

VAGINAL HYSTERECTOMY

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As early as the fifth century, operations which might be interpreted as vaginal hysterectomies were performed at intervals. Those operations and a few which followed are, however, more of historical interest than of surgical importance.

In the latter part of the nineteenth century, vaginal hysterectomy received sporadic attention, but not until the past decade did it gain any degree of popularity. In some quarters the pendulum may have swung blindly towards this operation, in that it has come to be recommended for the treatment of a wide range of pelvic symptoms, regardless of their cause.

In the first place, vaginal hysterectomy should be undertaken only by those who are thoroughly familiar with pelvic lesions and all their ramifications, and who possess, in addition, a thorough working knowledge of the anatomy, topography and so-called dynamics of the female pelvis. Moreover, upon contemplating a vaginal hysterectomy, the surgeon should assess his own dexterity and take cognisance of his limitations; further he cannot afford to overlook the efficiency of his assistants and the circumstances under which he is operating.

Before proceeding with a vaginal hysterectomy, it is essential that other lesions within the pelvis (and it is unfortunate that pelvic lesions rarely exist singly), be excluded. If unrecognised pelvic inflammatory disease or endometriosis exists, or if these lesions are recognised but their extent minimised by the operator, the difficulties encountered may, from a technical standpoint, be unsurmountable. In short, one should satisfy oneself that the pelvic organs are mobile before attempting the operation. In large centres, some 30 per cent. of patients referred to the gynæcological clinic have had previously some form of lower abdomen operation, in which case, the adnexa, if not the uterus, are frequently involved in dense adhesions. Whether the peritoneal cavity be opened through a vaginal or an abdominal approach, it is imperative that at the conclusion of the operation the peritoneum be left intact. It is quite apparent that where there is much destruction of peritoneum from adhesions, inflammation or other causes, reperitonealisation by the vaginal route will be difficult, unsatisfactory, and even impossible.

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While at first glance it would seem superfluous and indeed absurd to explore the uterus prior to vaginal hysterectomy, it is nevertheless the first step in the operation. The finding of tissue on curettage which (on gross inspection) is suggestive of malignancy, obviously should alter one's plan of attack. In order to prevent embarrassment it is considered wise that the surgeon prepare his patient psychologically for such an eventuality. If carcinoma is found in the fundus, the lesion should first be treated according to the currently accepted formulæ. Whether or not repair of the damaged birth canal be undertaken simultaneously with the introduction of radium is a matter of personal preference, but it is only reasonable that since the damage has existed for years, temporary postponement of repair should not be considered important. In most clinics, following radiation for the treatment of carcinoma of the fundus, it is recommended that the pelvic organs be entirely removed by the abdominal route, at which time the damaged birth canal may be conveniently repaired.

If a uterine tumour fills the pelvis, or for that matter is as large or larger than the foetal head, it is apparent that apart from the mechanical difficulties involved in delivering such a uterus, one may unexpectedly encounter an associated lesion. Morcellation to facilitate the delivery of a large tumour, as practised by certain operators, is not a sound surgical procedure.

Moreover, in dealing vaginally with relatively large benign tumours, in addition to the mechanical difficulties encountered, there is to be considered the increased operating time, the amount of tissue traumatised, the blood loss, the shock, the ever-present danger of overlooking an associated lesion and the more than probable possibility of completely deperitonealising the pelvic basin. Any one of these, or a combination of several, may seriously jeopardise the patient's life or her subsequent well-being. It should therefore be *axiomatic* that no attempt be made to remove per vaginam a uterus which is larger than an eight weeks' pregnancy, a fixed uterus, or one with associated pathological lesions palpable in the pelvis or fixed adnexa. Only one with very broad experience should make exceptions to this rule.

Notwithstanding such manifest disadvantages and limitations as the aforementioned, there yet remains a very considerable proportion of gynæcological patients, in the surgical treatment of whose disability vaginal hysterectomy would seem to be the operation of choice. The following are the more common conditions for which vaginal hysterectomy may be considered :—

1. Procidencia.
2. As part of the technique for repair of enterocele.
3. Lesions of the cervix other than those proven to be carcinomatous.
4. Lesions of the uterus other than malignancy or those mentioned in the previous paragraphs.

