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Laparoscopic Versus Abdominal Hysterectomy for Endometrial Cancer:

Comparison of Patient Outcomes

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Abstract

Objective—To compare the demographics, cancer characteristics, and hospital outcomes of endometrial cancer patients undergoing a laparoscopically assisted vaginal hysterectomy (LAVH) versus a total abdominal hysterectomy (TAH).

Methods—Two California population databases (Office of Statewide Health Planning and Development and the California Cancer Registry) were linked using patient identifiers. Patients who underwent endometrial cancer surgery from 1997 to 2001 were identified. The combined database was queried for type of surgery, patient demographics, hospital outcomes, comorbidities, and cancer characteristics. Statistical analyses included the *t* test, χ^2 test, and logistic regression.

Results—In this study, 978 endometrial cancer patients (7.7%) had an LAVH and 11,765 (92.3%) had a TAH. The mean ages for the 2 groups were 63.3 and 64.8 years, respectively. Lymphadenectomy was performed more frequently in LAVH patients compared with TAH patients (45.6 vs 41.1%; $P = 0.006$). Patients undergoing LAVH were more likely to be younger and healthier and have stage 1 or grade 1 disease ($P < 0.0001$). Total abdominal hysterectomy patients were more likely to have significant medical comorbidities. Mean length of stay for LAVH was 2.40 versus 4.36 days for TAH ($P < 0.001$), but mean hospital charges were comparable. Perioperative complications such as vascular and bowel injuries, pulmonary embolism, wound problems, and transfusions were significantly more common in TAH patients.

Conclusion—Surgeons seem to carefully select endometrial cancer patients for laparoscopic surgery. Although surgical staging was performed in less than 50% of endometrial cancer patients, the rate was not worse in laparoscopic procedures. Short-term hospital complications were less common in the laparoscopy group.

Keywords

Laparoscopy; Abdominal hysterectomy; Endometrial cancer; Patient outcomes

Endometrial cancer surgeries have been traditionally performed via laparotomy to accomplish a total abdominal hysterectomy (TAH) and surgical staging of retroperitoneal lymph nodes. The Gynecologic Oncology Group (GOG) protocol 33 helped establish that endometrial cancer should be a surgicopathologically staged disease because of the 22% incidence of extrauterine disease in clinical stage 1 patients.¹ This GOG study also defined the risk and pattern of spread of nodal metastases in endometrial cancer.^{1,2} Consequently, surgical assessment of the pelvic and paraaortic lymph nodes is the standard of care for most patients with operable endometrial cancer.

Childers and Surwit³ were the first authors to report the use of laparoscopically assisted vaginal hysterectomy (LAVH) with laparoscopic staging of pelvic and paraaortic lymph nodes in 1992 for treatment of early-stage endometrial cancer. Since that time, numerous reports have supported the equivalency of laparoscopic nodal staging compared with traditional open surgical staging for endometrial cancer⁴⁻⁹ that parallels the acceptable surgical standards defined by GOG.

Numerous authors have reported their institutional experience with laparoscopic surgery for endometrial cancer^{6-8,10-15}. These reports tend to emphasize the similarities between patients who undergo LAVH and patients who undergo TAH procedures. Characteristics such as age, weight, histology, and thoroughness of surgical staging were often equivalent in these reports, with advantages in the LAVH group such as decreased postoperative stays, decreased hospital charges/costs, and improved quality of life. However, it may reflect the experiences of a limited number of expert laparoscopic surgeons rather than what might be expected among all surgeons who manage endometrial cancer patients. Certainly, even proponents of laparoscopic surgery readily admit to a substantial learning curve necessary to obtain these beneficial outcomes,^{9,16-18} which leads to a bias regarding patient selection for laparoscopic surgery.

We were interested to see if endometrial cancer patients who underwent laparoscopic surgery were similar to those who received a traditional abdominal procedure. We used the California Cancer Registry (CCR), which is a large, well-validated tumor registry linked to another large database that contains rich details about California hospital discharges, to examine these issues. This population-based study broadly reflects actual community experience rather than narrower institutional reports. This combined database allowed us to compare patient demographics, medical comorbidities, cancer characteristics, and hospital outcomes in the endometrial cancer patients who underwent a laparoscopy versus laparotomy procedure.

Materials and Methods

We obtained approval for the conduct of this investigation from the University of California, Davis, Medical Center Human Subjects Review Committee; the California Office of

Statewide Health Planning and Development (OSHPD); and the State of California Committee for the Protection of Human Subjects.

