

## TOTAL VERSUS SUPRAVAGINAL HYSTERECTOMY

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OPERATIONS on the uterus for benign conditions constitute a large percentage of the major operative procedures on any gynecologic service. The type of operation to be performed in any given case depends not only on the pathologic condition, the patient's age, her marital state, the state of her general health and to some extent her wishes in the matter, but also on the experience of the surgeon and the results he has obtained with various types of operations in similar cases. In some cases more or less satisfactory results will be obtained with a variety of different operative procedures, but following some of these there may be the probability of future trouble which will require a second operation or frequent treatments. In my experience, in many cases in which trouble follows operation a cancer phobia develops to a greater or lesser degree. Many of them do not return to the original surgeon because they think he does not understand their case.

One of the most controversial points among gynecologists is whether to do a total abdominal hysterectomy or a supravaginal amputation in the majority of cases in which it is advisable to remove at least part of the uterine body. In all discussions on this subject it is freely admitted, even by ardent supporters of the more radical procedure, that statistics from the country as a whole will show a definitely higher mortality and morbidity when this operation is performed. This does not mean, however, that the operation is at fault, but simply that it is being attempted by some surgeons who are not familiar with the various steps of a difficult operation. I am satisfied that when total abdominal hysterectomy is done by competent surgeons in a large series of

cases, the end results are better, the morbidity is less and the mortality no greater than when a subtotal abdominal hysterectomy is done in a similar series of cases by the same experienced surgeons. For the occasional operator or for any surgeon who has not taken special pains to become thoroughly familiar with the technique of a total abdominal hysterectomy, my advice would be to continue doing the subtotal operation in a large majority of his cases even at the risk of leaving an infected cervix, which might require treatment or removal at a later date. A neglected infected cervix is a definite predisposing cause to complications; the most frequent of these is thrombophlebitis and the gravest are pulmonary emboli or the later development of cancer.

I do not agree with those who say that the only advantage of total abdominal hysterectomy over subtotal operation is the protection against the later development of cancer. If this were the case, I would not feel justified in advising the total operation as often as I do. Just what added danger there is of malignant disease developing in a cervical stump over the normal incidence of cancer of the cervix in a like number of cases is hard to determine. It is known, however, that cervicitis is a very common sequela to subtotal abdominal hysterectomy and that chronic irritation from infection is a definite predisposing cause of cancer. Statistics are very unreliable in such cases and vary a great deal in different countries and among different surgeons in any one country. The weight of statistical evidence, however, is that cancer occurs in probably not more than 1 or 2 per cent of cases in which a subtotal hysterectomy has been performed for benign conditions. Henriksen, in 940

cases of carcinoma of the cervix observed at the Johns Hopkins Hospital, found that carcinoma developed in the cervical stump in 2.3 per cent of them. At The Mayo Clinic, from July 1, 1930 to December 31, 1938, inclusive there were 1,489 cases in which a pathologic diagnosis of carcinoma of the cervix was made and of this number, sixty-five or 4.4 per cent were cases of carcinoma of the cervical stump. There is no doubt that this condition is reported much more frequently at the present time than it was formerly.

Von Graff reported on nearly 1200 cases in which cancer developed in the cervical stump and there is no doubt that many such cases are never reported. In most of the cases, as shown by C. H. Mayo and C. W. Mayo, the condition is not diagnosed until late and until the outlook for cure is not good. In a series of sixty-five patients who were treated for carcinoma of the cervical stump at the clinic and whom we were able to trace, we found that only thirteen, or 20 per cent, had lived five years. From January 1, 1910 to December 31, 1938, inclusive, we have seen 164 cases of carcinoma of the cervical stump. In twenty-four of these cases subtotal abdominal hysterectomy was performed at the clinic and in 140 cases it had previously been performed elsewhere. In 136 of these 164 cases, the malignant condition was recognized for the first time at least one year after the abdominal operation had been performed, and this interval, I think, should be accepted as evidence that the malignant lesion did not exist at the time of the supravaginal operation. Besides the cases of cervical cancer, we have seen many cases (more than 500) in which cervicitis with leucorrhoea was sufficient to require treatment. In many of these cases there was no history of the occurrence of leucorrhoea before the body of the uterus had been removed. Furthermore, recent investigation has shown definitely that cervicitis is frequently a focus for infectious arthritis, myositis, iritis and other disabling diseases. In addition to the danger

of cancer and cervicitis, one must recognize the danger of benign tumors, such as fibroids and cervical polyps, developing in a retained cervix. At the clinic we have operated on three patients for fibroids in retained cervixes and on many who had polyps.

