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Original Article

Impact of Surgical Wait Time to Hysterectomy for Benign Gynecologic Disease

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ABSTRACT **Study Objective:** To determine the impact of surgical wait time on healthcare use and surgical outcomes for patients undergoing hysterectomy for benign gynecologic indications.
Design: Retrospective cohort study.
Setting: Urban, academic tertiary care center.
Patients: Patients who underwent hysterectomy for benign disease between 2012 and 2018.
Interventions: None.
Measurements and Main Results: Patients were categorized into 2 groups, dichotomized by surgical wait times >30 days or ≤30 days. Healthcare use was measured by the number of discrete patient interactions with the healthcare system through phone calls, secure electronic messaging, and office and emergency room visits. Univariate and multivariable logistic regression models were performed to assess the association between surgical wait time and healthcare use and perioperative outcomes while controlling for confounders. A total of 277 patients were included in our analysis: 106 (38.3%) had surgical wait times >30 days (median 47 days, range 24−68 days), and 171 (67.1%) had surgical wait times ≤30 days (median 19 days; range 12−26 days). The groups did not differ by age, insurance status, substance use, or comorbid conditions. Patients in the group with surgical wait times >30 days were more likely to have increased healthcare use (69 of 106, 65% vs 43 of 171, 25%; odds ratio 5.55; 95% confidence interval, 3.27−9.41). There were no differences in intraoperative complications (9 of 106, 8% vs 19 of 171, 11%; p = .482) or postoperative complications (28 of 106, 26% vs 32 of 171, 19%; p = .13) between the groups; however, after controlling for potential confounders, patients with surgical wait times >30 days were 3.22 times more likely to be readmitted than patients with surgical wait times ≤30 days (95% confidence interval, 1.27−8.19).
Conclusion: A surgical wait time >30 days in patients undergoing a hysterectomy for benign disease is associated with increased healthcare use in the interim. Although patients who experience longer surgical wait times do not experience worse surgical outcomes, they may be at higher risk for readmission after surgery. Targeted interventions to optimize perioperative coordination of care for patients undergoing a hysterectomy for benign disease, especially those within vulnerable populations, are needed to improve quality of care, decrease any redundant or inefficient healthcare use, and reduce any unnecessary delays. Journal of Minimally Invasive Gynecology (2020) 00, 1−9. © 2020 AAGL. All rights reserved.

Keywords: Delay to surgery; Healthcare use; Perioperative outcomes; Time to surgery; Waiting for surgery

Hysterectomy is the second most commonly performed surgery for women of reproductive age and accounts for more than $5 billion in healthcare costs annually [1]. The United States spends more per capita on healthcare than any other nation and approximately twice as much as other high-income countries [2]. Each year healthcare expenditures in the United States continue to rise. The estimated annual health expenditures among American females aged ≥14 years with gynecologic conditions are $10.5 billion [3]. This creates an imperative to better understand how patients use the healthcare system and the factors associated with inefficient use of the system. Many factors contribute

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to healthcare expenditures including service use, prices of services, changes in disease prevalence, pharmaceutical fees, and changes in population size and age structure [4]. Differences in service or healthcare use have been associated with changes in surgical wait times [5].

In patients with gynecologic malignancies, the time between diagnosis of cancer and definitive surgical treatment is defined as the surgical wait time. Increased surgical wait times can be influenced by numerous factors, such as patient preference or preoperative planning and medical clearances, but importantly can also reflect structural problems within a healthcare system [6]. Previous studies have found that surgical treatment delays are associated with worse survival for patients with gynecologic malignancies such as uterine cancer [6–8]. In addition, surgical delay has also been associated with unplanned emergency admissions [9].

