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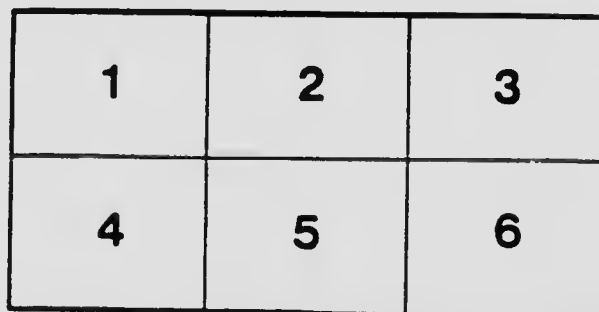
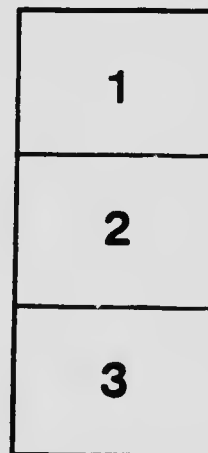
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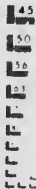
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Uterine Myomata and Their Treatment.

BY

THOMAS S. CULLEN, M.B.,

Associate Professor of Gynaecology in the Johns Hopkins University.

TORONTO :
REPRINTED FROM THE CANADA LANCET.
JULY, 1903.

Uterine Myomata and Their Treatment.*

By THOMAS S. CULLEN, M.B.,
Associate Professor of Gynaecology in the Johns Hopkins University.

Mr. President and Gentlemen:—

I GLADLY accepted your very kind invitation, not only on account of the great honour you have conferred upon me, but also because it gives me the pleasure of once more mingling with my teachers and schoolmates. It carries me back to my earliest glimpses of medicine, and even now I have vague recollections of sitting on the anxious bench nervously awaiting the results of the University and Council examinations.

The subject I have chosen is a familiar one everywhere, but strikingly so in the South where the negro population is greater. In Baltimore, nearly one-tenth of all gynecological cases admitted to our wards have been uterine myomata. Dr. Kelly and I have been analyzing the material of the Johns Hopkins Hospital of the last fourteen years, and during that time considerably more than a thousand cases of myoma have been placed on record. In deciding upon the preferable operative procedure in a given case, it is necessary to bear in mind the different varieties of myomata, their situation and size, the various degenerative processes which they may undergo and the complications that may arise. Furthermore, certain symptoms will also serve as a guide for treatment. In order to make the present paper clearer, permit me to discuss briefly these points. The subject is not new but we are every day adding little by little to our knowledge of it.

From the investigations of others as well as from our own studies, it would appear probable that in the beginning nearly all myomata are interstitial. As they increase in size they may remain so, or on the other hand, may push outward or inward, forming subperitoneal or submucous nodules. The number of myomata present in a uterus may vary greatly. Occasionally only one is present, but more frequently seven or eight, and in not a few instances twenty or more can be counted. Again, these growths usually vary much in size. Thus in a uterus there will often be found a myoma of many pounds' weight, while in its immediate vicinity is another myomatous nodule not larger than a pin-head. As we all know, myomata may occupy any part of the uterus, sometimes being located on the surface of the organ or at other times pushing their way out between the folds of the broad ligament. Again, not infrequently they occupy the entire pelvis, and we find the body of

*Address delivered at the Ontario Medical Association, June 17th, 1903.

the uterus lying on the top of them. These are the cervical myomata which at times are so difficult of removal.

CONDITION OF THE ENDOMETRIUM WHERE SIMPLE UTERINE
MYOMATA EXIST.

As a rule the cervical mucosa is perfectly normal save for the presence of a cervical polyp or some dilated cervical glands. In the body of the uterus, endometritis is occasionally found, but, when present, is almost invariably associated with inflammatory changes in the adnexa. Tuberculosis of the endometrium is occasionally associated with myomata but rarely occurs independently, and is then usually secondary to a similar process in the Fallopian tubes. Of squamous-cell carcinoma of the cervix and adeno-carcinoma of the body of the uterus we shall speak later.

While any of the foregoing conditions may exist, in nearly all instances the changes present are usually entirely mechanical in their nature. If the myomata are subperitoneal or intra-ligamentary the mucosa is usually normal, provided, of course, that the tubes are unaltered. When the nodule impinges on the uterine cavity the mucosa over the most prominent part becomes stretched and thinned out, until eventually there will remain nothing but the surface epithelium covering the nodule. While this atrophy is taking place, the mucosa in the depressions at the sides of the nodules remains unaltered or becomes thicker, this thickening occasionally being due to simple gland hypertrophy. Portions of the mucosa are often mechanically forced out into the cavity, producing polypi. With the distortion of the mucosa the glands sometimes become blocked, and small cystic dilatations are formed.

When the myoma becomes entirely submucous, it is usually covered by a thin layer of mucosa, but in a few instances we have seen a sloughing focus in the myoma opening directly into the uterine cavity.