The objections raised to the total operation, such as shortening of the vagina and a greater tendency toward prolapse of the vaginal vault, do not hold if the cervix is enucleated out of the vaginal vault and the latter is properly secured to the tissues from the base of the broad ligaments, uterosacral ligaments and round ligaments and if any relaxation or lacerations of the lower pelvic diaphragm are cared for at the same time or soon afterward. There is no doubt that obstetricians today are aware of the importance of puerperal gynecology, but Richardson has stated that "Recent reports from some of our best obstetric clinics reveal that late follow-up examinations disclose unsatisfactory conditions of the cervix and lower birth canal in 50 to 75 per cent of women who have borne one child or more." The contention that the total operation is a frequent cause of dyspareunia is unfounded. When this is a postoperative complaint, it is generally due to fixation of the ovaries to the vault of the vagina and to diminished vaginal secretion; this latter condition can be overcome by the use of a nonirritating lubricating jelly.

In reviewing the literature, it is interesting to find how infrequently physicians who have large gynecologic practices report cases in which complications or sequelae which require treatment occur after subtotal abdominal hysterectomy, whereas other physicians report seeing such cases frequently. It is not surprising that the former do not encounter cases of arthritis, neuralgia and iritis, but one would expect them to encounter an occasional case in which local disease had developed in the cervix itself. This can be accounted for, in part, by the fact that the patient fears that the operation was not

satisfactory and she therefore goes elsewhere for advice. The fact that subtotal hysterectomy had been performed elsewhere in 140 of the 164 cases of cancer of the cervical stump which we have seen at the clinic, lends strength to this argument.

Morbidity is frequently due to pelvic peritonitis of low grade, which these patients fortunately stand well, to thrombophlebitis and to adherent loops of small intestine in the pelvis. I have always thought that when a total hysterectomy is performed after surgical preparation of the vagina there is less chance of infection than there is when the subtotal operation is performed and the cervical glands are cut across and frequently are traversed with sutures. In many cases infection is already present. When the cervix is coned or is destroyed by cauterization, added protection from infection is not given as these procedures leave a sloughing region continuous with the operative field and peritoneum. Furthermore, such procedures do not protect against the occurrence of epithelioma of the cervix because this neoplasm starts on the portio vaginalis rather than in the cervical canal in most cases.

No matter which operation is performed, I am satisfied that a very important protection against subsequent trouble, not only while the patient is in the hospital but also for months or years afterward, is the care taken to prevent loops of small intestine from becoming adherent in the pelvis. This condition is the result of a pelvic infection of low grade, which is frequently caused by the use of drainage or occurs because all raw surfaces were not covered properly with peritoneum. If it is not possible to cover these raw surfaces in the ordinary way, it is advisable to utilize the sigmoid or appendices epiploicae. I have seen several instances of subacute intestinal obstruction months after a patient has left a hospital after what was regarded as a normal postoperative course and I have seen one case of complete obstruction fifteen years after a pelvic opera-

tion in which a loop of small bowel apparently had been adherent deep in the pelvis all that time. I am satisfied that many patients who die of peritonitis could be saved by early recognition of intestinal obstruction and freeing of a loop of small bowel adherent in the pelvis before infection spreads from the lumen of the bowel to the free peritoneal cavity.

In many cases of uterine fibroids in which the mass is not larger than a three months' pregnant uterus and in which the only symptom is menorrhagia, the advisability of performing a hysterectomy or treating by irradiation has to be considered. There is no doubt that there is legitimate ground for a difference of opinion if a subtotal hysterectomy is considered sufficient, but if there is any pathologic lesion in the cervix, I believe the best interests of the patient are served by removing the uterus completely. Radium and Roentgen therapy give excellent results with little inconvenience and hospital expense to the patient and practically no mortality. Burnam reported treatment by radium in 1800 cases without a death. One cannot, however, compare these statistics with surgical statistics because the former represent treatment in a very select group of cases. In all complicated cases, necessarily, treatment is by operation and many of the patients are exceedingly bad risks in whom operations are difficult. Moreover, in an occasional case in which the result is listed as good following treatment by radium months or even years before, subsequent treatment is required for leucorrhoea, menorrhagia, adnexal trouble or malignancy. At least once a year I see a case in which carcinoma of the body of the uterus has occurred after the use of radium therapy. Statistics show that in an unselected group of cases in which operation is advisable and is performed by a member of the visiting staff of most accredited hospitals the mortality rate associated with subtotal abdominal hysterectomy is about 4 per cent and that asso-

ciated with total abdominal hysterectomy is about 6 per cent.