For patients with benign diseases such as myomas and abnormal uterine bleeding, hysterectomy is typically performed electively after exhaustion of medical management; in this setting, surgical wait time reflects the time from a definitive decision to perform the hysterectomy to the time of surgery. In patients awaiting prolapse surgery and other nongynecologic surgery, there is some evidence that patients waiting for elective surgery for benign conditions can also experience negative outcomes including increased discomfort, decreased quality of life (QOL), and increased anxiety [10–12]. However, the impact of surgical wait time in patients undergoing hysterectomy for benign indications has not previously been examined. Understanding how surgical wait times affect patients and the healthcare system can provide targets to improve quality of care and reduce healthcare costs. In addition, although our interest in this issue predates the coronavirus disease pandemic, understanding the impact of delaying benign surgeries may help in better assessing the effects of the current pandemic. The objective of this study was to determine the impact of surgical wait time on healthcare use and surgical outcomes in patients undergoing hysterectomy for benign gynecologic indications. We hypothesized that a surgical wait time >30 days is associated with increased healthcare use.

Materials and Methods

We conducted a retrospective cohort study of patients who had undergone a hysterectomy for benign disease at the Hospital of the University of Pennsylvania between January 2012 and February 2018 and who were seen preoperatively in the resident gynecology clinic. Approval from the University of Pennsylvania Institutional Review Board was obtained. We obtained billing records to identify cases performed by the resident gynecology service and used Current Procedural Technology (CPT) codes to identify patients who underwent nonlaparoscopic abdominal hysterectomy (CPT codes: 58150, 58152), nonlaparoscopic supracervical hysterectomy (CPT code: 58150), nonlaparoscopic vaginal hysterectomy (CPT codes: 58260, 58262, 58263, 58267, 58270, 58275, 58280, 58285, 58290, 58291, 58292, 58293, 58294), laparoscopic supracervical hysterectomy (CPT codes: 58541, 58542, 58543, 58544), laparoscopic-assisted vaginal hysterectomy (CPT codes: 58550, 58552, 58553, 58554) and total laparoscopic hysterectomy (CPT codes: 58570, 58571, 58572, 58573) [13]. Robot-assisted laparoscopic cases were included in the appropriate laparoscopic categories.

Patients were included in the study if there was documentation of a preoperative visit in the resident gynecology clinic, the Helen O. Dickens Center for Women, and the hysterectomy was performed at the Hospital of the University of Pennsylvania under the care of the resident benign gynecology service. We excluded patients who were incorrectly identified by CPT codes and did not actually have a hysterectomy, were referred outside of the resident clinic for surgery, had a hysterectomy as part of an inpatient admission without a preoperative visit, or had a preoperative diagnosis of gynecologic malignancy. Standard practice in the resident gynecology clinic is for a patient to attend a preoperative clinic appointment once a decision for surgery has been made. At this visit, the patient discusses the intended surgery with a provider and meets with the surgery scheduler to confirm a surgery date within 30 days of their appointment. The patient is expected to receive at least 1 preoperative phone call from the chief resident on the gynecology service before surgery. If the patient does not have surgery within 30 days, another visit is made in the preoperative clinic before the surgery.

Study data were collected and managed using Research Electronic Data Capture tools hosted at the University of Pennsylvania [14]. Research Electronic Data Capture is a secure, web-based application designed to support data capture for research studies. The electronic medical record was reviewed for each patient including outpatient records, operative notes, inpatient records, discharge summaries, and pathology reports. The following demographics and medical histories were abstracted: age, race, insurance type, body mass index (BMI), alcohol use, tobacco use, drug use, history of psychiatric diagnoses, history of hypertension (HTN), and history of comorbid medical conditions as defined by the Charlson Comorbidity Index. The following perioperative data were abstracted: date of first preoperative visit, date of surgery, preoperative hemoglobin, American Society of Anesthesiologists physical status score, surgical approach (defined as abdominal, total laparoscopic, laparoscopic-assisted vaginal, vaginal, or robotic), preoperative use of leuprolide acetate injection, preoperative use of hormonal medications, use of blood and intravenous iron transfusions preoperatively, estimated blood loss (EBL), intraoperative complications, length of stay, postoperative complications, uterine weight, and 30-day readmission. The following interim healthcare use data were collected: number of preoperative visits, number of phone encounters, number of My Penn Medicine messages (a secure electronic messaging system), number of office visits (other than

preoperative visits), and number of emergency department visits within the University of Pennsylvania Health System that were related to the indication for surgery or surgery procedure.

