the results of very careful microscopical examination of the diseased ovaries. He divided hæmatomata of the ovary into two types—(1) hæmatoma of the Graafian follicle, and (2) hæmatoma of the corpus luteum. In the first type he found that in places the wall of the hæmatoma was lined by a single layer of epithelium, which he regarded as the membrana granulosa, lying on a basement membrane, and external to these were two layers of tissue which appeared to correspond to the theca interna and the theca externa; both were vascularized, especially the former. The cells of the inner layer showed early lutein cell formation. He also found ill-developed Graafian follicles near the cavity of the hæmatoma and some opening into it.

In the second type—hæmatoma of the corpus luteum—he found that there was an outer shell of ovarian tissue which was for the most part congested; the inner part of the wall showed newly-formed fibrous tissue, poor in cells, and near to the lining in between longitudinal strands of this tissue there were blood extravasations, many round cells and many large rounded or cuboidal cells containing yellow coarse granules. The nuclei of these cells were relatively small, and in many instances seemed to be crowded towards the periphery of the cell.

Five cases (8, 11, 14, 15, 17) in this series were examined microscopically; one (14) was a hæmatoma of the corpus luteum, and showed enormous clumps of lutein cells; another (8) showed hæmorrhage into the cyst wall; in the remaining 3 the wall was composed of fibrous tissue. In none of these last 4 was any trace of lining membrane found, nor did there appear to be any definite cell formation.

The Fallopian Tubes.

There is usually no evidence of gross tubal disease in these cases. In only 6 was any change in the appearance of the tube noticed; in 2 of these (14, 15) the wall was thickened; in 3 (4, 6, 11) the tubes appeared to communicate with the hæmatomata in the ovaries, and contained tar-like fluid; in the sixth case (17), in which the the fimbriated end apparently had been removed at the previous operation, the tube was closed and slightly distended by clear fluid. In 8 cases both tubes were perfectly healthy, and in 1 other (8) the

1. Brit. Gyn. Journal, Vol. 21, p. 285.

tube that was removed was normal; in the remaining 3 cases their condition was not recorded.

Fibromyoma of the Uterus.

In 6 cases (1, 2, 3, 4, 9, 11) there were fibroids in the uterus, and in another (6) the uterus was found at the operation to be hard and enlarged, apparently by fibroids, but as it was retroverted and firmly adherent it was not removed.

In 3 of the cases hysterectomy was performed for uterine tumours, which reached up to or above the umbilicus; in 3 others the fibroids were not large, and in one a subperitoneal tumour, measuring 2 by 2½ inches, was removed; the uterus in both the other cases contained two fibroids, of the size of hen's eggs, in one instance, and of walnuts in the other.

The Mode of Origin.

The primary causes of the development of hæmatomata of the ovary are very obscure, but from the naked eye appearances of the tumours there seems no reason to doubt that the actual process of formation is one of rupture of several or many Graafian follicles into one another, instead of on to the surface of the ovary separately. In the normal course of events a Graafian follicle enlarges, moves to the surface of the ovary, is ruptured, with hæmorrhage into it, and discharges its ovum into the peritoneal cavity. But in some cases the force exerted in the follicle appears not to be sufficient to rupture it, and a blood-cyst is formed on the surface of the ovary. In other cases bleeding takes place into the follicle while it is still deep in the substance of the ovary, and the resulting blood-cyst consequently does not project on to the surface. Both these types of blood-cysts are frequently found in ovaries removed during operations for other conditions, and are so common that we must conclude that the blood is usually absorbed in the course of time, just as extravasated blood is in any other part of the body.

Congestion of the pelvic organs, including the ovaries, has been regarded as a cause of ovarian hæmatoma and the association of fibromyomata of the uterus with this condition is well known. A large mass of fibroids would undoubtedly produce congestion and an increased blood supply to the ovaries, but it is remarkable how free these patients are from other causes of congestion in the pelvis; there is seldom any evidence of salpingitis or any history of gonorrhæal or puerperal infection.