Now and then a submucous myoma in the posterior wall will blend with a similar nodule in the anterior wall, obliterating the uterine cavity entirely over a limited area. From an examination of a great many specimens we can lay down the general rule that where the Fallopian tubes are normal, and where no sloughing submucous myoma exists the uterine mucosa is perfectly normal. This fact has no little bearing on the operative treatment inasmuch as the condition of the mucosa is an index of how far we may venture in removing a partially submucous myoma by way of the abdomen. Histological studies, then having taught us that the endometrium is usually normal, we can in most instances open up the uterine cavity with little or no danger of infection.

PARASITIC MYOMATA.

With the increase in their size the subperitoneal nodules are continually rubbing against neighboring structures and frequently become attached to them. As a rule they become adherent to the omentum, the omental vessels soon furnishing a part of the blood supply and the original attachment to the uterus becoming less and less, until it is finally lost and the nodule apparently springs from the omentum and from it receives its entire nourishment.

Recently, I operated upon a patient giving a clinical history almost typical of an ovarian cyst, but on opening the abdomen I found a myoma about the size of a foetal head. This was attached to the uterus by a very delicate pedicle, while all the omental vessel plunged into its upper portion and supplied nearly all its nourishment. Associated with this partially parasitic myoma was an accumulation of 52 litres of ascitic fluid.

A few months ago, while performing a hystero-myomectomy, I saw a nodule as large as a base ball situated at the brim of the pelvis. It lay directly over the ureter as the latter crossed the pelvic brim. Its nourishment came from the mesenteric vessels, and it had absolutely no connection with the uterus. This nodule in all probability had originated in the uterus but becoming adherent to the pelvic brim had gradually changed its source of nourishment until eventually all trace of its former attachment was lost.

SIMPLE DEGENERATION IN MYOMATA.

Myomata, no matter where situated, often undergo softening. In the first place the tissue changes in color from the characteristic whitish-pink to a white or yellowish-white. Such areas are sharply circumscribed and occupy a varying portion of the myoma. This whitish tissue gradually disintegrates and the spaces thus resulting are usually filled with a clear serous fluid. Sometimes, however, the material is oily in nature, resembling melted butter. As a result of the continual breaking-down of this altered tissue we have large cavities traversed by delicate trabeculae. On histological examination the degeneration is seen to be hyaline in character, and this hyaline tissue gradually melts or fades away, leaving the spaces filled usually with serum but occasionally with the butter-like material. This latter fluid on histological examination is found to contain large quantities of fat droplets and cholesterol crystals. In these degenerated myomata there is usually not the slightest inflammatory reaction and no evidence of infection. This is fortunate since, if perchance we should accidentally rupture such myoma during its removal, we

should have little to fear if some of its contents escaped into the abdominal cavity.

SUPPURATING MYOMATA.

Occasionally subperitoneal and intra-ligamentary myomata become infected, probably as the result of some degeneration which has permitted the entrance of bacteria. These suppurating myomata have an outer covering of myomatous tissue and are lined internally by granulation tissue. We have seen them containing several litres of pus. In one patient operated upon at the Johns Hopkins Hospital there was a large cavity in a subperitoneal myoma which extended as high as the umbilicus. This cavity communicated freely with the transverse colon, the faeces passing directly from the gut into the abscess cavity.

SLOUGHING SUBMUCOUS MYOMATA.

While the subperitoneal nodules are extending upward and outward the submucous ones are forced more and more into the uterine cavity. Their mucosa becomes thinner and thinner and eventually the dependent portion of the nodule usually undergoes necrosis and sloughing. Sometimes only a small portion of the nodule disintegrates, but occasionally the uterine cavity contains a sloughing nodule fully as large as an adult head.

In one of our cases we found a necrotic interstitial myoma which on its inner side communicated with the uterine cavity. On its outer side it had involved the uterine wall; necrosis had followed, the peritoneum had become involved, and the patient had died of a general purulent peritonitis.

THE TUBES AND OVARIES IN CASES OF MYOMA.

Let us now briefly consider the condition of the tubes and ovaries and also see the effect of the myomatous uterus on the surrounding structures. In the tubes we have noted hydrosalpinx (simple and follicular), hæmosalpinx, tubal pregnancy, salpingitis, tubo-ovarian cysts and adenocarcinoma, secondary to adeno-carcinoma of the ovary. Occasionally the normal tubes may be lost on the surface of the myoma and appear again at a distant point. While any of these conditions may be found simple inflammatory adhesions are the most frequent. In all probability the adherent condition of the tube is due to the mechanical irritation caused by its being rotated and rubbed against surrounding parts.

Numerous pathological conditions of the ovary are also associated with uterine myomata. Thus we have found Graafian follicle cysts, both large and small, corpus luteum cysts, multilocular adenocystomata, dermoids, papillo-cystomata, primary adeno-carcinomata and ovarian abscesses.

see. The ovaries are often embedded in adhesions, usually delicate and fan-like. The inflammatory reaction seems to be chiefly the result of mechanical irritation.

Parovarian cysts are also associated with myomata in a moderate number of cases.