This is a retrospective, cohort analysis of California endometrial cancer patients from 1997 to 2001. We linked 2 large population-based California databases (hospital discharge records from the California OSHPD and the CCR) together using patient identifiers to establish 1 large database for this study, using methodology that has been described previously.^{19–21} The CCR database is a well-validated registry with a rate of cancer reporting approaching 100%.²²

Hospital discharge data from OSHPD include primary and secondary diagnoses plus procedures using codes from the *International Classification of Diseases, Ninth Revision, Clinical Modification*²³ (ICD-9-CM). The CCR is California's statewide population-based cancer surveillance system, with detailed information on more than 1.3 million cases of cancer collected since 1985. Endometrial cancer cases were selected from the CCR database, using the ICD-9-CM code 182.0. Only epithelial adenocarcinomas were included in the analysis, excluding rare histologies and uterine sarcomas. The histology codes from the *International Classification of Diseases for Oncology*²⁴ included 8000, 8010, 8050, 8140, 8210, 8260, 8310, 8481, 8323, 8380, 8441, 8460, 8461, 8560, and 8570.

Surgical procedures were identified from the OSHPD hospital discharge database, using ICD-9-CM procedural codes. Laparoscopically assisted vaginal hysterectomy is coded as 68.51, and TAH is 68.4. Laparoscopically assisted vaginal hysterectomy did not have a unique ICD-9 code before 1997, making identification of these earlier cases inconsistent and problematic. Lymphadenectomy codes included 40.2 (simple excision of lymphatic structure), 40.3 (regional lymph node excision), 40.52 (radical excision of paraaortic lymph nodes), 40.53 (radical excision of iliac lymph nodes), and 40.50 (radical excision of lymph nodes, not otherwise specified), but these do not differentiate between open and laparoscopic lymphadenectomy. We assumed that if the patient underwent an LAVH, then the lymph node assessment was also laparoscopic. We only included endometrial cancer patients who had either an LAVH or a TAH with or without a staging procedure on the same date and therefore did not include patients who may have undergone a staging procedure for endometrial cancer separate from their original hysterectomy procedure.

The status of the excised lymph nodes was obtained from the CCR portion of the linked database. This included the number of identified lymph nodes from the pathology report, and the number of lymph nodes with metastatic disease (positive lymph nodes).

We analyzed the following demographic factors from the combined database: patient age, race/ethnicity, socioeconomic status (SES), and insurance type. The hospital discharges were queried for secondary diagnoses including medical comorbidities, hospital complications, and hospitalization characteristics such as length of stay, readmissions, blood transfusions, mortality, and hospital charges. Cancer characteristics such as tumor grade, stage, and nodal status were recorded. Cancer stage at diagnosis was coded according to Surveillance, Epidemiology, End Results (SEER) guidelines,^{25, 26} using SEER Summary Stage categorized as localized, regional, or remote. The SEER summary stage data are

assigned after surgicopathological staging, similar to FIGO staging for endometrial cancer. Localized cancer is comparable to FIGO stage 1 disease.

The Mantel-Haenszel age- and race-adjusted odds ratios were calculated using logistic regression to describe the risk of various endometrial cancer outcomes; χ^2 and Student *t* tests were used to test the differences of clinical outcomes between comparison groups. All the analyses were done by using SAS software (V8.2; SAS Institute Inc, Cary, NC).

Results

During the study period, we identified 978 patients (7.7%) who underwent an LAVH and 11,765 patients (92.3%) who had a TAH. The annual rates for LAVH were stable over the study period and therefore are not reported separately. The demographics of the endometrial cancer patients are noted in Table 1. The 2 groups differed in all measured variables. The mean ages of the LAVH and TAH patients were 63.3 and 64.8 years, respectively ($P = 0.0002$). Also, the LAVH group had fewer patients older than 70 years compared with the TAH group (29.1 vs 36.7%; $P < 0.0001$). Laparoscopically assisted vaginal hysterectomy patients were more likely to be non-Hispanic white, have private insurance, and have a higher SES than TAH patients.

We considered the endometrial cancer patients to have medical comorbidities if they were listed as secondary diagnoses during their hospitalization treatment. The incidence of several specific comorbidities was statistically different between patients who underwent LAVH and patients who underwent TAH. These comorbidities are shown in Table 2 and include cardiovascular disease, diabetes, obesity, and anemia. Without exception, all of the listed comorbidities were more common in the group who underwent TAH. Several other comorbidities were not found to be significantly different between the 2 groups, including valvular disease, paralysis/neurological diseases, chronic pulmonary disease, hypothyroidism, liver disease, peptic ulcers, rheumatoid disease, coagulopathy, weight loss, alcohol abuse, and psychiatric disorders (data not shown in the table).

