

# Radical Hysterectomy for Carcinoma of the Cervix\*

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Radical hysterectomy refers to the removal of the uterus and cervix and, in addition, to the removal of the upper one-half to one-third of the vagina, the parametria and the pelvic lymph nodes. This operation, which is commonly called the Wertheim operation, was actually first described by Clark in the United States and Ries in Germany. Wertheim's original operation for carcinoma of the cervix consisted only of a partial parametrial removal and removal of the upper one-third of the vagina. It did not include pelvic lymphadenectomy or the removal of the lateral portions of the parametria.

The early efforts at radical hysterectomy for cervical cancer resulted in operative and surgical mortality in the range of 25-75%. In 1903, when it became obvious that radiation therapy, available then only in the form of radium, was effective for the control of cervical cancer, clinicians abandoned the radical hysterectomy procedure in favor of this limited form of radiation. A few individuals persisted in performing the operation, and in 1935, the British gynecologist and surgeon, Victor Bonney, reported on 500 consecutive patients on whom he had done radical hysterectomy. His operative mortality was 16%.

In 1939, Dr. Joseph Meigs of Boston decided to take a second look at the radical hysterectomy procedure in view of some of the technical advances which had occurred in medicine, primarily in the areas of blood transfusion, anesthesia, antibacterial

chemotherapy, and improvement in pre and postoperative care. Between 1939 and 1951, Meigs performed 100 consecutive radical hysterectomy operations without a single surgical mortality. This astounding feat provided the impetus in the United States for a revision of thinking about this procedure in the post-World War II era.

Meigs also defined the advantages of utilizing radical hysterectomy in preference to radiation therapy for cervical cancer. These are as follows:

1. There can be no tumor recurrence in the cervix itself.
2. There can be no new tumor growths in the cervix or upper vagina.
3. The problem of radio-resistant tumors is avoided.
4. There can be no radiation injuries to the bowel or the bladder.

In addition to the advantages listed by Meigs, two other important factors can be considered as helpful. The first of these is the ability to preserve ovarian function in young women. The incidence of metastasis to the ovary in a patient with early carcinoma of the cervix is negligible, and it is possible, by using radical surgery to preserve at least one ovary, to avoid the onset of the climacteric. The second aspect is that the gynecologic oncologist will know the extent of the disease as reported to him by the pathologist after thorough study of the removed specimen. From this not only will the prognosis be known but also additional therapy can be considered.

Also, there are several clinical situations in which, given equally available expert radiation

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therapy and radical pelvic surgery personnel and facilities, one might elect a radical hysterectomy approach. These are as follows:

1. Previous pelvic surgery (supravaginal or total hysterectomy)
2. Presence of adnexal mass or masses, or previous pelvic inflammatory disease
3. Diabetes mellitus
4. Pregnancy
5. Radiophobia

Appreciating what has already been stated with regard to the advantages as well as the indications for the use of radical hysterectomy and pelvic lymphadenectomy, there are three significant limiting features:

1. *The medical condition of the patient.* This is primarily related to the patient's general condition, her age, obesity, and the presence of underlying cardiovascular and other diseases which might influence the development of significant operative and postoperative complications.

2. *The type and extent of the malignancy which is being treated.* In cervical carcinoma, one of the limiting factors is the extent of the disease and the degree of its parametrial infiltration. From a clinical standpoint, cancers of the cervix favorable for a radical hysterectomy are clinical Stage I-a, minimal to moderate-sized lesions which are I-b, or very early Stage II-a or Stage II-b tumors. More extensive local disease increases the probability of inadequate surgery as well as the risk of cutting through the tumor at the time of operation. Similarly, the presence of any tumor which is spread beyond the pelvic area in the abdomen, particularly lymphatic involvement of the para-aortic nodes or liver, is considered a contraindication to radical hysterectomy approach as is the finding of any distant metastasis during the preoperative oncologic evaluation. Finally, radical hysterectomy may be utilized in patients who have minimal, central, post-radiation recurrence in which the lesion has not extended to the bladder and rectum. This operation, under proper circumstances, is preferable to the more extensive and complicated procedure of pelvic exenteration.

