

TOTAL ABDOMINAL HYSTERECTOMY FOR BENIGN CONDITIONS

SOME TECHNICAL CONSIDERATIONS

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With increasing safety abdominal hysterectomy has become a common operation and much has been written on the technique, but few writers have pointed out that there can be no stereotyped procedure for this operation. Each describes his own favourite method and nearly all fail to indicate that no single method is suitable in every case.

Experience has shown that the technique used must be adapted to the pathological and anatomical variations encountered when the abdomen is opened. For example, the uterus may be symmetrically enlarged, enlarged and deformed, abnormally mobile owing to childbearing, or abnormally fixed owing to sepsis or endometriosis. It may also be deformed by degrees of supravaginal or vaginal elongation of the cervix. Indeed, it is probably fair to say that the uterus of normal size and mobility to which most text-book descriptions of technique apply, forms a minority of the cases presenting for total abdominal hysterectomy.

Therefore, I would suggest that potential operators should be taught a number of techniques suited to the varying conditions commonly encountered, and since such descriptions are not usually found in the standard text-books, a brief transcript may not be out of place. It is not my object to give a full account of the technique of abdominal hysterectomy, but only to describe in detail where the standard techniques must be modified to suit the varying circumstances mentioned above.

A surgeon takes many years to work out his own particular methods and this experience, plus the opportunity of observing many skilled operators at work, has enabled me to select what I consider the best suited way to deal with certain conditions.

NO. 1 TECHNIQUE

I shall call this the 'single-clamp method', indicating that, after the upper part of the broad ligament is divided and the bladder stripped down in the usual manner, one clamp only is used on the side of the uterus. Special care must be taken to depress the bladder at the vaginal angles, and here some venous bleeding may occur. This can be ignored since it is controlled as soon as the uterine clamps are applied. The bladder is stripped down until at least half-an-inch of vaginal wall is exposed, recognized by the vertical striations of the fascia and muscle fibres. The peritoneum of the broad ligament is stripped down at the sides of the uterus and, if necessary, the posterior layer is divided with scissors as far as the utero-sacral ligament. A strong pair of forceps with two-inch blades is now applied to the side of the uterus. The forceps used should have Kocher's tips and vertical grooves and may be straight

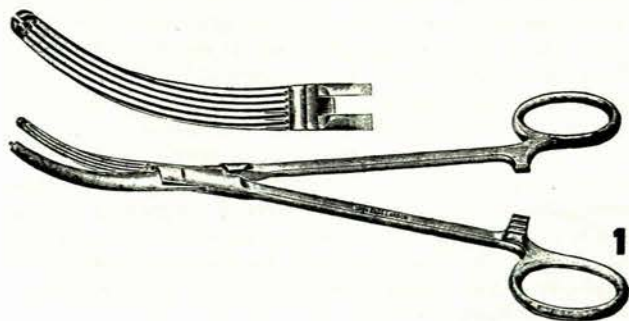


Fig. 1. Gwillim's hysterectomy forceps. (Illustration from Downe's catalogue.)

or slightly curved. The hysterectomy forceps devised by Gwillim are ideal (Fig. 1). They are applied by the following manoeuvre:

The bladder is retracted down at the vaginal angle with a narrow, straight retractor of the Langdon type. The surgeon, now controlling the uterus with the clamps on its upper part held in his left hand, pulls it to the opposite side and towards the patient's head. I prefer to apply the forceps with the convex side towards the uterus. With the forceps held in his right hand and the blades widely opened, the surgeon engages the tip of the anterior blade in the paracervical tissues as close to the uterus as possible, one centimetre above the bladder reflection. He now rotates the uterus into the blades of the forceps, and the posterior blade closes over the utero-sacral ligament where it joins the uterus (Fig. 2).