The lymphadenectomy types performed in association with either the LAVH or TAH procedures are noted in Table 3 and were obtained from the hospital discharge/OSHPD portion of the linked databases. With both hysterectomy types, the majority of lymphadenectomies were coded as either simple excision of lymphatic structure or regional lymph node excisions. Overall, the rate of lymph node assessment was greater in the LAVH group than the TAH group (45.5 vs 41.1 %; $P = 0.0055$), which seems largely due to a higher rate of regional lymph excisions in the LAVH group.

The stage, grade, and lymph node status of the cancers in these 2 cohorts are presented in Table 4. Staging information was available on all but 111 of the patients. The stage distribution was significantly different between the 2 groups using the χ^2 test ($P < 0.0001$). The LAVH group was more likely to have localized disease (84.4%) compared with the TAH group (75.5%). Conversely, the TAH patients were more likely to have both regional and distant metastases compared with the LAVH patients. Similarly, the grade distribution was significantly different between the 2 groups by the χ^2 test ($P < 0.0001$), with the LAVH

patients being more likely to have grade 1 cancer and the TAH patients more likely to have higher grade cancers. There was no difference in the percentage of LAVH versus TAH patients who had identified lymph nodes on the pathology report noted in the CCR portion of the linked databases (37.8% vs 35.6%; $P = 0.09$). The mean number of lymph nodes identified was higher in the LAVH patients than the TAH patients (8.2 vs 5.8; $P < 0.001$; data not shown in the table). The rate of nodal positivity was higher in the TAH group (6.7%) versus the LAVH group (4.0%).

Hospital outcomes were evaluated in the endometrial cancer patients and are shown in Table 5. Laparoscopically assisted vaginal hysterectomy patients had a shorter mean hospital length of stay compared with the TAH patients (2.40 vs 4.36 days; $P < 0.001$). There seemed to be a trend toward higher hospital charges in the LAVH versus TAH patients, but this was not statistically significant (\$23,181 vs \$21,193; $P = 0.074$). Perioperative complications were far more common in the TAH patients than the LAVH patients, including vascular, intestinal, and pulmonary embolism; wound complications; and blood transfusions. Readmissions and deaths (either during the initial hospitalization or at readmission) were not different between the 2 groups. Readmissions occurred in about 5% to 6% of all endometrial cancer cases. Conversions from a laparoscopic procedure to an open abdominal procedure were identified in 154 patients using the ICD-9 procedural code V64.41.

Discussion

In California, LAVH was performed on less than 8% of endometrial cancer patients in the period 1997 to 2001. There were significant differences in the types of patients undergoing LAVH versus TAH for endometrial cancer treatment. These differences were reflected in patient demographics, medical comorbidities, and cancer characteristics, all of which tended to favor healthier, low-risk patients for the laparoscopic procedures. The demographic data show that patients undergoing laparoscopic surgery were usually white and more likely to have private insurance and have a higher SES than laparotomy patients. Laparoscopically assisted vaginal hysterectomy patients were younger than TAH patients and had fewer reported significant medical comorbidities such as diabetes, hypertension, obesity, and heart disease. We expect that the use of secondary diagnoses from the hospital discharge database as an indicator of medical comorbidities underestimated the true incidence, because only the most severe medical illnesses were probably recorded by the attending physician and hospital abstractor(s).²⁷ It is likely that if the medical condition warranted a secondary diagnosis, then it was also clinically significant.

Many of our study results differ compared with other reported series and may reflect differences in study populations. Most laparoscopic studies are either case series or, less commonly, randomized clinical trials comparing clinical outcomes between laparoscopic versus laparotomy surgeries (eg, the recent reports from the GOG Lap 2 study [Walker JL, abstract presented at the 2006 Annual Meeting of the Society of Gynecologic Oncologists]). In these cases, selection bias can occur, either because of practice referral patterns or the eligibility criteria for a study. In contrast, our population-based study reports the clinical outcomes as reflected in the community (in this case, California). Because cancer is a

reportable disease in California, and the proportion of all cancer cases reported in the CCR approaches 100%²²(due to hospital tumor registry reporting), there is little selection bias regarding which patients are included in the database.

