ON PAN-HYSTERECTOMY, OR TOTAL EXTIRPATION OF THE UTERUS.

By Christopher Martin, M.B., F.R.C.S. Eng., Surgeon to the Birmingham and Midland Hospital for Women.

The term hysterectomy is somewhat loosely employed to denote any operation which involves partial or complete removal of the uterus. This removal may be made per vaginam (vaginal hysterectomy), or by abdominal section (abdominal hysterectomy). In partial hysterectomy the uterus is removed at or about the level of the internal os—the cervix being left as a "stump." This stump may be treated by the extra-peritoneal method (the clamp operation) or by the intra-peritoneal method, where the stump is sutured and dropped back into the abdomen.

To-night I propose to direct your attention to complete hysterectomy by abdominal section, total extirpation of the whole organ, *including the cervix*, or pan-hysterectomy.

Freund introduced the operation of total abdominal hysterectomy for cancer, but the mortality was so terrible that the method soon became discredited, and finally abandoned.

Bardenheuer was the first to perform pan-hysterectomy for myoma, and records seven cases with six recoveries. Martin of Berlin has adopted this method, and recommends it with all the weight of his great authority. In America, Baldy, Polk, Krug, Boldt, and others have recorded series of successful cases.

In this country we have been more conservative, and have

only adopted the operation in very recent years. We owe its introduction to Jessett of London, and Smyly of Dublin. Jessett did his first case in February 1892, and Smyly followed in the autumn of the same year.

I had the privilege of watching Dr Smyly perform the operation in 1894, and I take this opportunity of expressing my very deep indebtedness to his teaching. During the year 1895 I performed the operation eight times—six times for myoma, once for perforation of the pregnant uterus, and once in a case of occluded cervix with hæmatometra and pyosalpinx. All my cases have recovered. Before, however, I refer to these cases, let me give a general description of the technique I have adopted.

The patient is prepared as for an ordinary abdominal section. The pubes is shaved, the vagina, vulva, and abdominal wall are scrubbed with soap, washed with lysol solution 1 per cent., and finally with corrosive sublimate 1 in 1000. The vagina is packed with antiseptic gauze, and an antiseptic compress is applied to the abdomen.

The instruments, the silk ligatures, and the silkworm gut sutures, the gauze pads (used instead of sponges), and the water to be used at the operation, are all sterilised by boiling. I try to render aseptic my own hands and those of my assistant and nurses by prolonged scrubbing with soap and lysol, followed by immersion in corrosive sublimate. The patient is anæsthetised, and the gauze removed from the vagina. The patient must be kept as warm as possible on the table, and by hot-water bottles and blankets. I prefer to operate standing on the patient's right side, as for ovariotomy, with the patient lying in the ordinary dorsal position.

The abdomen is opened in the usual way, and the incision is made long enough to permit of the easy delivery of the tumour. When this has been effected, large gauze pads are to be packed into the abdomen above and behind the tumour, to soak up blood, etc., and to prevent undue exposure of the intestines. Sometimes the tumour cannot be delivered through the wound until one or both broad ligaments have been ligatured and partially divided.

The surgeon should now rapidly note the relation of the tumour to the uterus. He should determine the position of the cervix, and the line of reflexion of the peritoneum from the uterus on to the bladder. He should note the position of the ovarian and uterine arteries, and of the venous sinuses of the broad ligament. In some cases he is able to palpate the ureters as they course from the brim of the pelvis towards the bladder. In this investigation, and throughout the whole of the rest of the operation, a good light is essential, and I have found the electric hand lamp of the greatest value.

If you look at Diagram No. 1, you will see that the uterus receives on each side a double arterial supply—the ovarian artery running in the upper third of the broad ligament just beneath the Fallopian tube, and the uterine artery running in the lower third

just above the vaginal reflexion. The ovarian and uterine arteries on each side unite in a large anastomotic loop, which runs in the broad ligament close to the lateral border of the uterus. The vessels of one side of the uterus anastomose with those of the other side just beneath the peritoneum. Lastly, a few arterial twigs run upwards from the vaginal arteries into the cervix. The veins in each broad ligament form a plexus (often composed of huge varicose sinuses) which empties in two directions—into the ovarian plexus, and into the utero-vaginal plexus. I have not indicated these veins in the diagrams, but in many cases they are much more formidable, from the surgeon's point of view, than the arteries.