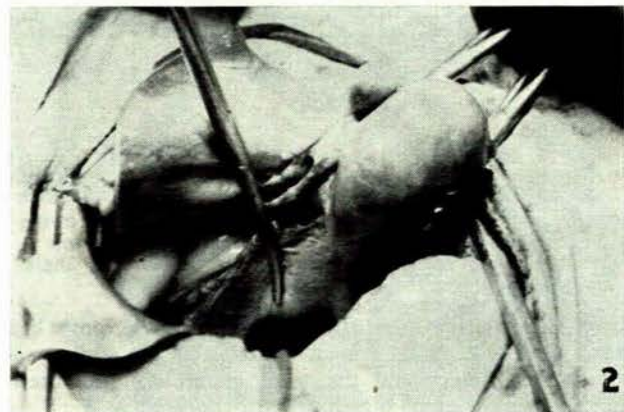


Fig. 2. Postero-lateral view of operation site showing the single-clamp method. Note the clamp includes the utero-sacral fold.

I have described this manoeuvre in some detail since it is the vital step in No. 1 technique. It will be seen that this single clamp contains from before backwards:

1. A sheet of fascia. This is the upper prolongation of the bladder pillar which becomes attached to the cervix and the fascia extending down from the round ligament.
2. The parametrial tissues of the lower part of the broad ligament.
3. The uterine artery, including its descending branch.
4. The upper part of the utero-sacral ligament.

These tissues are now cut through as near to the uterus as possible and the organ is free except for the vaginal wall. The vaginal wall is opened in front or at the back, according to the preference of the operator, and cut round; the uterus is then removed. The large pedicle is now held in the clamp, and it is my practice to crush this, with suture of No. 2 linen thread introduced just lateral to the tip of the forceps. This makes a safe ligature, preventing any retraction of the tissues or vessels. The upper portion of the pedicle containing the uterine artery is then re-tied with catgut medial to the thread ligature.

Sometimes the vaginal angle itself can be included in the tip of this clamp, but this will depend on the depth to which the bladder has been depressed, the mobility of the uterus and the size of the cervix. More often, when the uterus has been removed, $\frac{1}{2}$ -1 centimetre separates

the tip of the clamp from the vaginal angle. This space containing parametrium is conveniently closed with the same continuous suture that is used for the vaginal vault.

It seems that single-clamp hysterectomy is an almost forgotten method, and I cannot find it described in the modern text-books of operative surgery. But the one-clamp method has much to commend it as long as it is not attempted in the wrong case. I have used it as my routine for many years and only resort to more complicated methods where specially indicated. In my last 2,000 hysterectomies for non-malignant disease the one-clamp method has been applicable in just over 70% of cases. It is the simplest way to remove the uterus and, therefore, the quickest and easiest, and was described and practised by Victor Bonney,¹ that master surgeon with a genius for eliminating the unnecessary.

Possible Ureteric Damage

In any method of hysterectomy, the haunting danger of ureteric damage is foremost in the surgeon's mind. Some may assert that the chances of this catastrophe are increased by collecting so much tissue in one clamp, but this is not the case as long as the essential requirements for safety in this method are present.

In my series using the one-clamp method there has only been one instance of ureteric damage, and this was because the patient was badly selected for this technique—she had endometriosis affecting the utero-sacral ligament on one side. A leak of urine started 15 days after operation, when the patient had returned home. The fistula healed spontaneously after passage of a catheter up the left ureter; the catheter being left in place for 10 days.

Where there is any chance or possibility of ureteric damage it is essential to abandon the one-clamp method and select one of the techniques described below. Where great difficulty can be anticipated some surgeons recommend pre-operative ureteric catheterization. However, it is my experience that such catheters tend to fix the position of the ureters and, in certain difficult cases, render them even more liable to damage. Again, catheterization of the ureter from above through a small puncture hole at the pelvic brim has been recommended if the pelvic portion of the ureter is thought to be in danger during the operation. I myself have never had to resort to this manoeuvre.

By far the commonest cause of damage to the ureter at the side of the uterus is haemorrhage in the region lateral to the vaginal angle, and the blind application of forceps or suture. To avoid this accident the broad ligament should be opened up and the haemorrhage controlled by ligating the uterine artery near the pelvic wall where it leaves the internal iliac artery.