Patients were categorized into 2 groups: patients with surgical wait times >30 days and patients with surgical wait times ≤30 days. The 30-day time frame was set on the basis of the Centers for Medicare & Medicaid Services conditions of participation that require a surgical history and physical to be documented in the patient chart within 30 days of surgery [15]. Our primary outcome was healthcare use, which was defined by the number of patient interactions (phone calls, My Penn Medicine messages, emergency room and office visits) with the healthcare system from the time of the initial preoperative visit until the day of surgery. Each discrete interaction was tabulated as 1 healthcare use. For the analysis, healthcare use was dichotomized as 0 to 3 vs 4 or more uses. We defined increased healthcare use as 4 or more uses as we would expect each patient to receive at least 1 preoperative phone call before surgery. Our secondary outcomes were rate of intraoperative complications (including EBL >1 L, need for intraoperative transfusion, intraoperative visceral, or vascular injury), length of hospital stay, readmissions, and postoperative complications (including reoperation within 30 days of the initial surgery, unplanned intensive care unit transfer, urinary tract infection, pneumonia, venous thromboembolism, superficial surgical site infection, wound dehiscence or separation, postoperative blood transfusion, fever, vesicovaginal fistula formation, renal insufficiency or failure, cerebrovascular accident, or death).

Pearson chi-square was used to compare categoric variables. A *t* test or a Wilcoxon rank sum test was used to compare continuous variables, where appropriate. Multivariable logistic regression models were performed to assess associations between surgical wait time and healthcare use and perioperative outcomes while controlling for confounders. Factors suspected to be associated with increased healthcare use and any baseline characteristics significantly different between the 2 groups were included in our model as potential confounders. Our power calculation estimated that with 277 patients, we would have 80% power to detect a risk ratio of 1.8 or higher in women with >30 day wait times compared with those with ≤30 day wait times with a statistical significance at a p-value <.05. Statistical analysis was performed using STATA version 14.2 (Stata Corp, College Station, TX).

Results

A total of 292 patients underwent a hysterectomy during the study period; 13 did not obtain preoperative care in the resident clinic, and 2 were diagnosed with a malignancy, thus leaving 277 patients that met our inclusion criteria and were included in the analyses (Fig. 1). Of those, 106 (38.3%) were in the group with surgical wait times >30 days (median time to surgery: 47 days, interquartile

Fig. 1

Study population flowchart. Flow diagram of subject eligibility assessment and cohort assignment. *Patient did not attend preoperative visit in the outpatient clinic.