The broad ligaments must now be ligatured in sections and divided (between *double* ligatures) as far down as the level of the internal os. For this purpose I employ Galabin's pedicle needle—a blunt fully-curved handled needle with two large eyes—and sterilised silk (No. 5). Selecting a spot in the broad ligament free from veins, about the junction of the upper and middle thirds of the ligament, and midway between the uterus and the pelvic wall, a double ligature is passed. Care must be taken that the two ligatures do *not* interlock. By pulling the one forcibly inwards and the other outwards the aperture of puncture is stretched or torn into a transverse slit, about one inch in length (see Diagram No. 1, left side). In some cases I have made this transverse slit by forcing a pair of blunt forceps through the aperture of puncture, and then widely opening them. If this slit be not made, it is difficult to tie the ligatures in such a way that sufficient tissue is left beyond the ligatures to prevent slipping. The two ligatures are tied as far apart from each other as possible, and the intervening strip of broad ligament severed with a snip of the scissors. Whenever possible, I prefer to remove the ovaries and tubes with the uterus, and hence the outer or proximal ligature should be tied outside the ovary and Fallopian tube. This, however, is not a matter of great importance. On the right side of Diagram No. 1 is shown the condition of parts at this stage. In place of the distal ligatures —those on the uterine side—forceps may be applied. I prefer the ligatures, however, as they are not so likely to slip, and they do not by their presence hamper the surgeon. The same manœuvre is to be repeated on the other side. We have now tied both ovarian arteries, and divided the upper third of both broad ligaments.

The middle third of the ligament must be similarly treated. A double ligature is passed through the broad ligament about the level of the internal os, and nearer to the uterus than the first ligature. The aperture of puncture is stretched into a transverse slit, the two ligatures tied as far apart as possible, and the intervening bar of tissue divided. The same manœuvre is repeated on the other side.

The next step is to detach the bladder from the anterior

DIAGRAM NO. I.

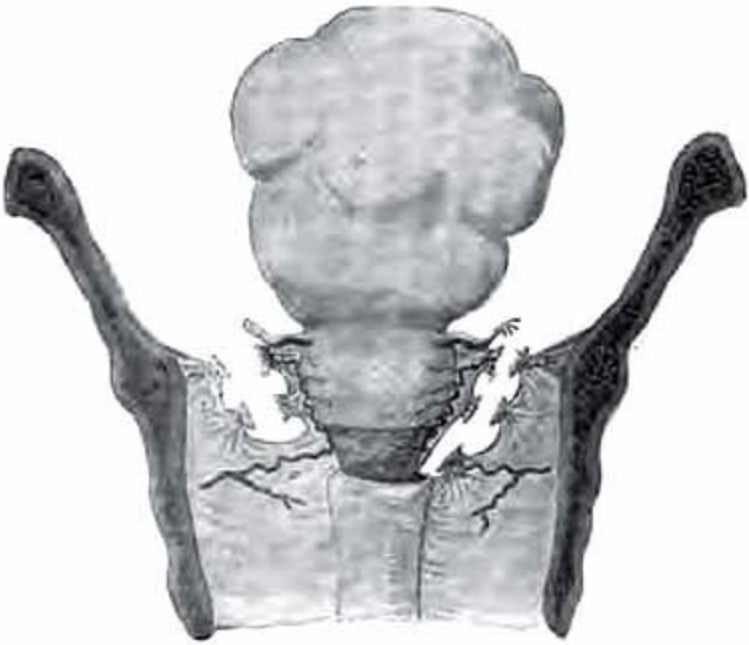

DIAGRAM NO. II.

DIAGRAM NO. III.

DIAGRAM NO. IV.

surface of the uterus. The line of reflexion of peritoneum from the uterus to the bladder can usually be seen as a whitish line, above which the peritoneum is firmly attached, and below which it is loosely attached, to the subjacent tissue. In case of doubt a sound should be passed into the bladder, and the limits of the viscus determined. A curved incision is now made about two-thirds of an inch above the line of reflexion across the anterior surface of the uterus from one broad ligament to the other. This incision should not penetrate deeper than the subserous connective tissue. The bladder can now be easily stripped off the uterus as far as the vagina by peeling it downwards with the thumb. The surgeon can tell when he has reached the vagina by introducing a stout pair of Spencer Wells' forceps into the vagina, and feeling for them with his finger in the gap between the uterus and the bladder. The vagina should now be opened close to the anterior lip of the cervix, by cutting with scissors on to these forceps, and the opening thus made enlarged by tearing. Hooking the fore-finger through this opening into the vagina, and using it as a guide, the posterior fornix is similarly opened with scissors.

