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Endometriosis after Laparoscopic Supracervical Hysterectomy with Uterine Morcellation: A Case Control Study

Mitchell W. Schuster, MD[1], **Thomas L. Wheeler II, MD, MSPH**[2], and **Holly E. Richter, PhD, MD**[3]

[1]Ob-Gyn Associates, Decatur, AL

[2]Department of Obstetrics and Gynecology, UMG Greenville Hospital Systems, Greenville, SC

[3]Department of Obstetrics and Gynecology, University of Alabama at Birmingham, Birmingham, AL

Abstract

Study Objective—To compare the incidence of new onset endometriosis after laparoscopic supracervical hysterectomy (LSH) with uterine morcellation to traditional routes.

Design—Single center case-control study

Design Classification—Canadian Task Force Classification II-2

Setting—Single Center case-control study of hysterectomies from January, 2006 through December, 2008.

Patients—277 laparoscopic supracervical hysterectomies with morcellation (cases) and 187 transvaginal or abdominal hysterectomies without morcellation (controls) performed from January, 2006 to December 2008.

Interventions—464 women underwent hysterectomy, 277 cases via laparoscopic supracervical approach (LSH) with morcellation and 187 performed either transvaginally or abdominally without morcellation. Repeat operative procedures were performed for other benign indications on 16 of 464 (3.5%) prior hysterectomy patients.

Measurements and Main Results—102 patients had endometriosis at the time of hysterectomy diagnosed by pathologic evaluation or gross visualization. In those without endometriosis, repeat operative procedures were performed for pain and bleeding in 3.3% (12/362). 60% (3/5) of LSH patients and 28.6% (2/7) of the control group were found to have newly diagnosed endometriosis conferring a rate of 1.4% (3/217) for the LSH group and 1.4% (2/145) in the controls. In patients with endometriosis, repeat operative procedures for pain and/or bleeding occurred in 2.9% (3/102); 3/60 of LSH patients and none in the control group (0/42). Two of these 3 patients undergoing a second surgery had recurrent/continued endometriosis.

Corresponding Author: Holly E. Richter, PhD, MD, Department of Obstetrics and Gynecology, University of Alabama at Birmingham, 1700 6th Avenue South, Suite 10382, Birmingham, AL 35233-7333, Tel: 205-934-1704, Fax: 205-975-8893, hrichter@uabmc.edu.

Conclusion—Newly diagnosed endometriosis was noted in 1.4% of patients after hysterectomy with a similar incidence between the LSH and control groups. Reoperation for those with endometriosis at the time of LSH with morcellation was infrequent, but endometriosis was usually found. Further research is needed to delineate risk factors for development of de novo endometriosis after hysterectomy.

Introduction

Hysterectomy continues as one of the most common non-obstetrical surgical procedures performed in the United States. In 2000-2004 an estimated 3.1 million women had hysterectomies for the most common indications including bleeding, symptomatic fibroids and pelvic pain.(1) Since the 1990's the laparoscopic supracervical hysterectomy (LSH) has gained popularity as an approach to perform this operation.(2) Proposed benefits include decreased blood loss and operating room time as well as a quicker return to normal activities. Residency training programs have studied learning curves and assessed the educational parameters involved in obtaining competency with this procedure, (3,4) despite the fact that little level 1 data exists showing short and long-term benefit and cost-effectiveness compared to traditional vaginal and abdominal approaches.

The LSH approach is different from traditional hysterectomy as it requires intra-abdominal morcellation of the corpus of the uterus be performed in order to remove it from the pelvis as the cervix is left *in situ*. Several case reports exist in the literature describing endometriosis after LSH with morcellation of the uterine corpus.(5,6,7) Possible etiologies offered have included that endometriosis was present but not visualized at the time of the original surgery, spillage and seeding of viable endometrial tissue during the morcellation, and retrograde flow from remaining endometrial tissue in the cervical stump.(5,6) This retrograde flow could mimic a mullerian anomaly and studies evaluating obstructing mullerian anomalies demonstrated increased incidence of endometriosis with the incidence of recurrent endometriosis being greater with worsening depth of initial disease. (8,9)

The primary purpose of this report is to compare the incidence of new onset endometriosis after LSH with morcellation of the uterus to traditional hysterectomy routes without morcellation in those patients without endometriosis on pathology. A secondary analysis was performed to describe continued or recurrent endometriosis in women with a diagnosis of endometriosis at the time of hysterectomy. To our knowledge, this is the first study attempting to quantify the incidence of endometriosis after LSH with morcellation.

