GYNECOLOGY

Rates of colpopexy and colporrhaphy at the time of hysterectomy for prolapse

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BACKGROUND: It has been shown that addressing apical support at the time of hysterectomy for pelvic organ prolapse (POP) reduces recurrence and reoperation rates. In fact, national guidelines consider hysterectomy alone to be inadequate treatment for POP. Despite this, anterior and posterior colporrhaphy are frequently performed without a colpopexy procedure and hysterectomy alone is often utilized for treatment of prolapse.

OBJECTIVE: The objectives of this study were to: (1) determine rates of concomitant procedures for POP in hysterectomies performed with POP as an indication, (2) identify factors associated with performance of a colpopexy at the time of hysterectomy for POP, and (3) identify the influence of surgical complexity on perioperative complication rates.

STUDY DESIGN: This is a retrospective cohort study of hysterectomies performed for POP from Jan. 1, 2013, through May 7, 2014, in a statewide surgical quality database. Patients were stratified based on procedures performed: hysterectomy alone, hysterectomy with colporrhaphy and without apical suspension, and hysterectomy with colpopexy with or without colporrhaphy. Demographics, medical history and intraoperative care, and perioperative care were compared between the groups. Multivariable logistic regression models were created to identify factors independently associated with use of colpopexy and factors associated with increased rates of postoperative complications.

RESULTS: POP was an indication in 1557 hysterectomies. Most hysterectomies were vaginal (59.6%), followed by laparoscopic or robotic (34.1%), and abdominal (6.2%). Hysterectomy alone was performed in 43.1% (95% confidence interval [CI], 40.6—45.6) of cases, 32.8% (95% CI, 30.4—35.1) had a colporrhaphy without colpopexy, and 24.1% (95% CI, 22—26.3) had a colpopexy with or without colporrhaphy. Use of colpopexy was independently associated with patient age >40 years, POP as the only indication for surgery (odd ratio [OR], 1.6; 95% CI, 1.185—2.230), laparoscopic surgery (OR, 3.2; 95% CI, 2.860—5.153), and a surgeon specializing in urogynecology (OR, 8.2; 95% CI, 5.156—12.923). The overall perioperative complication rate was 6.6%, with the majority being considered minor. Complications were more likely when the procedure was performed with an abdominal approach (OR, 2.3; 95% CI, 1.088—4.686), with the use of a colpopexy procedure (OR, 3.1; 95% CI, 1.840—5.194), and by a surgeon specializing in urogynecology (OR, 2.2; 95% CI, 1.144—4.315).

CONCLUSION: Colpopexy and colporrhaphy may be underutilized and are potential targets for quality improvement. Performance of additional procedures at the time of hysterectomy increased the rate of perioperative complications. Long-term consequences of these surgical practices deserve additional study.

Key words: apical suspension, colpopexy, colporrhaphy, pelvic organ prolapse, surgical quality measures

Introduction

Hysterectomy is the second most common surgical procedure performed on women in the United States.[1] Pelvic organ prolapse (POP) is the most common indication for hysterectomy in postmenopausal women,[2] and is the indication for 14% of hysterectomies in the United States.[3]

The role of hysterectomy in the treatment of prolapse is controversial and is an area of active investigation. However, it has been shown that addressing apical support at the time of hysterectomy for POP reduces recurrence and reoperation rates.[4] In fact, national guidelines consider hysterectomy alone to be inadequate treatment for POP.[5] Despite this, anterior and posterior colporrhaphy are frequently performed without a colpopexy procedure[4,6] and hysterectomy alone is often utilized for treatment of prolapse.[7]

Our primary objectives were to describe how often concomitant prolapse procedures are used at the time of hysterectomy for POP, to identify those factors associated with use of colporrhaphy and colpopexy (apical suspension) at the time of hysterectomy for POP, and to identify the influence of surgical complexity on perioperative complication rates.

Materials and Methods

This is a retrospective analysis of hysterectomies from the Michigan Surgical Quality Collaborative (MSQC). Funded by the Blue Cross Blue Shield of Michigan/Blue Care Network, MSQC consists of 52 hospitals voluntarily collecting perioperative surgical data on a sample of patients, irrespective of a patient's insurance, for general surgery, vascular surgery, and hysterectomy cases. This represents 30.2% of hospitals in Michigan. Of these hospitals, 19.2% have ≥500 beds and 53.9% are teaching institutions. Hysterectomy-specific data collection began in January 2013. Data collection occurs on a rotating schedule of different days of the week. The first 25 cases meeting the *Current Procedural Terminology* (*CPT*) code inclusion criteria at each participating institution during consecutive 8-day cycles throughout the year are selected. Cases are followed for 30 days postoperatively to capture readmissions and complications. Dedicated registered nurses trained in data abstraction collect data

from hospital records. Provider specialty is identified by the nurse abstractor at the hospital where the surgery was performed based on personal knowledge of the physicians' practice. The data collection is standardized and regularly reviewed through site visits, conference calls, and internal audits.

