**On the treatment of uterine myomata (fibroids) / by J. Bland Sutton.**

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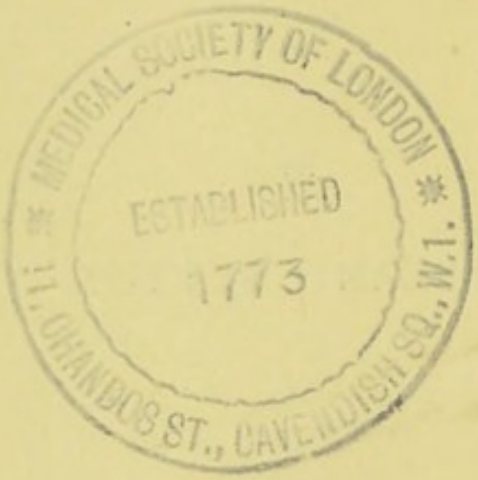

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# ON THE TREATMENT OF UTERINE MYOMATA (FIBROIDS).

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## Lecture I.

## PATHOLOGICAL.

All attempts to cure uterine myomata by medical and electrical methods have been conspicuous failures, so that patients are in the great majority of instances obliged to seek the aid of surgery. Happily they do not seek in vain; so I propose in these lectures to describe those surgical methods which have given me the best results; but before entering into the details of the operations it will be necessary to briefly discuss the pathology of these remarkable tumours.

Myomata (fibroids) are composed primarily of unstriped muscle-fibre, and occur in the uterus as encapsuled tumours.

Though myomata arise in every part of the uterus, including the round ligament, they are more common in the body of the organ than in its

neck. For clinical purposes they may be divided into two groups:

1. Myomata of the body.
2. Cervix-myomata.

The anatomy of each group requires separate consideration.

### 1. *Myomata of the Body of the Uterus.*

These grow in any part of the uterine wall, and may remain embedded within it, or project either on the serous surface of the uterus, or extend into and occupy the uterine cavity. It is convenient to express these conditions in special terms. Thus a myoma embedded in the wall of the uterus is described as being *intramural* (interstitial). When projecting into the uterine cavity it is said to be *submucous*, and when stalked it is called a polypus; when projecting from the peritoneal aspect of the uterus it is termed a *subserous myoma*, and may be pedunculated or sessile. Each of these varieties may occur as a solitary tumour; very frequently subserous, intramural, and submucous tumours co-exist in the same uterus. In many specimens it is difficult to decide whether a tumour should be described as an intramural or a sessile subserous myoma (Fig. 1). It is well to remember that in this as well as in the other figures in these lectures the shape and relations of the tumours as shown in the drawings give no adequate notion of the distortions they produce upon the uterus.

Intra-mural myomata in their early stages resemble knots in a piece of wood, and on section often present a peculiar and characteristic whorled appearance. In many instances the

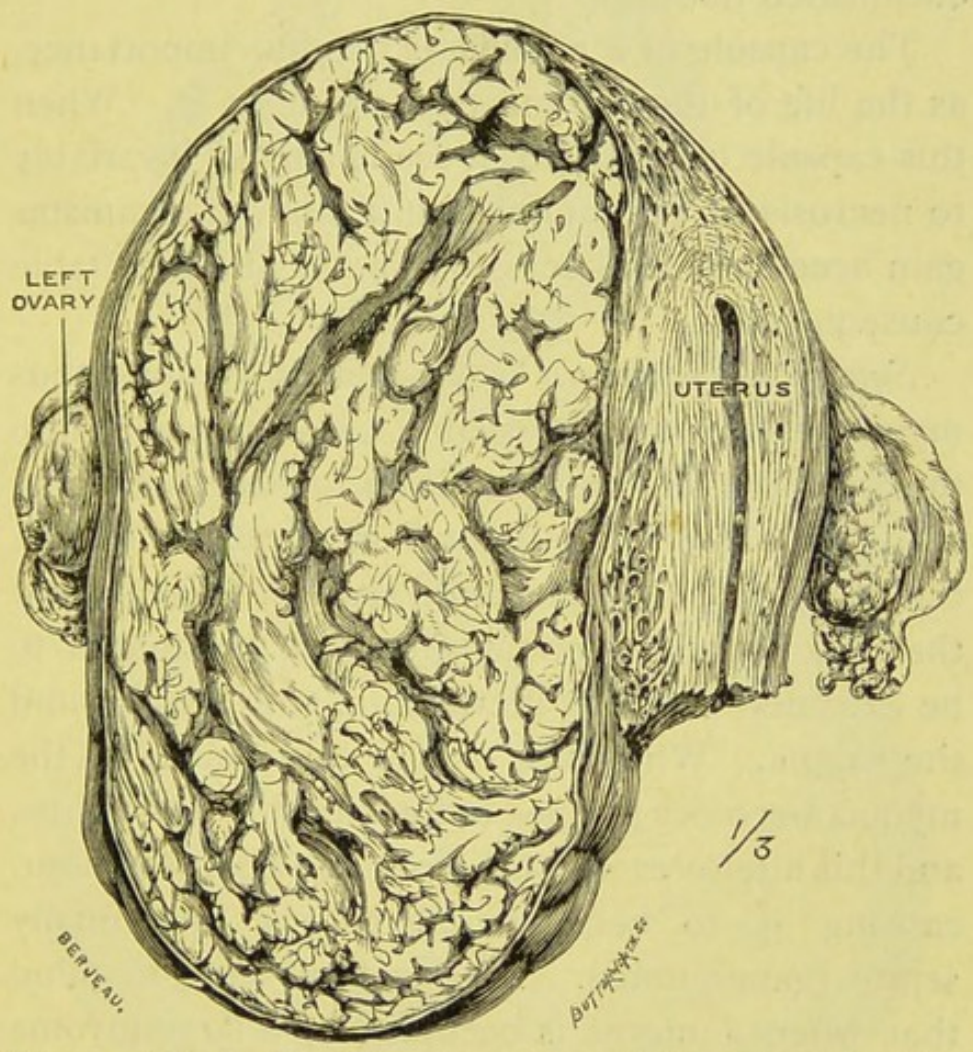


Fig. 1.—The body of the uterus in sagittal section, showing a large myoma traversed by narrow tortuous canals—probably lymph-spaces. The parts were removed by supra-vaginal hysterectomy: the patient had ceased to menstruate.

centre of the vortex is occupied by blood-vessels. There is no limit to the number of myomata in a uterus, nor to their growth. As many as forty

may be present, varying in size from a currant to a cocoa-nut.

Often a myoma is apparently single, but on section is found to contain three, four, or more encapsuled nodules.

The capsule of a myoma is of vital importance, as the life of the tumour depends upon it. When this capsule is damaged, it leads almost invariably to necrosis of the tumour; and if micro-organisms gain access to it, then gangrene is the inevitable consequence.

*Submucous myomata* —As soon as a submucous myoma attains an appreciable size it projects into the cavity of the uterus, and leads to great thickening of its walls. Such a tumour may remain sessile, but it often tends to become stalked. Frequently the stalk lengthens enough to allow the tumour to be extruded from the uterus into, and even beyond the vagina. When this occurs the pedicle of the myoma becomes gripped at the mouth of the uterus, and this interferes with the circulation of the tumour, causing it to become œdematous, and finally septic (gangrenous). It is well to bear in mind that when a uterus is occupied by a large myoma the uterine arteries often increase enormously in size, and branches of the artery which, under normal conditions, are of insignificant proportions may, when supplying a big myoma, be represented by vessels bigger than the radial artery at the wrist. The veins and often the lymphatics are correspondingly enlarged. Soft myomata are sometimes

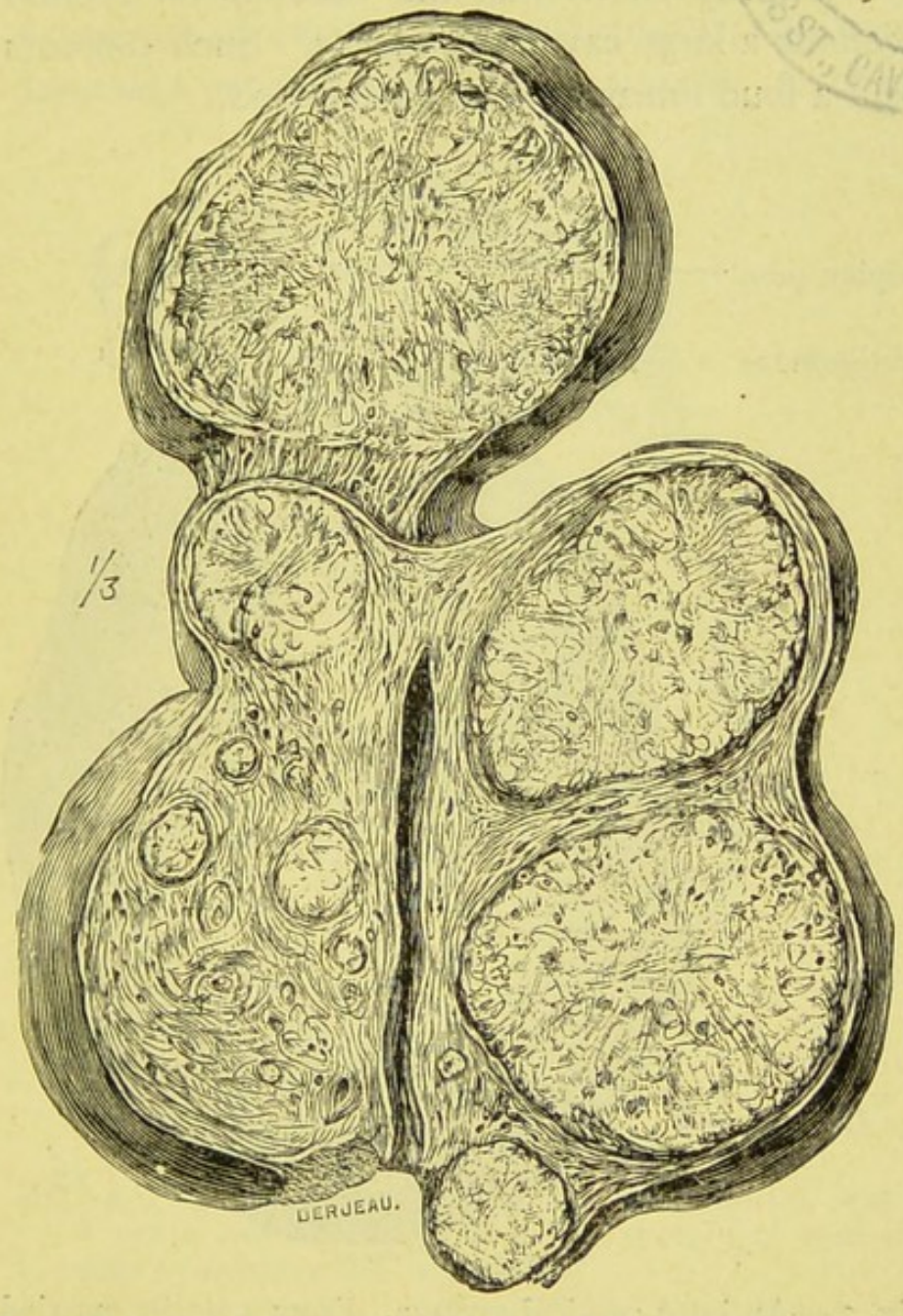


Fig. 2.—Uterus in sagittal section, showing multiple myomata. The parts were removed from a single woman 45 years of age, by supra-vaginal hysterectomy.

exceedingly vascular, and contain venous channels of such proportions that the tumours on section resemble a large cavernous nævus. Such tumours yield a loud murmur when auscultated.

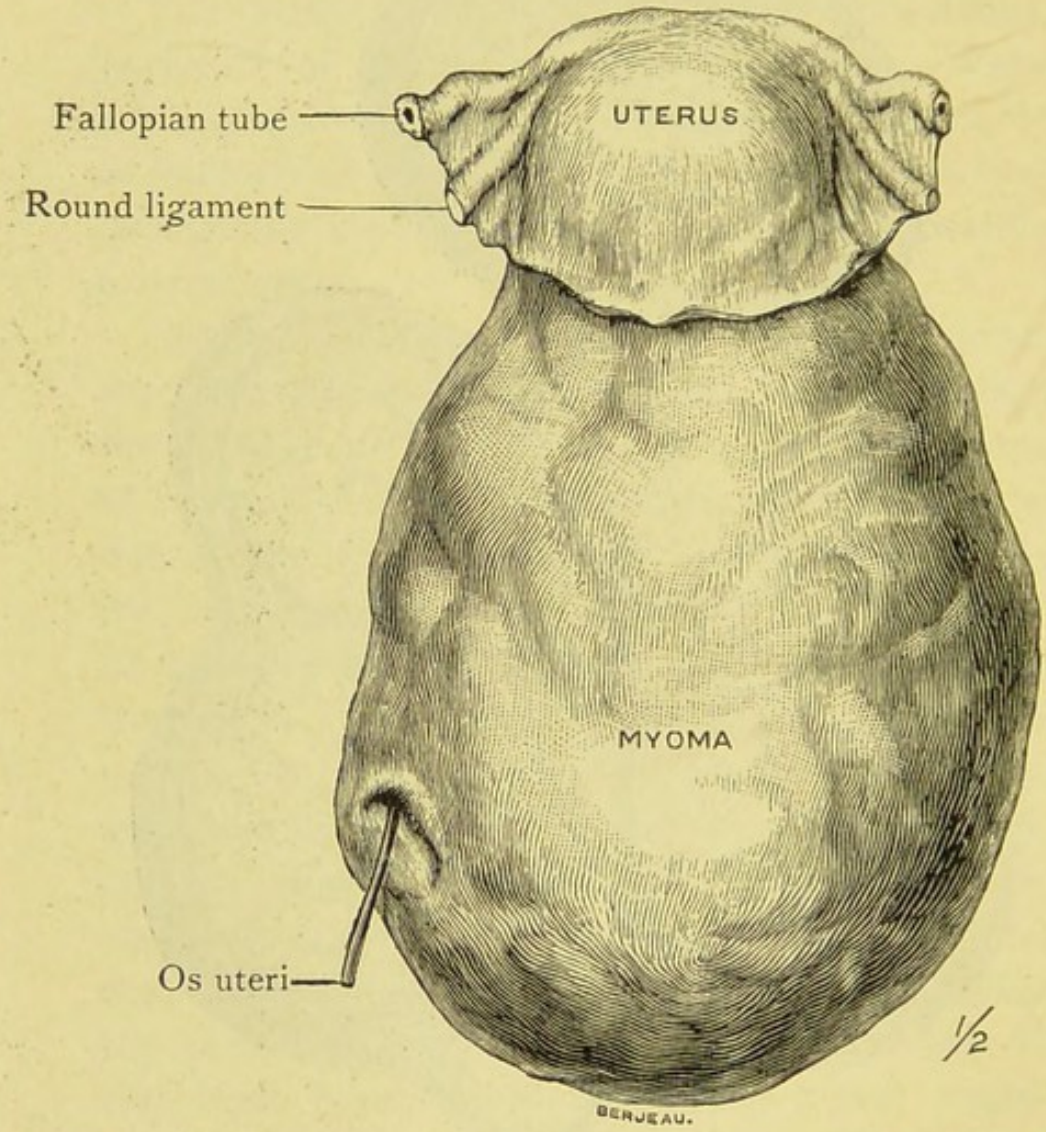


Fig. 3.—An intra-cervical myoma. From a sterile married woman 40 years of age.

*Subserous myomata.*—A single-stalked myoma may grow from the uterus and attain a large size even when its pedicle is narrow, but, as a rule,

those which have thin and long stalks remain small. When many pedunculated and sessile subserous myomata grow concurrently, the uterus assumes a peculiar tuberose appearance. A solitary

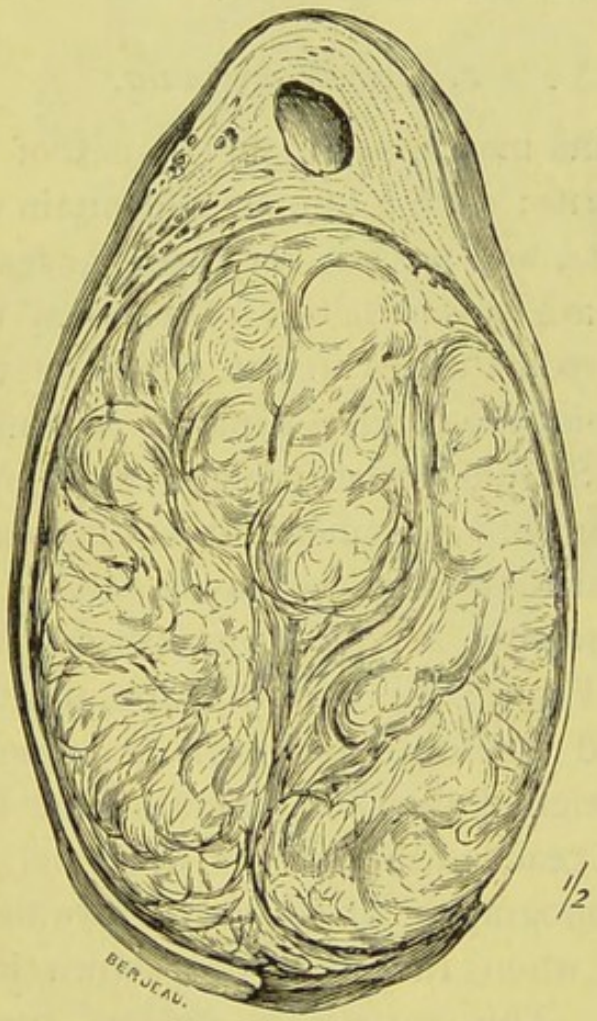


Fig. 4.—An intra-cervical myoma in sagittal section. From a woman 52 years of age, mother of four children; menstruation was active.

pedunculated subserous myoma is rarer than a solitary stalked myoma projecting into the cavity of the uterus.

It is useful to remember that *the narrower the*

*stalk in proportion to the size of the tumour, the greater is its mobility and liability to axial rotation.* Very mobile subserous myomata are a source of much error in diagnosis, and are often mistaken clinically for ovarian tumours.

### 2. *Cervix-myomata.*

A myoma may arise in the tissues of the neck of the uterus ; such a tumour may attain very large proportions, and possess very peculiar features.

There are two varieties of cervical myomata. When a myoma arises in the tissues of the cervix and occupies the cervical canal it is termed *intra-cervical.* Should it arise from the cervix and burrow into one or both mesometria it will not expand the cervical canal ; this variety may be called a *subserous cervical myoma.* A typical intra-cervical tumour is shown in Fig. 3 ; it is oval in shape, and the uterus is perched like a hillock on its summit. The myoma weighed five kilogrammes ; the fundus of the uterus reached the level of the navel.