In the selection of an operation for the reduction and cure of a sacropubic hernia, the factors possibly predisposing to such a condition should be borne in mind. It is therefore not inappropriate at this point to remind oneself of the common causes of procidentia, *i.e.* :—

1. Secondary :—

- (a) over stretching of the so-called pelvic ligaments (birth trauma),
- (b) Congenital enterocele.

2. Weakness in the musculature :—

- (a) inherent,
- (b) subsequent to prolonged systemic infection,
- (c) from debilitating diseases such as :—
 - (i) diabetes,
 - (ii) pernicious anæmia.

3. Congenital defects in recto-vaginal septum.

4. Disturbed innervation, *e.g.* spinal cord lesion from pernicious anæmia, lues, etc.

With the isthmus of the uterus at normal level, the practice of amputating a greatly hypertrophied or deeply lacerated cervix coincidentally with the repair of the birth canal is indisputably sound. Manifestly, however, one must be confident that such a cervix and that portion of the uterus above the internal os are free from malignancy.

The current practice, however, of amputating the cervix and involuting the mucous membrane as part of the repair, in many instances leaves much to be desired. Experience has demonstrated that too frequently the inverted mucous membrane does not "take" over the entire crater. Small pouches are consequently formed, which becoming filled with mucus, blood and debris, are in effect veritable cesspools. The symptoms then are those of an intermittent mal-odorous vaginal discharge and from the cellulitis (fortunately of low grade) the patient constantly complains of a burning or throbbing in the pelvis, as well as a general lack of well-being. As an alternative to such a procedure the cervix can be amputated with the actual cautery.

After protecting the vagina with retractors the cervix is drawn down firmly when amputation is gradually effected by encircling the cervix with the actual cautery kept at low temperature. The resulting amputation is crater like and within some three to four weeks following the separation of the slough the area becomes completely epitheliated.

It cannot be denied that there is a very considerable merit in those operations primarily designed for the cure of procidentia which include amputation of the cervix, but if the cul-de-sac is not occluded and the

utero-sacral ligaments not utilised to the fullest advantage, too frequently the patient does not experience complete relief from her symptoms. Further it is well to bear in mind that when the individual is past the child-bearing period that portion of the uterus above the internal os, in addition to being relatively inert, in too many instances serves no other purpose than that of a potential menace.

Patients with the debilitating deformity of procidentia must, in the first instance, be carefully assessed and any surgical plan of attack weighed with mature judgment. Various types of operation have been devised but unfortunately the results have been frequently disappointing. With vaginal hysterectomy, as with any other undertaking aiming at reconstruction, one's goal should be primarily one that will ensure the well-being of the patient.

In a patient in the fourth decade with a living family, who has such a degree of birth trauma that the cervix protrudes into or through the vaginal orifice, the type of operation best suited is a controversial point. Most authorities are at present leaning towards the opinion that repair of the vagina, under such circumstances, might well include vaginal hysterectomy.

While, therefore, the removal of the uterus is elective, there is still a large group for which vaginal hysterectomy is particularly designed. In those mothers in the fourth decade, who, in addition to suffering from damage to the birth canal, present a cystic, deeply-lacerated, everted granular cervix from which, in many instances, a polyp protrudes, the uterus should be regarded as a potential menace rather than as of future use. In the interest of the patient's health, it is therefore much wiser to remove the uterus than to amputate the cervix and blindly disregard the wisdom of extirpation.

Fortunately an enterocele of distressing proportion is infrequently encountered in the child-bearing period in those whose pelvic anatomy is otherwise normal. On the other hand in those past the menopause, coincident with general muscular regressive changes, even in the absence of any marked degree of descensus uteri, a symptomless enterocele can frequently be demonstrated. Further in over 90 per cent. of cases with procidentia, there is an associated enterocele of varying degrees.

An enterocele due primarily to a congenital defect in the recto-vaginal septum, or one which is secondary to procidentia, is in effect a hernia. In its repair, therefore, the surgical principles involved in herniotomy must be observed. Simple repair of an enterocele, while giving satisfactory anatomical results, does not altogether ensure the subsequent comfort of the patient.