Safety Measures

The essential requirements to make one-clamp hysterectomy a safe operation are:

1. A mobile uterus.
2. Soft parametrium and utero-sacral ligaments.
3. A uterus that is not enlarged in its lower third.
4. A cervix that is not unduly hypertrophied or expanded.
5. Absence of tumours in the broad ligament.

1. *A mobile uterus.* A moderate degree of mobility of the uterus is essential for the accurate application of the clamp, and it is obvious that the further the uterus can be pulled up the easier it is to keep the ureter and bladder at a safe distance. It is also important to divide or strip the peritoneum forming the posterior layer of the broad ligament right down to the side of the cervix and so depress the ureter, which may adhere to this layer.

2. *Soft parametrium and utero-sacral ligaments.* Hardening

of the parametrium and utero-sacral ligament may follow salpingitis, parametritis, endometriosis, and bilharzia, apart from malignant disease of the uterus, which we are not considering here. Such conditions may be encountered at any routine hysterectomy and cannot always be diagnosed pre-operatively. The degree of fibrosis can vary from only slight restriction of normal movement to solid fixity, and experience alone can teach the surgeon when to abandon the single-clamp technique. Any marked degree of fibrosis will make this method not only dangerous, but impossible to carry out, for the hardened tissues cannot be gathered in a single clamp. Endometriosis, a disease which seems to be met with more and more frequently, is nearly always a contra-indication to the single-clamp method. Even minor degrees of this disease affecting the utero-sacral ligaments will not only decrease mobility of the uterus to a marked extent, but may make it impossible to depress the ureter to a safe distance. Similar changes are produced to a lesser degree by the other pathological conditions mentioned. The adage must be, if in any doubt use the slower but safer methods.

3. *A uterus that is not enlarged in its lower third.* Any degree of enlargement of the lower third of the uterus will make one-clamp hysterectomy difficult. Such enlargement is frequently caused by fibroids or adenomyosis. The method may still be used, however, if the uterus is freely mobile and can be pulled well up to expose the utero-sacral ligaments and the depressed bladder at the sides of the cervix. In some of these cases, in spite of enlargement of the lower third of the uterus, a surprisingly narrow cervix is encountered and the single-clamp technique can be used safely as long as exposure is adequate.

4. *A cervix that is not unduly hypertrophied or expanded.* Apart from malignant disease a grossly hypertrophied cervix may accompany adenomyosis or chronic cervicitis. The cervix may also be expanded by fibroids or an inter-uterine polyp passing through the canal. The enlargement is often most marked in the supravaginal part of the cervix and, consequently, any of these conditions may contraindicate the use of a single clamp.

5. *Absence of tumours in the broad ligament.* Fibroids, true or false broad-ligament cysts, chocolate cysts and retro-peritoneal tumours, if they cannot be removed before hysterectomy, will enforce modifications of any standard technique. More often than not, however, such tumours can be removed or elevated sufficiently to expose the uterine artery and in these cases, unless the uterus itself is fixed, it may still be possible to use the single clamp.

NO. 2 TECHNIQUE

The preliminary steps are the same as outlined above, but the uterine artery is clamped at a slightly higher level. The uterine artery is now divided and the clamp separated from the side of the uterus by scissor snips or stripping to make room for a second forceps between it and the uterus. This procedure is repeated on the opposite side. Division of the uterine arteries with the upper part of Mackenrodt's ligament and parametrium on both sides frees the uterus considerably, and it can now be elevated slightly higher. A second straight Kocher's clamp is now applied medial to the first and includes the upper portion of the utero-sacral ligament, the lower portion of the parametrium and the vaginal angle. Division of the tissues medial to this clamp frees the uterus except for the vaginal wall and sometimes opens the vagina laterally if the clamp has been applied low and close to the cervix.

This method is well described by Kimble² and has much to commend it. It is applicable with safety where fairly advanced degrees of uterine fixation are present. In cases of advanced endometriosis, however, where the tissues are hard and brittle, the second clamp may well endanger a

ureter that has been drawn towards the uterus, and it is advisable to adopt No. 3 technique described below.