The topography of a cervix-myoma is best displayed when the parts are shown in section (Fig. 4). This variety of myoma presents, in sagittal section, a characteristic elliptical outline, and the expanded walls of the cervix extend like a thin capsule around it.

The subserous variety of cervix-myoma often attains large proportions, and pushes the uterus high above the pelvis ; it may extend into one or both mesometria, and mould itself to the true pelvis.

Such tumours present, like the intra-cervical variety, a characteristic elliptical section (Fig. 5), but their exterior is usually irregular and even tuberose.

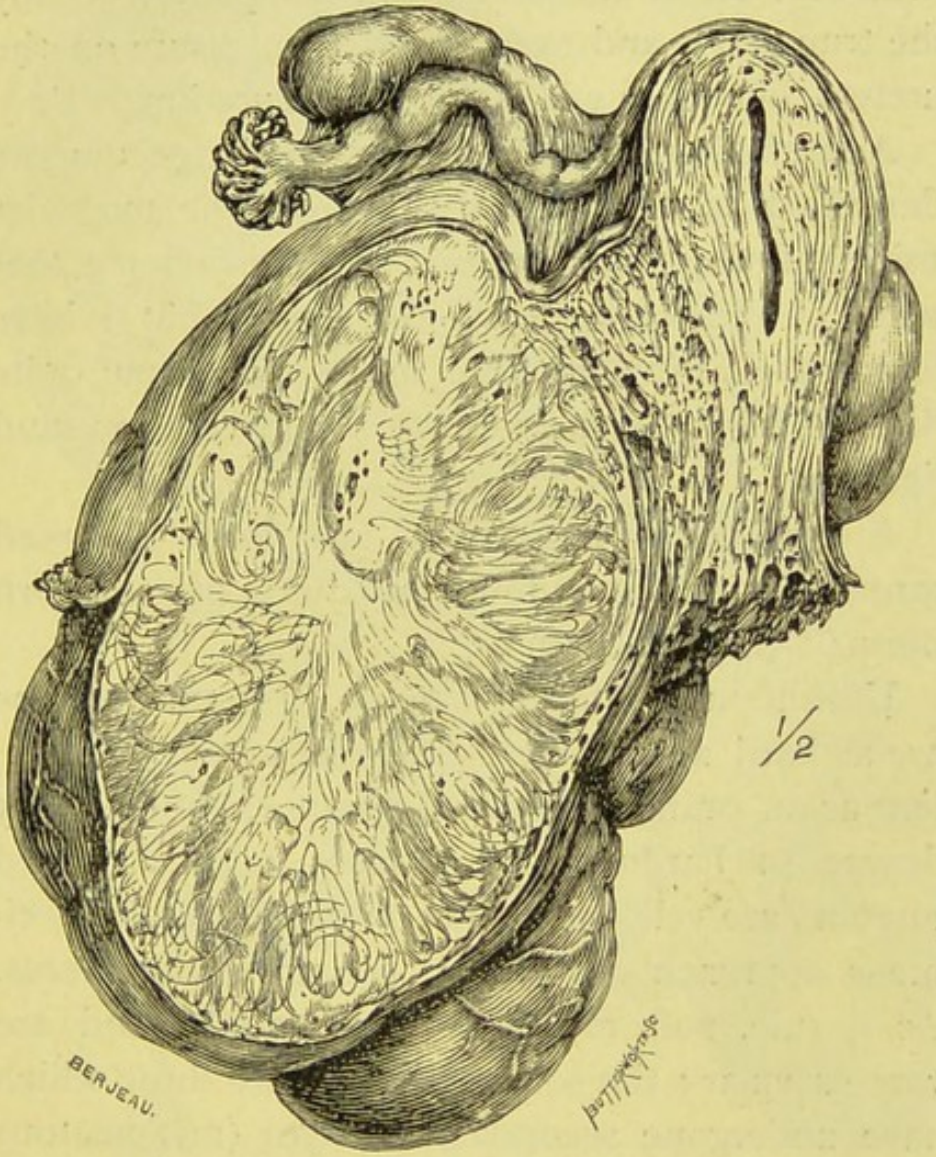


Fig. 5.—A subserous cervical myoma in sagittal section. From a woman 32 years of age, mother of two children.

Of course the ovoid shape of cervix-myomata is determined by the osseous boundaries of the true pelvis. In a woman with an average pelvis, the

pelvic diameters at the level of the middle of the cervix measure with the soft parts in position about 10 cm. (4 in.); hence a cervical myoma, whether intra-cervical or subserous, will completely occupy the true pelvis and exert injurious pressure on the ureters, but more especially on the urethra.

A careful investigation of some very large tumours described as myomata arising from the muscular tissue of the mesometrium has satisfied me that many of them arose from the cervix; but I have found them growing from the mesometrium quite distinct from the uterus, and also from the round ligament.

A myoma of large size has been observed growing from the rudimentary horn of a unicorn uterus (Amand Routh).

Uterine myomata differ much in texture; some are as hard as cartilage, others as soft and succulent as an orange: between these extremes every degree of hardness or softness occurs. Hard tumours are yellowish white on section; soft specimens approach the normal colour of the uterus. As a rule, soft myomata grow rapidly and are very vascular; the softest tumours are those which have undergone secondary changes (myxomatous degeneration). It is by no means uncommon to find a uterus beset with many myomata, some of which are very hard; one or more may be calcified, others are as soft as the uterine wall, whilst one or more may be diffluent in the centre, and perhaps the biggest one among them is gangrenous.

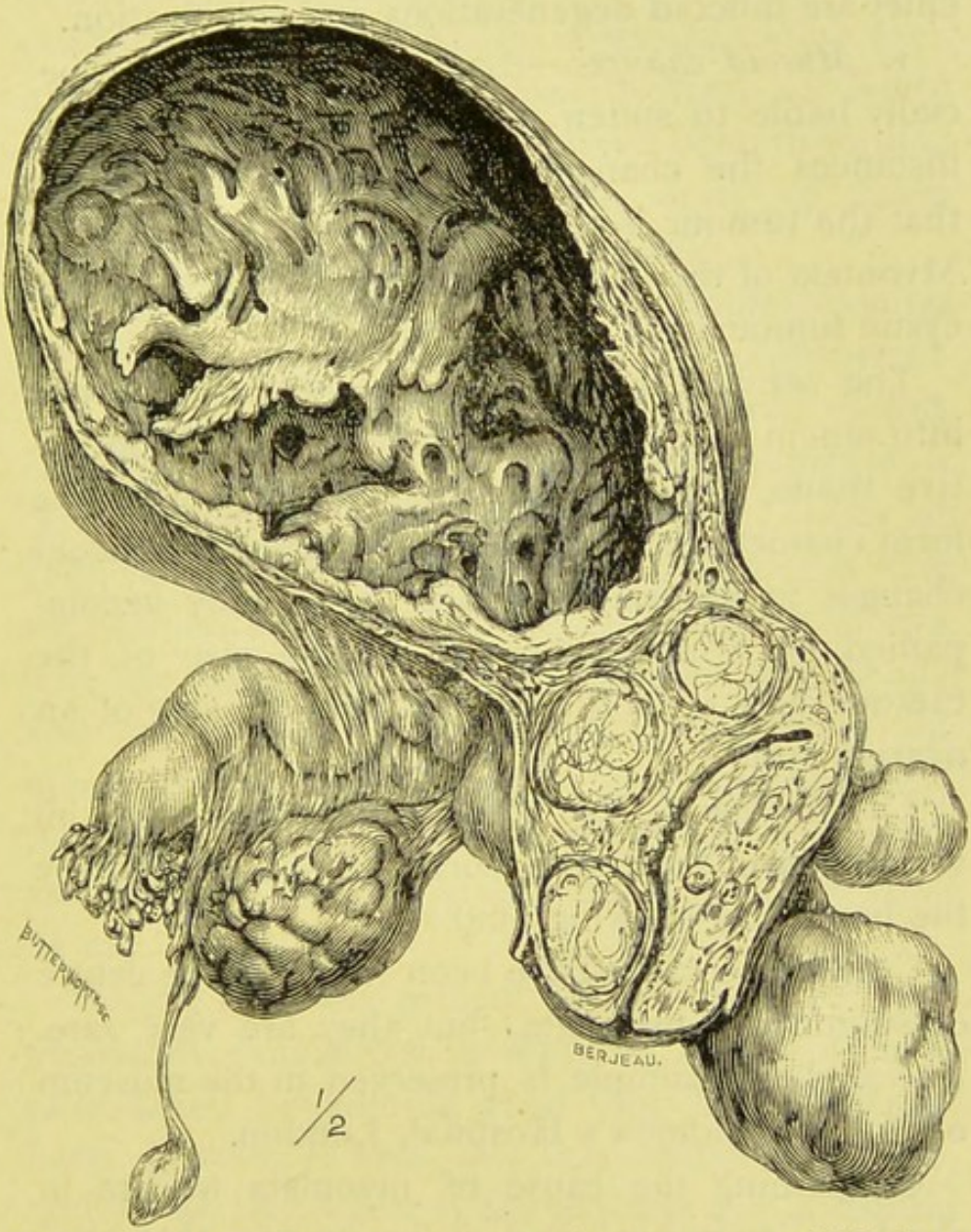


Fig. 6.—A sessile subserous uterine myoma which has undergone extensive mucoid degeneration. From a sterile married woman 37 years of age.

*Secondary changes.*—Uterine myomata of all kinds are liable to secondary changes; of these the chief are mucoid degenerations and calcification.

1. *Mucoid changes.*—Large myomata are especially liable to soften in the centre, and in some instances the change takes place so extensively that the tumour is converted into a spurious cyst. Myomata of this kind are sometimes called "fibro-cystic tumours" (Fig. 6).

The actual conversion of the tissue substance into mucin is preceded by œdema of the connective tissue, and the cells assume the spider-like form characteristic of myxomatous tissue. Mucoid changes in uterine myomata are usually accompanied by a rapid increase in the size of the tumour, and often furnish the clinical signs of an ovarian cyst.

*Calcification.*—Old uterine myomata of all varieties are liable to become calcified, especially the hard, slow-growing kind.

Collections of fat have been found in the centre of submucous myomata, but they are very rare. An excellent example is preserved in the museum of St. Bartholomew's Hospital, London.

Concerning the cause of myomata we are in absolute ignorance, and it is strange that they should arise so frequently in the uterus, yet be so rare in other hollow muscles, such as the bladder, œsophagus, stomach, intestine, and heart. A closer study of the facts only leaves us to wonder why myomata should be so common in the body

and neck of the uterus, whilst they are almost unknown in the Fallopian tubes. But, strangest of all, these tumours are almost peculiar to women (and though so common in white races are even more frequent in the black women of North America), for very few cases have been described by reliable observers in the uteri of lower mammals, either domesticated or wild.

In regard to the rate of growth of uterine myomata we are very ignorant. I know of only one observation on this matter which can be referred to with certainty. Stratz, in an interesting monograph, 'Die Frauen auf Java,' Stuttgart, 1897, writes on page 74 that in February, 1890, he removed a right ovarian dermoid from a woman 42 years of age. The left ovary and the uterus were of normal size and consistence. Nothing could be felt in the uterus during the operation. In August, 1893, the uterus was hard and tuberose with myomata, and reached to the navel. Its cavity measured 15 cm.

Hence, with our present knowledge, we find it absolutely impossible to reply to the question so often asked by patients, How long has my fibroid been growing? with any reasonable certainty, and I fear that when these patients get a candid answer they wonder at our deep ignorance.

## Lecture II.

# THE MODES IN WHICH UTERINE MYOMATA IMPERIL LIFE.

It is too true that myomata are the commonest of all the species of tumours to which women, whether married, single, fruitful or barren, are liable. It is also a fact that the uterus may contain one myoma or many, and cause neither inconvenience nor suffering,—indeed, the individual owning them is ignorant of the existence of a tumour in her womb; but it is equally true that uterine myomata are often the source of much suffering, and occasionally cause death in insidious ways, some of which will be considered in this lecture. It will, however, be useful to briefly sketch the life history of harmless myomata of the uterus.

Myomata arise in the uterus during the menstrual period of a woman's life. Their occurrence before puberty is unknown, and they are rarely recognised before the twenty-fifth year. Between the years 1888 and 1892 I made a careful examination of many pathological museums, and failed to find a specimen of uterine myoma observed before the twenty-fifth year. However, a few cases have been recorded. An example in a woman of twenty-three years has since come

under my notice, and will be described in the next lecture. After the twenty-fifth year they increase in frequency, which attains its maximum between the thirty-fifth and forty-fifth years. In many, very many sterile women the tumours, if their environment be favourable, cause no trouble, especially when they grow slowly; on the approach of the menopause, as a rule, they cease to grow and slowly calcify. It is stated by many writers that uterine myomata shrink and even disappear after the menopause, but the evidence on this matter is not of a satisfactory character.

It is well to bear in mind that occasionally a myoma growing slowly before the menopause will suddenly increase rapidly after this event. The inconveniences and perils which are associated with many myomata depend very largely on their environment; indeed, there is no organ in which the baleful effects of environment of innocent tumours can be studied in so many aspects as in the uterus.

1. *Hæmorrhage.*—This is the commonest of all the inconveniences which myomata cause, but it is confined to those which implicate the endometrium. The bleeding occurs under two conditions; most commonly it takes the form of excessive loss at the normal menstrual periods (menorrhagia). The most serious hæmorrhages are associated with septic myomata. It is a fact of some importance that a small submucous myoma will induce such profuse bleedings at the

menstrual period as to place life in imminent peril, whilst a large interstitial myoma, even though it project into the uterine cavity, scarcely influences the loss.

When a woman with a myoma bleeds excessively between, as well as at the normal menstrual periods, it often indicates that the tumour has become

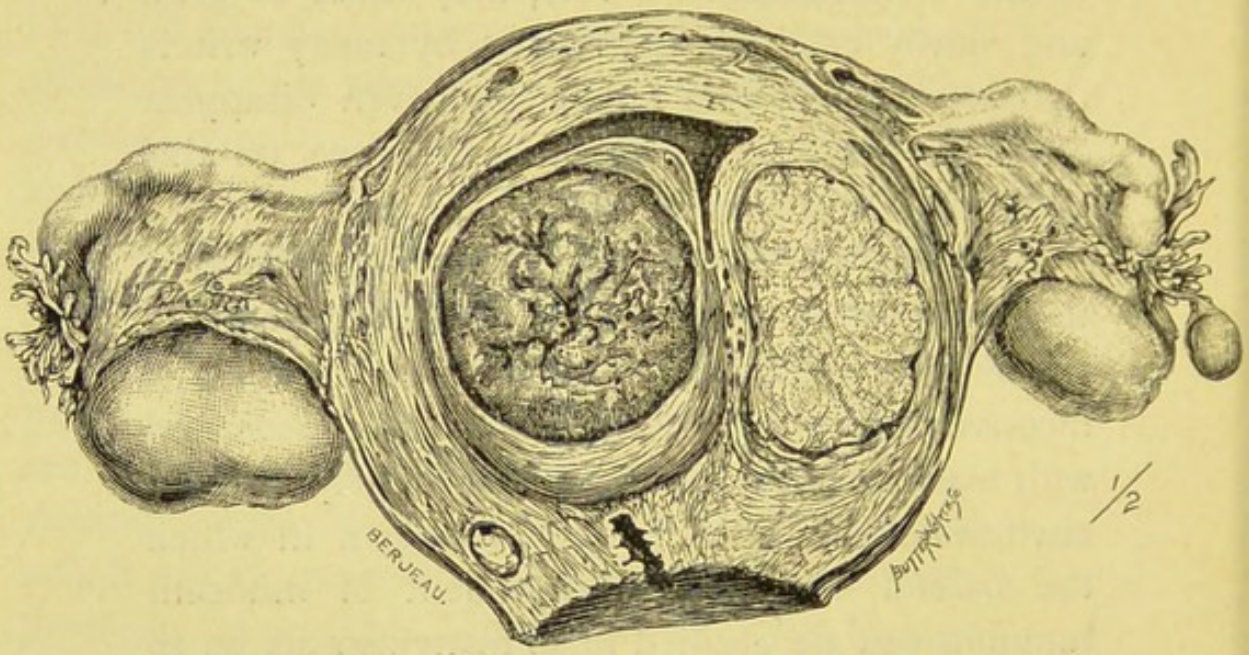


Fig. 7.—The body of the uterus containing two sessile myomata, one of which was gangrenous and the source of alarming bleeding. From a woman 40 years of age, mother of three children.

septic, and this explains the almost continuous bleeding associated with a partially extruded and septic polypus. For example, the fundus of the uterus (Fig. 7) was removed from a woman of forty years, on account of such severe bleeding that it was thought she had uterine cancer. She could not walk because she bled, and digital examination

of the uterus caused a rush of bright arterial blood. On dilatation a soft sessile tumour was made out, and after consultation the uterus was removed. It contained two myomata; the capsule of one had ulcerated, and the tumour, septic (gangrenous) and stinking, was the source of the bleeding.

*Septic Infection.*—This is, perhaps, the most serious complication of a myoma, and even when it does not cause death is always attended with dangerous consequences. Infection of a myoma may arise in a variety of ways,—*e. g.* the extrusion of a submucous myoma into the vagina exposes it to injury, and micro-organisms gain access to the tumour through abrasions in its capsule. Infection may be due to injury from the uterine sound or dirty dilators, or septic changes supervening on labour or miscarriage; occasionally it is due to intestinal gases when bowel adheres to the tumour, and it sometimes follows oöphorectomy. An infected myoma is a soft, dark-coloured, stinking mass, which bleeds freely when touched. In the early stages of the infection it appears on section œdematous, and exhales a sickly odour. On microscopic examination the muscle cells are separated by multitudes of inflammatory cells, and colonies of pathogenic micro-organisms can by special methods be demonstrated among the inflammatory cells.

When a large myoma becomes septic it gives rise to severe constitutional disturbance (septi-

cæmia), like gangrene of other organs, and will, unless promptly removed, inevitably destroy life.

Small myomata when septic, though they give rise to serious trouble, do not so urgently threaten life, but they work great mischief, for the infection extends from the tumour to the adjacent endometrium, and in due course involves the tubal mucous membrane, which in mild cases ultimately leads to occlusion of the cœlomic (abdominal) ostium of one or both tubes, an event which is occasionally followed by pyosalpinx. In very acute (fulminating) cases the septic material infects the peritoneum, often fatally. Occluded, distended, and pus-containing tubes are not infrequent concomitants of a small troublesome submucous myoma.