Smallwood Savage, in the paper I have already quoted, explains the effects of congestion in the production of hæmatoma of ovary as follows:—"In these cases of follicular hæmatomata it would seem that, abnormal congestion of the ovary occurring from whatever cause, many follicles prematurely develop at the same time, and that hæmorrhage takes place partly into immature follicles, and partly

into the stroma of the ovary, and by its extent and situation is impossible of removal by want of development of the lutein layer. Failure to travel towards the periphery of the ovary may be explained by the same want of a full development of the lutein layer."

But congestion can hardly be held to be the responsible cause in all cases, especially as in the majority there is no evidence whatever of congestion, not even congestive dysmenorrhœa or signs of other pelvic disease which might give rise to it.

Ovarian pregnancy has been suggested as a possible cause of hæmatoma of the ovary in some cases, but Griffith and Williamson who offered this explanation, were unable to find any evidence on microscopical examination to support it. Again, the fact that so many of the women are unmarried is additional evidence against this view.

It is possible that the accumulation of blood in the ovaries may be due to the failure of the mature follicles to rupture when hæmorrhage takes place into them.

But what is there in support of this? In examining the records of these cases three points are brought out which are very striking, and seem to favour the view that the follicles fail to rupture.

(1) The women, if married, are sterile or relatively sterile, though they may have been married for years before any symptoms of hæmatoma appear.

(2) The proportion of respectable unmarried women is very high.

(3) The disease is often associated with fibroids of the uterus, and very seldom with any other pelvic disease.

The relative sterility suggests the existence of some congenital defect in the ovary which prevents the liberation of the ovum, possibly by failure of the follicles to rupture.

The absence of sexual intercourse may be the cause of the non-rupture of many mature follicles. It is known that in some animals rupture only takes place as the result of copulation, and it is thought by many that coitus does cause rupture of the follicles in women though it is not a necessary factor.

Again, the chronic congestion of the ovaries associated with uterine fibroids may cause some increase in the density of the ovarian stroma which is sufficient to prevent the proper rupture of the follicles.

It appears that for one or other of these reasons small blood-cysts are frequently formed, but unless absorption of the blood fails to occur there is at no one time any large collection in the ovary. When an extravasation of blood occurs in any part of the body it is, as a rule, removed gradually by absorption, but sometimes, and particularly when the collections are in the abdominal cavity, as in the case of a pelvic hæmatocele, absorption does not take place,

and ultimately well-marked signs of infection are seen which may lead to abscess formation.

A few years ago Dudgeon and Sargent, in their work on the "Bacteriology of Peritonitis," showed that collections of blood in the peritoneal cavity, from whatever source, almost invariably became infected by the staphylococcus albus; amongst their cases there were 17 of intraperitoneal hæmorrhage following tubal gestation, and in every case they found that the blood was infected by this organism. In some of these the bleeding had occurred within 24 hours of the operation, and in others the hæmatoceles were old and completely encysted, one having been present for as long as 3 months. An old hæmatocele is always shut off from the general peritoneal cavity by adhesions which are the result of peritonitis, and beyond this barrier in two such cases, Dudgeon and Sargent found some clear fluid which contained the staphylococcus albus.

They concluded that the peritonitis which occurs as the result of intraperitoneal bleeding is due to the invasion of the blood by the organism and not due, as was formerly supposed, to the irritating effects of the blood itself on the peritoneum.

The staphylococcus albus is usually an organism of low virulence, and gives rise to a chronic form of inflammation.

In cases of hæmatoma of the ovary there are all the clinical signs of chronic inflammation, tenderness and pain, peritoneal adhesions of a very dense kind, frequent pelvic cellulitis, and, from time to time, acute attacks with fever.

Unfortunately, in only one case (18) of this series was a bacteriological examination made. The fluid, which was tarry, was taken from from an unruptured cyst in the wall of the main one, and Dr. Dudgeon found that it contained a pure culture of the staphylococcus albus.*

Many more bacteriological examinations of the fluid in and around the ovaries are needed, and it would be absurd to draw any general conclusions from this one observation; but the histories and clinical signs in these cases, combined with what we know of the bacteriology of intraperitoneal hæmorrhage, suggest a possible mode of origin of hæmatomata of the ovaries.

From the histories there is reason to think that blood-cysts may be of very common occurrence in these patients, and, seeing how close the blood is to the peritoneal cavity, it may become infected. Infection by the staphylococcus albus would lead to a chronic inflammation, of which there is ample evidence in these cases.

