CME CREDIT

Radical hysterectomy for cervical cancer: the effect of shorter length of stay on outcome

ALEXANDER W. KENNEDY, MD; GERT PETERSON, RN; LAURIE J. TUASON, MS; JEROME L. BELINSON, MD; KENNETH D. WEBSTER, MD

BACKGROUND The surgical treatment for limited cervical cancer (radical hysterectomy and pelvic lymph node dissection) has remained essentially the same for 40 years, but economic pressures have resulted in shorter length of hospital stay, and precautions against infectious diseases have resulted in less use of blood products

PURPOSE To determine if recent changes in hospital practices have affected outcomes, and if obese patients are at greater risk of complications.

METHODS Retrospective review of 100 surgical cases grouped by time period (1981 through 1987 and 1988 through 1993) and by patient weight (< 80 kg and ≥ 80 kg).

RESULTS Comparing the two time periods, the mean operative time remained the same (199 minutes), but use of blood products declined (mean 2.1 vs 1.5 units; $P < .01$), as did the mean length of hospital stay (10.6 vs 7.4 days, $P < .01$). The rate of postoperative complications decreased significantly ($P < .01$), and the 5-year survival rate remained 91%. Obese patients received more blood transfusions than did nonobese patients (2.6 vs 1.6 units; $P = .02$), but their mean operative time and hospital stay did not significantly differ. The rate of postoperative and long-term complications did not differ significantly between the two weight groups.

CONCLUSIONS Surgical treatment of limited cervical carcinoma continues to be safe and effective.

INDEX TERMS: CERVIX NEOPLASMS; HYSTERECTOMY; POSTOPERATIVE COMPLICATIONS CLEVE CLIN J MED 1995; 62:193–197

From the Department of Gynecology, Section of Oncology (A.W.K., G.P., J.L.B., K.D.W.) and the Department of Biostatistics and Epidemiology (L.J.T.), The Cleveland Clinic Foundation.

Address reprint requests to A.W.K., Department of Gynecology, A81, The Cleveland Clinic Foundation, 9500 Euclid Avenue, Cleveland, OH 44195.

INVASIVE CERVICAL cancer causes substantial morbidity and mortality. Although the incidence of cervical cancer has decreased in the United States, at least partially as the result of improved cytologic screening, its worldwide incidence continues to increase.

For patients with disease that extends beyond the cervix, radiation therapy has become the standard treatment, and surgery plays little if any role in the primary management of these patients. Substantial controversy exists regarding the merits of surgery vs radiotherapy in patients with cancer limited to the cervix. The International Federation of Gynecologists and Obstetricians (FIGO) and the Society of Gynecologic Oncologists both use strict criteria to define early invasive ("microinvasive") lesions that can be successfully treated with limited surgery, including standard total hysterectomy or conization. Patients with invasion beyond the criteria for microinvasion (FIGO stage IB) can generally be treated equally well with either radical surgery or radiation ther-

apy. Surgical therapy is often selected for young patients because of its greater expediency and fewer long-term complications.

Radical surgical extirpation of cancers of the uterine cervix has been accepted practice for many years. Wertheim[1] is generally credited with developing surgery for cervical cancer in the early 1900s in Austria. Subsequent modification by Meigs[2] in the 1930s and early 1940s further developed the procedure of radical hysterectomy and pelvic lymph-node dissection as it is practiced in the United States today. The Meigs procedure is also now referred to as a "type III" hysterectomy.[3] Recently, Averette et al[4] reviewed reports published since 1970 and calculated that the overall 5-year survival rate of patients with stage IB and IIA cervical cancer treated primarily with this procedure was 88%. The operative mortality rate was 0.72%, and the incidence of urinary-tract fistulas was 4.4%. The latter figures attest to the potential for significant complications during such radical pelvic surgery.