NO. 3 TECHNIQUE

The essential difference between this method and No. 2 technique is that three clamps are used as a routine on the side of the uterus instead of two (Fig. 3). The first forceps (A) secures the uterine artery; the second (B), the

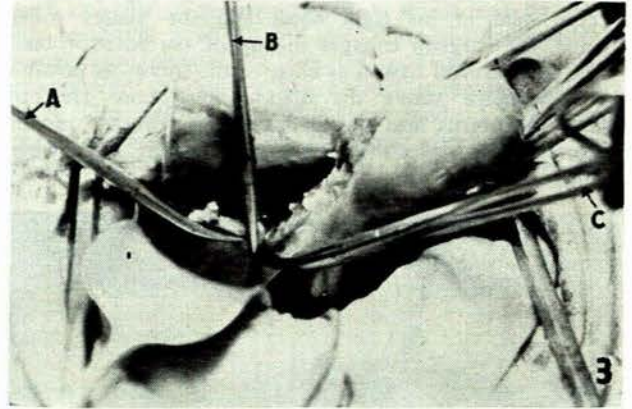


Fig. 3. Postero-lateral view of operation site showing hysterectomy in which three clamps are used. Clamp A is on the uterine artery, clamp B on the vaginal angle, and clamp C on the utero-sacral fold.

lower parametrium, the attachment of Mackenrodt's ligament, the descending branch of the uterine artery, and the vaginal angle; and the third clamp (C), the utero-sacral ligament at its attachment to the uterus.

This is a slow but sure method of hysterectomy applicable to nearly all cases, including advanced degrees of endometriosis or pelvic sepsis affecting the parametrial tissues. In very severe cases it may be necessary to use even more forceps on the side of the uterus, proceeding downwards in small bites.

All methods where more than one clamp is used at the side of the uterus carry the disadvantage that the operation site may become obscured by instruments, and most writers who describe these techniques recommend that each clamp is immediately replaced by a ligature. In practice this is not so simple, for until the uterus is removed it is often difficult and awkward to place these ligatures accurately, especially if the uterus is enlarged or the patient is obese.

NO. 4 TECHNIQUE

In this method the clamps are applied between the pericervical fascia and the uterus and not, as in the methods already described, between the pericervical and vesical fascia. The technique was first described by Richardson³ and later by Aldridge and Meredith,⁴ and is widely used in the USA. Most British operators, however, prefer to work outside the pericervical fascia.

After the preliminary steps of the operation, the uterine artery is clamped at approximately the level of the internal os and the ligated stump is stripped down the uterus to a lower level. The bladder has been separated in the usual way between the vesical and cervical fascia. A transverse incision is now made across the front of the cervix at a

level between the internal and external os, dividing the pericervical fascia. Richardson originally recommended an incision in the form of an inverted T. The lower edge of this fascia, which forms a definite layer, can now be picked up with forceps and is separated downwards and as far to the sides as possible by blunt dissection. The best instrument is the tip of the forefinger.

A transverse incision is now made just above the attachment of the utero-sacral ligaments to form a posterior flap. The utero-sacral ligaments are clamped and ligated. This posterior flap, with the stumps of the utero-sacral ligaments, is separated downwards with sharp and then blunt dissection. Both in front and behind, the dissection is carried as far to the sides as possible, all the time inside the pericervical cup of fascia, thus collecting the lower part of the parametrium and blood vessels in a bunch at the sides of the cervix. Here they can be clamped, cut and ligated.

The technique of working inside this cervical fascia certainly makes ureteric damage very unlikely. However, where chronic infection or endometriosis have left their mark the dissection can be difficult to carry out and is not by any means bloodless.

A somewhat similar operation, also devised for ureteric safety, was that of reaming out the cervix.

Here the safety measures were carried a step further and the uterus was removed inside a layer of cervical tissue with a rigid-bladed scalpel. The operation carried the disadvantage that in difficult cases, although the external os and cervical canal were usually successfully excised, varying amounts of cervix survived. Also, control of haemorrhage was more difficult than in the standard techniques. The operation is, therefore, rarely practised at present.