If a blood-cyst in an ovary became infected it would be a source of infection to other ripening Graafian follicles, and would cause adhesions round the ovary which would tend to prevent the rupture

* Since the above was written the fluid from another case has been examined by Dr. Dudgeon and found to contain the staphylococcus albus in pure culture.

of follicles into the peritoneal cavity, and so increase the likelihood of them rupturing into one another. The increase in size of a hæmatoma is apparently generally brought about by the addition of the blood poured out into the follicles which rupture from time to time into it. But in one case (13) the hæmatoma was known to have developed after the menopause, so that it appears that the increase may be due in some cases and possibly to some extent in all, to bleeding into the cavities from the vessels in their walls quite apart from any ripening of Graafian follicles.

The reason, I believe, that hæmatoma of the ovary is so seldom seen in connection with gonorrhœal or puerperal salpingitis or pyosalpinx is that the organisms in these conditions are so much more virulent than the staphylococcus albus that if infection of a blood-cyst of the ovary does occur an abscess and not a hæmatoma is the result.

The Cause of the Pain.

The peritonitis around the affected ovaries is enough to give rise to the pain which is such a frequent symptom; the sudden acute attacks which are sometimes accompanied by vomiting and fever probably indicate further spread of the peritonitis.

Severe pain at the periods may be accounted for by the engorgement and increase in size of an ovary which is embedded in adhesions.

Diagnosis and Treatment.

The diagnosis in cases of hæmatoma of the ovary is difficult and in many impossible; in only one case in this series was the condition definitely diagnosed. Usually all that can be made out on examination is some enlargement and fixation of the appendages of one or both sides with tenderness on pressure in the region of the enlargement; the fixation of the mass is generally very well marked, and there is sometimes definite inflammation of the cellular tissue near the swelling.

There is usually no history of either gonorrhœal or puerperal infection, and the women are for the most part childless or have had only a small number of pregnancies. With such a history and physical signs one may be able to arrive at a correct diagnosis.

The treatment is usually of the nature of an exploratory laparotomy with removal of the diseased ovary or ovaries. When both sides are affected an attempt may be made in suitable cases to leave a piece of normal ovarian tissue by dissecting away the lining of the hæmatoma. In one case which I saw treated in this way the patient has since menstruated regularly and without pain.

Although the signs of inflammation are always well marked, there is no need to drain the peritoneal cavity. In only one case (6) of this series was drainage established, and that was because the contents of the hæmatoma were offensive.

In all these cases the wound healed by first intention, but in most there was more irregularity of the temperature for the first few days after operation than is usual after abdominal sections for non-inflammatory diseases.

If the staphylococcus albus does play an important part in the production of hæmatomata of the ovary it is possible that vaccine treatment in the early stages of the condition might have good effects.

The results of operative treatment are good. In this series there was no fatal case and no suppuration in the abdominal wall; in all the patients were relieved of their symptoms, and none have returned to the hospital complaining of a recurrence of their pain.

CASE I. E. H.; April 18—May 19, 1900; æt. 36; single. Menstruation started at 13, was regular and painless. Well until June 1899, when there was severe pain at the onset of the period; after this great pain and excessive loss at each period. At the period late in March 1900 there was a rigor with high temperature, and the pain which had previously been on both sides settled down in the right iliac region.

On Examination. Hard mass the size of goose's egg in right iliac region, tenderness on deep palpation, but the tumour itself was not tender.

P.V. Uterus fixed and bulky, pedunculated fibroid at right cornu; on the left side there was a fixed, hard, nodulated swelling suggesting inflammation of the appendages.

P.R. Fixation of all parts to right and in front of bowel.

Operation (April 23). Fibroid of uterus felt, and behind the uterus both ovaries were found to be cystic, firmly adherent to pelvic floor, to surrounding structures and to one another. The fibroid, both ovaries and the right tube were removed. Both ovaries ruptured in removal and discharged dark brown altered blood.