There are reports of cases in which cancer developed in the vault of the vagina after a total abdominal hysterectomy, but I never have heard of such a case in which carcinoma of the vault of the vagina followed a vaginal hysterectomy. It would be impossible to prove but I have seen so many cases in which a total abdominal hysterectomy was supposed to have been done and in which some cervical tissue was left that I believe that such cases should be listed as cases in which carcinoma developed in the cervical stump rather than as cases in which the growth was vaginal in origin.

From January 1, 1934 to December 31, 1938, inclusive, hysterectomy was performed for benign conditions in 3,149 cases at the clinic. In the 1,776 cases in which total abdominal hysterectomy was performed, twenty-two or 1.2 per cent of the patients died; in the 766 cases in which subtotal abdominal hysterectomy was performed, seven or 0.9 per cent of the patients died, and in the 607 cases in which vaginal hysterectomy was performed, nine or 1.5 per cent of the patients died. During the years 1936, 1937, and 1938, I performed 784 hysterectomies with six deaths, or a mortality of 0.76 per cent; 196 of these were vaginal hysterectomies with one death, a mortality of 0.51 per cent.

In recent years I have become more and more convinced that a total hysterectomy is advisable in most cases in which it is necessary to remove any of the uterine body of women who have been delivered of children by the vagina and who are close to or at the menopausal age, provided the surgeon is familiar with the technique of such an operation and can complete it within an hour. I am satisfied that the three most important considerations in a low operative mortality are: (1) a well given anesthetic; (2) adequate exposure; and (3) no unnecessary delay in completing an operation. Few abdominal operations

should keep a patient on the operating table more than one and a half hours.

There is no doubt that spinal anesthesia, as given today by specialists in this field of therapy, is a relatively safe procedure, but I do not feel that it is as safe as a well given inhalation anesthetic by an expert with a modern anesthetic machine and the various gases that are now used under direct control. If I did not have an excellent anesthetist, I certainly would use spinal anesthesia much more often than I do. I am satisfied that spinal anesthesia always makes an operation easier for the surgeon but a little more dangerous for the patient.

In any consideration of hysterectomy it is also necessary to consider the disposition of the adnexa. Some surgeons feel that if the uterus is to be removed there is little to be gained by saving the tubes and ovaries, whereas others feel that the ovaries should be saved whenever possible. If the patient is close to or past the menopausal age, there can be little difference of opinion. Most surgeons agree that cutting the infundibuliform ligament close to the brim of the pelvis and total removal of tube and ovary on both sides are indicated if the uterus also is to be removed. The Fallopian tubes are of no use if the uterus is removed, but the ovaries are of definite value to the patient still in the child-bearing period of life. My practice has always been to save normal ovarian tissue when possible in young patients when operating for benign conditions. I would sooner consider the possibility of a second operation for some ovarian condition than to remove both ovaries of a woman less than 40 years of age. In recent years I have adopted the practice of removing the Fallopian tubes whenever I have to do a hysterectomy. I never could see any advantage in leaving them and I frequently have on my service patients in whom a second operation is made necessary on account of tubes that have been left following a hysterectomy. If care is taken in their removal there should be no interference with adequate blood supply to the ovary. The tubes develop

along with the uterus from the Müllerian ducts and their principal blood supply comes from the terminal branches of the uterine arteries. When these vessels are cut the ovarian vessels have to supply the tubes as well as the ovaries. They are able to do this all right but with the slowing of circulation clotting often takes place in the venous plexus in the mesosalpinx and this may well be the starting point of a pelvic thrombophlebitis. On my own service I certainly have had less trouble with pulmonary embolism and other less serious complications since I have been doing the more radical operation. As far as I can tell, the ovaries function normally in just as high a percentage of cases.