The relation of the *bladder* to the myomatous uterus is also of importance from an operative standpoint. At times it is not at all altered in its position but is often drawn upward and outward, being spread uniformly over the anterior surface of the tumor. In other instances it has early become adherent to the tumor at one point and with the growth of the myoma has been drawn out into a long tongue or funnel-shaped projection. We have seen the bladder drawn fifteen or more centimetres above its normal attachment and in a few instances it has extended upward as far as the umbilicus. The interior of the bladder is rarely, if ever, altered.

If the tumor become incarcerated in the pelvis and pressure symptoms develop the *ureters* are frequently affected. First they dilate, giving rise to a hydronephrosis, sometimes reaching 1.3 cm. or more in diameter. Later on they may become adherent to the myoma and with its continued growth be carried up out of the pelvis. It is exceedingly important to remember this possible displacement when operating. Hydronephrosis of the ureter is occasionally caused by the myoma and hydronephrosis may supervene.

Adhesions between the myomatous organ and the rectum frequently take place, especially where the growth tends to become incarcerated in the pelvis. As the growth rises up, it sometimes takes the rectum with it, making it taut and carrying the upper portion high into the abdomen. As might naturally be expected, the intestines which lie in direct contact with the tumor sometimes become adherent to it. As a rule these adhesions are slight, but at times the intestine is so intimately blended with the growth that it is necessary to sacrifice a portion of the uterine wall in removing the organ. Occasionally kinks in the bowel follow as a result of adhesions and the patient dies of intestinal obstruction. The appendix in many cases has dropped down and become adherent to the tumor or to the right tube and ovary.

ADENOMYOMATA OF THE UTERUS.

We will now consider a variety of myoma which until very recently has received little attention. In these cases we have as a rule a uterus which is moderately enlarged, but which conforms to the normal contour save for some small nodules scattered through-

out its walls or over its surface. On microscopic examination we find that the inner muscular layers of the uterine wall have become coarse in texture and converted into myomatous tissue. Into this coarse-textured tissue the uterine mucosa literally flows. We thus have myomatous tissue with islands and rivers of normal uterine mucosa scattered throughout it. With the gradual growth of the adeno-myoma portions of the mucosa are nipped off and either become submucous adeno-myomata or pass to the outer surface, forming subperitoneal nodules. The islands of mucosa in the myomata still retain their natural menstrual function and hence at each period pour out their quota of menstrual blood. Naturally where the nodule is subperitoneal and the islands are surrounded on all sides by myomatous muscle there is no escape of this flow. It thus accumulates and eventually we have the myomata containing large cyst-like spaces lined by a smooth velvety mucosa and filled with chocolate-colored fluid—the dammed-up, changed menstrual flow. In nearly every instance in which we find a large intra-ligamentary or subperitoneal myoma containing such cyst-like spaces and filled with chocolate-colored contents we may ascribe it to an old adeno-myoma. Adeno-myomata of the uterus were found in nearly two per cent. of our cases. They are benign.

SARCOMATOUS DEGENERATION OF MYOMATA.

Within recent years studies have definitely established the fact that myomata may undergo sarcomatous degeneration. Clinically, patients suffering from such growths usually give a history of several years' duration, during which the growth has either lain dormant or increased very slowly. Suddenly there is renewed activity and in a few months the myoma increases greatly in size and more or less marked signs of cachexia begin to appear. Sarcoma usually develops in one of several myomatous nodules and may be subperitoneal, interstitial or submucous, although it was formerly thought that such growths were always of the last-named variety. If the sarcoma develops in a submucous myoma portions of it may from time to time be expelled through the vagina—the so-called "recurrent fibroids." The sarcoma may develop from one of two sources, the connective tissue or the myomatous muscle cells. If it originates from the stroma the sarcoma may be spindle-celled or round-celled; if from the muscle, it is of the spindle-celled variety. From the drawings which are being passed, any one will be able to convince himself that a sarcoma may develop in the centres of myomata and from the histological pictures it is possible to trace all stages from the normal muscle fibres to those which show the typical ear-marks of sarcoma.

We have had several such cases in our series where the myomata became sarcomatous and in some of them death soon followed from metastases. It is of extreme importance to remember these cases when weighing in our minds the appropriate mode of treatment.

CARCINOMA OF THE UTERUS ASSOCIATED WITH MYOMA.

In my work on Cancer I reported several cases of carcinoma of the uterus occurring in conjunction with myomata, and in the three years intervening since the appearance of the book a goodly number of similar cases have come under my observation. Of course, where squamous-celled carcinoma or adeno-carcinoma of the cervix exists it will as a rule be readily detected before the operation and we will thereby be influenced in our mode of treatment. In the majority of the cases, however, where cancer of the body of the uterus has existed, it has not been suspected until the uterus had been opened after operation. Nor need such ignorance be unpardonable; for in all probability the only suggestive symptom has been haemorrhage, which naturally would be explained as belonging to the myoma. One would hardly deem it necessary or wise to curette when the myoma could be so clearly outlined and considering the fact that the uterus is to be removed in so short a time. Nevertheless, when outlining the treatment one should always bear in mind the possible co-existence of a carcinoma of the body of the uterus and act accordingly.