Parts Removed. The fibroid measured 2 by $2\frac{1}{2}$ inches, lined by smooth membrane. The right ovary measured $3\frac{1}{2}$ by $2\frac{1}{2}$ inches, there was one main cavity, from which 3 or 4 ounces of fluid escaped, and other smaller cavities with similar contents. The right tube was normal. The left ovary measured $1\frac{1}{2}$ by $1\frac{1}{8}$ inches, contained a ruptured cyst the size of a walnut and some smaller cysts containing tarry fluid; there was one well marked corpus luteum.

CASE II. H. B.; October 2—November 6 1901; æt. 36; married. Menstruation started at 12, profuse with severe pain on the first day. Married at 28, no pregnancy. Cured one year after marriage and cured of her dysmenorrhœa and menorrhagia; small fibroids found at operation. Patient had noticed an abdominal tumour for 4 years which had been rapidly increasing for 10 months.

On Examination. The uterus was found, enlarged by fibroids, rising 1 inch above the umbilicus; its right side was cystic.

Operation (October 10). On raising the uterus the ovaries were seen to be enlarged and adherent. Partial hysterectomy with removal of the appendages. The left ovary ruptured and discharged thick dark brown fluid.

Parts Removed. The uterus contained numerous fibroids. The left ovary, the size of a hen's egg, converted into a single cyst which had

contained dark altered blood and some small hard masses which could be broken between the fingers. The right ovary contained a similar though smaller cyst and a well marked corpus luteum which was soft and dark red in colour.

CASE III. J. C. ; April 12—May 7 1902 ; æt. 47 ; single. Menstruation started at 15, was regular and painless. Well until 4 months before admission ; at that time there began frequent and difficult micturition, the periods became painful, more profuse, and every 21 instead of every 28 days, the pain which was present for the first 2 days of each period was in the back and down the legs.

On Examination. Uterus smooth and hard, extended up to the umbilicus. The hymen was intact.

Operation (April 14). Partial hysterectomy with removal of the left appendages which were adherent. The right appendages were normal.

Parts Removed. The uterus enlarged by fibroids. The left ovary contained several cysts, the largest and several of the smaller ones contained thick tarry matter, the others clear fluid.

CASE IV. R.M. ; August 7—September 12 1902 ; æt. 48 ; single. Menstruation started at 13, was irregular, and each period was preceded by severe pain, particularly in the back. Six years before admission the periods became regular and profuse, but at the time of admission there had been 3 months amenorrhœa. In August 1898 the patient had a severe stabbing pain in the lower part of the abdomen, and for a month or more she was troubled with a sense of fullness in the same region ; for 2 years she had noticed an increasing abdominal swelling and had had some trouble in micturition and defæcation.

On Examination. The uterus found enlarged up to the umbilicus. The hymen was intact.

Operation (August 12). Partial hysterectomy with removal of both appendages. The left ovary was enlarged and firmly adherent ; in bringing it up it burst and discharged about an ounce of thick dark blood.

Parts Removed. The uterus enlarged by fibroids. The left ovary converted into a cyst with a tough wall $\frac{1}{4}$ inch thick except at the point of rupture where it was about $\frac{1}{8}$. The left tube was normal except for 1 inch at the abdominal end which was distended with dark blood ; no communication could be found between the lumen of the tube and this cavity. The right ovary contained 3 serous cysts the size of horse beans. The right tube was normal.

CASE V. H. S. ; December 27 1902—January 24 1903 ; æt. 40 ; single. Menstruation started at 14, was regular and painful at first, but there had been no pain for years. In August 1902 the patient was operated upon for hæmorrhoids and since had had pain in the back on exertion but none while at rest ; the pain increased until she took to her bed 2 weeks before admission.

On Examination. The abdomen appeared normal.

P.V. (under anæsthetic). The uterus was normal. On the right, depressing the fornix, was a firm, elastic, slightly moveable swelling the size of an orange. On the left a similar swelling which did not depress the fornix.

Operation (December 20). Two cystic swellings which extruded behind the uterus were seen, partly adherent ; they ruptured in removal and discharged tarry fluid.

Parts Removed. Both tubes were normal. The left ovary the size of an orange; the wall was thin and roughened by adhesions externally; the inner surface presented several hæmorrhagic areas. There was a second cyst the size of a cherry with tarry contents. The right ovary was exactly similar except that there was no second cyst.