This is a complication of uterine myomata which has not received the full attention it deserves. I have met with it in several cases, in which there was reason to believe that the pain and suffering which induced the patients to seek relief and submit to operation were caused by the occluded and distended Fallopian tubes. It is possible that the occlusion of the cœlomic (abdominal) ostia of the tubes is in a few instances responsible for the barrenness of the patients.

*Malignancy.*—It is currently believed that a sarcomatous change may supervene in uterine myomata. The matter has been considered very carefully by competent writers. A critical examination of the evidence makes it clear that a very

large proportion of cases, described as "sarcomatous degeneration of a fibroid," were examples of infected myomata. In all future records, if they are published as evidence in this direction, they will need to be sustained by the report of a microscopic examination conducted by a competent pathologist.

It is very difficult to deny that a sarcoma may not arise in a myoma, for in one case nodules were found in the right lung, wall of the cardiac ventricle, and right kidney. These furnished the microscopic features of a myoma, and the subject, a woman of fifty-nine, had a large myoma in the uterus. This case was reported by Dr. Findlay, and I made the *post-mortem* examination at the Middlesex Hospital.

The great defect in the history of nearly all the cases of so-called sarcomatous degeneration of uterine myomata is the absence of the complete history of the cases; sarcomata are so prone to give rise to secondary deposits that any case which had run its natural course to a fatal issue would be expected to yield secondary nodules in the lung at least. Nothing would be more convincing to those who are sceptic.

When carcinoma of the cervix arises in a uterus containing a myoma (and this is by no means a rare combination) the tumour remains unaffected until its capsule is eroded, then the myoma ulcerates and sloughs with great rapidity.

*Impaction and its Effects.*—A uterine myoma is said to be impacted (or incarcerated) when it fits

the true pelvis so tightly that the tumour cannot rise upwards into the belly. All varieties of myomata may become impacted, and as the complication is of great clinical importance, it needs detailed consideration.

A subserous myoma growing from the fundus will often produce retroversion of the uterus, and the tumour occupies the hollow of the sacrum. As the myoma grows it appropriates the available pelvic space, and in due course exerts pressure on the rectum and urethra, interfering with defæcation and micturition.

A solitary intra-mural myoma may be small enough to rest in the true pelvis without pressing unduly on the urethra or ureters. Presently it increases to such a point that the turgescence which precedes the menstrual flow will cause it to press the urethra against the symphysis, and cause retention of urine. When menstruation occurs the turgidity of the tumour subsides, and the urethra is set free. Frequent recurrence of this pressure permanently damages the bladder and kidneys. Very vascular myomata yield a loud murmur or hum on auscultation, a sign of very great value in differential diagnosis. In many cases I have been able to demonstrate the existence of a loud murmur for a few days before menstruation, but it disappeared with the flow of blood, and remained in abeyance until a few days before the succeeding period.

The most insidious and therefore the most dan-

gerous variety of impaction is that complicating cervical myomata. It has already been mentioned that when a cervix-myoma attains an average

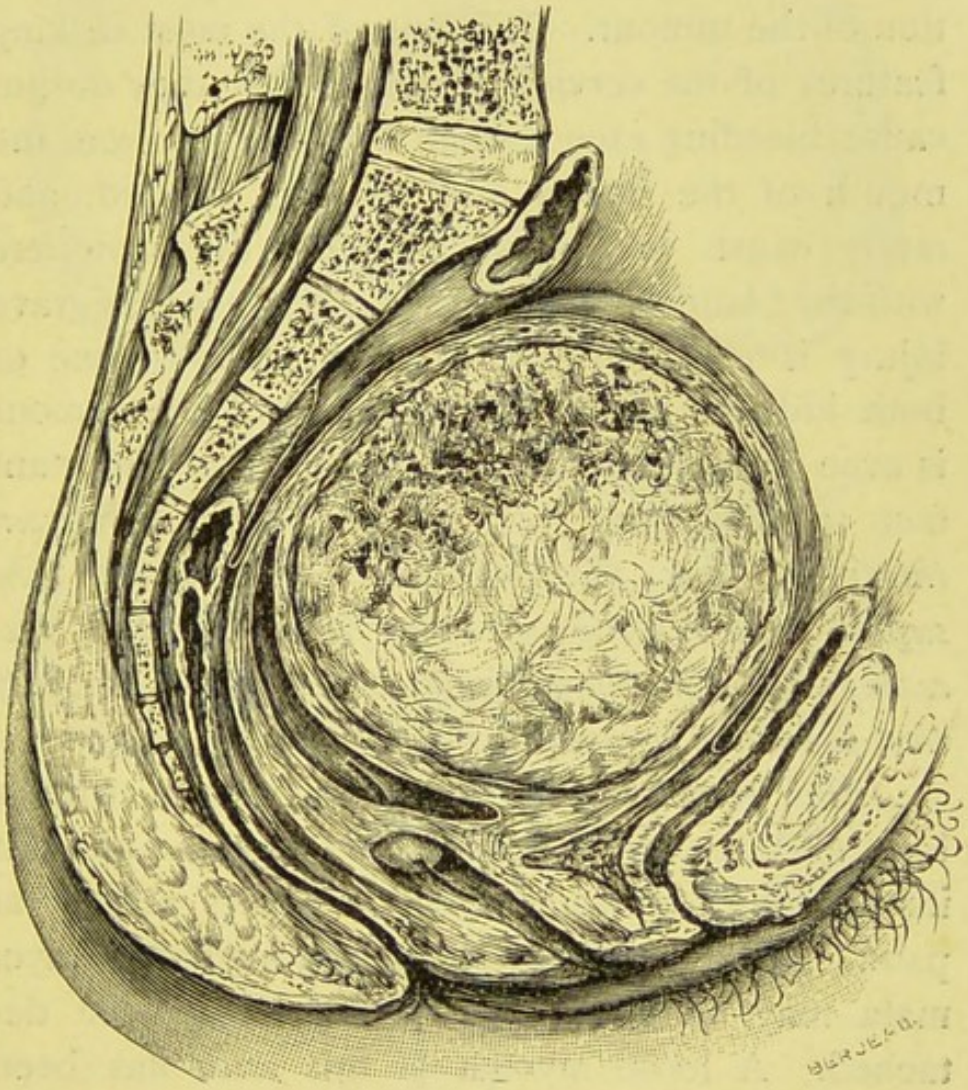

Fig. 8.—Sagittal section of a pelvis with the uterus in position, showing an impacted myoma. From a woman who died after oöphorectomy: there were septic changes in the tumour.

transverse diameter of 10 cm. (4 inches) it has practically used up the spare pelvic space, and necessarily exerts injurious pressure on rectum or

bladder. Most commonly it presses on the neck of the bladder and causes retention, leading to frequent and painful micturition, causing the patient to seek advice, and this leads to the detection of the tumour. It is one of the most striking features of the cervical myomata that they do not cause bleeding except when they extrude from the mouth of the uterus and become infected, and rarely cause inconvenience until they interfere with the bladder. Herein lies the danger, as grave injury is often wrought on the pelvis of one or both kidneys before the existence of the tumour is even so much as suspected. It is an important fact to remember that *when a woman between thirty-five and forty-five seeks relief because she suffers from retention of urine for a few days preceding each menstrual period, it is almost a certainty that she has a myoma in her uterus.*

*Axial rotation.*—A subserous myoma with a long and slender stalk is liable to rotate and twist its pedicle, a movement which causes very great pain. Some small calcified pedunculated myomata may be so twisted that they become detached. A loose myoma of this kind has been found in the sac of an inguinal hernia.

Although it is unusual to meet with subserous myomata possessing stalks so slender as to render axial rotation a factor of clinical importance, it is nevertheless an event to bear in mind in estimating the value of pain in diagnosis. For example, the tumour depicted in Fig. 9 I removed from a

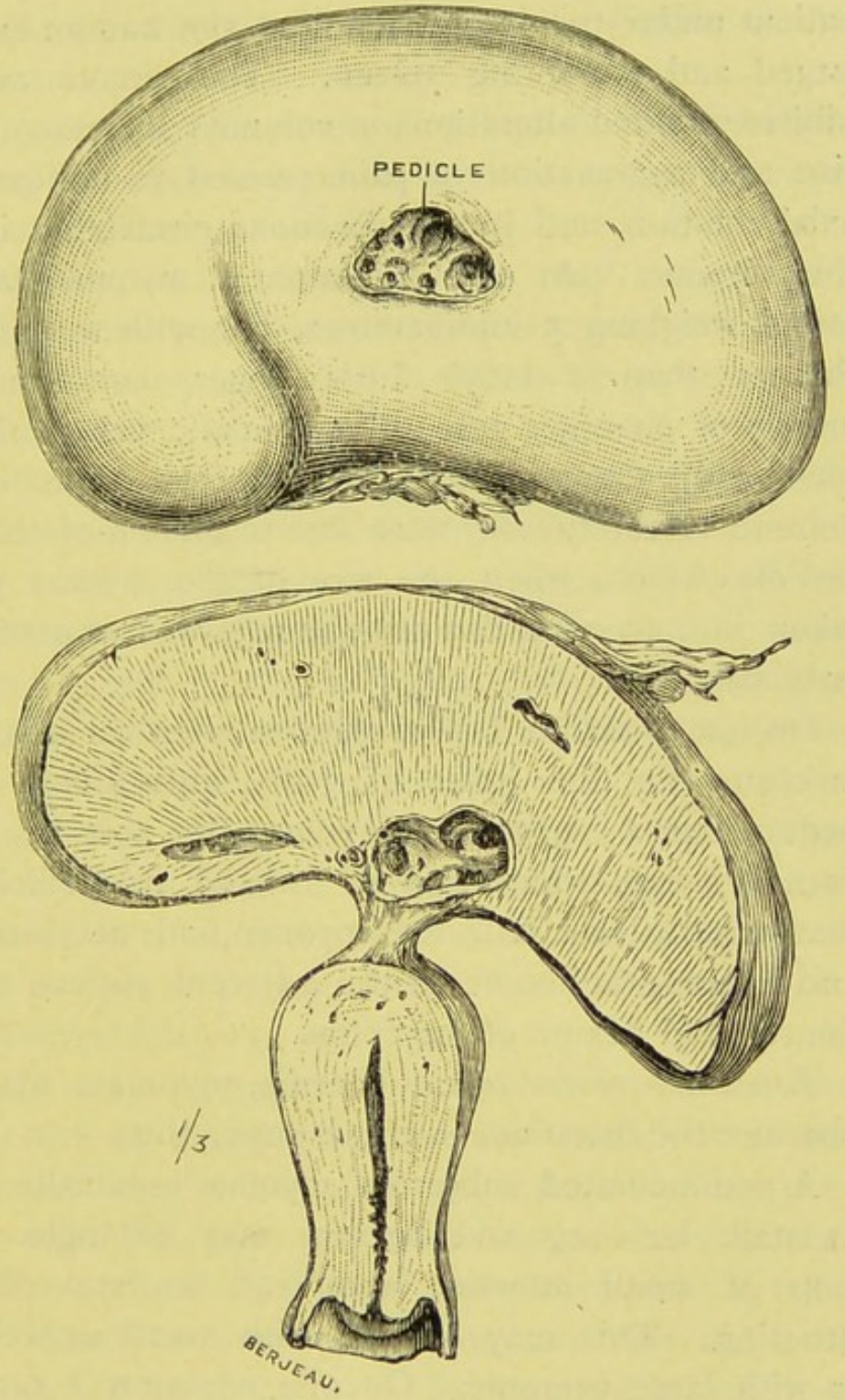


Fig. 9.—Subserous myoma with an unusually narrow and vascular stalk, which simulated a wandering spleen. The upper figure shows the spleen-like shape of the tumour; in the lower it is shown in section.

patient under the impression that she had an enlarged and wandering spleen. The tumour exhibited marked alterations in volume; increase of size and aggravation of pain seemed to indicate axial rotation, and impeded venous circulation in the tumour. At the operation a myoma was found weighing 5 kilogrammes, but with a stalk thinner than a lady's little finger, composed mainly of channels resembling hepatic veins. It was easily demonstrable that the variations in volume of the tumour were due to torsion of this pedicle, which, when the size of the myoma is taken into account, can only be regarded as extraordinarily thin.

On one occasion I performed abdominal myomectomy for the relief of pain, and found a pedunculated subserous myoma the size of a bantam's egg, which had so twisted its pedicle that exactly one half the myoma had necrosed and become adherent to the adjacent surface of the sigmoid flexure of the colon.

*Intestinal obstruction.*—Uterine myomata may obstruct the intestines in three ways; thus—

A pedunculated subserous myoma, especially if its stalk be long and narrow, may entangle a loop of small intestine and lead to fatal obstruction. This may happen with small as well as with large tumours. On one occasion I successfully operated on a single lady thirty-four years of age, and freed a coil of ileum which had become entangled round the pedicle of a stalked

subserous myoma growing from the fundus of the uterus.

A very large myoma rising high in the abdomen may rest upon the pelvic brim in such a way as to obstruct the sigmoid flexure.

Lastly, an impacted myoma may press upon the rectum and lead to obstinate constipation and chronic obstruction, with all its inconveniences and evils.

In a very exceptional case, recorded by James M. Arnott in 1840, a maiden lady seventy-two years of age was knocked down by a large dog and fell forward on the pavement. She was seized with severe pain in the belly, and died in thirty-four hours. At the autopsy a circular hole was found in the ileum, which lay between the anterior abdominal wall and a calcified uterine myoma as large as a child's head. The calcified tumour is preserved in the museum of the Middlesex Hospital. It is figured in my article on "Tumours" in 'Treves' Surgery,' vol. i, p. 465.

It may perhaps be useful to conclude this lecture by enumerating certain conditions of the uterus and its so-called appendages which may co-exist with myomata and lead to errors of diagnosis. Indeed, some of these when existing independently of uterine myomata are very apt to be mistaken for them, even by the most experienced physicians and surgeons.

1. The co-existence of carcinoma of the endometrium, either of the cervix or the body of

the uterus, and myomata has already been mentioned.

2. Unilateral or bilateral pyosalpinx. 3. Ovarian tumours of all kinds, unilateral and bilateral. 4. Inversion of the uterus may be induced by a small submucous myoma. 5. Pregnancy often occurs in a myomatous uterus, and is so important a subject as to demand nearly the whole of the succeeding lecture for its consideration. 6. Even such a rare combination as tubal pregnancy and myomata has been carefully observed and recorded.

## Lecture III.

# MYOMATA IN RELATION TO MENSTRUATION AND PREGNANCY.

This lecture will be devoted to the consideration in some detail of the perils which beset a patient when, with her uterus occupied by a myoma, she is unfortunate enough to conceive.

This is a matter of deep importance, and as a preliminary it will be necessary to briefly review the relationship of menstruation and uterine myomata.

There is nothing in oncology better established than the fact that *all uterine myomata arise during the menstrual period of life.*

In Great Britain menstrual life covers an average of thirty years, from the fifteenth to the forty-fifth year. There is, however, no reliable record of a myoma being found in the uterus before the twentieth year. Several examples have been observed between the twentieth and twenty-fifth years. A case under my own care was in a woman in her twenty-third year. The physical signs indicated the presence of a pyosalpinx on the left side of the pelvis. The patient was kept under observation, but the swelling increased so much in size that it was deemed expedient to remove it.

At the operation (June 15th, 1896) an ovoid myoma measuring 15 cm. in its major and 5 cm. in the minor axis was found springing from the side of the uterus, and separating the layers of the adjacent mesometrium. It was easily shelled out of its capsule. Eight months subsequent to the day of the operation she was delivered of a healthy, well-developed child, and as she remained in hospital until July 18th it is reasonably certain that she was pregnant at the date of the operation. During the pregnancy the scar in the linea alba became deeply infiltrated with black pigment; but some months later the pigmentation had vanished, leaving the scar quite white. The tumour exhibited the microscopic characters of a hard myoma; it was examined with unusual care in order to ascertain if it supported Recklinghausen's view as to the origin of some myomata from remnants of the mesonephric (Wolffian) duct.

Between twenty-five and thirty, myomata are fairly common, but the maximum of frequency is attained between the thirty-fifth and forty-fifth years (see table on p. 37).

Matthews Duncan pointed out that the interval between the twenty-fifth and the thirty-fifth years of a woman's life may be regarded as the great childbearing period, with an average length of twelve years. The menstrual epoch of a woman's life may be divided into three periods in relation to pregnancy and myomata, thus:

1. From fifteen to twenty-five, in which,

assuming the environment to be favourable, a woman is infinitely more liable to conceive than to grow a myoma in the uterus.

2. From twenty-five to thirty-five; during this period her liability to pregnancy is greater than in the preceding period, but her liability to myoma is also greater.

3. From thirty-five to forty-five; in this the liability for conception is greatly diminished, but that for myomata is immensely increased.

It is not only true that myomata arise during menstrual life, but it is equally certain that they influence menstruation, and I have operated on many cases in which this disagreeable phenomenon has been as profuse between fifty and fifty-five as it was at twenty.

This fact does not in any way disturb the rule that when a woman with a myoma in her uterus obtains the menopause the tumour may cease to grow. That they disappear ("dry up" is an expression in common use) after the menopause is an event almost as rare as the advent of a comet.

*Myomata sometimes take on an unusually rapid growth with the cessation of menstruation.*

In 1890 a patient 48 years of age was placed under my care in the Middlesex Hospital for a myoma which had been detected nine years previously. Six months before her admission to the hospital she ceased to menstruate, then the tumour began rapidly to increase in size and interfere with the bowel, causing constipation alternating with

diarrhœa. The tumour was removed by cœliotomy March 15th, 1890, and the pedicle treated by the intra-peritoneal method. The myoma was soft, and weighed 5 lbs.; it showed no signs of septic infection. The woman reported herself to be well six years later. This case is of interest to me, as it was the first occasion in which I performed supra-vaginal hysterectomy by the method of ligature in the treatment of a myoma. At a consultation with my surgical colleagues I explained the method and duly carried it out. The patient made such a rapid recovery that she left the hospital eighteen days after the operation.

A second instance occurred in my practice, the patient being a married woman who had once miscarried. She came under my care with a very large myoma reaching as high as the navel. At that time I made an attempt to carry out oöphorectomy, but after removing the right ovary and tube, failed to find the left ovary. Menstruation continued as usual till the forty-second year, when it suddenly and completely ceased, but the myoma grew steadily, and in 1896—five years after the oöphorectomy, and three years after the menopause—it became necessary to remove the tumour, which now reached to the diaphragm. It was a large sessile myoma seated on the fundus of the uterus. On section the tumour was white and tough in texture, like sponge. The patient is in good health at this date, 1898.