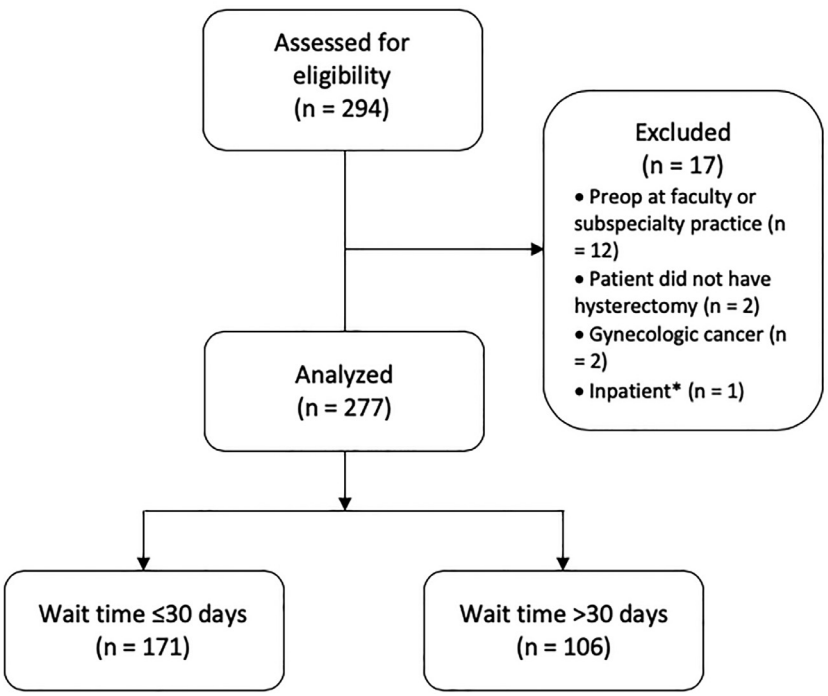

Table 1

Patient demographic and preoperative characteristics

		Wait time*		
Characteristic	Total, n = 277	>30 d, n = 106	≤30 d, n = 171	p-value†
Time to surgery, d, median (IQR)	26 (19−40)	47 (34−68)	19 (12−26)	<.001
Age, yrs, mean (± SD)	44.4 (7.7)	44.4 (7.0)	44.3 (8.2)	.948
Race, n (%)				.653
African American	256 (92)	97 (92)	159 (93)	
Other	21 (8)	9 (8)	12 (7)	
Insurance, n (%)				.357
Private	62 (22)	24 (23)	38 (22)	
Medicaid	175 (63)	72 (68)	103 (60)	
Other	40 (14)	10 (9)	21 (18)	
BMI, kg/m^2, n (%)				.914
<30	93 (34)	36 (34)	57 (33)	
≥30	184 (66)	70 (66)	114 (67)	
Alcohol use, n (%)				.713
No	145 (52)	54 (51)	91 (53)	
Yes	132 (48)	52 (49)	80 (47)	
Tobacco use, n (%)				.957
No	185 (67)	71 (67)	114 (67)	
Yes	92 (33)	35 (33)	57 (33)	
Drug use, n (%)				.236
No	229 (83)	84 (79)	145 (85)	
Yes	48 (17)	22 (21)	26 (15)	
HTN, n (%)				.173
No	158 (57)	55 (52)	103 (60)	
Yes	119 (43)	51 (48)	68 (40)	
Asthma, n (%)				.741
No	206 (74)	80 (75)	126 (74)	
Yes	71 (26)	26 (25)	45 (26)	
Psych, n (%)				.532
No	166 (60)	66 (62)	100 (58)	
Yes	111 (40)	40 (38)	71 (42)	
Charlson Comorbidity Index, n (%)				.65
0	143 (52)	53 (50)	90 (53)	
1	89 (32)	37 (35)	52 (30)	
2	27 (10)	8 (8)	19 (11)	
≥3	18 (7)	8 (8)	10 (6)	
Preoperative HGB, g/dL, n (%)				
<7	1 (0)	1 (1)	0 (0)	.518
7−9.9	60 (22)	22 (21)	38 (22)	
≥10	216 (78)	83 (78)	133(62)	
Lupron, n (%)	23 (8)	18 (17)	5 (3)	<.001
Hormone therapy	35 (13)	17 (16)	18 (11)	.18
Preoperative blood transfusion, n (%)	15 (5)	9 (8)	6 (4)	.075
Preoperative narcotics, n (%)	16 (6)	7 (7)	9 (5)	.642
Preoperative IV Fe, n (%)	26 (9)	12 (11)	14 (8)	.385

BMI = body mass index; Fe = iron; HTN = hypertension; HGB = hemoglobin; IQR = interquartile range; IV = intravenous; SD = standard deviation.
Data are presented as mean (SD), median (IQR) and number (%).
* Wait time in days.
† Pearson chi-square, *t* test, Kruskal-Wallis where appropriate.

range of 34−68 days) and 171 of 277 (61.7%) were in the group with surgical wait times ≤30 days (median time to surgery: 19 days, interquartile range of 12−26 days). Most patients were in their fifth decade of life, African American, and insured under Medicaid. The groups did not differ by comorbid conditions; preoperative hemoglobin; history of psychiatric diagnoses; or rates of alcohol, tobacco, or substance use (Table 1). The use of a leuprolide acetate injection preoperatively was more common in the group with surgical wait times >30 days (p <.001) (Table 1). The benign indications for surgery included myomas, abnormal uterine bleeding, adenomyosis, endometriosis,

Table 2

Preoperative diagnoses*

Indication	Wait time >30 d	Wait time ≤30 d
Myomas	77	112
AUB	76	122
Adenomyosis	23	52
Endometriosis	3	6
Chronic pelvic pain	40	69
Endometrial hyperplasia	3	4
Cervical dysplasia	9	15
Pelvic organ prolapse	1	0

AUB = abnormal uterine bleeding.
Data are presented as number.
* More than 1 preoperative diagnosis was documented for each patient, where applicable. No significant differences between groups.