CASE VI. E. G.; February 20—March 30 1904; æt. 47; single. Menstruation started at 13, periods regular without pain. At about 35 began to suffer from severe pain in the lower abdomen; 5 years later the periods became profuse; the pain was always relieved by the loss of blood at the periods. For 2 years there had been some pink intermenstrual discharge and irregularity of the periods for 9 months.

On Examination. A tumour extending half way to the umbilicus.

P.V. Mobility of the uterus greatly impaired, a firm swelling continuous with the cervix occupied the pelvis and extended half way to the umbilicus; this appeared to be the uterus. On the left side a firm fixed mass of tissue about 2 inches in thickness extended out to the pelvic wall. Behind was a hard fixed mass the size of an orange.

Operation (March 4). Pelvic organs were matted together. The appendages of each side were separated; both ovaries ruptured and discharged chocolate coloured blood. The fluid from both was somewhat offensive. The uterus was enlarged and firmly fixed in Douglas's pouch; it was not removed.

Parts Removed. Both appendages. The left tube was dilated at its abdominal end and the wall thinned in the ampullary region; nearer the uterus it appeared normal but its mucous membrane was swollen. The fimbriæ could not be recognized nor was it certain whether the ovary was represented by the ragged tissue round the end of the tube. The right ovary was much damaged and had contained a large quantity of fluid. The right tube was normal.

CASE VII. J. G.; February 7—March 2 1905; æt. 36; married. Menstruation started at 13, regular, with pain on the first 2 days. The patient had had 3 children, the youngest being 9; no miscarriages. In September 1904 there was an attack of sharp pain in the right side which radiated down the legs and to the back; it caused retching but not vomiting. Similar pain came on 2 days before each subsequent period and persisted for 2 weeks. There was no change in menstruation.

On Examination. A firm fixed mass felt on pressure in the hypogastric region.

P.V. The uterus found pushed forwards and, attached to it behind, was a fixed mass of elastic consistency the size of an orange.

Operation (February 9). A firm dark cyst was seen arising from the right ovary and adherent to surrounding structures: in separation it ruptured and dark tarry fluid escaped. The left tube and ovary were normal.

Parts Removed. The right appendages. The right tube normal except that it was roughened by adhesions. The right ovary represented by an empty cyst the size of an orange with a thick wall, rough externally and smooth internally.

CASE VIII. E. A.; June 5—July 1 1905; æt. 33; married. Menstruation started at 14, regular with "some" pain. Married 12 years, 1 child

after 1 year and 5 months, miscarriage 3 years later; lying-in normal each time. One year before admission the periods became lengthened and at the same time there was an offensive brown discharge which persisted for 6 months. When admitted there were only 5 clear days between the periods. The patient complained of pain in the left iliac region on exertion.

On Examination. Abdomen appeared normal.

P.V. Uterus normal in position; to the right there was a fairly moveable swelling the size of a hen's egg and to the left a similar swelling, but it was more closely attached to the uterus.

Operation (June 6). A cyst was found in connection with the right appendages; it was adherent to omentum and firmly to surrounding structures. In removal it ruptured and discharged gritty, dark, altered blood. The left appendages were very adherent and in separating them a collection of clear peritoneal fluid was evacuated. The condition of the appendages on this side appeared to be the same as that on the right, but as they were so firmly adherent to bowel it was thought better not to remove them.

Parts Removed. The right tube appeared quite healthy. The right ovary for the most part was normal in appearance but at one part it was expanded into a cyst the size of a hen's egg, the wall of which was dense fibrous tissue roughened by firm adhesions externally and smooth internally. On microscopical examination there was seen to be hæmorrhage into the cyst wall.

CASE IX. H. J. D.; June 17—July 15 1905; æt. 32; single. Menstruation started at 13, regular with "some" pain which remained unaltered. In 1899 there was vaginal discharge with scalding on micturition from time to time. In October 1902, attack of pain in the lower abdomen with temperature raised to 103°–104°; she was in bed for 3 weeks. Occasional attacks of pain in the lower abdomen but otherwise well until April 1905, when the pain became continuous; during May she had severe pain and high temperature and was in bed for 4 weeks.

On Examination. Abdomen rigid and tender in left iliac region.

P.V. The uterus retroverted and contained fibroids. There was a mass in the situation of the left appendages which was fixed to the pelvic wall.

