ORIGINAL ARTICLE

Utility of preoperative endometrial assessment in asymptomatic women undergoing hysterectomy for pelvic floor dysfunction

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Abstract

Introduction and hypothesis Uterine morcellation during laparoscopy for pelvic floor repair has prompted adoption of uterine screening tests by some surgeons. We report a case series of uterine malignancy incidentally diagnosed at the time of pelvic floor surgery.

Methods We reviewed records from patients undergoing hysterectomy for pelvic organ prolapse (POP) and/or urinary incontinence (UI) from January 2004 to December 2009 and abstracted preoperative screening trends and final pathologic diagnoses.

Results Of the 708 women in the study, 125 (18%) had preoperative endometrial biopsy (EB), 43 (6%) had pelvic ultrasound (US), and 21 (3%) had EB and US. Surgical route included vaginal (58%), abdominal (23%), and laparoscopic (18%). Most (97.1%) final pathologic diagnoses were benign. Five cancers (0.6%) were detected; four of these women had normal preoperative screening, including EB (2), US (1), or both tests (1).

Conclusions Screening with EB + US was found to be ineffective in our cohort of patients due to the low prevalence of undetected uterine cancer in asymptomatic women planning POP/UI surgery.

Keywords Endometrial biopsy · Endometrial cancer · Endometrial hyperplasia · Pelvic organ prolapse · Unanticipated malignancy

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Introduction

Hysterectomy is the second most common operation performed on US women, with 540,000 hysterectomies annually performed for benign disease [1]. Advances in operative laparoscopy have increased the rate of laparoscopic hysterectomy (total, supracervical, or vaginally assisted), with approximately 12% of all benign hysterectomies performed via the laparoscopic approach in 2003 [1]. In women over age 50, pelvic organ prolapse (POP) represents the most common indication for hysterectomy [1, 2]. Increased life expectancy and women's expectations for an active lifestyle after menopause underscore the importance of durable prolapse repairs. Currently, abdominal sacrocolpopexy is the most durable reconstructive approach to prolapse repair, with 10-year effectiveness rates of 91% [3].

The morbidity from sacrocolpopexy is diminished by advances in laparoscopic and robotic pelvic surgery. However, the laparoscopic approach presents unique considerations for pelvic and reconstructive surgeons. Observational data suggest that sacrocolpopexy mesh erosions are less common if a supracervical hysterectomy is performed rather than a total hysterectomy [4, 5]. Supracervical hysterectomy

via the laparoscopic approach is typically accompanied by mechanical morcellation of the uterus, during which uterine tissue may be dispersed throughout the peritoneal cavity. There are rare case reports of intestinal leiomyomatosis or disseminated endometriosis following morcellation, presumed to result from seeding of the peritoneal cavity with morcellated tissue particles [6]. Based on these findings, surgeons avoid morcellation of a known or strongly suspected uterine malignancy [7]. In contrast to women with fibroids or menorrhagia, patients seeking treatment for POP rarely have signs or symptoms that raise suspicion for uterine cancer and typically do not have indications to prompt evaluations of the uterine lining. Prior to the adoption of laparoscopic approaches to hysterectomy in the setting of prolapse repair, the uterus was removed en bloc and unsuspected uterine malignancy was contained. Morcellation raises concern over inadvertent dissemination of an unsuspected malignancy, prompting some physicians to adopt uterine screening tactics in asymptomatic women. The purpose of this study was to determine the incidence of uterine malignancy incidentally diagnosed at the time of prolapse repair.