SYMPTOMS OF MYOMATA.

The clinical features in cases of uterine myomata are mainly dependent on two chief factors. First: The situation of the nodules. Secondly: The size of the tumor. While these growths develop during the child-bearing period, they may not make themselves manifest until late in life. A myoma may be as large as a foetal head and yet give no symptoms whatever and be only accidentally detected. On the other hand, a nodule not larger than a walnut may give rise to alarming haemorrhages. If the myomata are interstitial or subperitoneal and so situated that they do not encroach on the uterine cavity, there will, as a rule, be little bleeding. On the other hand, if the myoma projects into the uterine cavity, thereby putting the mucosa on tension, there will undoubtedly be very free and troublesome haemorrhage. The amount of bleeding is usually in direct proportion to the surface area of the uterine mucosa on tension. We have had patients lose nearly two litres of blood at one time, and in one case I was called in to see the uterine cavity was 24 cm. in length and contained over a litre of decomposing blood-clots.

In the cases in which the myomata encroach on the uterine cavity the patient will usually give a history of prolonged menstrual periods for the last few years and will complain of some backache and often of a feeling of bearing-down pain in the lower abdomen. After suffering from these symptoms for a time she suddenly notices a lump in the lower part of the abdomen. With this increase in size there may be an increased frequency in micturition or retention due to the bladder being jammed up against the symphysis pubis. With the continued growth of the tumor constipation becomes marked and possibly pruritus ani develops, both due to the pressure of the growth on the rectum. Later on the woman suffers from pain and occasionally notices oedema in one or both of the lower extremities. I recently operated upon a patient who had an interstitial myoma about the size of a child's head. The pressure symptoms were such that when lying down she had to be assisted to rise, although, when once on her feet, she had no difficulty in attending to her household duties.

With the continued enlargement of the myoma the abdominal contents will be forced upward against the diaphragm and shortness of breath will naturally follow.

In those cases in which sub-mucous myomata exist, as evidenced by the prolonged menstrual periods or menorrhagia, the hæmorrhage usually increases in amount, and between the periods of bleeding there is a purulent or muco-purulent discharge. In some instances, the sub-mucous myoma is forced more and more into the uterine cavity and after a time projects slightly through the external os. At this time, there is often a loss of substance over the most dependent portion of the tumor. Necrosis of the nodule now readily takes place and we have in addition to the hæmorrhage a continual watery and most offensive vaginal discharge, in odour and appearance often strongly suggesting that common in cancer. The long drain on the patient's resources saps her strength and she becomes sallow or very æmic in appearance and may have irregular elevations of temperature due to the damming-up in the uterus of purulent fluid, or to a septic focus which has meanwhile developed in the Fallopian tubes or in a neighboring myomatous nodule. The hæmoglobin at this stage is often below 30 per cent. There are hæmic heart murmurs, and the patient suffers from giddiness and fainting spells. Under such conditions she is now forced to spend most of her time in bed. Such is frequently the clinical history in the severe cases of myoma. In addition to these symptoms, we must remember those occurring where intestinal obstruction or appendicitis supervene or where the development of ovarian cysts or extra-uterine pregnancy add to the complications.

Vaginal Examination:—While much may be learned from the clinical history, nothing gives such a clear idea as the bi-manual examination. In a simple case, the finger in the vagina finds the cervix to be of normal size, while with the abdominal hand one or more hard nodules are to be felt rising up out of the pelvis, and on making pressure upward from the vagina we are able to determine that the mass is directly continuous with the cervix. This also enables us to determine the mobility of the tumor and also sometimes permits us to say with a fair degree of certainty whether the growth is adherent or not. In not a few instances, we find the cervix jammed up against the symphysis pubis, and the posterior vaginal vault bulging downward due to the choking of the pelvis by the tumor. If the growth be cervical, the cervix has often unfolded itself on the surface of the myoma and is flush with the vaginal vault. In such a case, the external os is often recognized as a semi-lunar slit 2 or 3 cm. in length.

Where a sub-mucous myoma exists, the cervix will often admit the finger, and the nodule can be felt plugging the cervical canal just above the external os. If the myoma has already partially escaped into the vagina, the finger comes immediately in contact with it, and on skirting it backward the cervical lip is felt as a tense band hugging the outer surface of the growth.

Where the myoma is necrotic and has been sloughing for a long time we may find a tough but soft, slimy mass projecting from the vaginal outlet. Such tissue bears a striking resemblance to raw beef that has been macerated in water for some length of time.

Gentleness should always be exercised while making vaginal examinations. In at least two instances on opening the abdomen I have found that during the examination, just prior to the operation, subperitoneal nodules had been torn from their pedicles, and that from the rent there had been free hæmorrhage into the pelvis. In both of these cases several persons had examined the patient and evidently too much force had been used. Where the operation was performed at once, as in these cases, the injury was of little consequence, but should such an accident have occurred during an ordinary routine examination, there would, in all probability, have been a fatal hæmorrhage.

TREATMENT OF UTERINE MYOMATA.

