

GYNECOLOGY

Predictors of 30-day readmission following hysterectomy for benign and malignant indications at a tertiary care academic medical center

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BACKGROUND: Hospital readmissions are costly, frequent, and increasingly under public scrutiny. With increased financial constraints on the medical environment, understanding the drivers of unscheduled readmissions following gynecologic surgery will become increasingly important to value-driven care.

OBJECTIVE: The current study was conducted to identify risk factors for 30-day readmission following hysterectomy for benign and malignant indications.

STUDY DESIGN: A retrospective cohort study was conducted from 2008 through 2010 of all nongravid hysterectomies at a single tertiary care academic medical center. Clinical, perioperative, and physician characteristics were collected. Multivariable logistic regression models were used to identify predictors of 30-day readmission, stratified by malignant and benign indications for hysterectomy.

RESULTS: Among 1649 women who underwent a hysterectomy (1009 for benign indications and 640 for malignancy), 6% were subsequently readmitted within 30 days (8.9% for malignancy vs 4.2% for benign; $P < .0001$). The mean time to readmission was 13 days (15 days for malignancy vs 10 days for benign; $P = .004$). The most common reasons for readmission were gastrointestinal (38%) and infectious (34%) etiologies, and 11.6% of readmitted patients experienced a perioperative complication. Among women undergoing hysterectomy for benign indications, a history of a laparotomy, including cesarean delivery (adjusted odds ratio

[AOR], 2.12; 95% confidence interval [CI], 1.06–4.25; $P = .03$), as well as a perioperative complication (AOR, 2.41; 95% CI, 1.00–6.04; $P = .05$) were both associated with a >2-fold increased odds of readmission. Among women undergoing hysterectomy for malignancy, an American Society of Anesthesiologists Physical Status Classification of III or IV (AOR, 1.92; 95% CI, 1.05–3.50; $P = .03$), a longer length of initial hospitalization (3 days AOR, 7.83; 95% CI, 1.33–45.99; $P = .02$), and an estimated blood loss >500 mL (AOR, 3.29; 95% CI, 1.28–8.45; $P = .01$) were associated with a higher odds of readmission; however, women who underwent a laparoscopic hysterectomy (AOR, 0.32; 95% CI, 0.12–0.86; $P = .02$) and who were discharged on postoperative day 1 (AOR, 0.16; 95% CI, 0.03–0.82; $P = .02$) were at a decreased risk of readmission. Physician and operative characteristics were not significant predictors of readmission.

CONCLUSION: This study found that malignancy, perioperative complications, and prior open abdominal surgery, including cesarean delivery, are significant risk factors for consequent 30-day readmission following index hysterectomy. It may be possible to identify patients at highest risk for readmission at the time of hysterectomy, which can assist in developing interventions to reduce such events.

Key words: complication, hysterectomy, malignancy, outcome, readmission

Introduction

Hospital readmissions are frequent and costly, and are estimated to cost the US health care system >\$12–17 billion annually.¹ The Medicare Payment Advisory Committee estimated that 12.3% of readmissions are potentially preventable.² Recent data suggest that nearly 1 in every 7 patients hospitalized for a major surgical procedure may be readmitted to the hospital within 30 days of discharge.³ There has been increasing

recognition that surgical readmissions may arise from complications secondary to the care delivered at the time of the index procedure.³ Hence, policymakers have focused on unplanned postsurgical hospital readmissions as an objective metric for quality of care. Since 2009, the Centers for Medicare and Medicaid Services (CMS) has published 30-day readmission data for selected high-volume medical conditions. In 2010, as part of the Patient Protection and Affordable Care Act, CMS began to financially penalize hospitals with excessive readmissions.² It is anticipated that readmission following elective, nonemergent procedures will soon be added to the public reporting and pay for performance.⁴

Hysterectomy is the second most commonly performed surgical procedure worldwide, with >600,000 cases

each year in the United States alone, following cesarean delivery. By age 60 years, nearly 1 in every 3 US women will have undergone a hysterectomy.^{5,6} However, data focusing on perioperative complications and readmission following hysterectomy remain relatively limited, and previously published readmission rates after hysterectomy have ranged from 3.4–12.0% based on the type of patient population.^{7–9} Two recently published large-scale national observational studies using data from the National Surgical Quality Improvement Program across several hundred hospitals provided benchmark data for the overall frequency of 30-day readmission following hysterectomy (3.4% and 3.9%)^{7,10}; however, earlier studies have been limited due to the lack of available detailed patient-level data