Materials and methods

We performed a multicenter retrospective case series at four geographically diverse sites with busy urogynecologic services: Loyola University Medical Center in Chicago, IL; University of Alabama in Birmingham, AL; Washington Hospital Center in Washington, DC; and Hospitals of the University of Pennsylvania in Philadelphia, PA. After each site obtained Institutional Review Board approval, patients who had undergone hysterectomy and prolapse and/or incontinence surgery by any approach (vaginal, abdominal, laparoscopic/robotic) between January 2004 and December 2009 were identified using CPT codes (58150, 58152, 58180, 58260, 58262, 58290, 58291, 58541, 58542, 58552, 58553, 58554, 58570, 58571). Patients with a preoperative history suspicious for a malignant or premalignant process were excluded from the study. Demographic data along with the results of preoperative endometrial biopsy (EB) or pelvic ultrasound (US), route of hysterectomy, and final pathology were abstracted. The technique for EB was similar at all four study sites. EB was performed in the office using the Pipelle endometrial sampling device with an average of three passes through the endometrial cavity. Clinically significant pathologic diagnoses were defined as complex hyperplasia with atypia, endometrial carcinoma, carcinosarcoma, leiomyosarcoma, and ovarian malignancy. SPSS (Version 18.0 for Windows, Chicago, IL, USA) was used for data collection and statistical analysis.

Results

Table 1 displays the demographics of the 708 women included in the study. Thirty-six patients (5%) reported postmenopausal vaginal bleeding, while the rest were asymptomatic. The symptom status, preoperative endometrial assessment method, assessment results, and final pathology are reported in Table 2.

Of 708 patients, 125 (18%) underwent preoperative EB, with only 22 of the 125 patients (18%) reporting postmenopausal bleeding. Of the 22 patients who had vaginal bleeding, 7 went on to have a pelvic US with an endometrial stripe <5 mm. Five biopsies showed endometrial hyperplasia and all were from patients with a clinical history of vaginal bleeding. The remaining EB were benign or atrophic, including the 16 that were obtained from patients who reported a history of vaginal bleeding.

Forty-three (6%) patients underwent preoperative pelvic US, while 21 (3%) underwent both US and EB preoperatively. Of the patients screened with both EB and US, 20 had benign findings on EB and 2 had hyperplasia. Both patients with hyperplasia reported vaginal bleeding and had endometrial stripes of 6 and 17 mm on pelvic US. Fourteen patients who underwent both US and EB reported no history of vaginal bleeding. Nine of these patients had an endometrial stripe >4 mm, and three had leiomyomata, which may have prompted the biopsy.

Route of surgery included vaginal (58%), abdominal (23%), and laparoscopic with or without robotic assistance (18%). Vaginal approaches involved vaginal hysterectomy with or without salpingo-oophorectomy along with vaginal vault suspension (sacrospinous or uterosacral) for prolapse with or without anterior and/or posterior repair. Abdominal

Table 1 Demographics

Characteristic	Value
Age (years)	56±11
BMI (kg/m^2)	28±6
Race/ethnicity, n (%)	
Caucasian	560 (79%)
African American	78 (11%)
Asian	20 (3%)
Hispanic	50 (7%)
Postmenopausal (%)	453 (64%)
Postmenopausal vaginal bleeding	35 (5%)
Active HRT (%)	50 (7%)
Surgical approach	
Vaginal	413 (58%)
Abdominal	165 (23%)
Laparoscopic/robotic	130 (18%)

BMI body mass index, *HRT* hormone replacement therapy

Table 2 Preoperative assessment by symptom status

Symptom status	Preoperative endometrial assessment method	Detected abnormality on assessment	Undetected cancer on final pathology
Postmenopausal bleeding (n=36)			
	EB 15	3 (hyperplasia)	0
	US 4	0	0
	EB + US 7	2 (hyperplasia), 2 (EMS>4 mm)	0
No postmenopausal bleeding (n=672)			
	EB 89	0	1
	US 39	14 (EMS >4 mm)	1
	EB + US 14	9 (EMS >4 mm)	1