Surgeons in the United States now face additional challenges in their management of cancer patients. First, as a result of increasing economic constraints, they have had to reduce the length of hospital stay and the costs associated with operative procedures. As a result, most patients now do not enter the hospital until the day of surgery, and they are sent home sooner than they used to be. Postoperative procedures previously provided in the hospital have now, in many cases, been relegated to the patient or her family under the supervision of a home health worker. Second, because of increasing concern over the transmission of human immunodeficiency virus and other infectious agents, efforts have increased to limit blood transfusions or avoid them altogether.[5] This restriction may cause intraoperative problems and also increase the incidence of postoperative anemia and other complications.

To determine if recent changes in hospital practices have resulted in increased short-term or long-term morbidity and if patient survival has been compromised, we reviewed the experience of one surgeon in performing 100 consecutive radical hysterectomies for the primary treatment of FIGO stage IB and IIA cervical cancer. Additionally, we wanted to study the effect of newer transfusion policies on the use of blood products. Finally, we examined the outcomes of obese patients to review these same issues in a high-risk group and to confirm recent reports that obese patients who undergo radical hysterectomy experience more perioperative morbidity than do nonobese patients, but have the same rate of long-term complications.[6,7]

METHODS

The patients studied were 100 women who underwent radical hysterectomy with pelvic lymph-node dissection as primary therapy for FIGO stage IB and IIA cervical carcinoma. All patients underwent surgery at The Cleveland Clinic Foundation from December 1981 through May 1993, and all surgical procedures were performed by one author (A.W.K.) (since 1985, with the assistance of post-residency fellows in gynecologic surgery).

Each chart was reviewed, and details of the operation and the postoperative course were abstracted. The duration of the operation was determined from the anesthesia record. A.W.K. estimated the blood lost at the end of each operation. Pathologic findings were based on review of original reports, and slides were not reviewed. All histologic subtypes of cervical carcinoma were included in the study, including squamous cell carcinoma, adenocarcinoma, mixed carcinoma, undifferentiated carcinoma, and small cell carcinoma. The operative technique employed has been described by Morley and Seski.[8] Follow-up information was obtained from chart review, from the hospital tumor registry, and from the patient, as needed. Postoperative complications were defined as occurring while the patient was still in the hospital; long-term complications occurred after discharge. The study periods of 1981 through 1987 and 1988 through 1993 were selected to divide the patients as equally as possible into two groups.

The abstracted data were managed with SAS software (Cary, NC). Fisher's exact test (two-tailed) was used to analyze categorical data; the remaining numerical data were analyzed by the Wilcoxon rank-sum test. Survival was estimated by the method of Kaplan and Meier, and statistical comparisons were made using the log-rank test.

RESULTS

The average age of the 100 study patients was 46.5 years, and there were 96 FIGO stage IB tumors and four stage IIA tumors. The histologic subtypes were as follows: 70 patients had squamous cell carcinoma, 18 had adenocarcinoma, 10 had adeno-squamous

carcinoma, and two had small cell cancer. The mean follow-up time was 41 months. Patients who underwent surgery after January 1, 1991, were not included in any survival analysis because of their short follow-up. After surgery, 26 patients received adjuvant radiotherapy to the pelvis because of extensive lymphatic vascular involvement of the cervix (n = 12), positive pelvic lymph nodes (n = 11), or limited surgical margins (n = 3). A total of 14 patients had positive lymph nodes.

TABLE 1
MAJOR OPERATIVE EVENTS DURING TWO STUDY TIME PERIODS*

Variable	1981–1987 (n = 47)	1988–1993 (n = 53)	P value
Mean operative time, minutes	199 ± 36	198 ± 39	NS†
Mean intraoperative transfusion, units	1.0 ± 1.3	0.7 ± 1.3	NS
Mean postoperative transfusion, units	1.2 ± 1.1‡	0.7 ± 1.1	.03
Mean total transfusion, units	2.1 ± 1.3‡	1.5 ± 1.5	< .01
Patients who received transfusions, %	85	66	.04
Mean estimated blood loss, mL	830 ± 374	890 ± 482	NS
Mean hospital stay, days	10.6 ± 5.2‡	7.4 ± 1.5	< .01
Urinary catheter, days	12.7 ± 10.3‡	10.1 ± 5.4	NS
Patients requiring intermittent self-catheterization, %	39	60	.04