The fact in this case that menstruation ceased at

forty-two in no way interferes with the working rule that myomata generally prolong (sometimes as much as ten years) the menstrual period of life, and it is worth noting that in this case the myoma was solitary and subserous,—a circumstance which has a very important bearing on the matter to be discussed in the next section.

*Myomata and Pregnancy.*

If Matthews Duncan's conclusion that the interval from twenty-five to thirty-five is the great childbearing period of a woman's life, it follows as a corollary to the three deductions in the preceding section, that when pregnancy and myoma co-exist, the subjects of such a combination should be women past thirty, and these should, as a rule, be those who have either married late in life; or if married early, they remained many years sterile. The two facts may be stated with a fair amount of accuracy thus:

1. When the uterus of a parous woman begins to grow a myoma she usually ceases to conceive.

2. When a woman whose uterus contains a myoma conceives, this event is usually preceded by a long period of unfruitful wedlock.

An exception must be made of the solitary subserous myoma, as will be shown in describing the illustrative cases.

Case 1.—A woman 44 years of age, who had lived in sterile wedlock fourteen years, was placed under my care on account of an abdominal tumour

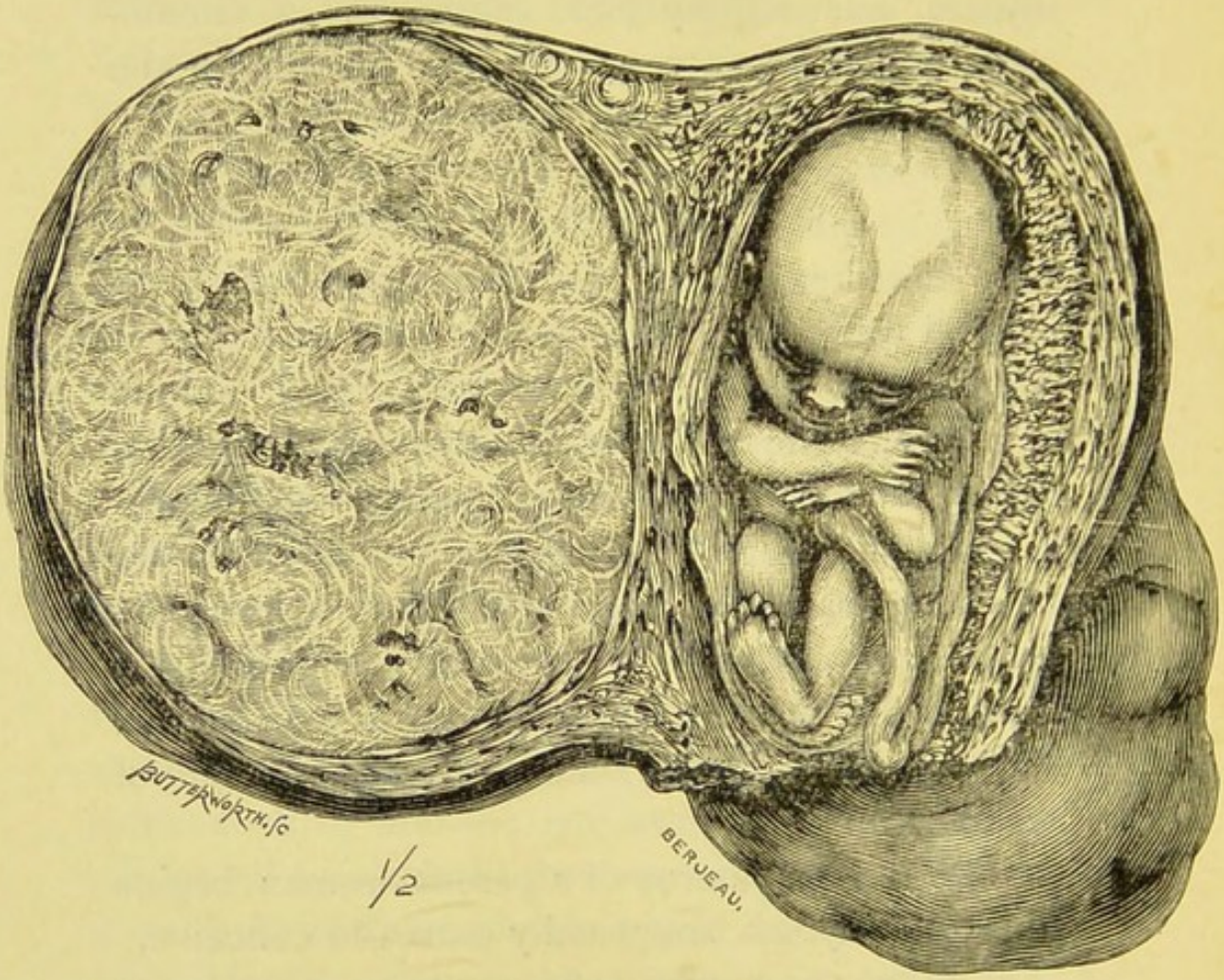


Fig. 10.—A myomatous and pregnant uterus removed by supra-vaginal hysterectomy from a woman 44 years of age. The fœtus is of about 4½ months. (Museum of St. Bartholomew's Hospital.)

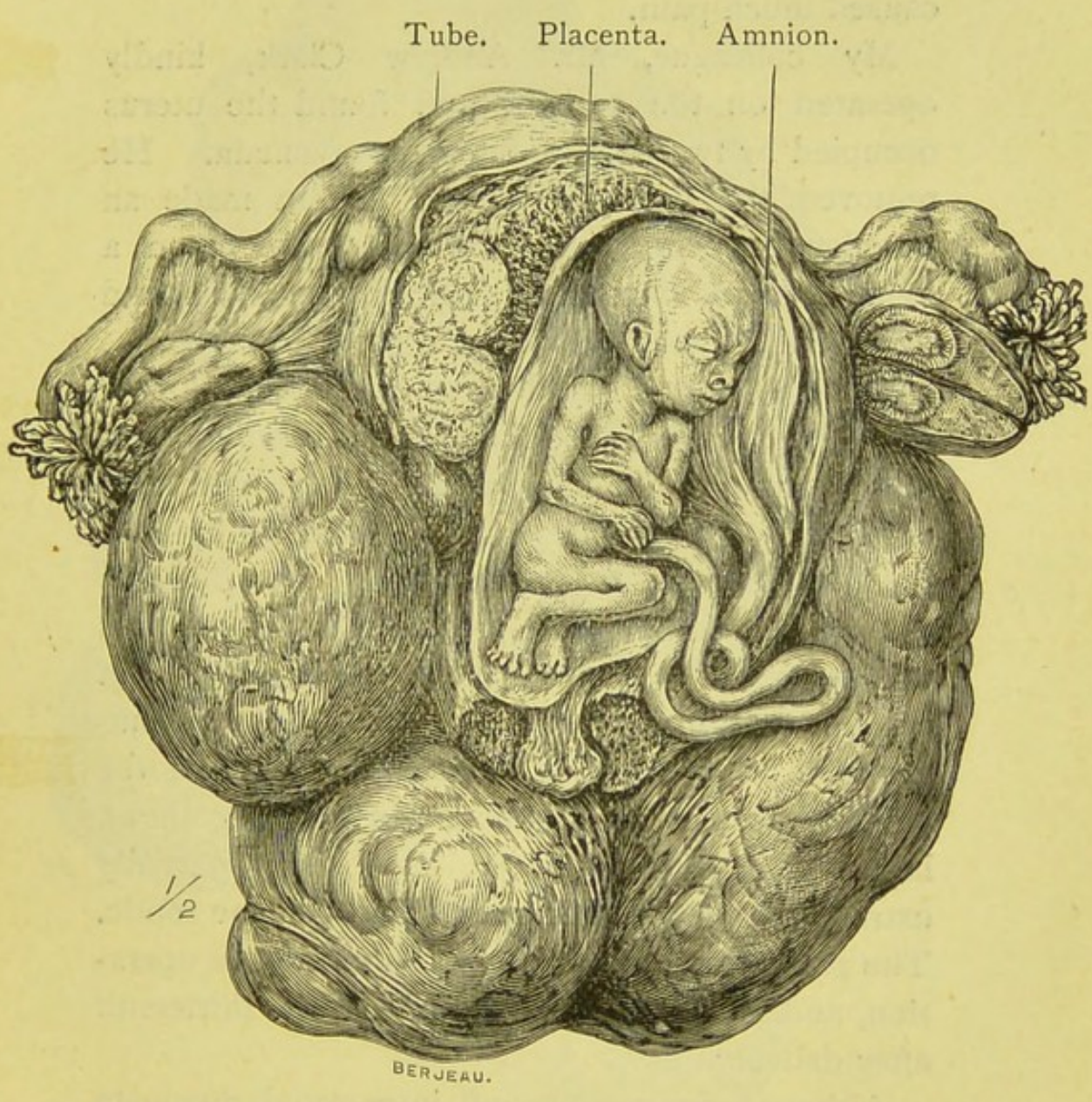


Fig. 11.—Myomatous and pregnant uterus removed from a single woman of 31 years. The operation was undertaken because the tumour had undergone rapid enlargement. The patient absolutely denied the probability of pregnancy. (Museum of St. Mary's Hospital.)

which was not only rapidly increasing in size, but caused much pain.

My colleague, Mr. Andrew Clark, kindly operated on the patient, and found the uterus occupied by two large submucous myomata. He removed the uterus, and the patient made an excellent recovery. On examining the organ a fœtus of about four and a half months was found occupying the uterine cavity.

Case 2.—In 1897 I saw in consultation a woman 40 years of age who had been married fourteen years; ten days previously she had been delivered of a full-time child. Coincidently with the expulsion of the placenta an oval body, in shape like a fœtal head, presented at the os; this was regarded at first as the head of a twin, but careful examination revealed some nodular outgrowths on the uterus. When I examined the patient there was no difficulty in deciding that a large submucous myoma had been partially extruded from the uterus, and had become septic. The patient was too ill to be submitted to operation, and she died three days later, the thirteenth after delivery.

Although submucous and intra-mural myomata hinder conception, it would be expected that a solitary subserous myoma would offer little or no hindrance to this process. This being the case, it would be expected that the co-existence of pregnancy and a subserous myoma would occur at an earlier period, and would not as a rule be pre-

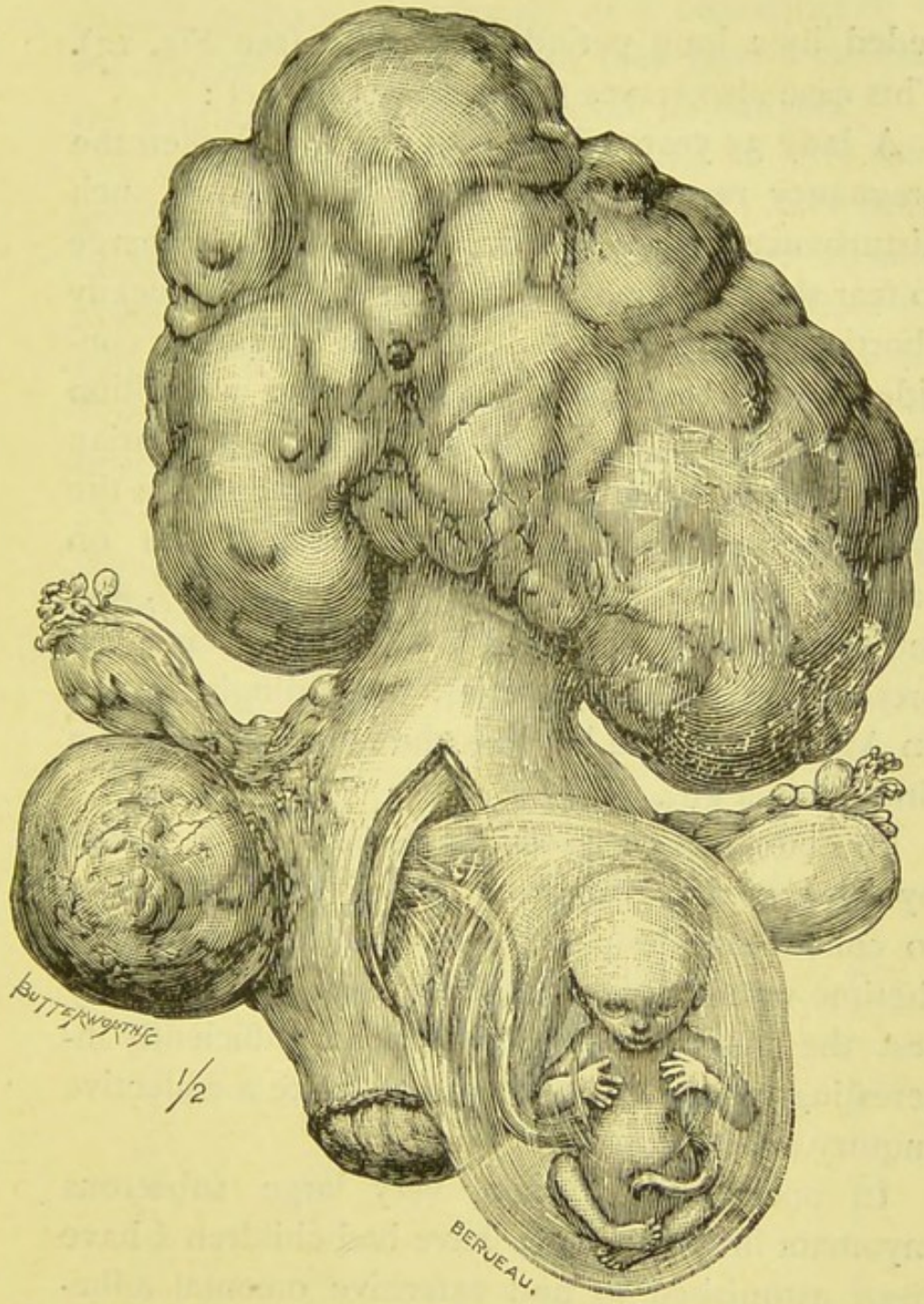


Fig. 12.—Pregnant uterus with a large subserous myoma, removed from a woman 31 years of age by Dr. W. Duncan. After the operation and before the uterus lost its tissue-life the anterior wall was cut away: in a few minutes, as the organ contracted, the fœtus and its membranes were extruded through the breach.

ceded by a long period of sterility (see Fig. 12). This case also serves to illustrate this fact :

A lady 35 years of age conceived, and when the pregnancy reached three and a half months such disturbance ensued as induced the doctor in charge to fear the existence of a tubal pregnancy. Luckily abortion occurred, and helped the diagnosis considerably ; it then became obvious that in addition to pregnancy the patient had either an ovarian tumour or a myoma. During the puerperium the symptoms caused such serious anxiety that on January 18th, 1895, I performed cœliotomy, and removed a large inflamed subserous myoma, but preserved the uterus, ovaries, and Fallopian tubes. In April, 1897, she became the happy mother of a fine baby, a girl.

Of course these questions require to be tested by a larger series of cases than I have the leisure to collect and prepare ; even the experience of a lifetime would not enable one man to adequately test the matter ; but they may be sufficiently interesting to induce some one to make a collective inquiry on these lines.

In operating on some very large subserous myomata in women who have had children I have been astonished to find extensive omental adhesions, and have seen the epiploic arteries and veins connected with the adherent omentum and tumour forming extraordinary mixed retia, the arteries in some cases being as large as the radials. The formation of such adhesions I have usually re-

garded, perhaps erroneously, as a consequence of the pregnancy. In any case they greatly increase the operative risks, and therefore its dangers.

I have added a table, consisting of fifty consecutive cases of uterine myoma which have come under my observation in hospital practice. In each instance an operation was necessary, so that the nature of the tumour rests on actual observation. The object of the table is to furnish facts as to the relative frequency of myomata in the two decades 25—35 and 35—45. I compiled a table very much longer with results nearly identical, but this short table will serve my purpose.

| *Age.* | *Civil State.* | *Nature of Tumour.* | *Parity.* |
|---|---|---|---|
| *23 | M. | Subserous | 1 |
| 29 | S. | Intra-mural | 1 |
| 30 | M. | Submucous | 2 |
| 30 | M. | Multiple | 0 |
| 30 | S. | Subserous | 0 |
| 31 | M. | Submucous | 0 |
| 32 | S. | Multiple | Ab. |
| 33 | M. | Submucous | 2 ab. |
| 33 | S. | Multiple | 0 |
| 33 | M. | Submucous | 3 ab. |
| 34 | S. | Submucous | 0 |
| 34 | M. | Submucous | Ab. |
| 35 | M. | Cervical | 0 |
| 35 | M. | Submucous | 4 |
| 35 | M. | Submucous | 0 |
| 36 | M. | Cervical | 0 |
| 37 | M. | Multiple | 0 |
| 37 | S. | Cervical | 0 |
| 37 | M. | Submucous | 1 |
| 38 | M. | Cervical | 2 |

* The exact age of this woman was 23 years 4 months. I possess a certificate of her birth.

| *Age.* | *Civil State.* | *Nature of Tumour.* | *Parity.* |
|---|---|---|---|
| 39 | S. | Submucous | 0 |
| 39 | S. | Subserous | 0 |
| 39 | M. | Subserous | 4 |
| 40 | M. | Submucous | 3 |
| 40 | M. | Submucous | 2 |
| 41 | M. | Intra-mural | 0 |
| 41 | M. | Submucous | 0 |
| 41 | S. | Intra-mural | 0 |
| 42 | M. | Submucous | 2 |
| 43 | S. | Multiple | 0 |
| 43 | S. | Subserous | 0 |
| 43 | S. | Multiple | 0 |
| 43 | M. | Cervical | 2 |
| 44 | S. | Subserous | 0 |
| 44 | M | Cervical | 0 |
| 44 | M. | Multiple | 0 |
| 44 | M. | Cervical | 0 |
| 44 | M. | Submucous | 6 |
| 45 | S. | Multiple | 0 |
| 45 | M. | Subserous | Ab. |
| 45 | S. | Multiple | 0 |
| 45 | S. | Multiple | 0 |
| 47 | M. | Submucous | 1 |
| 47 | M. | Cervical | 3 |
| 48 | M. | Multiple | 0 |
| 50 | S. | Submucous | 0 |
| 50 | M. | Multiple | 0 |
| 52 | M. | Cervical | 4 |
| 54 | M. | Cervical | 1 |
| 55 | S. | Submucous | 0 |

When a woman with a myomatous uterus conceives, it is certain that her life is in jeopardy, not only so long as the fœtus remains within it, but also when it is expelled, whether this occur prematurely or at the full time. The presence of the tumour not only leads to impaction, but tends to produce abortion ; when this occurs the mother may

die from hæmorrhage. A submucous myoma may become septic and slough. A subserous myoma may become œdematous, and when the uterus empties itself the myoma may inflame and lead to peritonitis or the formation of dangerous adhesions. A cervix-myoma offers mechanical obstruction to the transit of the fœtus; a submucous myoma may be driven out in front of the presenting part; more frequently it is extruded subsequent to the delivery of the child. The complete extrusion of a myoma in this way usually requires from four to six weeks; the peril to life is so great that the majority of women who fall into such straits die unless the aid of surgery be enlisted.