Operation (June 22). Two subperitoneal fibroids the size of hen's egg seen. The left ovary was embedded in adhesions and contained a hæmatoma which ruptured and discharged dark altered blood during removal. The right ovary was also adherent but not so firmly as the left; it contained a small hæmatoma which was opened but the ovary was not removed. Both tubes were examined, their fimbriated ends were somewhat injected but there was no thickening or other evidence of salpingitis.

Parts Removed. The left tube appeared perfectly normal. The left ovary was enlarged by a blood cyst the size of a walnut.

CASE X. F. M.; March 19—April 12 1906; æt. 37; married. Menstruation started at 15, regular, loss scanty, pain always came on 2 or 3 hours before each period and lasted for 1 or 2 days. Married 15 years, no pregnancy. A year and a half before admission there was dragging pain in the right iliac fossa; this persisted and there was occasional shooting pain down the inner side of the right thigh. There had never been any vaginal discharge.

On Examination. The abdomen appeared normal.

P.V. A tender fairly moveable mass was found in the position of the uterus.

Operation (March 26). The intestines were found very much matted in the pelvis; they were separated with great difficulty and a cyst of the right ovary displayed. In trying to free the cyst it ruptured and discharged about 8 ounces of dark fluid altered blood. Part of the cyst was removed and 2 inches of the right tube.

CASE XI. E. A. T.; December 2 1907—January 31 1908; æt. 44; single. Menstruation started at 17 and was regular and painless; there had been two attacks of profuse intermenstrual bleeding at 22 and 25. For ten years before admission the loss had been very profuse and during that time the patient had noticed some tenderness and enlargement of her abdomen. For 1 year there had sometimes been very severe abdominal pain one or two days before the onset of the periods and some incontinence of urine. For some weeks the enlargement of the abdomen had been increasing.

On Examination. The patient was very anæmic. The abdomen was enlarged over the lower half and a semi-solid tumour was found rising out of the pelvis to the level of the umbilicus.

P.V. The anterior vaginal wall and the left fornix were depressed by a hard swelling which appeared to spring from the front of the uterus and extend to the left pelvic wall: this hard mass seemed to be continuous with the cystic part felt in the abdomen.

Operation (December 5). Two cysts were seen adherent to one another and to the rectum and bladder; in separating the adhesions one cyst ruptured and discharged viscid tar-like fluid, the other cyst was opened and had similar contents. The left cyst communicated with a cavity in the broad ligament which was continuous with a retro-peritoneal pocket which ran up towards the left kidney and contained 4 or 5 ounces of tarry fluid.

Parts Removed. The uterus and appendages. The uterus contained 2 fibromyomata about the size of walnuts. The ovaries were converted into cysts, each capable of holding about a pint of fluid. Externally the walls were rough in places from adhesions and in the walls were scattered hard, circular areas varying in diameter from $\frac{1}{2}$ inch to 1 inch and of cartilaginous hardness to the inner surfaces of which old blood clot was adherent. The tubes contained tarry fluid, the left communicated with its cyst and the right appeared to have done so. [Specimen shown at *Roy. Soc. Med.*, January 9 1908.]

CASE XII. A. A.; June 3—29 1908; æt. 44; single. There had been an attack of pelvic inflammation at 16. Menstruation began at 12, periods regular with pain. In June 1905 the patient had an attack of sharp pain in the left iliac fossa which radiated to the chest and groin; in bed for 3 days and had similar attacks at short intervals, and again in July, August and December of that year. In September 1906 the pain became continuous though less severe and persisted for 6 months. She was well after this until August 1907 when the pain returned and was present at intervals until the time for admission. Menstruation had always been quite regular until April 1908 when the period was 3 weeks late and came on with severe pain in the left iliac fossa accompanied by vomiting; in bed 14 days. At

the next period there was severe pain again which kept her in bed a week.

On Examination. Tenderness in the left iliac fossa.

P.V. A cystic, somewhat movable swelling the size of an orange was found on the left side of the pelvis pushing the uterus backwards and to the right.

Operation (June 4). A very adherent cyst of the left ovary was found, the adhesions were broken down and the cyst removed unruptured. The right tube and ovary were normal.