TECHNIQUES FOR SPECIAL CONDITIONS

In certain circumstances the methods described are inadequate and special techniques or modifications of those described become necessary to remove the uterus successfully:

1. *Low-placed Myoma*

It is well known that myomas of any size involving the cervix can make routine hysterectomy impossible and they must be removed by myomectomy before the uterus can be dealt with.

This rule also applies to myomas placed low in the body of the uterus where they make it difficult to clamp the uterine artery at a reasonably low level. In such cases the broad ligament and upper vessels are divided and the uterine artery clamped as low as possible at the side of the uterus. Myomectomy is then performed, often with very little bleeding. It is surprising how easy hysterectomy becomes once the obstructing tumour has been removed, and I believe that this procedure is not adopted often enough by young surgeons, who will struggle on with a difficult case and seem frightened to perform a myomectomy.

2. *Adherent Mass behind the Uterus, or Myoma in the Posterior Lip of the Cervix*

Myomas may fill and expand the posterior fornix and are often best dealt with by removing the uterus from below upwards. A similar technique has been described by Bonney⁷ for use where an adherent inflammatory mass cannot be separated from the back of the uterus by the normal methods. Such a mass may contain bowel and adherent uterine adnexa.

The round ligaments are divided and the bladder depressed as far as possible. The vagina is opened in front by a transverse incision and the anterior lip of the cervix is grasped with a volsellum. The cervix is pulled upwards through the vaginal incision. The paracervical tissues, vaginal wall and uterine arteries are then clamped and divided from below upwards by a series of clamps. It will now be found quite easy to separate the adherent mass from the back of the uterus as the cervix is raised further and further upwards.

When a myoma is present in the posterior cervical lip, it should be delivered through the anterior vaginal opening and elevated with the cervix. The posterior vaginal wall is then divided and the tumour and uterus removed from below upwards, clamping and dividing the blood vessels close to the uterus as they are encountered.

3. *Tumours of the Broad Ligament*

Any tumours of the broad ligament, e.g. fibroids, cysts, endometriomas or inflammatory masses, which cannot be removed before hysterectomy, will make access to the uterine artery on that side impossible, and these cases are often best approached from the opposite side. The round ligaments are divided and the bladder depressed as far as possible. The broad ligament is divided and opened up on the unaffected side, and the uterine artery is clamped and ligated near the uterus. The ligated stump is now depressed and clamps are placed on the utero-sacral fold and vaginal angle. The vagina is opened antero-laterally and, with a volsellum pulling the cervix upwards, is cut round with scissors. During this manoeuvre the bladder must be carefully retracted. The uterine artery and utero-sacral ligament on the affected side are brought into view at this point and can be clamped and divided. It is now possible by elevating the lower part of the uterus either to dissect this organ off the tumour or to remove it with the mass attached. The ureter, which usually runs below the tumour, can be exposed and identified easily as the uterus is raised. Should the tumour not be removed with the uterus it is usually an easy matter to dissect it free from its medial side once the uterus is out.

4. *Vaginal Elongation of the Cervix*

It is as well to note any degree of elongation of the vaginal portion of the cervix pre-operatively, for when unsuspected this condition may cause unnecessary trouble. Most surgeons prefer to depress the bladder, and rectum if necessary, until the limit of the cervix can be distinguished by finger pressure. Should the vaginal portion of the cervix be elongated it is obvious that this dissection will be carried unnecessarily far and may cause serious venous bleeding anteriorly. In contrast, after previous amputation of the cervix, abdominal hysterectomy becomes extremely easy since only minimal dissection in this region is necessary.

Therefore, it is helpful in these cases to begin the operation with a curved, blunt instrument, such as a No. 8 dilator, lying in the vagina; it may be manipulated through the towels to distinguish the very top of the anterior fornix. The vagina is now opened by cutting down on this instrument with a scalpel. This technique will not only avoid unnecessary dissection, but will also avoid the risk of undue shortening of the vagina, which may be a cause for complaint at a later date.

5. *Giant Myoma*

Very large fibroids must be treated with respect, for the operative morbidity and mortality rates are considerably increased in these cases, even when modern resuscitative measures are available.