When a woman has a tumour suspected to be a myoma, and there is reason to believe that it is rapidly increasing, it is worth while to remember—

1. *That she may have conceived, and the enlargement is due to the progress of the pregnancy.*
2. *The tumour may have become septic, or secondary changes may have led to the formation of cyst-like spaces.*
3. *The diagnosis may be erroneous, and the suspected myoma may be really an ovarian tumour.*
4. *Ovarian tumours and uterine myomata often co-exist.*
5. *An over-distended bladder has many times been mistaken for a rapidly growing pelvic tumour.*

Even this list does not exhaust the possibilities, for a *myomatous uterus may become impacted in consequence of conception, and when the impaction is relieved axial rotation may occur*, as the following case demonstrates:

A woman 30 years of age had married in October, 1897, and after missing three menstrual periods was seized, in January, 1898, with severe pain in the pelvis and retention of urine. Dr. Mills found a mass in the pelvis which he regarded as a retroverted gravid uterus. With the aid of anæsthesia he succeeded in pushing the mass out of the pelvis, but found a "swelling" had appeared in each iliac fossa. These "swellings" were very tender, and the patient complained of great pain. It was clear that either a myoma of the uterus or an ovarian tumour was complicating pregnancy. Prompt measures were taken for the relief of the patient, and next morning I performed cœliotomy, and found a large myoma growing from the posterior wall of the uterus; it was lying in the right iliac fossa, and a small one on the anterior wall occupied the left iliac fossa.

It will be seen on examining the drawing of the specimen (Fig. 13) that the total antero-posterior length of the uterus is 20 cm.—far too great a measurement to allow the uterus to occupy a normal position in the pelvis. It would appear that the myoma on the posterior wall of the uterus became impacted in the pelvis, as the uterus enlarged after conception, and at last induced

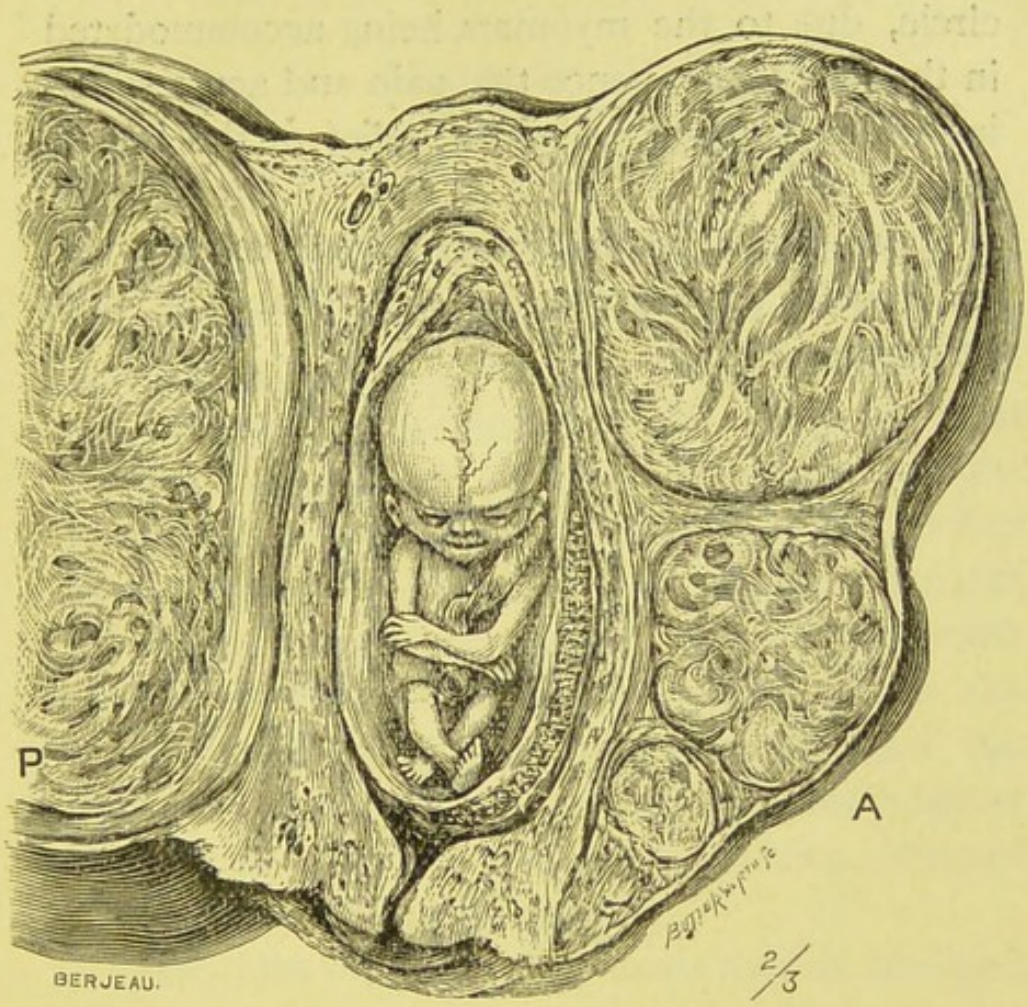


Fig. 13.—A myomatous gravid uterus in sagittal section. At the beginning of the third month impaction occurred; this was relieved, and as the uterus with its tumours was too long to lie in its natural position, axial rotation occurred. The antero-posterior length of the distorted organ was 20 cm. Only a portion of the large tumour is shown in the figure.

retention of urine by compressing the urethra. When Dr. Mills relieved the impaction axial rotation took place to the extent of a quarter of a circle, due to the myomata being accommodated in the iliac fossæ, hence the pain and acute suffering which supervened on the relief of the impaction.

Supra-vaginal (conservative) hysterectomy was successfully carried out, the right ovary and tube being preserved.

## Lecture IV.

## VAGINAL OPERATIONS.

It is a noteworthy fact that those who have made a careful and prolonged study of tumours, from the pathological as well as the clinical aspect, are unanimously of opinion that the most effectual method of treatment is *thorough removal of the tumour, whenever this is practicable, at the earliest possible moment.* In the case of uterine myomata the observance of this canon has only become practicable during the last five years. With the aid of anæsthetics, asepsis has revolutionised the surgery of the uterus, and some of the most brilliant and successful results of surgery have been obtained in connection with this organ.

Operations for uterine myomata may be arranged in two groups according to whether they are performed through the vagina or by means of an incision in the anterior abdominal wall (cœliotomy). Before describing the details of the operation, it will be necessary to define the terms used to designate particular methods.

I. Vaginal Methods.

1. *Vaginal myomectomy.*—This signifies the removal of a stalked myoma (polypus).

2. *Vaginal enucleation.*—This relates to the removal of a sessile submucous myoma.

3. *Vaginal hysterectomy.*—This term covers complete removal of the uterus, with or without one or both ovaries and Fallopian tubes.

II. Abdominal Methods.

1. *Abdominal myomectomy.*—This term signifies the removal of one or more pedunculated subserous myomata, preserving the uterus, the ovaries, and the Fallopian tubes.

2. *Abdominal enucleation.*—By this operation a sessile subserous, submucous, or intramural myoma is shelled out of its capsule; the uterus and, as a rule, the ovaries with the Fallopian tubes are preserved.

3. *Supra-vaginal hysterectomy.*—By this method the uterus, with a portion of the cervix, is removed.

Sometimes one, and occasionally both ovaries and tubes are preserved. In these circumstances the operation may be termed "*conservative supra-vaginal hysterectomy.*"

4. *Pan-hysterectomy.*—This signifies complete removal of the uterus and its neck; occasionally one or both ovaries and the Fallopian tubes are preserved.

5. *Oöphorectomy.*—In this procedure both ovaries and tubes are completely removed in order to arrest menstruation.

The remainder of this lecture will be devoted to the consideration of vaginal methods. The following instruments are necessary :

1. The crutch for securing the patient in the lithotomy position.
2. A duck-bill speculum for exposing the parts.
3. The uterine sound for determining the length and direction of the uterine cavity.
4. A vesical sound to determine the position of the bladder.
5. Volsellæ for manipulating the cervix and tumour.
6. Dilators for enlarging the cervical canal in order to afford access to the uterine cavity.
7. Sponge-holders.
8. Uterine probes.
9. Scissors, curved and straight.
10. Needles in handles.
11. Speculum forceps.
12. Hæmostatic forceps.
13. Retractors.

All these should be of metal, in order that they may be sterilised by boiling.

In addition a douche-can, artificial sponges, silks, gauze for tampons, lubricating substances and antiseptic solutions, and a soft catheter.

*Vaginal Myomectomy and Enucleation.*

The steps of this operation vary considerably as they depend upon the size, condition, and position of the tumour, but the preliminary preparation of the patient is the same in all cases, and consists of thorough evacuation of the bowels by purgatives aided by soap and water enemata; careful antiseptic douching of the vagina during two or three days preceding the operation. Mild solutions of perchloride of mercury (1 in 5000) or tepid water lightly tinted with permanganate of potash answer very well for this purpose, as they are colourless, odourless, and thoroughly reliable antiseptic reagents.

The patient is anæsthetised and secured by the crutch in the lithotomy position and placed in a good light. The operator then exposes the cervix by means of a duck-bill speculum and thoroughly douches the vagina. The first step is to determine whether he has to deal with a tumour of the uterus or the fundus of a partially inverted uterus, and he should remember that a submucous myoma (polypus) sometimes leads to inversion (Fig. 14), and a myoma protruding at the os strikingly resembles an inverted fundus. The uncertainty is dispelled in this way. In a case of polypus, when the sound is introduced into the uterus, it will pass to the full length ($2\frac{1}{2}$ in.—6·2 cm.), more often to a greater distance. In a case of inversion the sound passes between the uterine wall and the inverted

fundus, and is arrested at less than the normal length. So far, it is certain that when the sound passes $2\frac{1}{2}$ or more inches there is no inversion, but it does not follow that if it passes less than $2\frac{1}{2}$ inches that the fundus is inverted. In the case of a small cervix-myoma the sound may be arrested

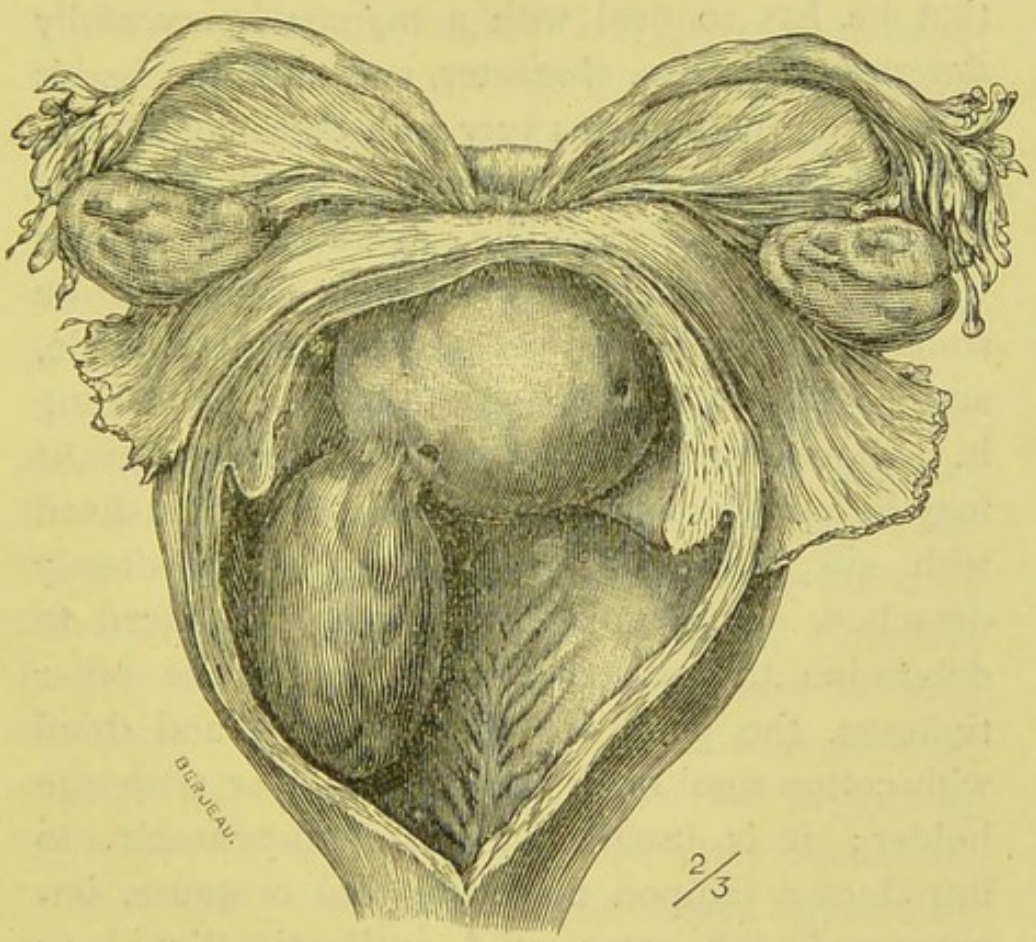


Fig. 14.—Partial inversion of a uterus due to a myoma (polypus).

at the top of a dilated cervix, and yet there may be the whole uterine cavity above.

There is, however, another test which is very valuable and easily carried out when the patient

has thin or lax abdominal walls; this is the presence of a cup-like depression replacing the normal convexity of the uterine fundus. This depression can be detected by a finger in the rectum, and even better by dilating the urethra and introducing the forefinger into the bladder.

As soon as the operator has satisfied himself that he has to deal with a myoma he carefully determines its size, character, and situation, as his subsequent manœuvres vary with these conditions.

1. *A pedunculated myoma (polypus) protrudes from the os uteri.*—The operator determines whether it is stalked or sessile. Should it be stalked, he determines the position of the pedicle, and is often able to detach the tumour by twisting it. Should the stalk be too thick to allow this, it may be cut through with scissors, or be transfixed with silk, ligatured, and then be bloodlessly detached. The forefinger is then introduced to determine the existence or otherwise of other tumours, the parts are then irrigated and dried with cotton-wool on a uterine probe or a sponge holder; it is usual, but not indispensable, to introduce a tampon of cotton-wool or gauze, impregnated with some mild antiseptic (liquid or powder) reagent, into the vagina, and the patient returned to bed. The tampon is removed in twelve hours, and the vagina douched twice daily. If there is much anæmia some mild preparation of iron may be prescribed, and at the end of two weeks the patient is, as a rule, convalescent.

2. *A sessile myoma protrudes at the os uteri.*—When the tumour does not exceed the dimensions of a bantam's egg, the operator carefully determines that he has to deal with a myoma and not an inverted fundus. After enlarging the cervical canal by means of dilators, he splits the mucous membrane and capsule, and by means of finger or raspatory shells the tumour out of its capsule as far as its base. The tumour is then seized with a volsella and cautiously twisted and pulled out of its bed.

Should the bleeding be free, the cavity of the uterus may be stuffed with sterilised or antiseptic gauze for thirty-six hours.

3. *Sessile and pedunculated myomata with an undilated cervical canal.*—It occasionally happens that the symptoms presented by a patient favour the presumption that there is a submucous myoma; the surgeon dilates the canal, and should a myoma be present he determines its size, condition, and situation. In many instances he is able to deal with it in the manner described in the preceding sections. Often, however, he will find himself face to face with a very large pedunculated myoma or a large sessile myoma with a broad base. The stalked tumour may be easily detached by twisting, but there may be great difficulty in extracting it; in the case of a sessile tumour there will be difficulty in enucleating as well as in delivering it. No definite rules can be laid down as to the size which determines whether a tumour can be expeditiously

and safely extracted by the vaginal route. When a woman has had children, then the stretched vagina and lax uterus will allow tumours as big as a child's head to be extracted, whereas in a sterile woman with a firm and unyielding cervix, difficulty may be found in withdrawing a tumour of the size of a bantam's egg.

When a myoma is too large to traverse the cervical canal without the exercise of undue force, I never hesitate to split the cervix bilaterally; then, after withdrawing the tumour, suture the cut cervix with silkworm gut. I have successfully enucleated unusually large tumours by turning the bladder off the cervix, and then dividing the anterior wall of the cervical canal as high as the internal os; this manœuvre greatly facilitates the enucleation, saves tearing and bruising of tissues, as well as shortens the time of the operation. After extracting the tumour, the edges of the cervical incision are brought together by sutures of silkworm gut. I have even removed through the vagina sessile subserous myomata from the cervix by detaching the bladder in this way.

Until the introduction of antiseptic and aseptic methods into surgery the dangers of enucleating submucous myomata were many and great.

The chief dangers are—

1. Hæmorrhage.
2. Perforation of the wall of the uterus.
3. Sepsis.
4. Inversion of the uterus.

With care and caution all these are, as a rule, avoidable, and the operation should have no evil consequences.

It is well to bear in mind that when a submucous myoma of the uterus becomes septic, salpingitis is a frequent complication; hence manipulation of the uterus in vagina myomectomy may rupture a pus-containing tube with a fatal issue.

### *Vaginal Hysterectomy.*

This method of dealing with myomata is not very often performed in England, because when it is possible to successfully remove the uterus by the vagina, the tumour could in the majority of cases be extracted and the uterus preserved. It is, however, easy to understand that there are conditions in which extirpation of the uterus may be necessary; for example, in extracting a large sessile intra-mural myoma, profuse and not easily controllable bleeding sometimes ensues; or the uterine wall in relation to the tumour may be torn through in detaching the tumour; and in cases of septic submucous myomata with extensive implication of the endometrium complete removal of the uterus with the tumour would, as a rule, be safer than extraction of the septic organ by means of cœliotomy. In Germany and France very large examples of uterine myomata are removed by the vagina, and when the tumour is too large to be extracted entire it is cut by means of strong

scissors and forceps and removed piecemeal, a method known as *morcellement*. At present this method has not been much practised in England, but Pean, Richelot, Landau, and others have had very gratifying results.

The preliminary steps are the same as those described for vaginal myomectomy, and the instruments are the same as those already enumerated, with the addition of some strong clip-forceps, which may be necessary for securing the vessels in the broad ligaments.