*Values represent mean ± standard deviation, except where indicated
†NS = not significant, $P \geq .05$
‡n = 46 after exclusion of one patient (see text)

TABLE 2
MAJOR OPERATIVE EVENTS ACCORDING TO PATIENT WEIGHT GROUP*

Variable	< 80 kg (n = 81)	≥ 80 kg (n = 18)	P value
Mean operative time, minutes	196 ± 34	208 ± 49	NS†
Mean intraoperative transfusion, units	0.7 ± 1.1	1.6 ± 2.0	NS
Mean postoperative transfusion, units	0.9 ± 1.1‡	1.1 ± 1.0	NS
Mean total transfusion, units	1.6 ± 1.3‡	2.6 ± 1.7	.02
Mean estimated blood loss, mL	790 ± 347	1147 ± 626	.01
Patients who received transfusions, %	70	94	.04
Mean hospital stay, days	10.8 ± 4.4‡	8.1 ± 1.3	NS

*Values represent mean ± standard deviation, except where indicated
†NS = not significant, $P \geq .05$
‡n = 80 after exclusion of one patient (see text)

Table 1 compares the mean operative time and information about blood transfusions, hospital stay, and urinary catheter management in the two study time periods. The more recent (1988 to 1993) group required transfusion less often and received fewer units of blood, although they lost a similar amount of blood. A single patient in the first time period experienced a protracted postoperative course (148 days), with multiple surgeries and systemic infections. This patient was not included in the analysis of postoperative transfusions, hospital stay, or urinary catheter management, as this would have unfairly inflated the data and biased comparison with more recent patients.

The mean hospital stay decreased by 3.2 days during this study. More patients required intermittent self-catheterization in the more recent group, as the mean time for an indwelling catheter decreased by 2.6 days (not statistically significant).

Comparison of the two study groups did not reveal any significant differences in mean age, cervical diameter, or prevalence of obesity, factors that might alter a patient's risk for complications. Thirty-one patients experienced at least one major postoperative complication including fever of unknown cause (23%), atelectasis (9%), urinary tract infection (7%), deep-vein thrombophlebitis (3%), and wound infection (2%). There was no postoperative mortality. The rate of postoperative complications decreased significantly ($P < .01$) over the two study periods. Thirty patients experienced at least one long-term complication, including lower-extremity lymphedema (8%), recurrent urinary tract infection (7%), and pelvic lymphocyst (5%). There were three urinary tract fistulas (two ureterovaginal and one vesicovaginal). There was no significant difference in the incidence of long-term complications between the two time periods.

Table 2 reviews major operative events based on preoperative weight for the 99 patients who had weight recorded in their preoperative assessment. Obese patients received more blood transfusions,

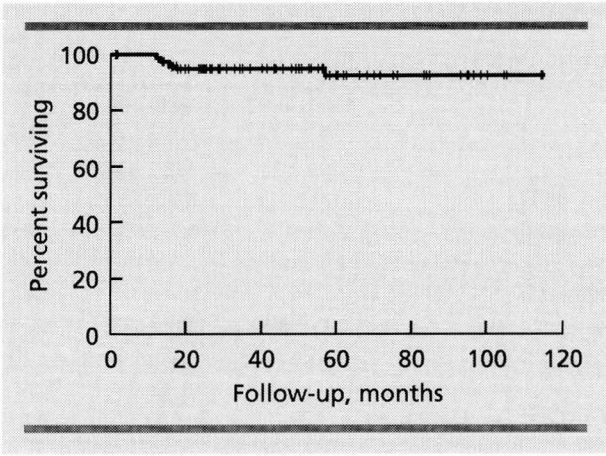

FIGURE. Kaplan-Meier survival curve for the 77 patients who underwent surgery before January 1, 1991. The 5-year survival probability was 91%.

but their mean operative time and hospital stay did not differ significantly from that of nonobese patients. The rate of postoperative and long-term complications did not differ significantly between the two groups.