The uterus is now attached on each side solely by the lower third of the broad ligament containing the large uterine artery (see Diagram No. 2). Should the ureters be seen, they should be carefully pressed outwards. The surgeon must now ligature the uterine artery, and this is one of the most difficult steps of the operation, particularly if the tumour be a large one, more or less filling the pelvis. He must take care, firstly, to pass the needle on the uterine side of the ureter, otherwise this duct would be tied with fatal results; secondly, he must leave enough tissue beyond the grasp of the ligature to prevent it slipping. With his left forefinger passed into the vagina from behind, he guides the pedicle needle under the uterine artery close above the mucous membrane of the lateral fornix. There is not room to tie a double ligature and to cut between. These ligatures should be tied on both sides before the uterus is cut away from either. The uterus should now be severed from the remaining attachments, keeping as far as possible away from the two lower ligatures. When this has been done, the uterus with its myomatous outgrowth is entirely free, and may be lifted out of the pelvis.

The cut edges of the vaginal wall should be seized with forceps, drawn slightly upwards, and inspected. Should there be any bleeding points, a few fine silk sutures should be passed to control the hæmorrhage. I have never had any trouble from this source. The pelvis should be sponged clear of clot, and the pedicles and all raw surfaces carefully inspected with the aid of the electric light, any bleeding points being seized and ligatured. All the ligatures, except those controlling the uterine arteries, are to be cut short and the pedicles dropped (see Diagram No. 3). A pair of Spencer Wells' long forceps

are passed into the vagina from below, and the two ligatures controlling the uterine artery drawn into the vagina. A thick roll of iodoform gauze must now be drawn down through the vagina by means of the forceps, until only about one inch of the gauze remains in the peritoneal cavity just above the vaginal opening (see Diagram No. 4). The bladder and divided broad ligaments fall together over the gauze, but I make no attempt to suture the peritoneum over the gauze, or to otherwise close the vaginal canal. The abdominal wound is now closed by interrupted silkworm gut sutures, no drainage-tube being inserted unless there have been extensive adhesions and there is oozing. The iodoform gauze, which fills the vaginal canal from the peritoneum to the vulva, acts as a drain, and forms an efficient barrier between the peritoneum and infection from below. Its upper end quickly becomes encapsuled with aseptic lymph, so that, when it is removed on the fifth or sixth day, there is left just above the vagina, and opening into it, a granulating cavity shut off from the general peritoneal cavity, and containing on its lateral aspects the stumps of the uterine arteries.

The method I have just described has at least one recommendation, its comparative simplicity. I may point out that I do *not* use the Trendelenburg posture, as Jessett and the Americans do, nor do I operate sitting between the thighs, as Martin of Berlin and Smyly do. I do not make anterior and posterior flaps, as Jessett does. I make no attempt to suture the peritoneum over the open vaginal canal, trusting entirely to the iodoform gauze. I do not use the elastic tourniquet, and I use no special instruments beyond Galabin's needle and the electric lamp.

The after-treatment is similar to that after ovariotomy. For the first four days the catheter is passed every six hours. The iodoform gauze should be removed on the fifth or sixth day, and after this the vagina should be very gently syringed night and morning with warm weak iodine water. The stitches in the abdominal wall are removed about the ninth day, and the patient is usually able to get up during the third week, and to go home during the fourth week after the operation. The ligatures on the uterine arteries, which were left hanging into the vagina, are allowed to separate naturally. This they usually do during the second or third week. The patient generally makes as easy and uneventful a recovery as if she had undergone an ordinary uncomplicated ovariotomy. Although the operation is a long and tedious one, it is attended with but little shock, provided the patient be kept warm and the intestines not unduly exposed, handled, or chilled during the operation.

Let me now, in fairness, point out some of the difficulties and dangers of pan-hysterectomy, and some of the objections that have been raised to it:—

(1.) It is a long, difficult, and tedious operation, usually taking over an hour.

(2.) There is the danger of chilling the patient, unduly exposing the intestines, and so adding to the shock.

(3.) There is the danger of one of the ligatures slipping, with consequent internal hæmorrhage.

(4.) There is the danger of tearing the bladder and cutting or tying the ureters.

(5.) There is the danger of adhesion of bowel to some of the raw surfaces left in the pelvis,—a danger I believe to be greatly exaggerated.

(6.) There is the danger of infection of the peritoneum through the open vagina.

(7.) There is the danger of weakening of the pelvic roof by the removal of the cervix, and subsequent prolapse—a purely theoretical objection. It does not occur.