Materials and Methods

Institutional Review Board approval was obtained. All women undergoing hysterectomy in a single center setting by the same group of board-certified obstetrician/gynecologists were identified by computer generated CPT code from January, 2006 through December, 2008. A total of 464 hysterectomies performed for benign indications were identified; 102 patients had endometriosis diagnosed at the initial hysterectomy by either pathologic evaluation or gross visualization. Separate analyses were performed on those women without endometriosis where the hysterectomies were divided into cases (LSH with morcellation, N=217) or control groups (hysterectomy without morcellation N=145); and in the patients diagnosed with endometriosis with cases, LSH with morcellation, N=60 and control, hysterectomy without morcellation, N=42.

The LSH technique was similar for all surgeons. Coagulation was performed with bipolar electrocoagulation and cutting was completed with harmonic scalpel. Three abdominal ports were used, and a physician assistant was present for each operation. The uterine corpus was

detached from the cervical stump in an inverted cone manner starting at the insertion of the uterosacral ligaments into the cervix and extending down so the point of the cone was at the ectocervix. Typically, the vaginal epithelium was visualized when separating the walls of the cervix during electrocoagulation of the remaining endocervical stump. An electric morcellator was used through an abdominal port for corpus removal.

After hysterectomy, all patients were evaluated by office visits and/or telephone follow-up. Between group comparisons were performed with Analysis of Variance for continuous variables and chi-square or Fisher's exact test, when distributions for chi square assumptions were not met, for categorical variables using JMP 8 (Cary, NC). Previous data found a 6.6% risk of endometriosis following hysterectomy with bilateral salpingo-oophorectomy in women with post operative pelvic pain. (10) Since this hysterectomy population did not necessarily have only pelvic pain, we estimated a theoretical occurrence of endometriosis of 3% in the control group (N=145). Our anecdotal clinical sense at the time of study design was that there would be 10% incidence of endometriosis in the case group (N=217). Based on an alpha of .05, this study had 74% power to detect that difference.

Results

From January, 2006 through December, 2008, 464 women underwent hysterectomy, 277 cases via laparoscopic supracervical approach (LSH) with morcellation and 187 controls performed either transvaginally or abdominally without morcellation. Demographic and clinical characteristics of the 2 groups are presented in Table 1. 102 patients were found to have endometriosis found at the time of hysterectomy by either gross visualization or pathologic confirmation, 60 (21.7%, 95% CI 17.2-26.9%) in the LSH group and 42 (22.5%, 95% CI 17.1-28.9%) in the control hysterectomy group.

Repeat operative procedures were performed for other benign indications on 13 of 362 (3.6%, 95% CI 2.1-6.0%) patients without endometriosis diagnosed at the time of hysterectomy and in 3/102 patients (2.9%, 95% CI 1.0-8.3%) diagnosed with endometriosis, with no difference found in the probability of repeat surgery if endometriosis was found (p=0.75, OR 0.81, 95% CI 0.2-2.9 (Table 2). One patient was excluded from the post-hysterectomy analysis because the peritoneal cavity was not entered for evaluation. Though not a primary outcome, the incidence of post-hysterectomy vaginal bleeding after LSH (including those with or without endometriosis at the time of hysterectomy) was 28/277 (10.1%, 95% CI 7.1-14.2%) and 35/187 (18.7%, 95% CI 13.8-24.9%) in the control hysterectomy group. All of the bleeding in the control group was described as mild related to granulation tissue and with treatment, resolved within 12 weeks of the hysterectomy. The LSH with morcellation group bleeding was described as moderate in 2 patients and spotting or mild in the remainder with cyclic post LSH bleeding seen in 4 patients, 2 years after hysterectomy. Further stratifying post operative bleeding, for those without endometriosis, the post operative bleeding rate was 24/217 (11.1%, 95% CI 7.5-15.9%) in the LSH group and 26/145 (17.9%, 95% CI 12.5-25.0%) in the control group. For those with endometriosis, the post operative bleeding rate was 4/60 (6.7%, 95% CI 2.6-15.9%) in the LSH group and 9/42 (21.4%, 95% CI 11.7-35.9%) in the control group. Only 1 patientwith endometriosis at hysterectomy had continued cyclic bleeding 2 years after LSH.