3. *The availability of a surgeon to perform radical hysterectomy.* This factor in general provides the greatest limitation to the surgical approach, since during the standard gynecologic residency program, there is neither the time nor the experience available in the performance of radical pelvic surgery for the

resident to develop the necessary skills. Similarly, in the routine practice of gynecology, a physician will not have sufficient numbers of such patients to maintain his operative expertise and capability. This limitation is gradually being overcome by the development of training programs in gynecologic oncology which include training in the performance of radical pelvic procedures. The identification and utilization of the gynecologic oncologist who can perform such procedures and who limits his area of specialization to the treatment of gynecologic cancer and its problems, is now a reality. A certifying board in gynecologic oncology has been developed and individuals are being recognized for skill in this particular area. In addition, training programs are now available throughout the country for individuals already qualified in obstetrics and gynecology. They can receive additional training for two years to develop these skills.

Let us turn to some of the improvements which have occurred in the results with radical hysterectomy in the management of cervical carcinoma. As mentioned earlier, the operative and surgical mortality was one of the major limiting factors in this procedure. Since Meigs' original series, other writers in recent times have reported series of patients on whom radical hysterectomy was carried out with minimal mortality. The inevitable catastrophe will occur from time to time when the surgeon, at times overstepping the bounds of good judgement, undertakes radical pelvic surgery on a patient and has an unfavorable result. In general, the operative and surgical mortality should be in the range of 0.5%.

Scrupulous attention must be given to the thorough preoperative evaluation of the patient, not only from the standpoint of her disease process so that an operation of this type will not be attempted on a patient with distant metastatic disease, but also attention must be given to the general physical condition of the patient, primarily her cardiovascular, pulmonary, and renal systems. Infection of the urinary system must be brought under control prior to surgery. The operation itself must be meticulously carried out with the knowledge of the extent of the operation, the patient's condition, and possible complicating factors well known to a competent medical anesthesiologist. Careful dissection of the pelvis with specific care around the large vessels and ureters will insure a much lower incidence of significant vascular and urinary tract complications which are the chief intra-operative problems. Finally,

Careful attention to the details of postoperative care are essential to avoid the problems associated with pulmonary, bowel, and urinary areas and to reduce the incidence of thromboembolic phenomena in these patients. For more detailed descriptions of these areas of importance in the pre and postoperative care, one's attention is directed to Nelson's *Atlas of Radical Pelvic Surgery*.\*

The major problem creating morbidity with radical hysterectomy for cervical carcinoma is associated with the urinary tract. While Meigs listed among the advantages of radical hysterectomy the avoidance of radiation complications to the bowel and bladder, it became evident that there was a significant morbidity associated with these structures from radical hysterectomy. In reviewing all of the complications associated with radical hysterectomy at the Hospital of the University of Pennsylvania, in an unselected group of radical hysterectomy procedures, the greatest number, almost 50%, had complications associated with urinary tract. These were chiefly urinary tract infections, ureteral and vesical fistulas, and postoperative bladder dysfunction.

Let us look specifically at the problem of uretero-vaginal fistula. The incidence of uretero-vaginal fistula as reported by Meigs varied from 10 to 15%. A significant improvement in the uretero-vaginal fistula rate was reported by Green, who found that the incidence of this complication could be reduced to approximately 4% by leaving the urethral catheter in the bladder for a minimum of 6 weeks following the operation. It was felt that this maneuver kept the ureteral bed in a more stable position and allowed better healing and vascularization. In 1966, Green also described a technique of ureteral suspension in which the ureter is approximated by several sutures to the superior vesical artery from the origin of this vessel to the ureterovesical junction. In his original report, he found only one fistula in 65 patients. This experience has been repeated in other centers, and it has been substantiated as an effective and simple method of reducing the uretero-vaginal fistula rate. This complication instead of being in the range of 10 to 15%, is now reported in the range of 1 to 2%.

Rather than keeping the urethral catheter in position in the bladder for a long period of time, it

has been the practice at the Hospital of the University of Pennsylvania to evaluate the bladder prior to and after operation by the use of cystometry. A baseline measurement of bladder function is obtained prior to surgery, and, on approximately day 9 or 10 following surgery, a repeat cystometric evaluation is carried out. Frequently the bladder will be found to be of the autonomous neurogenic type, where there is absence of the sensation of filling as well as failure of the bladder to accommodate to filling. If attention is not paid to this alteration in vesical function, the result will be overdistention and overflow incontinence. Generally by the 10th to 20th day after surgery there will be a gradual return of function toward normal, first with the return of the sensation of filling and the desire to void, and later a correction of the detrusor function where accommodation to filling and maintenance of low pressures develop until the patient has the proper desire to void.