By removal of the uterus incidental to the surgical repair of an enterocele, the structures necessary for such repair are made definitely more accessible. Further the symptoms of pressure on the rectum of a scarred tissue mass which too frequently follow the simpler repair of this type of hernia are thus obviated. A very considerable experience

has made it quite apparent that the incidence of recurrence of such a hernia, and the subsequent comfort of the patient following vaginal hysterectomy with obliteration of the hernial sac, justifies the procedure.

Often in addition to a damaged birth canal, there is a history of irregular uterine bleeding, the investigation of which may reveal a uterine polypus or polypi, hyperplasia of the endometrium, or small submucosal leiomyomata. Here it would seem that the removal of the uterus vaginally at the time of repair is preferable to the alternate double procedure of repair of the birth canal and abdominal hysterectomy, or the less advisable combination of intra-uterine radium and repair.

In the absence of any detectable lesion in the urinary tract, the symptom of so-called stress incontinence is probably too frequently attributed to damage to the support of the pelvic urinary apparatus. An extreme degree of birth trauma may be present without such a symptom, indeed it is worthy of note that stress incontinence relatively rarely accompanies procidentia. On the other hand it is not infrequently encountered in the absence of any defect in the supporting mechanism of the pelvic viscera, and in such circumstances one must look further afield for an explanation.

Following an intra-abdominal operation (particularly a sub-total hysterectomy) the bowel on occasions becomes adherent in the vicinity of the bladder when urinary incontinence, similar to that experienced in diverticulitis, is not infrequently observed. Obviously under such circumstances the pathological arrangement of the abdominal viscera are responsible for the symptom of stress incontinence, rather than a defect in the urethral or bladder supports.

By a somewhat similar mechanism an extremely pendulous abdomen may embarrass the control of the bladder. When arranged under a tightly fitting supporting garment, the fatty tumour is capable of pressing on the bladder. Under such circumstances the deformity of the anterior abdominal wall should receive attention, either by discontinuing the practice of dress or by surgical removal of such an overhanging lipoma.

The foregoing are but examples of the many conditions, the mechanics of which irrespective of the degree of birth trauma, may give rise to distressing urinary symptoms.

PREPARATION.—Both local and systemic factors must be considered in the patient's preparation. Just as a great deal of the success of any operation depends upon operating on relatively healthy tissue in as clear a field as can be prepared, so the safety of the procedure depends upon a careful pre-operative regimen directed towards improving the patient's general health. To quote Lord Moynihan: "We have made surgery safe for the patient, we must now make the patient safe for surgery."

All patients over fifty years of age, together with those under fifty years of age giving any history of cardio-vascular symptoms, should have an electro-cardiogram pre-operatively, if for no other reason than for the purpose of record.

The sugar tolerance curve should be established for it has been found that a sizable number of those patients with damage of the vaginal supports have a reduced sugar tolerance. When such is the case, healing is retarded and complications increased, unless this reduced tolerance is combated pre-operatively.

Similarly by a pre-operative knowledge of prothrombin time the incidence of thrombo-phlebitis may be reduced. The timely administration of heparin and dicoumarol post-operatively, as indicated by prothrombin time, should go far to avert the calamitous embolism.

Patients showing more than eight white blood cells per high power field in a catheter specimen of urine should receive appropriate amounts of sulfonamides pre-operatively in the hope that the causative organisms are sulfonamide sensitive. As previously mentioned the underlying cause of urinary symptoms may be remote. A cord lesion giving rise to symptoms of the urinary tract may be the initial manifestation of pernicious anæmia and not infrequently preceding the characteristic blood picture of the disease. As the ureters are so frequently embarrassed in procidentia, in addition to blood urea estimations, it is considered prudent to visualise directly or indirectly the entire urinary tract.

Upon completion of the clinical and laboratory investigation, the patient should be given three or four days "pre-operative convalescence." During this time, fluids, fruit juices and milk are liberally given, rest is induced by sedation, and debilitated patients are given intravenous proteins for at least twenty-four hours prior to operation.

The preparation of the operative field also demands attention. As senile vaginitis is most inimical to primary healing either from tissue changes or infection, an œstrogen preparation should be given by mouth in moderate dosage. Excessive œstrogen therapy will, however, produce a very friable and hyperæmic mucosa which may present considerable difficulty in suturing. If this effect is produced, as judged by its hyperæmic appearance, the operation should be delayed until the mucosa has returned to a more normal state.