Of those patients undergoing repeat surgical evaluation without a diagnosis of endometriosis, 3/5 (60%, 95% CI 23.1-88.2%) of the LSH with morcellation group was found to have new onset endometriosis and 2/8 (25.0%, 95% CI 7.1-59%) of the control group was found to have new onset endometriosis. Therefore the incidence of new onset endometriosis diagnosed by laparoscopy after prior hysterectomy was found to be 1.4% for both the LSH with morcellation group (3/217, 95% CI 0.5-4.0%) and the control

hysterectomy group (2/145, 95% CI 0.4-5.8%), p=.998, OR=1 (95% CI 0.2-6.1%). For those with endometriosis found at the time of hysterectomy, 3 patients from the LSH group underwent repeat surgical evaluation, with 2 having continued or recurrent endometriosis; none from the control group. Therefore the incidence of continued or recurrent endometriosis was 3.3% (2/42, 95% CI 0.9-11.3%) for the LSH group and zero for control hysterectomy group, p=0.34.

Discussion

In this case control study, there was no difference in the incidence of new-onset endometriosis between women undergoing a supracervical hysterectomy with uterine morcellation versus those women undergoing traditional vaginal or abdominal hysterectomy whether endometriosis was or was not present at the time of hysterectomy. In women without endometriosis, the rate of new onset endometriosis was low at 1.4%. In women with endometriosis at the time of hysterectomy, the rate of continued or recuurent endometriosis seen at a subsequent indicated surgery was also low at 3.3%, all having undergone an LSH with morcellation, but with no significant difference compared to the control group.

We hypothesized that with uterine morcellation there may be a risk of pelvic seeding of endometrial glands such that in the setting of the correct hormonal or other mediator facilitated milieu, increased implantation of endometrial glands may occur onto the peritoneum or other pelvic structures. This could result in pelvic pain and/or bleeding requiring subsequent diagnostic investigation and treatment. Other investigators have noted endometriosis after LSH. (10-16) It has also been found rarely after traditional hysterectomy without morcellation. (17) After an extensive review of the literature, this is the largest cohort of women to date reviewing the incidence of endometriosis after LSH with morcellation.

In the woman who is prone to forming endometriosis in the face of retrograde menstruation without outflow obstruction, one may ask if uterine morcellation leads to a higher recurrence rate for endometriosis as compared to those undergoing total hysterectomy. In the current patient population with endometriosis diagnosed at the time of hysterectomy, repeat surgery was only performed in 3 patients, all having undergone LSH, with 2 found to have recurrent/ continued endometriosis. However, most likely because of low numbers, the difference is not significantly different between the 2 operative groups.

The strength of this study is the definitive manner of diagnosis of endometriosis after hysterectomy by laparoscopy. Many studies have noted a history of bleeding and pain post hysterectomy, and, in women with a diagnosis of endometriosis at the time of hysterectomy, there has been a noted recurrence of endometriosis of up to 25%. (10) Our findings would suggest that for women with both pain and/or bleeding after any hysterectomy not resolved with conservative management, a laparoscopy for diagnosis should be considered.

The major weakness of this study is the limited numbers of patients who had undergone repeat operative intervention. There was potential inherent bias regarding repeat operative intervention as no protocol was followed regarding operative intervention being performed in all post hysterectomy patients with pain and/or bleeding, and the different surgeons may have managed them with a variety of medical treatments. Another inherent study weakness is the initial selection bias regarding the type of hysterectomy that patients underwent. This is not a randomized trial, although the control group does attempt to minimize this weakness. Most studies to date have been case reports or small observational series.

Additionally, evaluation of the intra-abdominal morcellation suggests the de novo endometriosis may be a result of endometrial seeding and ignores the possibility of

metaplasia, undiagnosed endometriosis at the time of hysterectomy or retrograde menstruation from remaining cervical tissue. The control group helps equalize the metaplasia and undiagnosed endometriosis risks. Regarding retrograde flow, the portion of remaining cervical stroma at LSH was minimal as frequently the vaginal epithelium was visualized at the time of extirpation.