Other aspects aimed at reducing urinary tract morbidity are the reduction of infection and the avoidance of trauma. There must be clearance of preoperative urinary infection, gentle and minimal handling of the ureter during the procedure, with an effort to preserve its blood supply as much as possible, and finally pre and postoperative administration of appropriate systemic antibiotics. Local intravesical antibiotics may be utilized through a triple-lumen Foley catheter (Neosporin\* G-U irrigant). Another approach is to carry out the suprapubic drainage technique to reduce possible contamination of the bladder seen so often with the use of the urethral catheter.

An added factor in reduction of uretero-vaginal fistula is the use of techniques to reduce the collection of serum and lymph in the retroperitoneal space. This was originally described by the Chinese using the paracoccygeal route. More recently, Welch, Pratt, and Symmonds applied closed-suction techniques to the retroperitoneal area via the abdominal wall. This

**TABLE I**  
Cancer of Cervix 1955-1969 Radical Hysterectomy Stage of Disease

Stage I-a .....	28
Stage I-b .....	62
Stage II-a .....	8
Stage II-b .....	4
Total .....	102

\* James Nelson, Jr., *Atlas of Radical Pelvic Surgery*. Appleton, New York, 1969.

**TABLE 2**  
**Radical Hysterectomy 5-yr. survival**  
**Cancer of Cervix HUP 1955-1969**

	Total	L	%
Stage I	90	75	83.3
Stage II	12	8	66.6

decreases the amount of materials which might become infected, reduces the possibility of lymphocyst formation, and also may improve the ability of the ureter to maintain its blood supply. The results associated with radical hysterectomy as primary treatment for cervical cancer at the Hospital of the University of Pennsylvania are noted in Tables 1, 2, 3, and 4. Comparison of statistics from one institution to another regarding the operable stages of cervical cancer show that radiation and surgery can provide approximately the same 5-year survival. The surgical proponents have always had the advantage, especially where absolute survival figures are considered, since the surgical patients are always better selected, usually in better medical condition, and more likely to survive five years.

Finally, it is important to consider some areas for the future with regard to radical hysterectomy in the management of cervical carcinoma. First, the use of cytological vaginal screening is providing the gynecologic oncologist with younger patients who have an earlier disease to treat. These patients are very favorable surgical candidates. Second, there is an unanswered question regarding the management of patients who are found at radical hysterectomy to have pelvic lymph nodes involved with tumor. Presently most of these patients are receiving postoperative irradiation therapy to the pelvis. The advisability of combining radical surgery with radical radiation must not only be measured in survival results but also in terms of the seriousness of the complications that frequently follow such combined therapy. Third, one might question the advisability of

**TABLE 3**  
**Cancer of Cervix HUP 1955-1969**  
**Radical Hysterectomy—All Cases**

	Total	L	%
Stage I-a	28	24*	85.7
Stage I-b	62	51*	82.3
Stage II-a	8	4	50.0
Stage II-b	4	4	100.0

\* one patient each group lost—considered dead

**TABLE 4**  
**Cancer of Cervix HUP 1955-1969 (5-yr. survival)**

Stage	Negative nodes		Positive nodes	
	L	%	L	%
I-a	24/27*	88.8	0/1	0
I-b	45/50*	90.0	6/12	50.0
II-a	3/4	75.0	1/4	25.0
II-b	2/2	100.0	2/2	100.0

\* one patient in each group lost—considered dead

abandoning the procedure when para-aortic lymph nodes are found to be involved with tumor. The question which needs to be answered is whether such patients are better handled by carrying out the radical hysterectomy procedure, where technically feasible, and then adding pelvis and para-aortic irradiation postoperatively. Answers to the second and third problems need to be obtained, and this probably can best be accomplished through national cooperative study groups.

Finally, if cervical cancer detection programs continue to increase the findings of preinvasive malignancy, with the eradication of invasive cervical cancer, one wonders whether the case load will be sufficient for the maintenance of large numbers of experts in radical pelvic surgery among gynecologic oncologists. Only time will answer this question.

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