Parts Removed. The left ovary converted into a cyst the size of an orange, the wall was thick and rough externally; it contained thick altered blood and the inner surface of the wall was covered with organised clot. The left tube was normal.

CASE XIII. A. J. M.; March 8—April 6 1909; æt. 53; married. Married at 24 and had a child a year later, but no other pregnancy. Menstruation started at 11, regular until the menopause at 50: for 2 years before the change there had been excessive loss and pain at the periods. Six months after the menopause the patient had a urethral caruncle removed at St. Thomas's Hospital; under the anæsthetic a pelvic examination was made, "the uterus and appendages could be felt bimanually and were normal." Re-admitted in 1909 for recurrence of the caruncle and pain in the left side of the abdomen of 2 months standing.

On Examination. Abdomen normal.

P.V. A cystic swelling the size of a billiard ball could be felt in the situation of the left ovary.

Operation (March 18). A dark coloured cyst of the left ovary was seen; it was adherent to both rectum and uterus. Removed unruptured. The uterus and right ovary were atrophic.

Parts Removed. The left tube was normal. The left ovary converted into a thick walled cyst the size of a billiard ball and contained thick tarry blood.

CASE XIV. A. R.; March 9—April 2 1910; æt. 24; married. Menstruation began at 13, normal. Married 4 years, no pregnancy. For 3 years the patient had had occasional attacks of sharp shooting pain in the lower part of the abdomen and left side, the pain was increased by walking. It had no relation to menstruation but at the time of the first attack the periods were very irregular.

On Examination. Abdomen normal.

P.V. A cystic swelling found in the left ovarian region.

Operation (March 11). The left appendages were found to be very adherent to surrounding structures; in separation the ovary ruptured and discharged tarry fluid. The right tube and ovary were normal.

Parts Removed. The left appendages. The tube was tortuous and its walls were thickened and oedematous. The ovary was ragged and the cyst that had ruptured was about the size of a walnut, there were 6 or 8 small ones which gave the ovarian tissue a honey-combed appearance. All the cysts contained tarry blood.

On Microscopical Examination. This proved to be a lutein cyst of ovary with enormous clumps of lutein cells.

CASE XV. E. P.; March 10—April 9 1910; æt. 34; married. Menstruation started at 19, the periods were regular and very profuse, each

lasting 10 days. There was always severe pain at the periods which had caused her to stay in bed for 2 or 3 days and apply fomentations to the abdomen. Married 10 years, 2 confinements in the first 2 years, one at full term the other prematurely; each puerperium normal. For years before admission there had been some constipation and pain in the right iliac region. Late in November 1909 a period ended, a week later she felt ill and went to bed, that evening she vomited. There was pain in the right iliac fossa but no worse than it had been on many occasions. The next day vaginal hæmorrhage started and persisted for 10 days, clots were passed and the discharge was said to be offensive. The patient remained in bed a month and vomited nearly every night; during this illness the pain passed into the left iliac fossa and persisted until admission. The next period came on one month after the hæmorrhage ceased and afterwards menstruation was regular; there was, however, no dysmenorrhœa and a small amount of brown discharge was noticed between the periods.

On Examination. Abdomen normal.

P.V. A large, hard, irregular, fixed mass was felt on the left of the uterus.

P.R. Craggy hardness of the cellular tissue. From the examination the mass appeared to be of a malignant nature.

Operation (March 11). The mass was found to be composed of the densely adherent left appendages; in separation a cyst ruptured and discharged about $\frac{1}{2}$ an ounce of tarry fluid. The right appendages were normal. There was very marked inflammation of the pelvic cellular tissue.

Parts Removed. The left appendages. The tube was thickened. The ovary contained a ruptured cyst the size of a walnut with thick tough wall roughened externally.

On Microscopical Examination. The wall was found to be composed of pigmented fibrous tissue.

CASE XVI. E. S.; July 16—August 10 1910; æt. 37; married. Periods always regular and profuse with discomfort for a week before and for 2 or 3 days of the flow. She had had 1 child 7 years and a doubtful abortion 1 year before admission. Frequent attacks of pain in the left iliac region for 3 or 4 years; in November 1909 there was a very severe one accompanied by vomiting and marked abdominal tenderness, after this the pain became almost constant. On July 16 she was seized with very acute abdominal pain, it persisted all day and there was frequent vomiting; the bowels had been regular. The patient was brought to the hospital that evening.