The surgeon's first duty is to remove the growth. The second, equally important, is to sacrifice the reproductive organs as little as possible consistent with safety. Prior to opening the abdomen a catheter should be introduced to determine the confines of the bladder.

If the *viscus* is high up, the abdominal incision should be commenced near the umbilicus and carefully continued toward the pubes. After having entered the peritoneal cavity and carefully packed off the intestine, the operator should examine the tubes and ovaries, and if these are free from adhesions, the question of a simple myomectomy should be considered.

MYOMECTOMY.

Should the tubes be the seat of an inflammation a hysterectomy should be performed, as there is a possibility of infecting the cavities left in the uterus after the removal of the myomata. Several years ago, over enthusiastic for conservatism, I did a myomectomy, after having made artificial fimbriated extremities for both tubes. In a few days there were distinct evidences of infection of the uterus. I again opened the abdomen and drained from above and below. The patient lingered for month and then died. In this case there was in all probability a latent infection lurking in the tubes, although no pus was detected at the time of the primary operation. The operation was a simple one, and had I performed a hysterectomy recovery would, in all probability, have followed.

After satisfying ourselves that the appendages are normal, and that there is no offensive vaginal discharge indicative of a submucous myoma or of carcinoma, we should carefully examine the uterus to see if it be feasible to do a myomectomy. Where the nodules are few in number and situated at accessible points, the uterus should be saved. In a few instances we have removed interstitial myomata larger than an adult head, and yet been able to preserve the uterus. If, however, the uterus is everywhere studded with small or medium-sized myomata, there is a great probability that some would be left behind and a subsequent hysterectomy become necessary.

It is not advisable to do a myomectomy where the nodule situated in the broad ligament or deep down laterally in the pelvis. In these situations it is impossible to obliterate the resultant spaces and blood is bound to accumulate. These difficulties might be overcome by abdominal drainage, but here hysterectomy is preferable. Several years ago I removed a nodule, the size of a small cocoa nut, from the left broad ligament. The lower portion of this nodule extended far down beside the vagina. There was little hemorrhage, and the tissue apparently fell together nicely. In a few days, however, the temperature rose to 104. Shortly after this there was a free discharge of pus from the bladder, and on examination much induration of the left side of the vagina was found. The abscess had opened into the bladder. After several weeks the abscess cavity closed and the patient is now, six years

after operation, in perfect health. A similar case was noted by a colleague of mine; in this instance, however, the bladder was not implicated.

Should we decide on myomectomy, the easiest method of controlling bleeding is by means of a gauze rope applied around the cervix and clamped with artery forceps, thus avoiding the necessity of tying. If the myoma be small, the incision is made directly over it and as soon as the nodule is exposed it is grasped with a meso-forceps and twisted or shelled out. Where the nodule is large and partially sub-peritoneal, a orange-shaped piece of muscle is usually excised with the tumor. Care should be taken not to sacrifice too much muscle, as so much contraction may occur that it will be found almost impossible to bring the margins of the cavity together. After carefully palpating the uterine walls to be sure that no other nodules remain and having turned in the mucosa and sutured with cat-gut, should the uterine cavity have been opened at any point, the various cavities are totally obliterated by cat-gut sutures, three or four rows being used if necessary. It is upon this total obliteration of all dead spaces that the success of the operation depends. Often there is bleeding from the stitch holes on the surface. This is usually controlled by placing one or more cat-gut sutures at right angles to the others.

The operator need not be alarmed if the temperature rise to 100 or even to 102 or 103 a few days after the operation. This we have noted very frequently. In such cases dead spaces have undoubtedly been left behind and there soon occurs a disintegration and absorption of the blood.

One should always remember that myomectomy is a much more dangerous operation than hysterectomy, and if the patient be weak or any other contra-indication exist the complete operation should be chosen. The latter operation is the one of choice after the menopause, myomectomy being applicable during the child-bearing period.

The operator should also bear in mind the possibility of leaving some myomata behind. I recently saw in the dispensary a patient on whom myomectomy had been performed nine years previously. She had been perfectly well for several years, but when admitted to the hospital a second time the uterus was fully five times the normal size and everywhere studded with myomata.

Where the resultant incision in the uterus is long and it is necessary to hold the organ up on account of its large size, intra-abdominal shortening of the round ligaments is preferable to suspension. I am familiar with a case in which, following a myomectomy, the uterine incision became intimately blended with the abdominal wall over a wide area.

Pregnancy followed, Caesarian section was performed and the patient died. Suspension in such a case is an entirely different problem to the simple operation for displacement, as in the latter there is no raw surface whatsoever.

I would strongly advise giving the preference to myomectomy in all suitable cases, but in every doubtful instance hysterectomy should be performed.

HYSTERO-MYOMECTOMY WITH PRESERVATION OF THE OVARIES.