I have already indicated how most of these dangers may be avoided.

Let me now compare pan-hysterectomy for myoma with some of the rival operations.

(1.) Removal of the uterine appendages is a comparatively safe operation for small myomata (less, say, than a five months' pregnancy), but I have found it a risky and unsatisfactory operation in cases of large myomata. I have removed the appendages twenty times for small myomata with one death, and eight times for large myomata with two deaths. In about 90 per cent. of those who recover a cure results,—menstruation ceases, and the tumour shrinks. But in the remaining 10 per cent. the patient is *not* cured, the floodings continue, the tumour grows, presses on bladder and rectum, and renders the patient's life a burden to her. It is these failures that shake one's faith in the advisability of removing the appendages for myoma, and lead one to search for some more excellent way. I think that small myomata should be treated by vaginal hysterectomy, and large myomata by abdominal pan-hysterectomy.

(2.) For the treatment of large myomata, hysterectomy with extra-peritoneal treatment of the pedicle (clamp cases) is the favourite operation with most surgeons. To this method there are numerous and obvious objections. It is very risky, being attended by a mortality of 15 to 30 per cent. The patients that do not die escape by the skin of their teeth. They have an offensive necrosing stump, sometimes as thick as the wrist, filling the lower portion of the wound and slowly sloughing off. They run the gauntlet of septicæmia, peritonitis, and secondary hæmorrhage. When the stump separates, a huge suppurating chasm is often left going down to the peritoneum, and separated only by a weak barrier of granulation tissue from coils of intestine. The wound is slow in healing, and it is usually from four to eight weeks before the

patient may even sit up in bed. There is a great danger after these clamp cases of a ventral hernia forming at the lower end of the wound. In cases where the myoma invades the broad ligament or the cervix it is often almost impossible to get a safe pedicle when the clamp is used. In all these points pan-hysterectomy is superior to the clamp operation. It cures the patient, it is much less risky, the abdominal wound heals by first intention, the patient is up within three weeks, and there is but little risk of subsequent hernia. For my own part, I have vowed never to use a clamp again.

(3.) Hysterectomy with intra-peritoneal treatment of the pedicle and abdominal myomectomy seem to be attended with such great risks (internal hæmorrhage, suppuration of the stump, peritonitis, and septicæmia) that they are more dangerous even than the clamp operation, whilst they offer no advantages that are not better secured by pan-hysterectomy.

(4.) Vaginal hysterectomy for small myomata compares favourably, as regards mortality, even with removal of the appendages, whilst, of course, it offers an absolute cure. It is not advisable, however, in cases where the tumour is larger than a four months' pregnancy.

(5.) Enucleation per vaginam is usually a risky operation, except for small submucous tumours to which access is easy. It is justifiable in cases of large sloughing submucous myomata. In other cases, however, pan-hysterectomy seems to me to be a sounder and safer operation.

To briefly sum up the advantages of pan-hysterectomy: (1.) It absolutely cures the patient. (2.) It has a lower mortality than the clamp operation, than enucleation, and than the intra-peritoneal method of treating the pedicle. (3.) It is attended by but little shock. (4.) The convalescence is easy and uneventful, the wound heals by first intention, and the patient is up in about three weeks. (5.) There is a very slight risk of the subsequent formation of a ventral hernia.

Permit me now to briefly describe the eight cases in which I have performed abdominal pan-hysterectomy.

CASE I.—R. G., single, æt. 33, a patient of Dr Pitt's, of Oldbury, came to me suffering from a small myoma of the fundus, enlarged cystic ovaries, and hydrosalpinx. She was a very tubercular subject, lame from old hip-joint disease. She suffered from intense dysmenorrhœa. In February 1893 I removed the uterine appendages without any benefit. In April 1894 I dilated the cervix. As menstruation continued and her sufferings were extreme, I performed pan-hysterectomy, assisted by my brother Mr Charles Martin, at my private hospital on May 21, 1895. I found the uterus desperately adherent to intestine, and the stumps of both Fallopian tubes were distended with bloody fluid. She was some-

what collapsed after the operation, but rallied well. She was able to get up on the seventeenth day, and to return home on the twenty-seventh day. I saw her about a month ago, and as far as her pelvic symptoms were concerned she was quite cured.