Most authors who advise the more frequent use of subtotal hysterectomy have figures to show that the bladder, ureters and bowel are less frequently injured when the less radical operation is performed. The only reason I can see for this is that some surgeons who are doing total abdominal hysterectomy do not see accurately what they catch with each forceps or include with each stitch. In the technique that I use, I ligate the uterine vessels at the same point in all cases of benign lesions no matter whether I do a total or a subtotal hysterectomy. The only difference is that I have to tie separately an extra branch that goes to the cervix on each side in all cases in which I perform a total hysterectomy. Abnormally situated ureters are occasionally noted, but as a rule they run a normal course unless pressed upon by uterine or ovarian tumors. The way to avoid them is to keep close to the uterus. In all cases of doubt it pays to isolate them before attempting to control deep pelvic bleeding, and in peritonealizing the raw surface all stitches should be superficial.

Injuries to the bladder are probably most often due to stripping the bladder from the cervix by blunt or gauze dissection rather than by sharp dissection. This is especially true in cases in which the uterine lesion is complicated by pericervicitis. Personally,

I prefer a sharp knife to scissors for this part of the operation.

#### TECHNIQUE

The especially long instruments and the Mayo fibroid hook which I use for performing hysterectomy are shown in Figure 1. A Kocher hemostat is first placed close to the right side of the uterus; it includes the proximal parts of the right round ligament, the right Fallopian tube, the right utero-ovarian ligament and the upper part of the right broad ligament. Another hemostat is placed on the right round ligament just distal to the first forceps; the round ligament is cut between them and the peritoneum is cut on each side of the round ligament for a distance of  $1\frac{1}{2}$  or 2 inches (3.8 or 5 cm.). (Fig. 2.) The fimbriated end of the right Fallopian tube is now grasped with forceps and the tube and ovary are thoroughly inspected. If it is decided to save the ovary but remove the tube, I catch the vessels close to the tube with one or two clamps and then cut the ovary free from the uterus by cutting the utero-ovarian ligaments between clamps. I like at this time to tie securely the end of the round ligament, the utero-ovarian ligament and the various vessels secured by forceps after removal of the tube. The various steps of the operation as described are now repeated on the left side of the uterus, but in most cases the ovary is also removed on the left side as it is less liable to cause postoperative discomfort, but if the left ovary is the better of the two, it is saved and the one on the right side is removed. Traction is now made on the forceps placed on each side of the uterus. The peritoneum is cut in front and the bladder is freed from the cervix and vault of vagina by sharp dissection. (Fig. 3.) As a rule, it is necessary to ligate one small artery in the vesico-cervical fold on each side. By continuing traction on the uterus and drawing it down over the symphysis pubis, the uterosacral ligaments are exposed. These ligaments are then cut from the posterior surface of the cervix. At this time, I also like to cut the

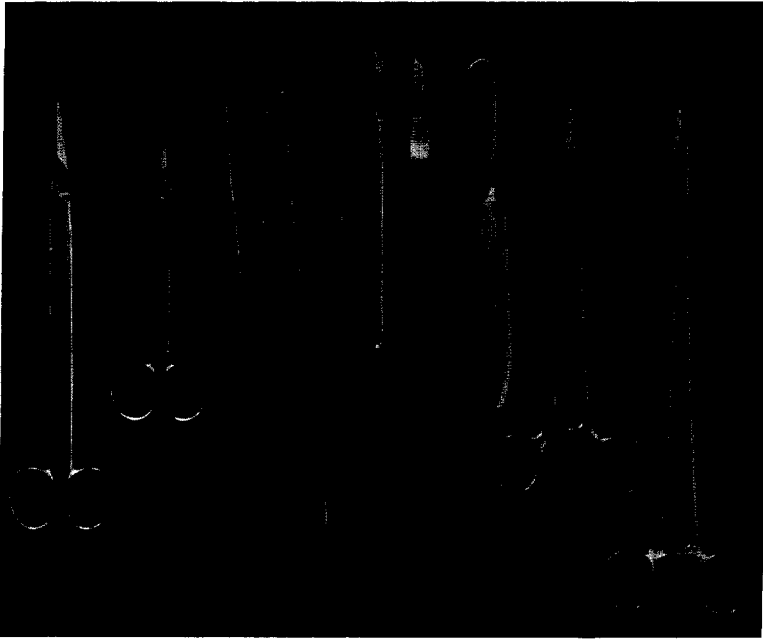


FIG. 1. The Mayo fibroid hook and long-handled instruments are a definite help in most cases.