During the pre-operative period, lactic acid douches, one drachm to the pint, seem to improve the state of the operative field and reduce the number of pathogens present. If the mucosa is thick and of the consistency of pachydermia, or there are decubitus ulcers, the prolapse should be reduced and supported by tampons; these are removed daily and reintroduced after douching.

While in most centres the operation of total hysterectomy has wisely replaced that of sub-total, or incomplete hysterectomy, the neglected cervical stump is still common. This may fall heir to all the diseases

of the cervix in the intact uterus. The vaginal operation for removal of a non-malignant unhealthy stump is essentially the same as that for removal of the entire organ.

It not infrequently happens that inversion of the vagina occurs subsequent to incomplete, complete, or vaginal hysterectomy. Here, apart from actually removing the uterus, repair of such a hernia is satisfactorily accomplished by adopting the same technique as that employed in repair of an enterocele associated with procidentia.

There are three accepted methods for removal of the uterus vaginally. The principles involved in these are :—

1. The base of the broad ligament (so-called cardinal ligaments) are employed to support the pelvic basin.
2. In the clamp method (Kennedy and Price), the cicatrix, following the removal of the clamps, forms a dense keystone of scar tissue, which prevents subsequent prolapse.
3. The utero-sacral ligaments are so sutured into the pubo-cervical fascia as to form a continuous fascial plain extending from the pubis to the sacrum.

The main features in the technique of the latter are :—

1. That the hernial sac should be shortened and securely closed.
2. That all ligated vessels be exteriorised.
3. That the utero-sacral ligaments be isolated and fixed into the pubo-cervical fascia.

TECHNIQUE.—After preparation of the field of operation, the cervix is firmly grasped with a double-toothed teneculum and drawn downward. An Allis forceps may be attached to the mucosa immediately posterior to the urethral orifice. With a sharp knife a racquet-shaped incision is made in the mucosa, extending from the urethra and surrounding the cervix. To minimise hæmorrhage the opening thus outlined should be only of sufficient size to permit the delivery of the uterus.

Having incised the mucous membrane, the cervix is drawn forward and upward. The mucous membrane in the posterior fornix is now pushed upward for a distance of approximately one inch so that the base of the broad ligament becomes clearly visible, the utero-sacral ligaments standing in relief.

The racquet-shaped flap of the mucous membrane of the anterior vaginal well is freed at its upper end and grasped with a gland forceps. Usually by gentle downward traction the mucous membrane may be readily separated from the base of the bladder. Occasionally, however, it is necessary to employ dissection to obtain the proper line of cleavage between the mucosa and the cellular tissue supporting the base of the bladder. If one encounters scar in this area (particularly the type

following previous operation), the dissection should be most cautiously performed and a great deal of care exercised, so that the bladder wall which not infrequently is involved in such scar may not be torn. All bleeding points should be ligated.

The forceps attached to the flap of the anterior vaginal wall along with the tenaculum to the cervix are firmly held in the left hand. With a small abdominal sponge over the thumb of the right hand, the base of the bladder can be readily pushed upward. If it is not readily freed, the adhesions may be snipped with the scissors, after which the bladder can be pushed well up on the anterior wall of the uterus. Great care should be taken in this step of dissection, as not infrequently a small diverticulum of the bladder is present which may easily be cut or torn across.

The cervix is now drawn well forward by an assistant. With dissecting forceps held in the left hand the submucosal tissue in the posterior fornix is firmly grasped and incised with scissors. The lower end of the cul-de-sac is now opened. Occasionally the cul-de-sac is not readily accessible, as the reflection of the peritoneum of the posterior wall of the uterus may be at a relatively high level. When the cul-de-sac is opened, the scissors are inserted and opened to enlarge the opening, as in Hilton's method.

A small abdominal sponge with a tape attached is then inserted into the cul-de-sac. The sponge, having been first immersed in an aqueous solution of acriflavine, is wrung out before insertion. The function of the sponge is twofold :—

1. It prevents soiling of the pouch of Douglas ; it absorbs blood which may enter the cul-de-sac.
2. It prevents the bowel or omentum from gravitating into the field of operation.