CASE II.—M. A. B., married, æt. 53, was sent to me by Dr Lynch of Walsall. She had a history of severe and almost continuous floodings of eighteen months' duration. Two years before, she noticed a swelling in the abdomen, which had since rapidly grown. She was admitted into my private hospital, and on July 15, 1895, assisted by Mr J. F. Jordan, I performed pan-hysterectomy for a myoma which reached above the umbilicus. The tumour weighed 7 lbs. The ovaries and tubes were not removed. The patient made an excellent recovery. She got up upon the seventeenth day, and returned home on the twenty-eighth day, and has since remained well.

CASE III.—E. G., married, æt. 20, was about three months pregnant. On October 8, 1895, she began to abort, and on the morning of October 9 Dr Wilson of Balsall Heath removed a large mass of "hydatid mole" from the vagina. During the afternoon she became collapsed, having all the symptoms of grave intraperitoneal hæmorrhage. Dr Wilson then sent for me. I diagnosed infiltration of the uterine sinuses, with myxomatous chorionic villi, perforation of the peritoneal coat of the uterus, and internal hæmorrhage. She was collapsed and nearly pulseless. As speedily as possible I opened her abdomen, assisted by Mr Charles Martin, and performed pan-hysterectomy. The abdomen was full of blood. On the anterior surface of the body of the uterus was a ragged perforation, through which tufts of chorionic vesicles were projecting into the peritoneal cavity. I did not remove the appendages. Her convalescence was delayed by an attack of phlegmasia alba dolens, but otherwise she made a good, if slow recovery. She was in bed nearly five weeks. I saw her the other day, and she was still anæmic, although otherwise in excellent health.

CASE IV.—H. W., widow, æt. 50, was sent to me in November 1893 by Dr Davidson of Coventry. She had then profuse menorrhagia of ten years' duration, and a large soft myoma, filling the abdomen, of six years' duration. I put her on ergot and hydrastis, and advised her to wait for the menopause. She ceased to menstruate in December 1894, but the tumour continued to grow and to cause serious pressure symptoms. The lower half of the tumour also became markedly cystic. I admitted her into the Hospital for Women, Birmingham, and on October 12, 1895, assisted by Dr Edge, I performed pan-hysterectomy. Both broad ligaments were terribly vascular, and six ligatures were required on each side. The tumour weighed 15½ lbs., and was a cystic myoma. She got

up on the twenty-fifth day, and returned home on the thirty-fourth day after the operation. I saw her the other day, and she was then in good health. Both ovaries and tubes were removed with the tumour.

CASE V.—F. H., single, æt. 34, was sent to me by Dr Hallwright suffering from a rapidly growing submucous myoma, retention of urine (requiring catheterisation), and menorrhagia. In July 1894 I opened the abdomen and removed her appendages. For a few months menstruation ceased, and the pressure symptoms diminished. They then recurred, and gradually increased in severity. The floodings became alarming, and on several occasions I thought she would bleed to death. Ergot and hydrastis were found to be useless. I admitted her into my private hospital, and on November 5, 1895, assisted by Mr J. W. Taylor, I performed pan-hysterectomy. I found no trace of the appendages. The tumour (which weighed 4½ lbs. after removal) so filled the pelvis that it was very difficult to reach the uterine arteries and to tie them without including the ureters. The bladder was spread out over the front of the tumour, and reached nearly to the umbilicus. She got up on the twenty-first day, and returned home on the twenty-fourth day, having made an uninterrupted recovery. She is now regaining strength rapidly.

CASE VI.—A. S., married, æt. 34, was sent to me by Dr M'Naught of Birmingham in September 1895. She had complete retention of urine, profuse menstruation, and a cystic tumour (which I diagnosed as ovarian) behind the cervix and filling the pelvis. I admitted her into the Hospital for Women, and on November 14, assisted by Dr Morgan, I opened her abdomen. The cystic tumour I found to be a globular enlargement of the fundus about the size of a five months' pregnancy, which, indeed, it very closely resembled. I incised it, and found it to be a cystic myoma, and I then proceeded to perform pan-hysterectomy, removing both appendages with the uterus. She made an absolutely uneventful recovery. She got up on the fifteenth day, and returned home on the twenty-second day, and has since remained well.

CASE VII.—E. G., married, æt. 26, was sent to me by Dr Cox of Winchcombe, with a history of severe floodings of five years' duration. She had for two years noticed a swelling in the lower abdomen, which had grown rapidly the last three months. I admitted her into the Hospital for Women, and on November 20, 1895, assisted by Mr Jordan, I performed pan-hysterectomy. I removed the right appendages with the uterus, but did not remove the left. The tumour was a multinodular myoma, weighing 6 lbs. She made a slow but uninterrupted recovery. Although at no time had she any serious symptoms, the wound was slow in heal-

ing, and she did not get up till the twenty-eighth day, nor leave the Hospital till the thirty-eighth day.