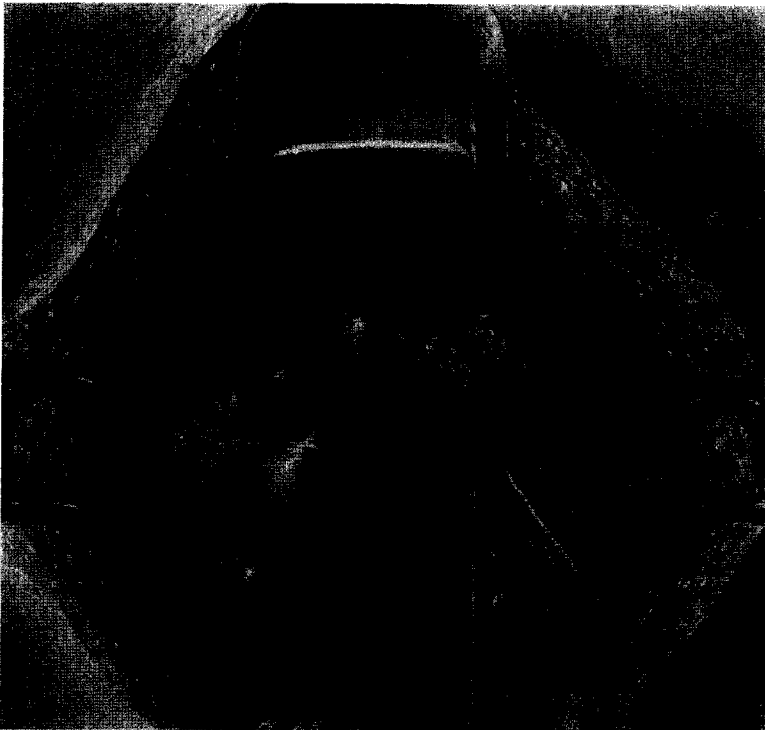


FIG. 2. Cutting through broad ligament; stumps of uterine vessels round ligament and utero-ovarian ligaments have been ligated.

peritoneum across the posterior surface of the broad ligament.

The uterine vessels and the cardinal

secured is the same whether one is doing a total or subtotal operation. The only difference is that if a subtotal operation is

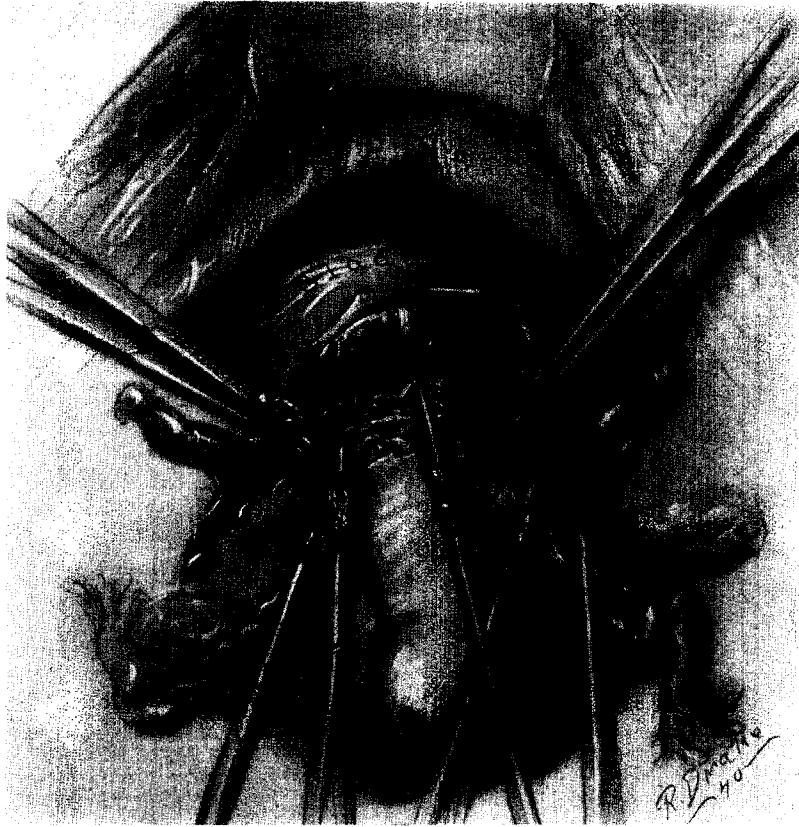


FIG. 3. Separating bladder from cervix by sharp dissection; uterine vessels doubly clamped at right angles to cervix.