With the cervix drawn downward and to the left, the index finger of the left hand is inserted through the opening in the cul-de-sac and passed along the posterior aspect of the utero-sacral ligament. The utero-sacral ligament can be readily identified when put on the stretch. At this point, so as not to grasp the ureter with the clamp, the cellular tissue in the region of the uterine artery should be further pushed upward.

Having applied a Wertheim clamp to the utero-sacral ligaments on each side and cut between them and the cervix, more of the broad ligament is put on the stretch with the index finger of the left hand in order to bring each uterine artery into view ; these as well as the broad ligaments on each side are clamped by one or two Wertheim clamps and divided from the uterus.

To deliver the fundus of the uterus, the index finger of the left hand is passed behind the uterus, putting the uterovesical fold of the peritoneum on the stretch. This fold is then incised, and the fundus

of the uterus is delivered through the incision and grasped with a "bulldog tenaculum." The left round ligament, utero-ovarian ligament and fallopian tube now brought into view, are clamped with Mayo-Kocher clamps and divided from the uterus. (It has been found that these clamps, being relatively straight, are more suitable for clamping the upper portion of the broad ligament than the Wertheim clamp.)

The uterus is now carried to the left, the right broad ligament is put on the stretch, secured with two or three similar clamps, and divided, thus freeing the uterus completely.

Following the removal of the uterus all bleeding points are ligated separately and clamps removed. The sutures affixed to the utero-sacral ligaments are held and not cut.

By grasping the peritoneum with Allis forceps, the cul-de-sac can be adequately exposed. A purse-string suture is then inserted into the peritoneum, care being taken not to injure or incorporate the ureter by taking a deep bite with the needle.

The purse string suture should be inserted as high in the cul-de-sac as possible and tightened as the taped gauze in the cul-de-sac is gradually being withdrawn. The peritoneal cavity is now completely occluded while the end of all severed vessels lie extraperitoneally. The free ends of this purse string suture are held, to be later employed.

At this point the redundant portion of the peritoneum may be resected.

The abdominal cavity having been occluded, the mucous membrane of the anterior vaginal wall is then grasped and held with a series of Allis forceps or lung clamps. With gauze over the index finger, the mucosa is further separated from the underlying tissue.

Since the blood supply becomes more abundant as one approaches the pubic arch, by thus delaying the complete separation of the mucosa, embarrassing bleeding is obviated. This step in the technique ensures a relatively dry field until after the uterus is removed and the peritoneal cavity closed.

On a fistula needle the sutures previously ligated to the utero-sacral ligaments are fixed into the pubocervical fascia at its junction with the anterior portion of the urogenital diaphragm. By this arrangement the bladder is properly supported on a platform formed by the pubocervical fascia and utero-sacral ligaments.

The purse-string ligature occluding the cul-de-sac is brought around the lateral sides of the utero-sacral ligaments and tied. By so doing, the potential dead space between the peritoneum and the new pelvic floor is obliterated. At the same time, the two utero-sacral ligaments are firmly brought together. These ligaments may be further drawn together by two or three interrupted sutures. To prevent a hernia in the vault, it is important that there should not be a large hiatus anterior to the rectum.

The redundant mucosa of the anterior vaginal wall is now put on the stretch and resected with the scissors. Sufficient tissue should be left to ensure against tension on the closing sutures.

Closure is made in the anterior vaginal wall by four or five interrupted sutures in the pubo-cervical fascia. Some eight or nine sutures of No. 00 plain catgut are employed in approximating the mucosa.

In the repair of the posterior vaginal wall, the vagina is grasped with an Allis forceps on either side at the junction of the scar with the mucous membrane. A third Allis forceps grasps the skin immediately anterior to the anal ring. The incision, it will be noted, is not transverse but rather V-shaped. Such an incision prevents a redundancy of the perineum. The edge of the mucosa flap to be removed is grasped with gland forceps and elevated. The rectum is gently separated from the mucosa of the posterior wall by gauze dissection. Rarely is sharp dissection required for this step in the operation.