These days it is rare to see enormous tumours in European practice, for patients seek treatment earlier, but they are still encountered on occasion in the non-European (Fig. 4).

Difficulties which combine to make the operation more dangerous are:

(a) *Elevation of the tumour.* Elevation of the tumour may be difficult owing to its size, which cannot be reduced



Fig. 4. Giant fibroid weighing 69 lb. Removed by total hysterectomy.

by tapping as in the case of an ovarian cyst. A very long incision from symphysis to xiphisternum may be necessary, and I recall one case in which the tumour could not be raised until the costal cartilages had been divided. Elevation may also be impeded by adhesions. Large fibroids frequently outgrow their blood supply and areas of degeneration form in the growth. Such areas may become infected, with consequent adhesion to bowel, omentum and anterior or posterior abdominal wall, necessitating a long painstaking dissection. Also, these large tumours are inclined to burrow beneath the posterior peritoneum, and it is not uncommon to find a portion of the transverse, descending, or pelvic colon stretched out on the front of the tumour. Not infrequently the ureter is displaced forward and becomes liable to damage. Mobilizing such a tumour before it can be elevated will add considerably to the time and severity of the hysterectomy.

(b) *Haemorrhage.* The risk of haemorrhage is greatly increased by the size of the tumour. Very large veins, sometimes the size of a half-inch hosepipe, may run on the surface of the growth, and the veins in the broad ligament are enormously enlarged. Careless application of forceps or accidental tearing of these vessels results in torrential haemorrhage, which is not always easy to control. The best approach is to divide the round ligament and, having pushed a finger beneath the peritoneum, the vessels can then be elevated from the tumour in a bunch and safely divided between large clamps. The very size of the blood vessels and the volume of the tumour means that blood loss is always above normal, and it should be a routine with these large growths to transfuse the patient during operation.

(c) *Visibility.* The third hazard when removing large tumours is visibility. A second assistant is necessary to handle the tumour and pull it from side to side. Even with this assistance direct exposure of the pelvis may be difficult to obtain. It is therefore recommended, where exposure is inadequate, that the uterine arteries be clamped and a sub-total hysterectomy be performed; subsequently, the cervix can be removed easily with full visibility. In difficult cases it is justifiable to cut off the uterus at an even higher level than the internal os in the interests of full visibility.

The risk of the above procedures is the possibility of sarcomatous change, where, obviously, the uterus is best removed *in toto*. According to Crane and Decker,⁵ malignant change occurs in less than 0.5% of myomatous uteri, although the figure may be slightly higher in very large growths.

SUMMARY

1. No standard operation is suitable for all patients requiring hysterectomy for non-malignant conditions. The technique must be adjusted to suit varying pathological and anatomical findings. Such variations demand different methods of applying clamps to secure the uterine artery and its branches and of separating the uterus from the vagina.
2. Four different techniques are described. Special reference is made to the single-clamp method, the simplest and quickest way to remove the uterus.
3. The essential requirements for the safe application of the single-clamp method are listed and the alternative techniques, for use when this method is not considered applicable, are described.
4. The dangers of injury to the urinary tract are stressed and the precautions for avoiding this accident are mentioned. In this respect experience is necessary to know when the simplest technique must be abandoned and another selected.
5. Some special conditions are listed for which the ordinary techniques of hysterectomy cannot be used. The special methods and precautions necessary under these circumstances are described.

REFERENCES

1. Bonney, V. (1952): *A Text-book of Gynaecological Surgery*, p. 321. London: Cassell & Co.
2. Kimble, C. in Rob. C. and Smith, R. (1958): *Operative Surgery*, vol. 6, p. 78. London: Butterworth & Co.
3. Richardson, E. H. (1929): *Surg. Gynec. Obstet.*, **48**, 248.
4. Aldridge, A. H. and Meredith, R. S. (1950): *Amer. J. Obstet. Gynec.*, **59**, 748.
5. Crane, R. and Decker, J. P. (1960): *Lab. Invest.*, **9**, 28.