In those cases in which it is deemed safer to perform hysterectomy, if the patient has not passed the menopause, we should endeavor to save the ovaries. In the first place we have no right to remove normal structures, and in the second place preservation of the ovaries will relieve the patient to a great extent, of the troublesome hot flushes and nervous phenomena naturally associated with the menopause. Thus, when the operation is performed on a woman, say thirty-five years of age, these unpleasant phenomena are generally deferred until the usual time for the cessation of menstrual life or for several years at least. We make it a point to preserve one or both ovaries wherever feasible. Spinelli and others are still more conservative, and whenever possible preserve at least the lower segment of the uterine cavity. In other words some of the mucosa from the body is left *in situ* and the menstrual function, although naturally limited, is still preserved. In the near future it seems probable that this plan of treatment will often be adopted.

In performing the ordinary hysterectomy with amputation through the cervix it is always well to remember the blood supply of the pelvic organs. From above downward we have the ovarian artery and veins easily exposed to the outer side of the ovary. Next comes the artery of the round ligament which, although small, often occasions much oozing, if not tied. On freeing the folds of the broad ligament the uterine artery with its accompanying veins is seen skirting the side of the cervix near the internal os. On the opposite side a similar system of vessels is encountered. We may then roughly compare the hysterectomy with amputation at the cervix to an ordinary amputation with four main vessels, the ovarian and uterine on each side.

Where the growth is situated in the body of the organ and the cervix is long, the operation is as a rule quite simple. The round ligaments are first tied and the organ can be lifted still higher out of the abdomen. Portions of the ovarian vessels passing to the uterus are controlled at the uterine horn and the uterus is freed on each side. After opening up the broad ligaments laterally and separating the bladder reflection

anteriorly, the uterine vessels are readily exposed and tied. Many operators employ only cat-gut for the uterine and ovarian arteries. We still feel much safer with silk, and always use it for the larger vessels. After tying the uterine arteries, taking of course good care not to include a ureter in the ligature, we cut through the cervix, encountering little or no bleeding except from the tumor. We usually cup the cervix slightly and then close with cat-gut sutures. Only occasionally is the cautery introduced into the cervical canal. The broad ligaments are then closed with continuous cat-gut sutures, care being taken to cover over the stumps of the appendages. The bladder peritoneum is drawn over to that of the posterior surface of the cervix. The pelvis now presents a perfectly smooth surface, offering little opportunity for the subsequent development of intestinal adhesions.

HYSTERECTOMY WITH REMOVAL OF THE APPENDAGES.

If it has been deemed advisable to remove the ovaries, the operation is carried out in precisely the same manner, save that the ovarian vessels are tied just before they reach the ovary instead of on the uterine side.

While many hysteromyomectomies offer little difficulty, others are by no means so easy. Sometimes the growths are exceedingly large and so distorted that it is at first hard to get one's bearings. Under such circumstances it is always advisable to seek out the round ligaments and sever them at once. This invariably renders the tumor more mobile. The left tube and ovary are then usually tied off and the tumor rolled outward and to the right, as recommended by Dr. Kelly. The uterine vessels on the left side are now controlled and severed, and the cervix is cut across with the upright slant so that the cervical stump, and consequently the uterine vessels left on the right side, will be longer. Clamps are applied to the right ovarian vessels and the entire tumor is removed *en masse*. It is astonishing with what ease an otherwise difficult operation is rendered comparatively simple by this "from left to right" operation of Kelly. Great care must be taken with the ureter and if the operator has the least suspicion that one or both have been injured he should seek each ureter as it crosses the pelvic brim and follow it through the pelvis and carefully outline it to its vesical insertion.

Several months ago I had a very difficult hysteromyomectomy in which the patient was exceedingly anaemic and the vagina was filled with a very vascular submucous myoma. While liberating a subperitoneal nodule adherent to the right pelvic brim, I found it necessary to tie the ovarian vessels. There was only one point at which the vessels could be controlled and that merely wide enough for a single ligature.

After having emptied the pelvis I felt rather uneasy about the right ureter, although no suture had been placed anywhere near the usual ureteral site. As a matter of fact the ureter had been included with the right ovarian vessels. It was released with ease and the patient made a perfect recovery.

Sometimes the ureter is carried up out of the pelvic cavity by large tumors and there is great danger of it being tied or cut. If, after tying the round ligaments and releasing the tube and ovary, the blunt dissection be carried down close to the uterus, the danger is minimized. In some instances it may be necessary to perform a preliminary myomectomy, thus diminishing greatly the size of the uterus and allowing the ureters to drop back into their normal position. The same result may be accomplished by bisection of the uterus.

BISECTION OF THE UTERUS

In not a few instances, on opening the abdomen, the operator is confronted with a very discouraging problem. The pelvis is filled with a nodular tumor glued everywhere to the omentum and intestinal loops or firmly wedged in the pelvis. In some of these cases it is next to impossible to gain a point of cleavage, and were it not for bisection of the uterus the operation would either have to be abandoned or the resultant injury to the intestine from the difficulty in the separation of adhesions would be so great that the chances of the patient's recovery would be minimized. In such difficult cases the uterus is firmly grasped with mesoforceps on each side and the organ is boldly split in the middle. As the incision is increased fresh mesoforceps grasp the uterine walls on either side, and eventually the entire organ is separated into two halves or divided as far as the cervix. We would naturally expect to see injury to the surrounding parts, but by this operation we reach the adhesions from their under surfaces where they are lightest. You would also naturally expect much haemorrhage, but if the uterine halves are kept taut with the mesoforceps little danger from this source is to be feared.