ligament in the base of the broad ligament are now caught at about the level of the internal os with three Kocher hemostats that are applied almost at a right angle to the cervix, and the tissues are cut between the upper and middle forceps. If this technique is followed, I do not believe it is necessary to isolate the ureters as there is no chance of injuring them if the forceps catch right up to the cervical tissue. It is only in the exceptional case in which some bleeding occurs deep in the base of the broad ligament or along the side of the vagina that I feel that it is necessary to locate the ureters before controlling the bleeding. I do not believe that inserting ureteral catheters before starting the operation is a necessary or good practice. The point at which the uterine vessels are

contemplated the cervix is cut across at the level at which the uterine vessels are clamped and the cervical canal is closed by two or three stitches, whereas when a total hysterectomy is contemplated the pericervical tissues are cut and the cervix is enucleated from the vaginal vault. If the surgeon works close to the cervix in this part of the dissection there is no danger of injury to ureter, bladder or rectum. Constant traction on the uterus by means of Mayo hooks and the use of a knife with a long handle or a long pair of scissors make this part of the operation easy. (Fig. 4.)

As soon as the vagina is opened I insert a strip of gauze about 2 inches wide and 12 inches long, which has been dipped in tincture of merthiolate. This is left in place until the third or fourth postoperative day.

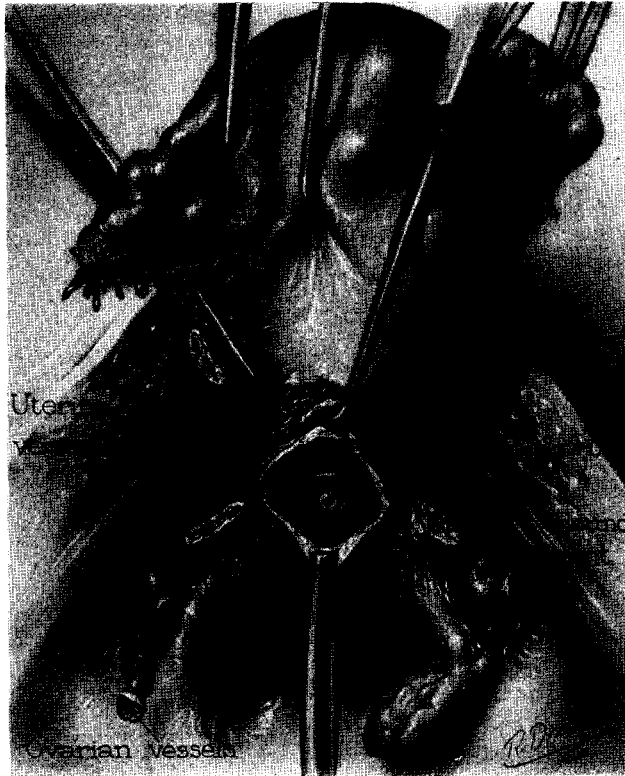


FIG. 4. The uterus freed on both sides, a hook is inserted in the posterior surface of the cervix to make traction; the vault of the vagina is cut posteriorly and a tenaculum is placed on posterior wall of the vagina; gauze soaked in tincture of mercuric iodine is inserted into the vagina before the operation is started.



FIG. 5. Closure of vagina, showing method of insertion of two rows of sutures.



The vault of the vagina is closed with a continuous mattress suture that rolls the cut edge of the mucous membrane into the

the vagina and I think it is important to make a wide approximation of the round ligaments (if possible, overlapping them) to



FIG. 6. Fixation by two rows of sutures of round ligaments, stumps of uterine vessels, uterosacral ligament and vault of vagina.



FIG. 7. Completed operation; all raw surface covered with peritoneum; ovary partially buried in peritoneum and fixed well up on side of pelvis.



FIG. 8. In cases in which the operation is difficult the body of uterus is removed as in subtotal hysterectomy, the cervix is split posteriorly and removed separately.

vaginal canal. It is also a good hemostatic suture. To close the vagina further the peritoneum and uterosacral ligaments are brought upward from behind and placed over the vault of the vagina by a continuous suture. (Fig. 5.)