The mucosa of the posterior vaginal wall having been freed from the rectum to the upper limits of the apparent rectocele, a V-shaped portion is outlined and two crushing clamps applied. With a sharp knife the mucosa is resected along the lateral side of the clamps. By this method of resecting the mucosa of the posterior wall, the flap is accurately and regularly mapped out, and the edges are cut. When a scissors is used, the edges are more or less crushed and union is not so satisfactory.

The perirectal cellular tissue is then approximated with a series of interrupted catgut sutures, while the separated levator ani is drawn together by three interrupted sutures.

In order to retain the normal topography of the perineum, it is essential that the sphincter vaginae be attached to the sphincter ani externus, by a subcutaneous suture. Otherwise, the sphincter vaginae will eventually draw the skin of the perineum forward, partially barring the vaginal orifice, while the sphincter ani, if not firmly fixed to the sphincter vaginae anteriorly, will tend to be drawn backward, causing a distressing deformity of the perineum—the so-called “sacral anus.”

At the conclusion of the operation, the vagina is packed with emulsion gauze and an indwelling catheter inserted into the bladder.

The packing is removed at the end of a twenty-four-hour period, while the catheter is not disturbed (other than releasing the clamp every four hours), until the fourth day.

COMPLICATIONS.—If the patient is thoroughly investigated pre-operatively the complications following vaginal hysterectomy should be neither frequent nor serious.

There are, however, certain post-operative complications peculiar to vaginal hysterectomy. These may be attributed to many factors.

In the first instance, the bladder in procidentia ordinarily is not enlarged from urethral obstruction, but rather from atony. The tone

in such a bladder can be re-established by the use of an indwelling catheter or, in refractory cases, a so-called tidal drain.

One, too, must not lose sight of the fact that as a result of the operation, the innervation of the bladder has been insulted either from laceration of the nerve supply at the time of operation, or from subsequent œdema.

The catheter ordinarily is removed on the third post-operative day. Thereafter, the patient should be catheterised every six hours immediately following voiding. If after the sixth day, the patient is unable to void and there is still a considerable residual urine, 1½ fluid ounces of "mercurochrome" instilled into the bladder has been found to be particularly effective in encouraging voiding. When the residuum after voiding has diminished to approximately 30 c.c., it may be considered that the bladder needs no further attention.

Abscess of the vaginal vault is fairly common, but again frequently avoidable. It occurs most often in patients with senile vaginitis and in those who have not received pre-operative attention.

Persistent leucorrhœa in the absence of granulation in the vaginal vault is suggestive of a peritoneal fistula. If at the time of the operation the distal end of the fallopian tube, or a fragment of omentum is caught in the purse-string occluding the cul-de-sac, such a fistula may result.

The vagina is shortened only in those cases where at the time of operation the recto-vaginal septum has been found wanting.

Atresia of the vagina is to some extent avoidable. It occurs most commonly in those in whom menopausal symptoms have not subsided; at this point, contractures are very more apt to occur than in those in a younger or older age group.

In a relatively large series of vaginal hysterectomies performed, incidental to the surgical relief of procidentia, subsequent herniation of the vaginal vault occurred in less than one per cent. These, no doubt, resulted from failure adequately to occlude the hiatus bounded anteriorly by the junction of the two utero-sacral ligaments and posteriorly by the rectum.

In a certain proportion in the advanced age group, reduction of the hernia and re-establishment of bladder and rectal support should be the primary object of the operation, while reconstruction of the vaginal canal is of secondary importance.

We, therefore, must appraise our results not only on the permanency of reconstruction, but also on the subsequent well-being of the patient.

In gynæcological surgery, and more particularly in vaginal surgery, one is more and more forced to appreciate the interdependence of the various branches of medical science. A fair understanding of these is necessary in order to obviate the failures which too frequently follow vaginal surgery.

Briefly, one's views on vaginal hysterectomy are that if in the absence of a damaged birth canal, extirpation of the uterus is indicated,

its removal per vaginam is not a simple procedure and, in general, should not be considered. On the other hand, if there is any marked degree of procidentia, providing there is no lesion in the pelvis and the uterus is not unduly large, a most satisfactory result can be obtained by the combined operation of vaginal hysterectomy and vaginal reconstruction. The prolonged cul-de-sac which accompanies the displacement, can be occluded and those structures necessary in the reconstruction of the pelvic basin and the vaginal canal made more accessible.