The 68 patients who had a mushroom catheter placed through the vaginal apex for drainage had the drain in place for a mean of 3.4 days, while the 32 patients with closed-suction retroperitoneal drains had them in place for a mean of 7.5 days ($P < .01$). There was no significant difference in the rates of postoperative or long-term complications between the two groups.

Finally, among the 77 patients with at least 2 years of follow-up, the 5-year survival probability was 91% (*Figure*). We detected no difference in survival between the two time intervals or the two weight groups. The eight patients with positive pelvic lymph nodes who underwent surgery before January 1, 1991, achieved a 5-year estimated survival probability of 88%. Five of these patients underwent postoperative pelvic radiotherapy.

DISCUSSION

When Meigs described his practices in the 1930s and early 1940s, patients entered the hospital 4 days before surgery and remained in bed for 14 days afterwards.[2] He did not comment on the total length of their hospital stay. In their experience from 1945 to 1975 at the University of Michigan, Morley and Seski reported an average hospital stay of 10 days and a postoperative mortality rate of 1.4%.[8] The corrected 5-year survival rate of their patients was 90.9%. Our series reflects the outcomes of the Michigan technique of radical hysterectomy in an era of increasing cost containment.

In our series, the mean operative time of 199 minutes remained the same for the 1981-to-1987 and the 1988-to-1993 groups. It is also remarkably similar to the median operative time of 195 minutes reported by Morley and Seski.[8] Given that the operative time has not changed dramatically in the last 40 years, it is unlikely to do so in the foreseeable future. Throughout our study, preoperative testing consisted of only routine blood work, electrocardiography, chest roentgenography, and intravenous urography.

However, other aspects of the surgical procedures have recently changed. In our study, the mean hospital stay significantly decreased by 3.2 days, from 10.6 days in the earlier group to 7.4 days in the later group (*Table 1*). Likewise, fewer patients now receive transfusions. In our study, most of this decrease reflected fewer postoperative transfusions (0.6 units mean) as a result of more stringent criteria for blood use.[5] Because hospital stays are now shorter, patients have indwelling urinary catheters for a shorter time, but more (60%) require intermittent self-catheterization. Vaginal drains seem as effective as retroperitoneal drains and require less time in place, as others have reported.[9]

It is most reassuring that, despite the many changes in patient care, overall patient outcome has not been detrimentally affected. The 5-year probability of survival remains 91%, and neither postoperative nor long-term complications have increased. The decrease in short-term postoperative complications may be the result of improved prophylaxis and operator skill and earlier patient mobilization, perhaps related to the introduction of patient-controlled analgesia.

Two recent reports demonstrate that obese patients tolerate radical hysterectomy reasonably well, but have a longer operative time, lose more blood, and need more transfusions than do nonobese patients.[6,7] Our results support these findings, although the difference in operative time (12 minutes) was not significant. Obese patients required more blood transfusions, mostly during surgery (*Table 2*). All but one of the obese patients required a transfusion, and we now routinely advise obese patients to prepare for autologous transfusion. Nevertheless, the long-term complication and survival rates for obese patients are

satisfactory, and we continue to offer selected obese patients the option of radical hysterectomy.

Controversy continues regarding the efficacy of postoperative radiotherapy in patients who have undergone radical hysterectomy for early cervical cancer.[10] In the present series, only one of 26 irradiated patients required later surgery for small-bowel complications, but three (12%) did develop severe pedal lymphedema. Twelve patients in the early study period received postoperative radiotherapy, compared with 14 in the later period. This therapy therefore seems to be acceptably tolerated, but larger series will need to address the question of efficacy.

SUMMARY

Radical hysterectomy and pelvic lymph-node dissection for the treatment of limited cervical carcinoma continues to be safe and effective. The changes in practice resulting from shortened hospital stays and other cost-containment measures do not seem to have negatively affected eventual patient outcome. Measures to limit blood use have decreased the number of postoperative transfusions, but most patients still require transfusion, and autologous transfusion should be used whenever feasible. Selected obese patients can also undergo surgery for early cervical cancer. Further reductions in resource consumption will likely require the more widespread application of endoscopic procedures for radical pelvic surgery.

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