The steps of the operation are as follows :—The patient is anæsthetised and secured in the lithotomy position by the crutch, and arranged so that the perinæum faces a good light. The hair is shaved from the pubes and labia (it is an advantage to have this carried out by the nurse some hours previously, but it is not always agreeable to the patient), and the external parts washed with warm soap and water and then douched with a solution of perchloride of mercury (1 in 1000) or some equally efficacious antiseptic.

The operator, seated at a convenient level, introduces the beak of the speculum into the vagina, and passes a sound into the bladder ; this the assistant retains there in order to keep the operator informed of the relation of the bladder to the cervix throughout the first stage of the operation.

Stage 1.—This consists in seizing the cervix with a stout volsella, and then by means of a

scalpel the mucous membrane on its anterior aspect is transversely divided at a point sufficiently low to avoid injury to the bladder. The bladder is then cautiously separated from the cervix with the forefinger, assisted, if necessary, with the handle of the scalpel; it is an advantage to divide the peritoneum forming the lower limit of the utero-vesical pouch, and gain access to the peritoneal cavity. Throughout this stage the operator constantly informs himself of the exact position of the bladder by manipulating the sound.

Stage 2.—The incision in the mucous membrane is now carried round each side of the uterus, and by means of scissors the recto-vaginal pouch is opened, and a sponge is introduced to protect as well as to restrain the bowels and omentum.

Stage 3.—The broad ligaments are dealt with in the following manner:—A curved needle in handle armed with strong silk is made to transfix the connective-tissue tract close by the side of the cervix in order to avoid the ureter. The object of this ligature is to secure the uterine artery near the spot where it turns on to the side of the uterus. The ligature is firmly knotted. Very often the artery may be seen. It is then picked up with forceps and deliberately tied. When the artery has been secured on each side, and the tissue between the ligature and the uterus divided with scissors, the organ can now, as a rule, be drawn low down into the vagina, and the upper segments of the broad ligament transfixed with double silk ligatures.

These embrace the Fallopian tubes with the ligament of the ovary, the ovarian artery and veins, and the round ligament of the uterus ; the tissues between the uterus and the ligatures are divided, and the uterus is removed. Should an ovary or a Fallopian tube be found diseased, then they should be removed by transfixing the pedicle with silk.

If the silk threads have been properly secured there is, as a rule, no bleeding ; should any free oozing be noticed, the bleeding point is sought, seized with hæmostatic forceps, and ligatured with thin silk.

The vagina is then irrigated with warm water, the sponge removed, and if the cut edge of the vaginal mucous membrane bleeds,—a frequent condition,—it is useful to secure it with a continuous suture of thin silk, or arrest the bleeding with forceps and leave them on for twelve hours.

The ligatures used to secure the broad ligaments are left long, those of each side are knotted together, and a strip of gauze is introduced into the vagina to serve as a drain.

The details given above are those which are easily carried out when the vagina is capacious, and the uterus but slightly enlarged and mobile. It is very different when the vagina is narrow and rigid, as in virgins, and especially when the uterus is large, and cannot be drawn down. In these circumstances very much depends on the experience and skill of the operator. Sometimes it is necessary to divide the perinæum, and

even to make incision in the lateral walls of the vagina. In some cases it is useful to secure the uterine arteries, and then split the uterus sagitally with scissors and remove it in halves, or adopt the method of *morcellement*, and excise it piece by piece.

Many operators do not employ ligatures, but prefer to secure the broad ligament on each side of the uterus with specially constructed clamps. The uterus is then cut away, and the clamps remain *in situ* for about forty-eight hours; they are then carefully removed.

Each method has its advocates, and there are advantages and disadvantages associated with both. The employment of clamps greatly shortens the time occupied in the operation.

*Operative dangers.*—The chief of these are the following:

1. *Injury to bladder.*—If this viscus be cut the opening needs to be carefully secured with a continuous suture of thin silk.

2. *Injury to ureters.*—These ducts are sometimes damaged in reflecting the bladder from the cervix, but they are more liable to be included in the ligatures applied to the bases of the broad ligaments, and this is one of the reasons why it is preferable to deliberately expose and ligature the uterine arteries. The accident has happened to many operators, and the sequel is invariably serious for the patient, and fraught with great anxiety to those in charge of her. The recogni-

tion of the accident and the manner of dealing with it will be detailed in Lecture VI.

3. *Injury to bowel.*—Occasionally the rectum has been cut in making the opening into the recto-vaginal fossa, and the small bowel has been nicked with the scissors in cutting through the broad ligaments. Should the small gut be adherent to the uterus, it is apt to be torn. Such an injury will lead to the formation of a fæcal fistula, which is usually temporary, but a source of inconvenience and great distress as long as it persists.

4. *Bleeding.*—However carefully the bleeding may be controlled, whether by ligature or clamp, a small quantity of reddish serum always finds its way down the gauze drain. Any serious loss of blood is due to the slipping of an ill-applied ligature or clamp, or a vessel which remained unsecured, and then bled freely as the patient recovered from shock and anæsthesia. Free bleeding necessitates re-examination of the parts under an anæsthetic, and whilst preparations are being made to carry this out, the loss of blood may be in a measure controlled by temporary digital pressure applied to the abdominal aorta. As soon as the source of the bleeding has been detected and secured, the patient should be transfused when the hæmorrhage has been severe. A simple apparatus for this purpose is represented in Fig. 15. It consists simply of a yard of india-rubber tubing to which a funnel is attached. The opposite

end of the tube is fitted with a glass (or metal) nozzle with the point fine enough to enter the median basilic (or the median cephalic) vein. The

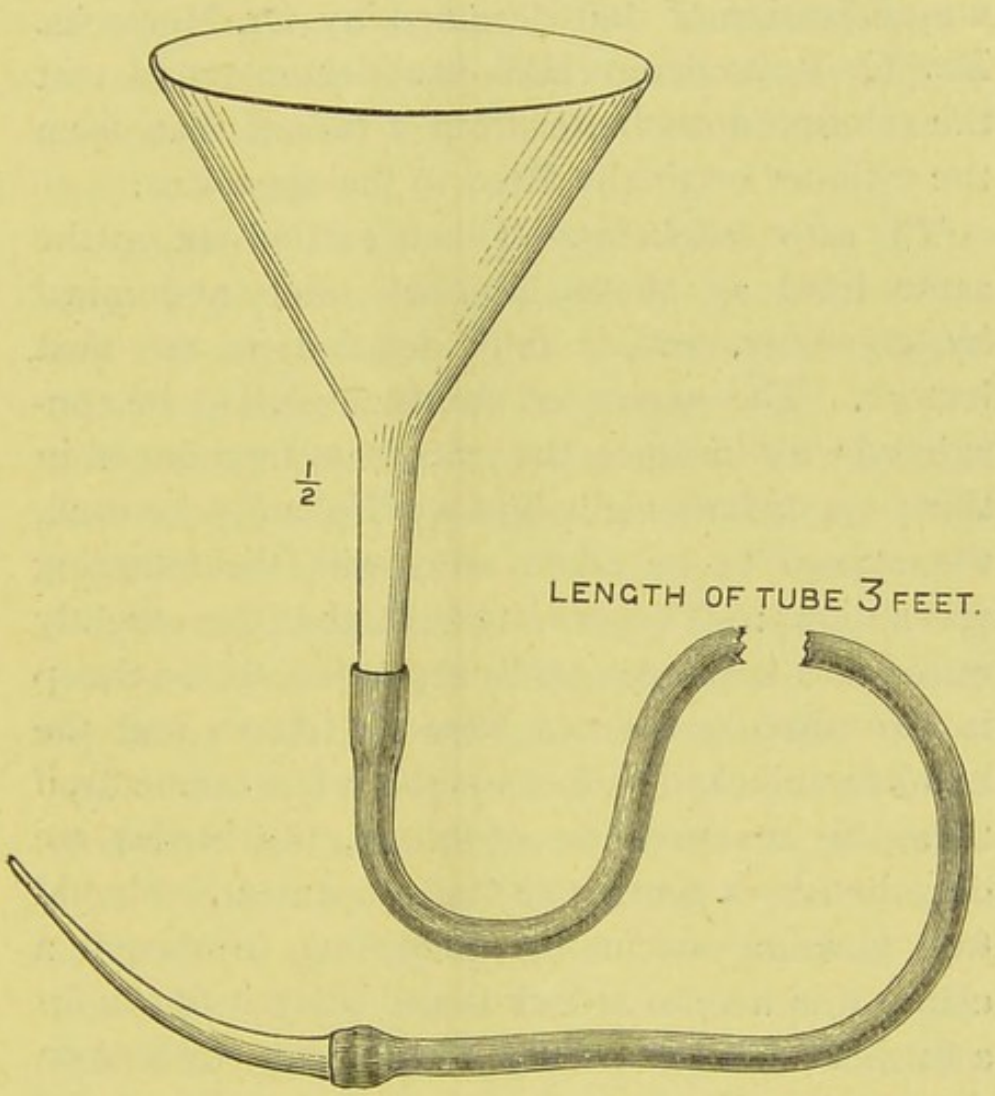


Fig. 15.—A simple apparatus for transfusing with salt solution.

nozzle is introduced into the vein and secured by a silk ligature, and two to three pints of saline solution, consisting of a teaspoonful of clean table salt (chloride of sodium) to a pint of water at a

temperature of 100° is allowed to slowly run into the vein. The effects are often magical.

This simple apparatus is always ready in the theatre of the Chelsea Hospital for Women. It is a modification of that designed by Dr. Horrocks. Mr. C. Beauchamp Hall has demonstrated that the solution flows better from a funnel than from the cylinder originally fitted to the apparatus.

*The after treatment.*—This is carried out on the same lines as those adopted after abdominal hysterectomy, and is fully detailed in the next lecture. The vagina of course needs to be considered; for instance, the gauze may be changed in thirty-six or forty-eight hours. If clamps be used, these need to be taken away with the following precautions:—The patient's thighs are slightly raised and the knees gently separated, then a clamp is very carefully isolated from its fellows and the handles unlocked; after waiting a few moments, if there be no trickling of blood, the blades are detached by a gentle twisting movement. Should free bleeding occur in attempting to detach a clamp it is wise to re-lock it and leave it *in situ* for a further period of twenty-four hours. Oozing on the attempted removal of one clamp should not deter the surgeon in attempting to remove its companions. The temperature after vaginal hysterectomy usually rises towards the close of the second day; this is due to separation of ligatured or clamped, and therefore necrosed, tissue. It may rise as high as 103° F., and the discharges become

offensive. At the end of six days gentle irrigation with sterilised water is useful, and the temperature declines to normal. By the ninth day the ligatures begin to become detached, and, as a rule, they are all away by the twentieth day. Occasionally one or two remain in for several weeks. Generally the patient is allowed to leave her bed at the end of the third week.

*Sequelæ.* — Vaginal hysterectomy, like other surgical proceedings, is liable to be followed by evil consequences. Thus the operation may be rapidly fatal from shock and hæmorrhage. Death may follow in a few days from peritonitis (sepsis), and occasionally from injury to the ureters. With care, however, and with strict asepsis the operation has a very low rate of mortality (5 per cent.). The sequelæ are purulent discharge due to retained ligatures, vesical complications, especially cystitis and occasional thrombosis of the pelvic veins with œdema of the lower limb and liability to embolism. In a few instances fatal intestinal obstruction has supervened on this operation, but patients seem less liable to this grave complication after vaginal than after abdominal hysterectomy or ovariotomy.

## Lecture V.

# SUPRA-VAGINAL HYSTERECTOMY AND MYOMECTOMY.

These operations are performed for uterine myomata which on account of their size cannot be safely and expeditiously dealt with by the vaginal method.

*Abdominal hysterectomy is always a grave proceeding.* It is, however, indicated in cases where the tumour is impacted in the pelvis and interferes with the bladder, or leads to intestinal obstruction by pressing on the rectum or colon. Myomata which become cystic, inflamed (septic), or enlarge rapidly after the menopause, demand removal. Large submucous myomata which cause serious and repeated bleeding, and produce profound anæmia, causing the patient to lead the life of an invalid, justify operation.

*Preliminary preparations.*—It is a great advantage to keep the patient absolutely confined to bed two or three days preceding the operation. The rectum should be emptied by a soap-and-water enema, and the patient should abstain from food at least six hours before taking the anæsthetic; this diminishes the tendency to vomit.

Over-night the nurse shaves the pubes com-

pletely, thoroughly washes the abdomen with warm soap and water, and at least six hours before the operation she swathes the abdomen in a compress soaked with an antiseptic solution (such as carbolic acid 1 in 60 or perchloride of mercury 1 in 2000). Immediately before the patient is placed on the operating table the bladder is emptied naturally or by means of a catheter.

The Trendelenburg position, though not absolutely necessary, nevertheless greatly facilitates the operation.

*Instruments.*—The following are as a rule sufficient :—Scalpels, 2 ; dissecting forceps, 2 ; hæmostatic forceps, 12 ; retractors, 2 ; needles, straight 6 and curved 6 ; reels or tubes of plaited silk of various thicknesses ; a tube of fine silkworm gut ; sponges, 6 (2 flat and 4 round) ; sponge-holding forceps ; pedicle needles, 2 ; large pedicle forceps, 2 ; bladder-sound ; and a catheter.

It is necessary that all instruments shall be of metal throughout, in order that they may be boiled in the steriliser.

Silk and silkworm gut should be boiled twenty minutes in a solution of carbolic acid (1 in 40), and be preserved for use in glass tubes or jars containing carbolic acid solution (1 in 20).

Many surgeons have abandoned sponges, but nothing is equal to them in abdominal operations ; the only drawback to their employment is the fact that they require more than usual care in preparation in order to keep them aseptic. A sponge

that has been in contact with septic matter should be immediately burned. During the operation the sponges should be rinsed in water at 100° F.

*The steps of the operation.*—As soon as the patient is completely unconscious a sound is introduced into the bladder, and the surgeon makes himself acquainted with the relation of the bladder

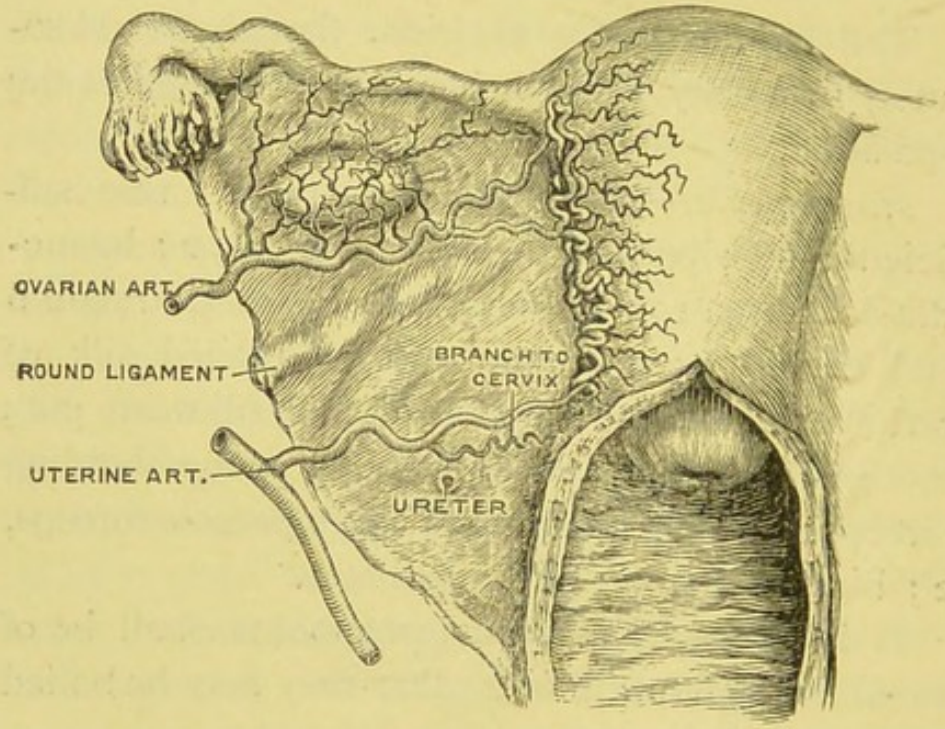


Fig. 16.—A diagram to show the relation of the ovarian and uterine arteries to the uterus.

and tumour. The sound is left in position, and acts as a pilot throughout the operation. The patient is then placed in the Trendelenburg position.

*The incision.*—The abdomen is opened by a free cut in the linea alba between the navel and the symphysis pubis. With a large tumour the in-

cision will often require extension above the umbilicus; it is necessary to cut cautiously in the neighbourhood of the pubes to avoid wounding a displaced bladder.

On gaining the peritoneal cavity the intestines should be at once protected by means of a warm

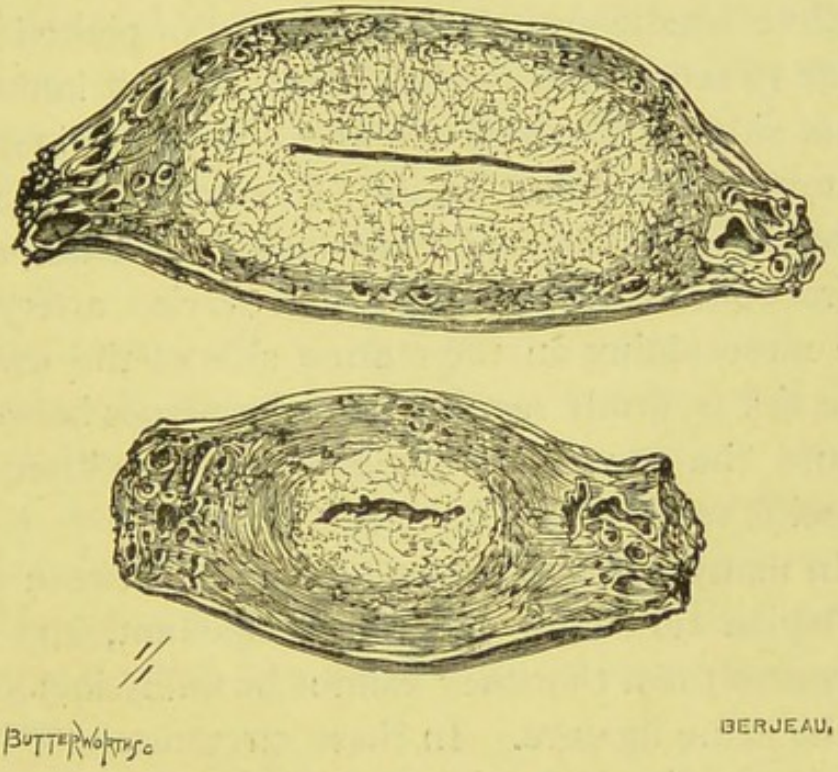


Fig. 17.—The uterus in transverse section to show the vascular tracts. In the upper figure the section is made through the middle of the body of the uterus; in the lower it is carried through the upper part of its neck.

flat sponge. The tumour is then examined, and the relation it bears to the uterus determined; also the presence or absence of complications, such as the co-existence of ovarian tumours, visceral adhesions, or distended tubes. The operator then proceeds to ligature the blood-vessels, and as this is one of the

most important steps in the operation it requires to be considered in detail. The arteries and veins of the uterus follow four distinct routes (Figs. 16 and 17), and each route is easily accessible to, and capable of being safely controlled by a ligature.