With the uterus now in halves the respective portions are removed entire or amputated through the cervix, the vessels being controlled in reverse order to the usual method, namely, first the uterine, then the round ligament and finally the ovarian vessels. The remainder of the operation is completed in the usual way.

ABDOMINAL HYSTERECTOMY WITH PRELIMINARY AMPUTATION THROUGH THE CERVIX.

In a certain number of cases, in which the adhesions are so great that bisection of the tumor is not feasible, it may be possible

after severing the round ligaments to push down the bladder so that the cervix is exposed. The uterine vessels are then clamped on both sides and the cervix is cut through. The cervix is then drawn strongly forward and Douglas' sac is opened from below. The broad ligaments are then clamped and the tissues cut. The cervix is now drawn still further upward and all the adhesions are gradually separated from the under service. The ovarian vessels are clamped on each side and the tumor is delivered. In these desperate cases all vessels have been clamped and the organ is removed without a ligature having been applied. The vessels are tied with silk and the operation is completed in the usual way.

Where the intestines are densely adhered to the tumor, always sacrifice part of the myoma, or its overlying layer of uterine muscle as the case may be, leaving it attached to the intestines. This raw flap adherent to the gut is now turned in on itself in such a manner that the bleeding is checked and a smooth surface left.

COMPLETE ABDOMINAL HYSTERECTOMY.

While amputation of the cervix is usually preferable, first, because it is easier, and secondly, on account of the remaining portion of the cervix forming a good firm support for the vaginal vault, still in not a few instances the complete operation is clearly indicated. For example, where a large cervical myoma exists there is often no normal cervix left and the growth has so encroached on the vagina that a small cuff of this must also be removed. In these cases, after tying the uterine arteries low down near the ureter it is not very difficult to free the mass on all sides until the vagina is exposed. In every case, however, where there is great danger of injury to the ureters these should be carefully outlined to see that they are intact.*

In all cases in which we suspect co-existent adeno-carcinoma, or the development of sarcoma in a myoma, splitting of the uterus should never be performed, as we run the risk of not only implanting cancer or sarcoma cells upon healthy tissue, but also of setting up a general peritonitis, as in these cases virulent pus organisms are very liable to be present. Knowing that we may at any time encounter malignant growths in the uterus, when we are operating for myoma, I have made it a rule where the uterus has been amputated at the cervix to always have the organ opened at once, so that, if perchance, a malignant growth exists, the cervix may also be removed before the abdomen is closed.

*Doyen's operation where Douglas' sac is opened, the cervix firmly wrapped and drawn backward and upward and then freed from the vagina on all sides and the uterine vessels are clamped and cut, is also a method of complete hysterectomy to be strongly recommended.

TREATMENT OF MYOMA COMPLICATING PREGNANCY.

If pregnancy occurs when the uterus is studded by large and small myomata, which apparently encroach on the uterine cavity to such an extent that they almost preclude the possibility of the pregnancy advancing over a few months, hysterectomy should undoubtedly be performed, irrespective of the ovum. In other cases in which the myoma is cervical, and so plugs the pelvis that labor through the normal passages is impossible, the question should be laid squarely before the family, and the alternative of complete hysterectomy at once, or Cæsarian section at term, followed by hysterectomy at a later period discussed. The uterus might possibly be removed immediately after the Cæsarian section, but the parts are so vascular in the pelvic floor, and a large cervical myoma is often so difficult of removal that no fixed rule can be laid down, and the surgeon must use his own discretion in the individual case. Recently I saw a patient who was eight months' pregnant, who had a myoma as large as a child's head, situated in the anterior uterine wall. Three surgeons were sure that Cæsarian section would be necessary; two considered normal labor possible. All preparation was made for operative interference, but the patient fortunately had a normal labor.

TREATMENT OF SUBMUCOUS MYOMATA.

Where the submucous myoma is small, and situated far up in the body and no discharge exists, it will often be advisable to open the abdomen, split the uterus and remove the nodule sewing up the rent in the uterine mucosa, and then uniting the muscle. If the myoma projects through the cervix where it can be grasped, it is often possible to bring it down, and we can control the pedicle by two or three cat-gut sutures. If it be impracticable to reach the pedicle, the cervix may be split anteriorly until the necessary exposure is obtained. If the nodule is very large and fills the vagina, delivery by obstetrical forceps is at times feasible; but as a preliminary measure it may be necessary to incise the peritoneum to obtain the requisite space.

In a recent case the vagina was completely filled by the growth and the hæmorrhages had been very profuse and frequent. I endeavored to build up the patient but without success. We waited until within a few days of the next period so that she might rally somewhat. On attempting to wash up the vagina the hæmorrhage was alarming. I accordingly desisted and opened the abdomen at once, fearing that any more vaginal interference until the uterine vessels were tied would render her pulse-

less. After all the blood supply had been cut off, the nodule was readily drawn up through the abdominal incision with the accompanying multinodular myomatous uterus.