The uterine vessels and the cardinal ligament are ligated en masse by a stick tie that secures some of the vaginal wall, but an attempt is made not to reach the mucous membrane of the vaginal canal. The round ligaments are now secured to the vault of

the tissues in the base of the broad ligaments, the stumps of the uterine vessels and the uterosacral ligaments. (Fig. 6.) All raw surfaces are now covered by peritoneum, and the ovary, if saved, is partly buried between the folds of the broad ligament well up on the side of the pelvis rather than fixing it to the vault of the vagina as is so often done. (Fig. 7.) If the left ovary is saved, special care should be taken to prevent it from becoming adherent to the sigmoid. If there has been an old

pelvic inflammatory condition, it is often impossible to close the peritoneum in the usual way, and it is then frequently necessary to obliterate the cul-de-sac of Douglas more or less and cover the raw surface by stitching the sigmoid and appendices epiploicae to the posterior surface of the broad ligaments and posterior surface of the vagina.

In many cases in which it is expedient to remove the cervix, especially where there is an old pelvic inflammatory condition, it often simplifies the operation to perform a supravaginal amputation first and then to split the cervix posteriorly and shell it out from the vault of the vagina under direct vision. (Fig. 8.)

In the majority of cases it is advisable to remove the appendix at the same time, as this procedure adds little if any risk to the operation and occasionally saves the patient from another intervention.

The use of drains either through the abdominal incision or through the vagina, when not necessary, is a very definite added danger to any pelvic operation and as it is seldom necessary to operate for acute pelvic conditions it is rare, indeed, that any drainage is necessary. For several years, I have never used any abdominal or vaginal drainage even in operations for old pelvic inflammatory conditions or Wertheim operations for carcinoma of the cervix. If a tubo-ovarian abscess is ruptured during removal, the pelvis is washed out with physiologic saline solution and a tube drain is carried down to the peritoneum but not into the peritoneal cavity, when the wound is being closed. There is no doubt that the peritoneum can resist infection better than the soft tissue of the abdominal wall, and if a drain is inserted into the peritoneal cavity it causes a definite increase in postoperative adhesions and in the possibility of obstruction, and no good purpose is served. Whenever an infection becomes chronic it is a definite indication that the patient has a good resistance to that particular infection.

#### PREOPERATIVE AND POSTOPERATIVE TREATMENT

In many cases in which there is a history of menorrhagia the patients are exceedingly poor surgical risks on account of the secondary anemia that has developed. In these cases a preoperative transfusion of whole blood definitely decreases the risk, but my practice for some years has been, if the patient is able to be up and around the greater part of the day, to have her blood typed and, if necessary, a transfusion can be given any time after the operation. Since I started using a 6 per cent solution of acacia (about twenty years ago) in any case in which the blood pressure remains low following operation or the patient exhibits any signs of shock during the operation, I have used whole blood very seldom except when the concentration of hemoglobin has been less than 5 Gm. per 100 c.c. of blood.

#### CONCLUSIONS

1. More than 50 per cent of women who have borne one child or more have an unsatisfactory condition of the cervix and lower part of the birth canal.
2. Statistics from most hospitals show that subtotal abdominal hysterectomy is a safer operation than total abdominal hysterectomy.
3. Experienced surgeons can develop a technique by which a total abdominal hysterectomy can be performed as safely as the subtotal operation and with a lower morbidity.
4. The bladder, bowel or ureters will not be injured if the surgeon sees what is included in the grasp of each hemostat or in each suture.
5. Danger of cancer developing in the cervical stump is not the only reason for its removal, but cancer developing at this site is more frequently reported than formerly.
6. If a total abdominal hysterectomy is properly performed there is no tendency to prolapse of vaginal vault or shortening of the vaginal canal.

7. Neglect to repair the perineum often accounts for an unsatisfactory result following abdominal hysterectomy.

8. Morbidity is most frequently due to thrombophlebitis, low-grade pelvic peritonitis and firm adhesions of loops of small intestine deep in pelvis.

9. In my opinion spinal anesthesia makes any abdominal operation easier for the surgeon but a little more dangerous for the patient.

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IN 1809 Mary Crawford rode 60 miles on horseback, that Ephraim McDowell of Danville, Kentucky, might attempt the removal of an ovarian cyst so large that her abdomen hung well down towards her knees. From—"A Textbook of Surgery" by John Homans (Thomas).