EMS endometrial stripe

and minimally invasive approaches involved sacrocolpopexy or transabdominal uterosacral vaginal vault suspension. Most (97.1%) final pathologic diagnoses were benign. Five patients (0.7%) had clinically significant pathology: four endometrial adenocarcinomas (0.6%) and one leiomyosarcoma (0.1%). Additionally, one patient (0.1%) had complex endometrial hyperplasia with atypia. Table 3 displays the characteristics of the patients with clinically significant pathology. The remaining findings included simple hyperplasia without atypia (1.4%), complex hyperplasia without atypia (0.1%), and simple hyperplasia with atypia (0.3%). All six patients with significant pathology underwent vaginal hysterectomy, were postmenopausal, and did not have a clinical history of vaginal bleeding; two of the six

used systemic hormone replacement. The patient with leiomyosarcoma had a preoperative pelvic US revealing large fibroids and did not have a biopsy. Of the four incidentally diagnosed endometrial adenocarcinoma patients, one did not have any preoperative endometrial screening; one had a pelvic US with a 9-mm endometrial stripe that prompted EB, which was benign; one had a benign EB; and one had an US with a 14-mm endometrial stripe but did not go on to be sampled as she was asymptomatic. All five patients with a final diagnosis of malignancy were referred to a gynecologic oncologist for consultation. None of the endometrial cancer patients had any further workup or treatment following the consult; the leiomyosarcoma patient was taken back for a staging procedure and underwent multiagent chemotherapy; she died 12 months following her initial surgery. The patients with endometrial adenocarcinoma are alive with no evidence of disease.

Discussion

More women with POP are undergoing supracervical hysterectomy to diminish the risk of mesh erosion associated with colpotomy and vaginal suture line at the time of sacrocolpopexy mesh placement. Recent studies report a nearly fivefold increased risk of mesh exposure if sacrocolpopexy is done at the time of total hysterectomy and that avoiding a vaginal suture line with supracervical hysterectomy protects against graft-related complications [8]. In 2010, the

Table 3 Characteristics of patients with clinically relevant diagnoses on final pathology

Pathologic diagnosis	Age	BMI	Postmenopausal bleeding	HRT use	Preoperative assessment	Surgical procedure	Postoperative treatment
Complex atypical hyperplasia	61	37.8	Unknown	Yes	None	Vaginal hysterectomy, BSO, apical suspension	None
Endometrial adenocarcinoma, grade I, no myometrial invasion	71	33.3	No	Unknown	EB benign	Vaginal hysterectomy, BSO, apical suspension	Oncology consult, no further workup or treatment
Endometrial adenocarcinoma, grade I, no myometrial invasion	52	30.5	No	Unknown	None	Vaginal hysterectomy, apical suspension	Oncology consultation, no further workup or treatment
Endometrial adenocarcinoma, grade I, invasion 1/3 myometrial thickness	71	33.2	No	No	US 7-mm EMS; EB benign	Vaginal hysterectomy, BSO, apical suspension	Oncology consult, no further workup or treatment
Endometrial adenocarcinoma, grade II, invasion 1/2 myometrial thickness	60	24.6	No	Yes	EB benign	Vaginal hysterectomy, BSO, apical suspension	Oncology consult, no further workup or treatment
Leiomyosarcoma	55	39.0	No	No	US 16×10×11 cm uterus with obscured EMS	Vaginal hysterectomy, BSO, apical suspension	Laparotomy and staging by oncology, multiagent chemotherapy

HRT hormone replacement therapy, *BSO* bilateral salpingo-oophorectomy, *EMS* endometrial stripe

American Congress of Obstetricians and Gynecologists (ACOG) reaffirmed its position on routine endometrial assessment of patients planning a supracervical hysterectomy, stating that "amputation of the uterine corpus in the abdominal approach and morcellation of the corpus in the laparoscopic approach require adequate preoperative assessment of the endometrial cavity to exclude neoplasm" [9]. This position likely reflects ACOG's assumption of intrinsic uterine pathology, such as menorrhagia or uterine fibroids, as the indication for hysterectomy. However, within our study population of women with pelvic floor disorders, patients rarely have uterine pathology (we report a rate of 0.7%) and undergo hysterectomy only as a means of accessing the vaginal vault or cervix to facilitate pelvic floor repair. Based on our findings, we suggest that ACOG's statement on supracervical hysterectomy should not be automatically extended to include asymptomatic women (no uterine bleeding) undergoing hysterectomy as a part of pelvic floor repair.