Conclusion

Industry has developed new technology to assist with the morcellation of the uterus when performing a laparoscopic supracervical hysterectomy. This new technology has made the procedure simpler and more accessible to the gynecologist while public perception has increased requests for minimally invasive procedures, whether performed laparoscopically or robotically. Recently, the American Association of Gynecologic Laprraroscopists issued a position statement noting minimally invasive surgery is desirable in women requiring hysterectomy for benign uterine conditions and continued efforts should be taken to facilitate these approaches. (18) These facts combined with the findings of this study highlight the need for prospective, randomized trials that evaluate the short and long term effects of this hysterectomy technique.

Acknowledgments

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Table 1
Demographic and Operative Characteristics of Women Undergoing Hysterectomy

Demographics	All Patients	LSH with Morcellation	Control without Morcellation	P-Value LSH versus Control
N	464	277	187	
ENDOMETRIOSIS AT TIME OF HYSTERECTOMY		*60 (21.7%)*	*42 (22.5%)*	*.838*
AGE	40.2 +/- 9.2	40.1 +/- 7.7	40.6 +/- 11.1	.565
RACE:BLACK/WHITE	49/415	27(9.8%) 250(90.2%)	22(11.8%) 165(88.2%)	.488
PARITY				.029
0	49(10.6%)	32(11.6%)	17(9.0%)	
1	114(24.6%)	68(24.5%)	46(24.6%)	
2	216(46.5%)	139(50.1%)	77(41.1%)	
3	67(14.4%)	31(11.1%)	36(19.3%)	
4	17(3.7%)	6(2.2%)	11(5.9%)	
7	1(.2%)	1(.4%)	0	
UTERINE WEIGHT, GRAMS		112.5 +/- 71.3	147.5 +/- 140.0	.002
TYPE OF PROCEDURE		277	VH 29(6.3%) TAH 78(16.8%) LAVH 50(10.8%) DAVINCI LAVH 30 (6.5%)	
SALPINGO-OOPHORECTOMY				.003
NONE	251 (54.1%)	164 (59.2%)	87 (46.5%)	
UNILATERAL	50 (10.8%)	20 (7.2%)	30 (16%)	
BILATERAL	163 (35.1%)	93 (33.6%)	70 (37.4%)	
HYSTERECTOMY ESTIMATED BLOOD LOSS, ml	72.1 +/- 96.1	42.5 +/- 46.5	115.8 +/- 128.6	<.001
HYSTERECTOMY COMPLICATIONS	18 (3.9%)	6 (2.2%)	12 (6.4%)	.020
PAIN OR DYS-MENORRHEA PRIOR TO HYSTERECTOMY	309 (66.6%)	180 (65.0%)	129 (69.0%)	.370

Table 2
Characteristics of Women Undergoing Re-operation

Hysterectomy Type (no endometriosis)	Indication for Second Operation	Primary Operative Findings
LSH with Morcellation	Pelvic Pain	Endometriosis
LSH with Morcellation	Cervical Bleeding	Normal Anatomy
LSH with Morcellation	Pelvic Pain	Serous Cystadenoma
LSH with Morcellation	Pelvic Pain	Endometriosis
LSH with Morcellation	Cervical Bleeding	Endometriosis
DAVINCI LAVH	Pelvic Pain	Endometriosis
LAVH	Pelvic Pain	Endometriosis
VH	Pelvic Pain	Adhesive Disease
TAH	Postoperative Bleeding	Vaginal Cuff Bleeding
LAVH	Vaginal Bleeding	Vaginal Cuff Bleeding
TAH	Pelvic Pain	Adhesive Disease
VH	Pelvic Pain	Adhesive Disease
VH	Vaginal Bleeding	Granulation Tissue
Hysterectomy Type (endometriosis)	**Indication for Second Operation**	**Primary Operative Findings**
LSH with Morcellation	Ovarian Pathology	Follicular cyst with hemorrhagic corpus luteum
LSH with Morcellation	Pelvic Pain	Endometriosis
LSH with Morcellation	Postoperative Bleeding	Endometriosis and Adhesions

LSH, laparascopic supracervical hysterectomy; LAVH, laparascopic assisted vaginal hysterectomy; VH, vaginal hysterectomy; TAH, total abdominal hysterectomy