When possible the tumour is drawn out of the pelvis, and each mesometrium is transfixed with a pedicle needle armed with a thread of plaited silk so as to secure the ovarian vessels on the inner or outer side of the ovary according as he decides to remove or leave this organ. In some cases, apart from the physiological advantage, it is safer and more convenient to secure the ovarian artery in the mesosalpinx on the uterine side of the ovary. The silk is firmly secured, and the tissues between it and the uterus are divided, and any bleeding vessel is secured with hæmostatic forceps.

In many cases a myoma intrudes between the Fallopian tube and the round ligament, and so separates them that they cannot be safely included in the same ligature. In these circumstances it is prudent to ligature the round ligament separately; it is sometimes necessary to adopt this course on account of the large size of the ligament, for it often shares in the hypertrophy of the uterine tissues.

When the mesometria are divided the uterus becomes freer, and is easily manipulated. At this stage the uterine vessels may be detected in the vascular tract at the side of the uterus. When this is the case two courses may be followed;

thus the surgeon may transfix the peritoneum and uterine tissues adjacent to the vessels, and secure them with a silk ligature at a spot near the middle of the supra-vaginal cervix, or he may seize them with hæmostatic forceps and ligature them at a later stage. When the shape of the uterus is distorted, and especially when the tumours are multiple and large, the vessels are often embedded in deep grooves and not easily accessible until the supra-vaginal cervix is freely exposed. It is also well to know that with very large tumours, the uterine arteries may be larger than the radials at the wrist.

It is impossible to prescribe precise rules for dealing with the uterine arteries in every case ; in this, as in most details of surgery, a little experience and common sense serve as very efficient guides, but there is one rule I always adhere to in this operation,—I take extreme care that every ligature applied to a vessel also traverses the peritoneum.

*The peritoneal flaps.*—At this stage the sides of the uterus have been exposed by division of the mesometria. It is now necessary to determine the relation of the bladder to the uterus. The surgeon then divides the peritoneum on the anterior and posterior surface of the uterus in such a way as to make them continuous with the opening in each mesometrium. These flaps are then carefully turned down ; it is a great advantage to have plenty of flap, and the way the muscular tissue in

the subserous tissue wrinkles them up is often very astonishing.

*Amputation of the uterus.*—The uterine arteries being secured, either with forceps or by ligatures, the uterus with its tumours is cut away. If the vessels have been properly secured, the cut surface of the cervical stump is usually white and dry; but small vessels in the peritoneal flaps may bleed and require ligatures.

In the case of a cervix-myoma the operation is somewhat modified thus :

The ovarian and uterine arteries are ligatured as described in the preceding section, and the expanded cervix with the tumour is drawn as far out of the pelvis as possible. The cervix is then incised and the capsule of the tumour freely opened to allow the myoma to be shelled out, but leaving the vaginal portion of the cervix like a shallow cup with a central perforation (the external os). The edges of the peritoneum and the cut margins of the cervix may be brought into apposition with the same sutures.

The advantages of leaving the lower half of the cervix in this way is very great, for all attempts to remove this segment of the uterus greatly endanger the ureters. Indeed the only safe way of avoiding the ureters is to keep inside the capsule of the tumour, and so well has this plan answered that in all my myoma operations I have never seen them.

It is unwise to divide the cervix lower than is

necessary to clear the tumour, because it not only brings the operator into the territory of the vaginal branches of the uterine arteries, but it leads him into the immediate neighbourhood of the ureters.

*Adjustment of the peritoneal flaps.*—The pelvis is cleared of blood, and the parts carefully scrutinised to ascertain that all vessels are properly under control. It sometimes happens that it is convenient to leave the forceps on the uterine vessels and secure them at this stage; this is accomplished by transfixing the peritoneal flaps in such a way that the silk encircles the cut vessels. On tightening the knot the vessels are secured, and the flaps approximated at the same time. Two or three interrupted sutures are then employed to fix the cut edges of the peritoneum over the stump, then the flaps are carefully brought together by a thin continuous silk suture from the ovarian pedicle of one side to that on the other. It is well to point out that when one or both ovaries are left (conservative hysterectomy) the flaps are much shorter than when they are removed. In suturing the flaps care must be exercised in order to avoid pricking the bladder. The pelvis is sponged dry, and the omentum is drawn over the intestines and spread behind the stump in the pelvis. Arrangements are then made to suture the wound; the sponges and instruments should now be counted.

*Suture of the wound.*—This is of great im-

portance. The method which gives me best results consists in uniting the peritoneal edges with a continuous suture of fine silk. The cut edges of the sheath of the rectus are drawn together with interrupted sutures of silkworm gut, and the skin is carefully approximated by a continuous suture of silk.

When the cervical stump is unusually thick and vascular it is sometimes advisable to introduce a narrow piece of india-rubber tubing into the recto-vaginal pouch, and let it project at the lower angle of the wound.

*Dressing.*—A pad of sterilised or antiseptic gauze covered with a pad of absorbent cotton wool or gamgee tissue, and retained by a flannel binder. This dressing remains undisturbed for seven days unless drainage has been necessary; in this event it will require changing every twelve hours as long as the tube is used. This is rarely needed more than fifty-eight hours.

*Abdominal myomectomy.*—It may happen when the surgeon opens the abdomen that he finds the myoma growing from the fundus of the uterus by a narrow stalk. In such a case he transfixes the pedicle, ligatures it tightly, and cuts away the myoma exactly as he treats an ovarian tumour. In some cases, especially when the pedicle is thick and near one or other uterine cornu, there is some difficulty in completely controlling the oozing from the pedicle. In such circumstances the removal of the adjacent ovary and tube close up

to the cornu will often immediately arrest the bleeding.

The after results of myomectomy are admirable, as the surgeon leaves not merely the ovaries and tubes, but the uterus. When age and environment are favorable the patient may conceive. In some pregnancy has occurred, and terminated in happy delivery. An event of this kind was detailed in Lecture III.

*The after treatment.*—The patient is returned to bed with gentleness. A pillow is placed under her knees, and hot-water bottles to the feet, and it should be remembered that the patient is unconscious, and if the bottles are too hot the feet and legs will be blistered. The metal stopper of the bottle is particularly apt to do this if it comes in contact with the skin.

In two or three hours, as consciousness returns, the patient complains of pain and thirst. When the pain is very severe, a suppository containing a quarter of a grain of morphia may be given, or the same quantity of the drug may be injected in the skin. In the majority of cases no morphia is required, and the routine use of the drug is injudicious.

*Vomiting.*—This troublesome sequel is best treated by keeping the stomach empty twenty-four hours. In order to relieve thirst the patient may frequently wash the mouth with cold or hot water, but should avoid swallowing it. Vomiting during the first twenty-four or thirty-six hours, though dis-

tressing to the patient, is of no serious moment; but when it persists for two or three days, and is accompanied by a quick pulse and a distended belly, is a distinctly unfavorable sign.

*Diet.*—At the end of twenty-four hours small quantities of barley water, or of milk and soda water are to be given, and if retained may be given in greater quantity and at shorter intervals. On the third day boiled fish and custard pudding, chicken jelly, or pounded chicken are allowed, and the patient soon gets well enough to take convalescent diet.

No precise rules can be formulated in dieting patients, as many cannot take milk, and some refuse beef tea.

When vomiting gives trouble it is wise to abstain from administering food by the mouth and sustain the patient by nutrient enemata given at regular intervals. Three ounces of strong beef tea, containing if necessary half an ounce of brandy, is easily retained by the rectum, and may be repeated every four hours. When it is necessary to continue rectal feeding three or four days, the rectum needs washing out with warm water once daily.

*Distension of the bowel.*—Accumulation of gas in the large bowel often causes much distress, especially when morphia is given. The use of the rectal tube every three hours is an excellent means of preventing this distension; its use should be discontinued as soon as the patient can expel

the flatus herself; this requires about thirty-six hours.

*The bladder.*—It is always wise to encourage patients to pass water unaided. In many it is necessary to use the catheter every eight hours. Before using a catheter the nurse should wipe away any mucus that may have collected around the urethral orifice; cystitis causes much misery. After hysterectomy, even when the patient passes urine unaided, it is judicious to pass a catheter once in thirty-six hours to be sure that she completely empties her bladder. The utmost watchfulness is necessary to ensure the strictest cleanliness of the catheter.

*The bowels.*—At the end of four or five days the bowels may act naturally. Usually, however, it is necessary to employ a soap-and-water enema. If this be retained, a second enema may be given in twelve hours, to which an ounce of castor oil may be mixed with advantage. When a soap-and-water enema is retained it sometimes produces a copious red (urticarial) rash.

*Temperature.*—This should be taken every four hours in the mouth, and be duly marked on the chart. The first reading after an operation is low, 97° or even 96°; it then slowly rises to 100° or 101° without occasioning alarm. As a rule, this subsides to 99° in a few days.

*Pulse.*—This is a very valuable guide. As long as the pulse remains steady and full it is a sure sign that all is going well. A rapid, thready pulse,

running 130 or 140 to the minute, and maintained, is a sure indication that things are not going satisfactorily.

*Sutures.*—The superficial sutures are removed on the eighth day. Occasionally one of the silkworm-gut sutures may cause a stitch abscess; in such circumstances it is a great saving of time to remove it. Suture abscesses of this kind usually declare themselves about the tenth day.

When the convalescence has been uneventful, patients usually leave their beds by the twenty-first day.

The invention known as the belt I have discarded since adopting the "triple" method of closing the wound.

## Lecture VI.

# THE IMMEDIATE AND REMOTE RISKS OF SUPRA-VAGINAL HYSTERECTOMY.

The removal of a myomatous uterus through an incision in the belly wall is beset with the same dangers that attend abdominal operations in general. Of these the chief are shock, hæmorrhage, injury to viscera, sepsis, thrombosis, and embolism; nevertheless some of them depend on peculiarities of the operation, and demand careful consideration. It will be convenient to consider them in detail.

*Shock.*—The amount of physical disturbance clinically termed "shock" which follows any grave abdominal operation is often well marked after supra-vaginal hysterectomy, especially when the tumour has burrowed deeply into one or both mesometria, even when the loss of blood has been small in amount. Unless shock has been intensified by great loss of blood during the operation it usually disappears in six or twelve hours. The degree of shock may be gauged by the fall of the bodily temperature and the duration of the depression. It is no uncommon thing for the temperature to fall to 96° Fahr. after a severe

operation, and then in a few hours it will rise to 99° or 100°. This causes no alarm, but post-operative shock with the temperature at 96°, or lower, which does not rise in twelve hours needs consideration, and it is wise to resort to restoratives such as injections of warm water, beef-tea, or milk, by the rectum, with a small quantity of brandy added. The deepest shock in these operations usually accompanies unusual loss of blood.

*Hæmorrhage.*—Bleeding may ensue with the reaction, and may arise from the slipping of an ill-applied ligature from some small vessel which was unnoticed during the operation, but which bled freely with the reaction. When the bleeding is very severe its signs are generally unmistakable. The patient should be re-anæsthetised, the wound opened up, and the vessel secured; the clot is removed by irrigation or sponging. Whilst the wound is being sutured the patient should be transfused with two or three pints of saline solution, according to the necessity of the case (see Lecture V).

*The Bladder and Ureters.*—Considering the intimate relations which the bladder and vesical sections of the ureters bear to the neck of the uterus, it is clearly very necessary to be watchful and cautious in order to avoid damaging them in the performance of hysterectomy. Ofttimes, in spite of every care, it happens in cases where the bladder and ureters have not been obviously injured, their function is often greatly disturbed after

hysterectomy, and this disturbance is occasionally a source of great distress.

*The bladder.*—This has been cut and its cavity opened in making the primary incision, and there is especial liability to this accident when the urethra is compressed against the pubes, and the bladder displaced above its normal level by a cervix-myoma.

Accidents of this kind are best avoided by introducing a sound into the bladder in order to ascertain its limits at the outset of the operation, and leaving it in the bladder to act as a pilot during the subsequent stages. Inadvertent incisions into the bladder should at once be closed with continuous sutures of fine silk, and the bladder tested by filling its cavity with sterilised milk to be sure that there is no leakage.

Occasionally, and especially with cervix-myomata, the tumour may burrow between the uterus and the bladder; it is then necessary in separating them to exercise very great care. On one occasion I found the bladder spread over and adherent to the fundus of a myomatous uterus, obliterating the utero-vesical pouch.

In cases where it is necessary to cut the cervix at or below its middle, the bladder will come so prominently into the field of operation, and be so closely associated with the anterior peritoneal flap, that it runs the risk of being pricked by the needle, and even stitched to the cervical stump when the peritoneal flaps are sutured.

*The ureter.*—These ducts seem to be more often injured than the bladder. In writings dealing with the operative details of hysterectomy it is customary to describe minutely the relations of at least the pelvic portions of the ureters. In all varieties of abdominal and pelvic operations there is needed, besides a knowledge of regional anatomy, the power of "appreciating the nature of tissues." This in plain words means "knowing a thing when one sees it." For example, in removing a large myoma which has burrowed deeply in the mesometrium it may push the ureter out of its course, until it lies like a strap around the periphery of the tumour, or it may lie on the crown of the myoma, and be carried up to the level of the brim of the true pelvis. Regional anatomy in such circumstances is of little avail; all depends on the immediate recognition of the nature of the displaced tissue. To divide a ureter even though the accident be immediately recognised, and the surgeon is able to repair it, is an event that always adds to the anxiety necessarily associated with an operation which in itself jeopardises life. When one or both ureters are divided, and the accident is unrecognised, then the chances of recovery are greatly diminished; and even when the patient survives she is in an extremely miserable condition.

In addition to actual division of a ureter, either by cutting instruments or tearing during the enucleation of a tumour from the pelvis, it is apt to be included in a ligature. When one ureter is thus

occluded the accident is scarcely suspected until a few days after the operation ; then the ligature separates, and urine begins to leak into the belly or trickles from the vagina. When this happens the operator may be a little perplexed as to whether he has to deal with an injury to the bladder or a ureter, but a little watchfulness soon solves the problem. When the leakage is due to a vesical fistula the whole of the urine escapes through the vagina, but when the leakage is due to a ureteral fistula half the total quantity escapes by the vagina (or in some still more unfortunate cases through a sinus in the abdominal wall), whilst the other half is voided in a regular manner by the bladder. In order to place the matter beyond doubt, it is necessary to put the patient in the lithotomy position, and expose the vagina by a duck-bill speculum in a good light, and inject a measured quantity of sterilised milk into the bladder ; if this viscus be intact the milk will be retained, but if it be fistulous the milk will escape into the vagina. A systematic examination of this kind is of great advantage, inasmuch as it may enable the surgeon to determine which ureter has been injured ; and as a ureteral fistula often demands the removal of the kidney for its cure, it is of the utmost importance to decide which ureter is at fault, as irreparable harm would be inflicted upon a patient by excising the kidney belonging to the intact ureter.

As far as my inquiries have extended I have failed to find an instance of the ureters being

injured in the supra-vaginal operation; it is the complete removal of the neck of the uterus, either in vaginal hysterectomy or pan-hysterectomy, which so greatly endangers these ducts.

There is a form of vesical disturbance which arises after hysterectomy which demands full consideration. In all cases it would be judicious to have the bladder emptied every six hours by catheter, but even in the hands of the most trustworthy nurses the urine will occasionally be contaminated and decompose. To avoid this my nurses are instructed to let the patient void urine unaided if possible, and pass the catheter perhaps once in forty-eight hours to be quite sure the bladder empties itself. In many instances the patient will for three or four days after the operation void urine unaided; she then gets retention, and requires the routine use of the catheter three times daily for ten or fifteen days. This form of inconvenience is prone to arise after the removal of a cervix-myoma. It is fair to assume that when the bladder has been freely separated from the neck of the uterus, even with the utmost care and gentleness, bruising and even more serious damage is inflicted on the muscular tissue of, and the nerves distributed to the bladder, thus causing temporary paralysis with the retention of urine as a consequence. Such conditions necessitate the use of the catheter from the beginning. The later form of disturbance arises from a different cause. When the operator has carefully sutured the peri-

toneum over the stump of cervix he will be able to assure himself by means of the sound that in a large proportion of cases the posterior surface of the bladder lies in direct contact with what is left of the uterine cervix, no peritoneum intervening. Such a bladder may contract efficiently for two or three days after operation ; then become atonic and dilate, retention being the consequence. This behaviour is due, I believe, to inflammatory exudation into the perivesical connective tissue ; occasionally this exudation will extend beyond the pelvic connective tissue, and involve the subserous tract belonging to the anterior abdominal wall. When pyosis (suppuration) supervenes the vesical incapability continues until the pus finds an outlet, a common situation being the lower angle of the abdominal incision. As soon as the pus escapes, the bladder regains its power. So far the difficulties which have been considered are those due to paralysis of the bladder, but occasionally vesical irritability is observed. This in many instances is due to cystitis, the result of decomposition of urine, the outcome of catheterism, but it is often due to other causes. For instance, a septic ligature gives rise to an abscess ; the pus and sometimes the ligature make a way through the bladder wall, the ligature with its knot forming a nucleus for phosphatic deposit.

On one occasion a patient who had been submitted to supra-vaginal hysterectomy in the Antipodes suffered from frequent micturition on the

voyage home. Her urine was fœtid, purulent, and often contained calculous material. On dilating the urethra I found that the supra-vaginal portion of the cervical stump had made its way through the posterior wall of the bladder, and was projecting freely into the vesical cavity, bristling with thick silk ligatures, arborescent with phosphatic deposit. The ligatures were removed, the urine soon became acid, and in spite of the anomalous body in the bladder the patient soon ceased to experience any inconvenience.

It has long been known that silk ligatures employed in ovariotomy, oöphorectomy, and hysterectomy, as well as sutures employed in operations on the bladder, are occasionally met with in the centre of soft phosphatic vesical calculi. There is an unusual form of bladder disturbance secondary to ureteral spasm which it is necessary to draw attention to.