Our study reviewed the practice patterns and outcomes of preoperative endometrial assessment in a large cohort of women undergoing surgery for prolapse and/or urinary incontinence (UI) at four major academic centers in the USA. We found that very few (only 0.7%) women undergoing POP/UI surgery had undiagnosed serious endometrial pathology, with five incidentally detected cancers. Our results are consistent with the findings of Frick et al., who reviewed 644 hysterectomy cases performed for POP and found two unanticipated malignancies (0.3%) [8]. Four of the five patients with incidentally diagnosed cancer in our study had normal preoperative endometrial assessment by biopsy (one), US (two), or both (one). The low cancer detection rate in our study may seem surprising given the widespread acceptance of the Pipelle endometrial sampling device established by studies that cite detection rates of 67–92% [10, 11]. However, it is critically important to note that the studies used to establish the sensitivity of the Pipelle were limited to symptomatic women with confirmed endometrial malignancies who represent a very different cohort from our study population of largely asymptomatic women whose presenting complaints were related to their pelvic floor, not uterine bleeding. When Rodriguez et al. performed a study evaluating the proportion of total endometrial surface area sampled by the Pipelle, they found that Pipelle sampled an average of 4% (range 0–12%) of the endometrial lining [12]. These findings shed light on the low cancer detection rate of EB in our study patients, whose cancers were incidentally removed at a presymptomatic stage with only focal involvement of the endometrium. The plausibility of our findings is further supported by Guido et al., who found that the Pipelle had a high rate of false-negative results in patients whose tumors occupied less than 50% of the endometrial surface area [13]. The early, presymptomatic stage in our patient

population may also explain the uniformly low histologic grade of the endometrial tumors identified in our study. We postulate that had these same women chosen conservative rather than surgical management of their prolapse, they would have developed uterine bleeding as their endometrial cancers progressed; EB may have had a higher detection rate if performed after the tumor load had reached a size large enough to produce symptoms.

Based on our findings, preoperative endometrial screening in women planning POP/UI surgery yielded a positive predictive value of zero. The cost of an EB, including physicians and facility fees, is US $656 (cost based on reports from Loyola University Medical Center Department of Financial Services). As laparoscopic surgery for POP becomes more common, routine endometrial screening will amount to significant cost expenditures.

We found an overall preoperative endometrial assessment rate by EB or US of 27% but no clear algorithm for endometrial evaluation within or between the study sites. Some surgeons relied only on biopsy, whereas others used pelvic US as a screening tool and went on to biopsy only if US revealed a thickened endometrial stripe. This variety of screening approaches reflects the absence of guidelines regarding sampling in an asymptomatic population. The inconsistency in preoperative evaluation, coupled with the ineffectiveness of this screening approach in asymptomatic patients, suggests that more reliable screening techniques or protocols are needed before surgeons can be asked to rely on current screening techniques to identify endometrial cancer in the POP/UI population.

Our study includes a large, diverse cohort of women undergoing POP/UI surgery and describes trends in preoperative endometrial screening in four major US academic medical centers between 2004 and 2009. This study population was chosen as a representative sample of women seeking surgical treatment for pelvic floor disorders in order to examine the incidence of uterine malignancy in this population and does not necessarily reflect current surgical approaches to prolapse repair. As reconstructive surgeons gain laparoscopic and robotic facility to perform sacrocolpopexy, and in light of the warnings recently issued by the US Food and Drug Administration regarding vaginally placed mesh for prolapse, the rate of minimally invasive sacrocolpopexy as the method of choice for primary prolapse repair will continue to increase.

Based on our results, we conclude that endometrial assessment prior to POP/UI surgery in asymptomatic women is unreliable at detecting malignancy. In our study, four of five women with cancer on final pathology were screened preoperatively and failed to receive the correct diagnosis. This may be a reflection of the low incidence of uterine malignancy in otherwise asymptomatic women planning surgery for pelvic

floor repair. We urge that recommendations for routine screening with US or biopsy in this population be reevaluated.

Conflicts of interest Kimberly S. Kenton is a consultant for Intuitive Surgical.

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