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TABLE 1

Demographic and clinical characteristics of women undergoing hysterectomy overall and stratified between malignant vs benign cases (N = 1649)

Variable	Overall, N = 1649 (%)	Malignancy, N = 640 (%)			Benign, N = 1009 (%)		
		Readmission N = 57 (%)	No readmission N = 583 (%)	P value	Readmission N = 43 (%)	No readmission N = 966 (%)	P value
Age, mean (SD), y	54.8 (12.2)	61.1 (12.4)	60.1 (11.9)	.55	49.2 (12.6)	51.4 (11.0)	.20
BMI, mean (SD), kg/m ²	29.6 (7.9)	32.0 (9.2)	30.9 (9.2)	.37	30.0 (6.9)	28.7 (6.9)	.24
Operative approach							
Laparotomy	840 (50.9)	46 (80.7)	368 (63.1)	.02	24 (55.8)	402 (41.6)	.14
Laparoscopy	445 (27.0)	5 (8.8)	161 (27.6)		10 (23.3)	269 (27.8)	
Vaginal	288 (17.5)	1 (1.8)	7 (1.2)		7 (16.3)	273 (28.3)	
Robotic	76 (4.7)	5 (8.8)	47 (8.1)		2 (4.7)	22 (2.3)	
ASA class							
I	148 (9.0)	0	22 (3.7)	.01	6 (14.0)	120 (12.5)	.03
II	1221 (74.0)	32 (56.1)	415 (71.1)		26 (62.8)	747 (77.4)	
III	272 (16.5)	25 (43.9)	142 (24.4)		10 (23.3)	95 (9.8)	
IV	7 (0.4)	0	4 (0.7)		0	3 (0.3)	
Surgeon experience, y, median (IQR)	16 (14–21)	17 (15–19)	17 (15–27)	.91	15 (12–21)	15 (12–20)	.91
Surgeon volume, >10 cases/y	1301 (78.9)	55 (96.5)	558 (95.7)	.78	29 (67.4)	659 (68.2)	.91
Prior abdominal surgery ^a							
None	820 (49.7)	26 (45.6)	301 (51.6)		15 (34.9)	478 (49.5)	
Laparoscopy	299 (18.2)	10 (17.5)	98 (16.8)	.66	5 (11.6)	186 (19.2)	<.01
Laparotomy, including prior Cesarean delivery	529 (32.1)	21 (36.8)	184 (31.6)		23 (53.5)	301 (31.2)	
Prior cesarean delivery	254 (15.4)	7 (12.3)	75 (12.9)	.89	14 (30.2)	158 (16.3)	.01
Indication for hysterectomy ^a							
Pelvic mass	328 (19.9)	19 (33.3)	132 (22.6)	.07	8 (18.6)	169 (17.5)	.85
Incontinence/prolapse	275 (16.7)	0	13 (2.2)	.25	7 (16.3)	255 (26.4)	.13
Uterine fibroids	373 (22.6)	0	25 (4.3)	.11	14 (33.0)	334 (34.6)	.78
Abnormal uterine bleeding	316 (19.2)	2 (3.5)	9 (1.5)	.27	15 (34.9)	290 (30.0)	.49
Pelvic pain	171 (10.4)	0	17 (2.9)	.19	5 (11.6)	149 (15.4)	.49
Torsion	2 (0.1)	0	0	—	0	2 (0.3)	—
Endometritis	3 (0.2)	0	0	—	0	3 (0.4)	—
Prophylactic/risk reduction	294 (17.8)	3 (5.3)	51 (8.7)	.36	14 (32.3)	226 (23.4)	.16
Baseline serum albumin, g/dL							
≤4	202 (20.8)	11 (25.6)	109 (26.8)	.85	1 (3.7)	81 (17.4)	.07
>4	770 (79.2)	32 (74.4)	297 (73.2)		26 (96.3)	415 (83.7)	
Baseline hematocrit, %							
≤32	122 (7.5)	4 (7.4)	51 (8.9)	.75	1 (2.3)	66 (6.9)	.07
32–42	1281 (78.7)	46 (85.2)	448 (77.8)		40 (93.0)	747 (78.4)	
>42	225 (13.8)	6 (11.1)	77 (13.4)		2 (4.7)	140 (14.7)	

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