Authors of previous studies tended to emphasize similarities in the types of endometrial cancer patients selected for laparoscopy compared with open procedures.^{6,8,11} Other studies have reported that neither obesity^{28–30} nor being elderly^{15,31} is a contraindication for laparoscopic surgery. Therefore, why did our study show such marked differences in the types of patients who receive an LAVH compared with a TAH?

The answer likely reflects the characteristics of patients who are afflicted with endometrial cancer. Common risk factors associated with endometrial cancer that might affect perioperative management include older age, hypertension, diabetes mellitus, and especially obesity.^{32,33} Everett et al³⁴ have reported the following rates for these associated comorbid medical conditions including hypertension (42.7%), diabetes (22%), coronary artery disease (10.4%), pulmonary disease (9.6%), arrhythmia (7.3%), and hypothyroidism (7.6%). These factors, especially if severe, would appropriately determine the medical suitability for any surgery and anesthesia and influence the surgical approach. Although some published studies with experienced laparoscopic surgeons support the ability to perform either an LAVH or a TAH for the treatment of endometrial cancer despite comorbid conditions, our data suggest that many surgeons (at least in California) consider the same comorbid factors when selecting surgical options for these patients.

The issue of obesity illustrates the limitations of surgical approach and rigorousness of surgical staging. By convention, relative degrees of obesity have been defined as normal weight (body mass index [BMI], <30 kg/m²), obese (BMI, 30–40 kg/m²), and morbidly obese (BMI, >40 kg/m²). When performed by a gynecologic oncologist, surgical staging for endometrial cancer is feasible and safe for most patients, even when morbidly obese. Everett et al³⁴ noted that their total lymph node count in surgically staged patients was not limited simply because of obesity (average of 16 nodes recovered regardless whether the BMI is <30 vs >40 kg/m²); however, the likelihood that pelvic and paraaortic nodes both were assessed dropped from 5.6% (BMI, <30 kg/m²) to 1.9% (BMI, >40 kg/m²).³⁴ In their series, laparoscopic lymphadenectomy was done infrequently, but when performed the rate dropped from 3.1% (BMI, <30 kg/m²) to 0 (BMI, >40 kg/m²). In the series of Pavelka et al,³⁵ the rate of aortic lymphadenectomy dropped from 74% if the BMI is less than 30 kg/m² to 48% if the BMI is more than 40 kg/m², but when performed, the aortic node counts were similar (7 vs 6). The reasons for decreasing rate of aortic node sampling in morbidly obese patients were not stated, but likely reflects the higher rate of grade 1 disease (71%)³⁵ and increased surgical difficulty.

The feasibility of laparoscopic retroperitoneal lymphadenectomy has been demonstrated repeatedly.^{4,9,18,31,36,37} However, the success of laparoscopic pelvic and paraaortic lymphadenectomy has been variable, and relative obesity seems to be a similar key factor. For example, Scribner et al¹⁸ reported that laparoscopic lymphadenectomy was successful in 82.1% of patients with a Quetelet index of less than 35 and only 44.4% when greater than 35, in the GOG Lap 2 study randomizing endometrial cancer patients to either LAVH plus

lymphadenectomy versus TAH plus lymphadenectomy, the success rate of completing the laparoscopic lymphadenectomy dropped significantly as the weight increased, such that at a BMI of 35 kg/m², the success rate was 65% and fell rapidly from there. This likely reflects that obesity is a persistent technical challenge, even for experienced surgeons.

Notable in our study, surgeons who performed laparoscopic surgery had a rate of lymph node assessment that was at least equivalent to when an abdominal operation was performed (45.5 vs 41.1%, respectively). Also, there was a higher lymph node count in the LAVH versus the TAH groups (mean, 8.2 vs 5.8 nodes). The rate of surgical staging was no worse than those who underwent a TAH, despite that LAVH endometrial cancer patients had lower grade and lower stage disease compared with the TAH patterns. This likely reflects a strong commitment for surgical staging by the laparoscopic surgeons, and/or it may be that the endometrial cancer patients who underwent an LAVH were healthier and less obese.

We note that the rate of lymphadenectomies (for both laparoscopic and abdominal surgeries) as obtained by ICD-V codes was higher than the rate of identified lymph nodes from the pathology report (Table 4). The explanation for this discrepancy is somewhat elusive, but likely reflects the different sources of information obtained (OSHPD database vs CCR database) and possibly less accurate data from the hospital discharge abstracting. Of note, we find it very worrisome that a minority of endometrial cancer patients in California undergo surgical staging despite well-publicized guidelines from the American College of Obstetricians and Gynecologists and National Comprehensive Cancer Network (Orr et al, Management of endometrial cancer. ACOG Practice Bulletin no. 65 [2005]; and Greer et al. NCCN guidelines—uterine cancers. [Rockledge, PA [2006]). Currently, many endometrial cancer patients are managed by nongynecologic oncologists, which may explain the low rate of surgical staging. Although the rate of surgical staging with laparoscopic surgeries is not inferior to abdominal surgeries, neither does it meet published standards. We anticipate that as laparoscopic expertise with management of endometrial cancer increases, adherence to surgical staging standards will improve.