We reviewed hysterectomies in the database performed from Jan. 1, 2013, through May 7, 2014. The data presented represent all hysterectomy-specific data available at the time of analysis. Inclusion criteria were age >18 years and a preoperative indication of POP in the operative report. Route of hysterectomy was determined with operative note review. Total and subtotal hysterectomies were grouped together based on surgical approach. Robotic-assisted laparoscopic and laparoscopic hysterectomies were both included as laparoscopic approach. Vaginal and laparoscopic-assisted vaginal hysterectomies were considered vaginal approach. Concomitant procedures were determined with *CPT* codes. *CPT* codes indicating use of colporrhaphy were the following: 57240 (anterior), 45560 or 57250 (posterior), and 57260 or 57265 (combined anterior and posterior). *CPT* codes indicating use of colpopexy or apical suspension were the following: 57425 (laparoscopic), 57280 (abdominal), 57282 (extraperitoneal), and 57425 (intraperitoneal). Subjects were stratified based on surgical intervention into 3 cohorts. In the first group are hysterectomy only cases, in which there were no *CPT* codes for either colporrhaphy or colpopexy. In the second group are hysterectomy with colporrhaphy cases, in which *CPT* codes for colporrhaphy are present but *CPT* codes for colpopexy are not. In the third group are hysterectomy with colpopexy cases, in which *CPT* codes for colpopexy are present and those for colporrhaphy may or may not be present. Perioperative complications were identified by chart review. Data abstracters reviewed the patient chart using predetermined definitions to identify the various complications. For example, urinary tract infection (UTI) was identified when the patient reported symptoms of UTI in conjunction with a positive urinalysis,

urine culture, or both. Complications were then classified as either major or minor. Major complications included deep incisional surgical site infection (SSI), organ/space SSI, pneumonia, unplanned intubation, pulmonary embolism, acute renal failure/insufficiency, stroke, cardiac arrest, myocardial infarction, cardiac arrhythmia, transfusion, deep vein thrombosis, sepsis, *Clostridium difficile* infection, and central line-associated bloodstream infection. UTI and superficial SSI were considered minor complications. Conversion from planned surgical route was not considered a complication. The institutional review board at the University of Michigan deemed analyses regarding this data set to be exempt from formal institutional review board approval (HUM00073978).

Bivariate analyses were used to compare the 3 patient groups stratified by surgical procedures and to identify variables for the multivariate analyses. Categorical variables were compared with χ^2 statistics and analysis of variance with Welch adjustment for normally distributed, continuous variables. Nonnormally distributed variables were analyzed with nonparametric Kruskal-Wallis test. Clinically relevant factors also statistically significant in bivariate analysis ($P < .05$) were entered into a stepwise multivariable logistic regression algorithm. The outcome variables of interest were (1) use of colpopexy and (2) any perioperative complication. Variables were evaluated for collinearity through correlation analyses. Final models included only significant variables. Model fit was assessed with Hosmer-Lemeshow χ^2 tests and C-statistics (Tables 1 and 2). Analyses were performed using SPSS, Version 21.0 (IBM Corp, Armonk, NY) and SAS, Version 9.3 (SAS Institute, Cary, NC).

Results
Among 9860 hysterectomies in the MSQC, POP was listed as a preoperative indication for 1557 (15.8%) and as the only indication for 878 (8.9%). The indication for surgery was missing for 49 (0.5%). The mean age of women was 56.7 ± 12.9 years, the mean body mass

index (BMI) was 28.9 ± 6 kg/m², and the majority of women were white (1369, 87.9%). Physicians identified as obstetrician-gynecologists performed 90.2% of the hysterectomies for prolapse, urogynecologists performed 7.8%, and the remaining 2% were performed by gynecologic oncologists, general surgeons, or both. When prolapse was an indication, the most common route of hysterectomy was vaginal or laparoscopic-assisted vaginal (59.6%). Of the remaining cases, 34.1% were robotic-assisted laparoscopic or laparoscopic, and 6.2% were abdominal.

Figure 1 displays procedures performed at the time of hysterectomy for POP. In 43.1% (95% confidence interval [CI], 40.6–45.6) of cases, POP was treated with hysterectomy alone. Hysterectomy with colporrhaphy but without colpopexy was performed in 32.8% (95% CI, 30.4–35.1). There were 376 colpopexies (24.1%; 95% CI, 22–26.3) performed. Of these, 79 (21%) were extraperitoneal colpopexies, 136 (36.2%) were intraperitoneal colpopexies, and 161 (42.8) were sacral colpopexies. Generalist obstetrician-gynecologists performed a colpopexy in 289 (25.1%) of their cases with POP. In comparison, urogynecologists performed a colpopexy in 87 (71.9%) of their cases. Patients of urogynecologists were older than those of other providers (60.1 vs 56.4 years, $P = .03$), more likely to have POP as the sole indication for their hysterectomy (68.6% vs 55.4%, $P = .003$), and more likely to have an American Society of Anesthesiologists (ASA) class ≥3 (31.4% vs 19.9%, $P = .003$), but were no more likely to have prior pelvic surgery (40.5% vs 46.7%, $P = .113$) or abdominal surgery (34.6% vs 36.8%, $P = .39$).

Comparisons of demographic and perioperative characteristics associated with the 3 cohorts are shown in Table 3. Women having hysterectomy alone were younger, had higher BMI, were more likely to be non-white, had higher prevalence of other indications (in addition to POP) for hysterectomy, had lower prevalence of ASA class ≥3, had lower prevalence of Medicare insurance, and had higher prevalence of prior pelvic