Where a sloughing submucous myoma exists, the utmost care is necessary. If there be little bleeding, it will be safe to delay operation a few days and frequent douches of a 1 or 2% formalin solution should be given. Where there are no other myomatous nodules and where the offensive discharge has ceased the myoma may be treated as a simple submucous nodule and removed. If, however, the uterus be large and studded with other growths, the cervical lips may be sewn together, the vaginal portion of the growth having been removed some days previous. The vagina is then thoroughly doused with a 2% formalin solution and bichloride and complete abdominal hysterectomy performed. Unless the chances of infection from the uterine cavity be reduced to a minimum, the probability of general peritonitis is great.

WHEN NOT TO OPERATE IN CASES OF UTERINE MYOMATA.

It is only after studying many cases and following, as it were, their life history that we can get the true perspective and determine with any degree of accuracy when to operate, or in what cases it would be better surgery to refrain from interference. This is especially the case when considering the treatment of uterine myomata. We all know of patients who have had myomata for many years and yet suffered no inconvenience whatever. Others have experienced some trouble, but not sufficient to interfere with their daily work. Judging from these cases alone we would naturally infer that no operation would be necessary unless the myoma attained very large proportions. From our work on the subject, however, we find that unpleasant consequences may follow ultra-conservative treatment. In the first place we have seen that uterine haemorrhages often become profuse and frequent, occasionally amounting to from 1 to 2 litres at a time. Then again the general health gradually yields under the constant loss of blood. After a time pressure symptoms not infrequently develop, accompanied by gradual interference with locomotion. Again, we have to bear in mind that these growths may be so situated as to effectively prevent a normal labor. With the formation of adhesions there is some danger of intestinal obstruction and an operation, where such a complication exists, is most unpromising. Finally, we must remember that in fully 1 per cent. of the cases sarcomatous degeneration of the myomata occurs,* and in another 1 per cent. carcinoma

* This is a very conservative estimate as some have noted it in 2 per cent.

complicates myoma; so that in practically 2 per cent. of all uterine myomata a malignant growth also develops at one period or another.

The Operative Results in Myoma Cases. It is not many years since the mortality in simple myoma cases was excessive. To attempt removal of a large and adherent myomatous uterus was rarely undertaken. But during the last decade the technique has been so perfected that in some clinics the mortality in simple cases is not over 3 per cent., and in Naples last fall, Professor Spinelli informed me that he had just operated upon 100 cases with a mortality of not over 1 per cent.

With such advances in surgery, bringing with them so marked a decrease in the mortality of these cases, have we the right to advise against operative interference with the possibility of hæmorrhage, loss of health, pressure symptoms, septic infections, intestinal obstructions staring us in the face and even the remote likelihood of sarcomatous degeneration or of carcinoma? And this is not all. When giving our verdict in this or that case, it is on the assumption that our diagnosis has been correct. Unfortunately, we are not infallible. Less than seven weeks ago, I saw in consultation a patient complaining of slight hæmorrhage and with a uterus about twice the natural size, rather firm and feeling exactly like a small uterus containing a nodule the size of a small apple. To clinch the diagnosis were two small nodules, each about 2 cm. in diameter, one on the posterior surface of the uterus, the other at the right cornu. She asked if it were cancer and I informed her that it was without doubt a myoma. On account of bleeding, I advised hysterectomy, and to my surprise the growth proved to be an adeno-carcinoma of the body of the uterus, while the two supposed small myomata were situated at points at which the cancer had extended entirely through the uterine walls, forming secondary growths on the surface of the organ. They were already adherent to the small intestines. With my eyes closed, and that uterus in my hand, I should undoubtedly have diagnosed the case as one of myoma.

Nor are these cases by any means rare. I removed a uterus, the size of a four-months' pregnancy, two years ago and to my surprise on opening it I found it the seat of an extensive nodular carcinoma, no myoma being present. Two weeks ago one of my colleagues removed a uterus about the size of a four-months' pregnancy. Pregnancy, however, was absolutely excluded and the specimen was sent to the laboratory with the supposition that the growth was a myoma. On opening the organ, we found a cancer just above the internal os. This had blocked the cervical canal, and the uterus was distended by fully 500 cc. of blood. On three different occasions I have opened the abdomen expecting to find

myomata. In each the history was absolutely against pregnancy, but upon this we cannot rely in the majority of the colored race. In each of the three I carefully made an incision until the nodule was detected and then did a hysterectomy. These are but a few instances of the difficulties that arise in making an absolute diagnosis in cases in which myomata are suspected.

After a careful study of many cases and finding that the operative mortality is as low as, or even lower than that which follows where patients are not subjected to operation, I feel that the only patients that should be advised against operation are those who exhibit no symptoms or where the myomata are very small and give rise to little or no trouble.

I am afraid my remarks have been too lengthy, but the subject is a very important one and merits, I feel, all the time you have so kindly allowed me to occupy.