CASE VIII.—E. R., single, æt. 19, a delicate, anæmic girl, was sent to me by Dr H. Brown of Coventry. She had an occluded cervix, moderate distension of the fundus with menstrual fluid (hæmatometra), and double pyosalpinx. I admitted her into my private hospital, and on December 12, 1895, assisted by Dr Morgan, I operated. I first tried to reach the uterus per vaginam, and failed. I then opened the abdomen, and performed total extirpation of the uterus and both ovaries and tubes. The bladder was, unfortunately, wounded to a slight extent, and required suturing. The patient suffered from shock after the operation, and required free stimulation. She rallied well, however, and has since made a good recovery. She is now (January 8) getting up, and will return home in a few days' time.

Let me briefly summarize the above eight cases. There were six cases of myoma. Of these, one (Case I.) was small, and the rest were large tumours. There was one case of hæmatometra with pyosalpinx (Case VIII.), and one case of perforation of the gravid uterus by a hydatid mole (Case III.). This last case is, I believe, the only one on record in which this very rare condition has been diagnosed and successfully treated by surgical operation. In two cases (Case I. and Case V.) I had previously removed the uterine appendages, but without any benefit to the patient. In two cases (IV. and VI.) the myoma was cystic. Three of the cases were operated on at the Birmingham Hospital for Women, four in my private hospital, and one at the patient's own house. Several of the patients were unfavourable subjects for a severe operation. Cases I. and VIII. were delicate, strumous subjects. Case V. was profoundly anæmic, and exhausted by chronic hæmorrhages; and Case III. was collapsed, and nearly moribund from acute internal hæmorrhage. I therefore feel I am fortunate in not having to record a single fatal case.

Dr Berry Hart congratulated Dr Martin on his most brilliant paper. Some of the cases were unique, and, so far as he knew, no one had previously diagnosed such a case as that of uterine perforation in hydatid mole, far less operated on it successfully by total extirpation. His own opinion agreed as to operations in fibroids with that of Dr Martin. He approved of removal of the appendages in suitable cases, and of total extirpation in those where the uterus was too large for the former operation. Dr Martin had evidently improved the technique of the latter operation, and his success was most encouraging.

Dr N. T. Brewis had much pleasure in congratulating Dr Martin on the lucid description which he had given of pan-hysterectomy,

and on the excellent results which he had obtained in the cases operated on by him. When a myomatous uterus required to be removed, he (Dr Brewis) was of opinion that the operation just described was the best one, and he had no doubt it would become the operation of the future. The most difficult part in the technique is the tying of the uterine arteries, chiefly from their position and their close relation to the ureters. Dr Brewis had found that they become more accessible when the patient is in the Trendelenburg position, and the danger of including the ureters in the ligature is abolished when the operator passes probes along them after the method of Kelly. He considered that the extra-peritoneal operation, with Koëberle's wire constrictor, had still a place in the treatment of these tumours, chiefly on account of the rapidity with which the operation could be performed, and he would always prefer it when he had a feeble patient to deal with. In the cases which Dr Brewis had operated on by this method he was well satisfied with the results, and he had not found that they were followed by hernia more than other abdominal operations were, though certainly the convalescence was more prolonged. He also held that there was a class of cases where removal of the appendages gave the desired results, viz., in tumours which did not extend above the pelvic brim. If the ovaries and the whole of the tubes along with the broad ligaments as low down as beneath the round ligaments were removed, one can in nine cases out of ten make sure of the cessation of the growth of the tumour. At any rate, such was his experience.

Dr Martin, in reply, thanked Dr Hart and Dr Brewis for their kind criticism of his paper. He could only find some seven or eight cases on record of "perforating hydatid mole"—all discovered post-mortem. He believed his own to be the first case that had been diagnosed during life and saved by surgical interference. The "clamp" operation was undoubtedly an easier and more rapid proceeding than pan-hysterectomy, but it was more fatal. He did not use the Trendelenburg posture,—(*a*), because vessels which did not bleed in this position might do so after the wound was closed, when the patient's legs were lowered; (*b*), because of the tendency of blood to gravitate towards the diaphragm and escape notice; (*c*), because by traction on the uterus the pelvic floor became quite accessible. So far he had had no trouble from the ureters, and he did not catheterise them. But he could quite see that such a proceeding might be of great service in difficult cases, as undoubtedly the great danger of the operation was ligation, or division of the ureter.