On Examination. The abdomen was distended below the umbilicus; there was marked peristalsis and tenderness in both iliac fossæ, especially the left. On July 18 a brown vaginal discharge was noticed. The tenderness gradually subsided and then a swelling could be felt on deep palpation just above the symphysis.

P.V. An elastic swelling was found filling up the posterior and right side of the pelvis, depressing the posterior fornix and fixed to the pelvic wall. Just behind the cervix there was marked induration.

Operation (July 26). On opening the abdomen a small quantity of tarry blood was found in the peritoneal cavity. There was a very adherent

cyst of the left ovary, the size of a cocoa-nut, which had apparently leaked. In removal it ruptured. The right appendages were normal.

Parts Removed. The left appendages. The ovary was converted into a cyst which had contained about half a pint of tarry fluid; the wall was tough and thick for the most part but thinned in places. The external surface was ragged from adhesions. The left tube was normal in appearance.

CASE XVII. S. S.; August 3—26, 1910; æt. 28; married. Menstruation started at 14, was regular and painless. Married 8 years, 1 child 7 years and 1 miscarriage 5 years before admission. In 1907 she had suffered from continuous aching pain in the left iliac region; she was admitted to a hospital in Russia where she remained in bed for 4 or 5 months under treatment for her pain and finally was operated upon. For 2½ years she was well except for a yellow vaginal discharge. In June 1910 the periods ceased and she suffered from pain across the lower part of the abdomen, in the thighs and left shoulder. Since the onset of the pain she had vomited after nearly every meal. For a fortnight before admission the pain had been more severe. She came to the out-patient department on August 3; then she had marked tenderness over the whole of the lower part of the abdomen but especially in the right iliac region and the right vaginal fornix, the temperature was 100° and she appeared to be so ill that she was admitted at once. Lying in bed for 2 days the temperature fell to normal, but the pain persisted and kept her awake at night in spite of injections of morphia.

Operation (August 5). Under the anæsthetic a fixed mass the size of a tangerine orange could be felt on bimanual examination in the situation of the right appendages. The abdomen was opened through the old scar and the right appendages were found to be firmly bound down by adhesions; in separating these 2 cysts ruptured, one containing blood stained serum the other tarry fluid. The left appendages were absent.

Parts Removed. The right appendages. The tube was closed and distended to the size of one's little finger with serous fluid, the fimbriated end had apparently been removed. The ovary was the size of a hen's egg and contained 10 or 12 blood cysts the largest of which had ruptured, some of the smaller ones contained tarry fluid and the others clotted blood.

CASE XVIII. M. B.; August 14—31 1910; æt. 32; married. Menstruation started at 11, regular and painless. Married 8 years, no pregnancy. In 1905 she had an attack of sharp pain in the left side of the abdomen and after that there was always a dull ache in the same region; at this time the periods became much more profuse and recurred every 14 days; this condition persisted for 4 years when the periods became irregular with intervals sometimes of 2 or 3 months and sometimes of only a few days. There had been 3 months amenorrhœa at the time of admission.

On Examination. Marked tenderness in both iliac regions.

P.V. A fixed mass on either side behind the uterus, the left about the size of a tennis ball, the right a little smaller.

Operation (August 15). Matting in the pelvis around cysts of both ovaries. In separation they both ruptured and discharged several ounces of dark tarry fluid.

Parts Removed. Both appendages. The tubes were normal. The left ovary was converted into a spherical sac $2\frac{1}{2}$ inches in diameter which had ruptured. The wall varied in thickness in different parts from $\frac{1}{4}$ inch to the thickness of paper. There were many adhesions on the outer side and several small cysts containing tarry fluid. The inner surface was smooth, but in several places there were cup-like depressions indicating the original site of separate cysts. The right ovary was similar, its chief cyst measuring $1\frac{1}{2}$ inches in diameter; crossing it was a cord about the thickness of the radial artery.

Bacteriological examination of the contents of one of the small unruptured cysts showed the presence of staphylococcus albus in pure culture.