The hospital outcomes in our study support the common view that patients who have laparoscopic surgery have better short-term outcomes based on hospital length of stay and fewer perioperative complications compared with laparotomy. The hospital duration was significantly shorter in the LAVH patients versus the TAH patients, consistent with other studies.^{6-8,11,14} Postoperative complications such as wound infections, blood transfusions, and medical complications such as pulmonary embolism favor the patients who undergo laparoscopic surgery, consistent with the results from GOG Lap 2 and other studies.^{11,13} These findings support the contention that patients who have a successful laparoscopic surgery benefit from a shorter hospital stay and fewer postoperative complications compared with those who have abdominal procedure. However, patients who require conversion from a laparoscopic to an abdominal approach to complete the procedure are more likely to have significant perioperative complications compared with those who have a successful laparoscopic procedure or even an initial abdominal procedure based on the initial GOG LAP 2 results. This includes higher rates of pulmonary embolism, congestive heart failure, ileus, and wound problems. Although the initial randomization of endometrial cancer patients in the LAP 2 study included balancing for patient weight, patients who were

converted to open procedures were significantly heavier than those patients who had either successful laparoscopic or initial open surgeries. Although it is undetermined if the increased postoperative complications were due to the conversion or were inherent patient characteristics, it nevertheless reinforces the issue of appropriate selection of laparoscopic candidates.

In our study, hospital charges were not statistically different between the 2 surgical approaches, with a trend toward higher charges for the laparoscopic patients. The increased charges associated with laparoscopic surgeries are generally attributed to increased time in the operating room and high cost of disposable laparoscopic instruments, which may obviate any potential cost savings from shorter hospital stay.^{6,28} In 2 studies that showed a cost savings favoring laparoscopic surgery,^{8,12} the average hospital duration for the abdominal surgery was greater than 6 days, which is nearly 50% greater than the average length of stay in our study (4.36 days) and may account for the increased expenses for the TAH groups seen in those studies. Since the study concluded in 2001, it is possible that these costs may have diminished because of faster surgical times (surgeon experience) and decreased equipment costs.

In summary, laparoscopic surgery seems to be a viable effective alternative to standard abdominal surgery for endometrial cancer with rates of surgical staging that are apparently comparable. Patients who undergo an LAVH for endometrial cancer have fewer perioperative complications and shorter hospital stay compared with TAH patients. However, as currently practiced, surgeons seem to carefully choose which endometrial cancer patients are offered laparoscopic surgery based on favorable characteristics such as patient demographics, medical comorbidities, and cancer characteristics.

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Table 1
Demographic variables of endometrial cancer patients, 1997 to 2001

Procedure Type						
Variables	LAVH (n = 978)		TAH (n = 11,765)		P*	
	n	%	n	%		
Age <70 y at diagnosis	285	29.1	4318	36.7	<0.0001	
Race/ethnicity					<0.0001	
Non-Hispanic white	818	83.6	8892	75.6		
Non-Hispanic black	11	1.1	472	4.0		
Hispanic	76	7.8	1468	12.5		
Asian/Pacific Islander	67	6.9	877	7.5		
Unknown/other	6	0.6	56	0.5		
Insurance					<0.0001	
Private	629	64.3	6840	58.1		
Public	295	30.2	4231	36.0		
No insurance	7	0.7	223	1.9		
Unknown	47	4.8	471	4.0		
Quintile of SES scale					<0.0001	
Lower 20%	48	4.9	1476	12.5		
20% 40%	123	12.6	2127	18.1		
40% 60%	190	19.4	2644	22.5		
60% 80%	219	22.4	2696	22.9		
80% 100%	398	40.7	2822	24.0		

* χ^2 Test for differences among categories, comparing LAVH and TAH endometrial cancer patients.