The ureter is practically a muscle traversed by a channel lined with epithelium. At its lower end the muscle-tissue of the ureter is directly continuous with that of the bladder. It has been determined by actual observation that rhythmical waves of peristaltic contraction occur in the ureter, the waves passing invariably from the kidney to the bladder. These contractions arise in the same way as those of the heart, and may be spoken of as the "beats" of the ureter, and they are subordinated to the flow of urine into the renal pelvis: the more active the secretion of urine, the more

frequent and vigorous are the beats of the pelvis and ureter.

I have satisfied myself in two or three cases where great vesical irritability became an annoying symptom after pelvic operations, and in which there was no cystitis, that the spasmodic contractions of the bladder did not arise in its own walls, but were due to exaggerated ureteric beats, which instead of ending at the bladder, spread to and induced rhythmical contractions of the vesical muscle; the spasms of the ureter and bladder being due to the fact that the ureter was entangled and partially occluded by inflammatory exudation in the base of the mesometrium In one case the suffering was so great that I excised the kidney connected with the implicated ureter, a proceeding which gave immediate and permanent relief. The accidents and inconveniences to which the bladder and ureters are liable may be briefly summed up thus:

1. The *bladder* may be cut in making the primary incision.
2. It may be torn in separating it from the supra-vaginal cervix or in detaching adhesions.
3. It may be punctured in suturing the peritoneal coverings of the stump.
4. The bladder wall may be perforated by an abscess, a ligature, or the supra-vaginal portion of the cervical stump.

1. The *ureters* are liable to be cut or torn.

2. One or both may be included in a ligature, or,
3. Worried by being involved in inflammatory exudation in the pelvis.

The ureter and bladder complications have been considered at length because they are perhaps the most serious risks which beset hysterectomy, whether vaginal or abdominal.

*Injury to Intestines.*—These are far less common in operations on the uterus than in complicated ovariotomy. Should the bowel be injured, the opening should be at once occluded by careful suturing with thin silk.

*The stumps and ligatures.*—After an uncomplicated supra-vaginal hysterectomy there are at least three stumps,—a median one consisting of the remnant of the uterine cervix, and two lateral stumps consisting of a portion of each mesometrium, with the ovarian vessels and nerves and the round ligament. When the appendages are not removed the Fallopian tube and ovarian ligament are necessarily included in the ligature. On those occasions when it is desirable to ligature the round ligament on one or both sides separately, then the lateral stumps are increased to three or four according to circumstances.

Of course the formation of so many separate stumps increases the risk, for every piece of silk employed in securing these structures is an additional element of danger, however carefully the silk be prepared.

The cervical stump needs very careful consideration. The amount of the neck of the uterus left behind varies according to the size and position of the tumour; sometimes the whole cervix is left, at other times the supra-vaginal portion is completely removed, and occasionally, especially in the case of a large subserous myoma sessile on the fundus of the uterus, it may happen that a fair proportion of the body of the uterus forms part of the stump. The character of the uterine stump often exercises a very significant influence on the convalescence. A narrow cervix with an undilated canal furnishes an ideal stump. A thick cervix, whether long or short, and especially when it contains an unhealthy endometrium, constitutes an unsatisfactory stump, and is very apt to initiate trouble. The expanded cup-like cervix left after the removal of a large intra-cervical myoma gives, as a rule, excellent results.

Many operators regard the cervical canal as an element of danger, inasmuch as it furnishes a route for the conveyance of infective agents from the vagina to the peritoneum, some of which may be, as it were, in ambuscade in the cervical endometrium. The opinion that the cervical canal is in itself an element of danger I do not share; on the contrary, I believe it serves as an excellent drainage track and makes supra-vaginal hysterectomy a possible operation. On critically studying the clinical records of women submitted to this procedure, one of the most striking features in the

charts is the almost constant rise of temperature for a few days following the operation, the elevation standing in close relation to the thickness of the cervical stump and the diameter of its canal. With a narrow stump, as a rule, the temperature reaches 100° F., and gradually subsides to normal in three or four days. With a thick cervical stump the temperature sometimes ascends to 102° or even 103°, and may take seven, eight, or even ten days to subside. Coincident with a marked subsidence of temperature there is an escape of thin blood-stained fluid from the vagina. When the cervical stump is narrow it is possible to obtain a more perfect hæmostasis than with one that is thick and indurated. Even when there is no escape of blood after the operation some serum is sure to ooze from the cut surfaces, and this will leak into the pelvis until the peritoneal flaps adhere; then it will have but one avenue of escape, namely, the cervical canal. Failing this, the exudation will burrow under the peritoneal flaps and infiltrate the perivesical tissue, and occasionally pyosis (suppuration) with all its inconveniences and dangers is the consequence. That the cervical canal affords an excellent drainage track is, I think, indisputable; that it is an occasional source of danger is also undeniable. In some of my early hysterectomies I tried the effect of routine drainage by inserting a narrow india-rubber tube (I discarded glass drain-tubes in 1892) behind the stump. It was a striking fact that even in those cases where the hæmostasis

seemed most perfect blood-stained serum amounting to three ounces would escape along the tube within the first twelve hours of the operation. I soon satisfied myself that the peritoneum could easily and safely deal with this, and I came to the conclusion that the employment of a drain-tube probably adds to the risks of the operation.

*Sepsis.*—It is easy to conceive that if the endometrium be septic at the time of the operation the pelvic peritoneum could be infected from this channel, especially in those cases where the uterus contained a gangrenous submucous myoma at the time of the operation. A few cases of fatal peritonitis following supra-vaginal hysterectomy have been reported in which infection has been attributed to the cervical canal.

*Thrombosis.*—In operations involving the application of a mass-ligature to venous plexuses it occasionally happens that the resulting coagulation in the veins extends sometimes to neighbouring venous trunks. Thus thrombosis of the venous plexuses in the broad ligament may extend to the iliac veins and lead to œdema of the lower limb after ovariotomy, oöphorectomy, and hysterectomy.

*Embolism.*—In perusing the clinical histories of a long series of cases of ovariotomy, or of hysterectomy, here and there a record may be read to this effect :—"The patient did well after the operation till the eighth day; the sutures were taken out and the patient sat up, laughed and chatted

with the nurse, then suddenly fell back dead." Anything more awfully tragic than this it is difficult to conceive, and, as a rule, after such a sad occurrence the relatives of the patient are so upset that they very rarely permit an examination of the body.

Death in such circumstances is attributed to embolism of the pulmonary artery. This in many cases is pure assumption, for there are excessively few records in which the presence of the embolism has been demonstrated.

Sudden death seems to be a more frequent sequel to abdominal hysterectomy than to ovariotomy. It is well to bear in mind that a patient may after hysterectomy exhibit the signs of pulmonary embolism and recover, and curiously enough a patient may have signs suggesting a succession of emboli.

*Pyuria.*—When a myoma has been impacted in the pelvis and seriously interfered with the bladder it may have wrought indirectly serious injury to the kidneys, such as dilatation of the renal pelves and septic pyelitis. Removal of the myoma relieves the pressure, but the renal damage is irreparable. I have satisfied myself that some patients who had slight pyuria before the operation presented this symptom a year afterwards.

*Nerve disturbances.* Supra-vaginal hysterectomy, like other grave surgical operations, is liable to be followed by mental disturbance; but as far as I can ascertain they are not so serious or so persistent as

those which occasionally follow amputation of a limb, or childbirth.

The nerve disturbances which trouble patients most are those which supervene on complete removal of both ovaries, and these are the well-known flushes which are so indicative of an accentuated menopause. In the majority of cases they rapidly diminish in frequency, and in a few months cease to cause inconvenience. These are avoided by conservative hysterectomy even when only one ovary is left.

Exceptionally, in removing a large myoma sessile on the fundus, a portion of the body of the uterus may be left; under such conditions, when one or both ovaries are also left and the patient is still in the menstrual period of life, menstruation will continue regularly.

It is clearly established that a wombless woman can enter into all the pleasures of life and enjoy them as well as those who have not had the misfortune to develop large tumours in the pelvis. It is, moreover, a cowardly act to tell women who require hysterectomy that the operation will increase their liability to insanity, cause them to lose their voices, and that they will become sexless. Such statements cause unnecessary alarm, and inflict upon them much anguish of mind, which it is our plain duty to spare them; moreover, as these statements do not accord with facts, they are untrue.

## Lecture VII.

# OÖPHORECTOMY *v.* CONSERVATIVE HYSTERECTOMY.

It was an excellent effort of reasoning which led Lawson Tait in 1872 to the deduction, that as uterine myomata usually cease to grow after the natural cessation of menstruation, it would be useful to induce an artificial menopause in patients with uterine myomata, by removing their ovaries. He not only conceived the idea, but possessed the ability necessary to carry out the operation and convince the whole surgical world of the soundness and utility of the proceeding.

In the quarter of a century which has elapsed since Tait's epoch-making discovery, the surgery of the female pelvic organs has been brought to a high state of perfection, and hysterectomy can be performed with almost the same safety as oöphorectomy. In my own practice, whenever it is possible, I actually reverse the conditions, and instead of removing the ovaries and Fallopian tubes, leaving the uterus with its tumour, I often find it safer and certainly better surgery to remove the uterus and tumour (conservative hysterectomy), leaving the patient at least one ovary with the

corresponding Fallopian tube. These views I communicated to the Obstetrical Society, London, November 3rd, 1897, and it is very gratifying to me to find that Dr. Howard Kelly, Baltimore, has also carried out a similar plan of conservative hysterectomy with equally gratifying results (*vide* 'Brit. Med. Journ.,' January 29th, 1898).

There are very clear indications that hysterectomy will very rapidly supersede oöphorectomy in the treatment of myomata, and this is due to an improvement in the treatment of the uterine stump, for which we are mainly indebted to Baer.

When ovariotomy became an established operation in surgery, it was natural that enterprising surgeons should attempt to deal with formidable uterine myomata on the same lines. A study of the earlier literature of ovariotomy shows that in very many cases large uterine myomata were often successfully treated, but the surgeon believed that he was dealing with an ovarian tumour. This was during the "reign of the clamp." With the introduction of antiseptics and the short ligature, it soon became clear that whilst this method gave wonderfully improved results with ovarian tumours, the consequences were woeful in the case of uterine stumps; and in spite of much ingenuity in ligaturing the uterine tissue it was found that the clamp and the serre-nœud furnished the safest course. In a very large proportion of cases the neck of the uterus, consisting so largely of muscle-tissue, could not be securely constricted by trans-

fixion ligatures as is the case with the thin pedicle of an ovarian tumour. Many attempts were made by surgeons to secure the ovarian and uterine vessels separately so as to avoid the necessity of transfixing the cervix, but the best and most successful method was introduced by Baer in 1892. This surgeon found that when the uterine arteries were secured in the broad ligaments the bleeding from the cervix was in most cases effectually controlled; and the best method of preventing the cervix from sloughing was to interfere with it as little as possible, and certainly not to strangle it by tight encircling ligatures.

Since this date hysterectomy has entered on a new and wonderful career, and the method can be applied even to those formidable varieties of myomata which could not be treated by clamp or serre nœud, and which offered the greatest operative difficulties to oöphorectomy.

It is necessary to consider in detail why oöphorectomy, which has given good results in the past, should be abandoned in favour of hysterectomy. The objections to oöphorectomy may be arranged under four headings:

1. It is not always practicable to remove both ovaries.

2. The relief is neither prompt nor certain whereas convalescence is quicker and more satisfactory after hysterectomy than after oöphorectomy.

3. The mortality of oöphorectomy is scarcely less than that of hysterectomy.

4. It is a greater disadvantage for a woman to lose her ovaries than her uterus.

I will deal separately with each of these objections.

1. *It is not always practicable to remove both ovaries.*—This difficulty is admitted by the most ardent advocates of oöphorectomy. Often the removal of both ovaries is a very simple matter. In a very large proportion of cases the removal of the appendages on one side offers no difficulty, but on the opposite they are insurmountable, and in a few instances the ovary cannot be found. When the layers of the broad ligament are widely separated by a myoma, the difficulty of applying ligatures is very great, and this increases the risk of hæmorrhage. Even the most experienced and skilful surgeons have undertaken operations with the view of removing the ovaries, but on account of difficulties in securing the vessels, have been compelled to perform hysterectomy.

2. *The relief is neither prompt nor certain.*—It is admitted by all who have devoted careful attention to the effects of double oöphorectomy on uterine myomata that the most beneficial results have followed this operation in cases where it was performed for the relief of profuse menstruation. In Lecture III it was pointed out that the submucous variety of myomata was the one most commonly associated with excessive menstruation; in very many cases it has happened that women have been submitted to oöphorec-

tomy, and that after the operation the recurrent bleeding continued unaltered, then the uterine cavity has been dilated and a small polypus extracted, with the effect of staying the "issue of blood." Anyone who can boast of experience in dealing with myomata has been astonished to find that a woman may have a myoma in her uterus as big as her head which causes her very little inconvenience, yet her life is placed in jeopardy during each menstrual period by a submucous myoma no bigger than a cherry ; yet the larger tumour has so distorted the uterine cavity that it was impossible to reach it by the vaginal route ; oöphorectomy was equally ineffective, and hysterectomy alone had the effect of staying the monthly loss.

No one has attempted to explain why removal of the ovaries causes uterine myomata to shrink. They rarely disappear completely. The rapidity with which some myomata have shrunk after the operation has also astonished me. That this effect follows complete removal of both ovaries in a very large proportion of cases is one of the best attested facts in surgery, but no one has made any efforts to work out the details of the process. I have noted in many instances in which I performed oöphorectomy for large tumours that a slightly sanguineous fluid persistently escaped from the vagina many months after the operation, and that some of my best results were in patients who reported the existence of this flow. In one case a patient from whom I removed both ovaries was so

annoyed by this discharge for a period of two years, that as the myoma had shrunk to a small body I dilated the uterus and enucleated the remnant. At the time of the oöphorectomy the myoma was as big as a cocoa-nut ; the shrunken tumour equalled a billiard ball in size, and was partially calcified. In a few cases in which I have examined uteri removed from patients who have had hysterectomy performed a year or more after double oöphorectomy, I have found evidence of necrotic changes in the tumours ; in two instances the shrivelled tissue was calcified, and in others the remnant of the tumour, instead of being firm and hard as myomata usually are, possessed the toughness of a solid india-rubber ball.

I am further convinced that the shrinking of myomata after complete removal of the ovaries is in essence a necrotic process, by the fact that even the most carefully conducted antiseptic or aseptic oöphorectomy is followed by irregular rises of the bodily temperature such as rarely ensue on an ovariotomy, or supra-vaginal hysterectomy, conducted in the same manner. These changes, too, explain to my mind why the convalescence is so prolonged. I have had series of cases in which patients after ovariotomy or supra-vaginal hysterectomy have left their beds in eighteen days, but an oöphorectomy patient requires to keep in bed for twice that period before her temperature resumes the normal range.

3. *The mortality of the operation.*—Here we are

face to face with a very difficult question. It is not by the rate of mortality in the hands of one expert operator, or by the results obtained in one hospital, that the risks of any operation can be judged, but by the results of a large number of operations "complete and incomplete" impartially published by many operators.

In experienced hands the risk of double oöphorectomy for myomata is that of ovariotomy. In the practice of less experienced operators it is much greater than ovariotomy. Then, again, this question is not to be judged merely by statistics. I have carried out a double oöphorectomy where it could be done as easily and as safely as the simplest ovariotomy; on the other hand, I have undertaken operations for the purpose of removing both ovaries, but found the condition so embarrassing that I removed the uterus and left the ovaries because it was the safer and simpler operation.

However, this much is certain, the technique of hysterectomy is now so near perfection that there is less risk in removing a myomatous uterus than there was five years ago in the performance of double oöphorectomy; and during the next few years there are good grounds for the hope that it will rival ovariotomy, which even at the end of 1896 had in the hospitals of London a mortality varying from 5 to 18 per cent.

4. *It is a greater disadvantage for a woman to lose her ovaries than her uterus.*—To deprive a woman or a man of any organ is always a

matter of regret, but when it is not an organ essential to life, and is incapacitated, troublesome, and dangerous from disease, then such considerations are not seriously taken into account; but it is a grave proceeding to remove two healthy organs to relieve one that is diseased, when it is practicable to save them by removing the unhealthy organ itself.

It is a very great advantage to remove a myomatous uterus and preserve one or both ovaries, for it is evident that an ovary serves other duties than yielding ova.

The advantages of leaving at least one ovary were referred to in Lecture VI, and there is no necessity to repeat them here; but it is necessary to mention that one of the most important results appreciated by those who have practised conservative hysterectomy for uterine myomata is the remarkable improvement in the general health of the patients, which is quite independent of the relief to the mechanical troubles. It seems that a myoma, even when it does not drain patients by oft-recurring menorrhagia, impairs their vitality and induces a condition which they express by the phrase "never feeling quite well." After extirpation of the tumour the restoration to health is accompanied by increased vigour, which is to them a revelation.

*Pan-hysterectomy.* — A careful perusal of the literature relating to abdominal hysterectomy makes it clear that there is a very important

question to decide, viz. *the superiority or otherwise of supra-vaginal hysterectomy over pan-hysterectomy.*

Pan-hysterectomy signifies the complete removal of the uterus and its neck by the abdominal route. I do not venture to discuss this method as I have never performed it. I have seen other operators carry out this procedure, but have not felt disposed to perform it myself on account of the great risk of wounding the ureters. Having seen the ureters damaged by several operators I have good grounds for my caution. On many occasions I have made a careful examination of patients on whom I have performed supra-vaginal hysterectomy, and found the vaginal portion of the cervix mobile and natural in size and colour, and have failed to find any objection to its retention. Apart from its peculiar risks to the ureters, pan-hysterectomy is a long and tedious operation, requiring in some cases two hours for its performance, for which in my judgment there is no compensation either in greater safety or in remote consequences.

Some critics in reviewing my writings on hysterectomy complain that I make light of the operation; this is contrary to facts. I contend that conservative supra-vaginal hysterectomy is based on sound anatomical principles, and in some instances can be carried out with relative ease and freedom from anxiety by an operator of experience in abdominal surgery. But in many cases, and especially in large cervix-myomata and those which burrow between the layers of the broad ligament, where

their removal is most imperative, the operation is fraught with difficulties and dangers which test the resources of the boldest and most skilled, and are among the most difficult of all surgical enterprises. They well illustrate a surgical proverb in regard to operations—"The greater the necessity, the greater the danger." It is, however, a matter of congratulation that some of the most brilliant operative results of recent years have been won in this field of surgery. In conclusion, it may be stated that two sets of factors have enabled supra-vaginal hysterectomy to vanquish oöphorectomy in the treatment of myomata; they are, *rigid asepsis and perfect hæmostasis.*

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