Table 2
Reported comorbidities of endometrial cancer patients, 1997 to 2001

Comorbidities	Procedure Type					
	LAVH			TAH		
	n	%	n	%	n	P*
Congestive heart failure	16	1.6	477	4.1		0.002
Peripheral vascular disease	5	0.5	210	1.8		0.003
Chronic hypertension	282	28.8	4715	40.1		0.0001
Diabetes without chronic complications	75	7.7	1729	14.7		0.0001
Diabetes with chronic complications	12	1.2	242	2.1		0.07
Renal failure	1	0.1	67	0.6		0.05
Metastatic cancer	10	1.0	245	2.1		0.02
Obesity	75	7.7	1826	15.5		0.0001
Fluid and electrolyte disorders	73	7.5	1306	11.1		0.0004
Chronic blood loss anemia	14	1.4	393	3.3		0.001
Deficiency anemia	62	6.3	1075	9.1		0.003

* χ^2 Test for differences between groups, comparing LAVH and TAH endometrial cancer patients.

Table 3
Lymphadenectomy type by hysterectomy procedure approach

Lymphadenectomy Type*	Procedure Type					
	LAVH (n = 978)			TAH (n = 11,765)		
	n	%	n	%	n	P
Simple excision of lymphatic structure (40.2x) [†]	108	11.0	1724	14.7	0.002	
Regional lymph node excision (40.3)	299	30.6	2763	23.5	<0.0001	
Radical excision of lymph nodes, any type (40.50, 40.52, 40.53)	50	5.1	451	3.8	0.048	
Radical excision of lymph nodes, not otherwise specified (40.50)	0	0.0	5	0.0	1	
Radical excision of periaortic lymph nodes (40.52)	13	1.3	241	2.0	0.122	
Radical excision of iliac lymph nodes (40.53)	45	4.6	334	2.8	0.002	
Lymphadenectomy, all types (40.2x, 40.3, 40.50, 40.52, 40.53) [‡]	446	45.6	4830	41.1	0.0055	

* Lymphadenectomy type comes from *ICD-9* procedural codes. The data were in the California OSHPD portion of the linked databases (see MATERIALS AND METHODS).

[†] 40.2x Includes all subcategories of simple excision of lymphatic structure(s).

[‡] Total of the lymphadenectomy types contained above.

Table 4

Endometrial cancer characteristics, 1997 to 2001

Variables	Procedure Type					
	LAVH			TAH		
	n	%	n	%	n	p *
SEER summary stage						<0.0001
In situ	14	1.4	212	1.8		
Localized	825	84.4	8887	75.5		
Regional by direct extension	92	9.4	1425	12.1		
Regional by lymph nodes	25	2.6	242	2.1		
Regional by direct extension and lymph nodes	8	0.8	322	2.7		
Remote/distant	11	1.1	569	4.8		
Unspecified	3	0.3	108	0.9		
Histological grade/differentiation						<0.0001
Grade 1, or well differentiated	529	54.1	5001	42.5		
Grade 2, or moderately well differentiated	290	29.7	3997	34.0		
Grade 3, or poorly differentiated	106	10.8	2000	17.0		
Grade 4, or undifferentiated/anaplastic	18	1.8	291	2.5		
Grade and differentiation not stated	35	3.6	476	4.0		
No. patients with lymph nodes identified pathologically	370	37.8	4193	35.6		0.09
Lymph nodes with metastatic cancer	39	4.0	784	6.7		0.001

* χ^2 Test for differences among categories, comparing LAVH and TAH endometrial cancer patients.

Table 5
Risk of adverse hospital outcomes for endometrial cancer patients, 1997 to 2001

Outcomes	Occurrences						P	Adjusted OR (95% CI)
	LAVH		TAH					
	n	%	n	%				
Outcomes								
Readmission within 30 d Complications	52	5.3	697	5.9	0.8360	0.97(0.7–1.3)		
Vascular	28	2.9	531	4.5	0.0566	1.46(1.0–2.1)		
Intestinal	42	4.3	1022	8.7	<.0001	2.11 (1.5–2.9)		
Pulmonary embolism	29	3.0	686	5.8	0.0027	1.79(1.2–2.6)		
Wound complication	22	2.3	642	5.5	0.0016	2.02(1.3–3.1)		
Blood transfusion	60	6.1	1625	13.8	<.0001	2.11 (1.6–2.8)		
Any of the 5 complications	153	15.6	3363	28.6	<.0001	1.91 (1.6–2.3)		
Died during initial hospitalization	1	0.1	51	0.4	0.2431	3.27 (0.5–23.9)		
Died at readmission within 30 d	1	0.1	23	0.2	0.8525	1.21 (0.2–9.1)		

OR, odds ratio; CI, confidence interval.