Table 3

Healthcare use

Healthcare utilization	>30 d, n = 106	≤30 d, n = 171	p-value*
Phone calls			
Provider initiated, median (IQR)	3 (2−6)	1 (1−2)	<.001
Patient initiated, median (IQR)	1 (0−3)	0 (0−1)	<.001
Number of calls, n (%)			<.001
0	4 (4)	34 (20)	
1	16 (15)	61 (36)	
≥2	86 (81)	76 (44)	
My Penn Medicine messages			
Number of messages, n (%)			.241
0	92 (87)	156 (91)	
≥1	14 (13)	15 (9)	
Visits			
Number of visits, n (%)			<.001
0	89 (84)	168 (98)	
1+	17 (16)	3 (2)	
Healthcare use n (%)			<.001
0−3	37 (35)	128 (75)	
4+	69 (65)	43 (25)	

IQR = interquartile range.
Data are presented as median (IQR) and number (%).
* Pearson chi-square or Kruskal-Wallis where appropriate.

chronic pelvic pain, endometrial hyperplasia, cervical dysplasia, and pelvic organ prolapse and were not significantly different between the 2 groups (Table 2). In the group with surgical wait times >30 days, the reason for a longer surgical wait time was not explicitly documented for most patients (58 of 106, 54.7%). Of those in which the reason for a >30 day wait time was documented, the reasons included need for medical clearance (n = 18), optimization of anemia (n = 13), patient preference (n = 9), operating room scheduling (n = 4), active drug use (n = 2), financial concerns (n = 1), and patient work schedule (n = 1).

There was a statistically significant difference in healthcare use between the 2 groups (Table 3). Patients in the group with surgical wait times >30 days were 5.5 times more likely to have increased healthcare use (95% confidence interval [CI], 3.27−9.41). After controlling for leuprolide use, those in the group with surgical wait times >30 days remained significantly more likely to have increased healthcare use (odds ratio [OR] 5.09; 95% CI, 2.97−8.73). Other covariates including age, diagnosis of HTN, BMI, Charlson Comorbidity Index score, and diagnosis of pelvic pain were not confounders for healthcare use. For each additional day of surgical wait time, the odds of reaching 4 or more uses increased by 3% (OR 1.03; 95% CI, 1.02−1.04). The most commonly used mode of healthcare use was by telephone. The group with surgical wait times >30 days accounted for 63.5% (641 of 1010) of the phone calls with an average of 6.73 ± 7.82 calls per patient, and the group with surgical wait times ≤30 days accounted for 36.5% (369 of 1010) with an average of 2.32 ± 2.79 calls per patient (p <.001). The most common themes of the telephone calls included discussion of details of the surgical procedure (n = 309, 31%), medical clearance (n = 220, 22%), scheduling (n = 196, 19%), and medication management (n = 107, 11%) (Table 4). We defined administrative calls as those related to scheduling and paperwork (e.g., Family Leave and Medical Act forms). When administrative calls were excluded and after controlling for leuprolide use, the group with surgical wait times >30 days still had increased healthcare use (OR 3.91; 95% CI, 2.20−6.92). This increased use remained when expanding administrative calls to include scheduling, paperwork, and medical clearance themes (OR 3.52; 95% CI, 1.85−6.70).

Secondary outcomes are outlined in Table 5. There was no statistically significant difference in the rate of perioperative complications or the length of hospital stay between the 2 groups. The overall 30-day readmission rate for the cohort was 8%, and the patients in the

Table 4

Reasons for phone calls

	Wait time		
Reason for call, n (%)	Total, n = 1010	>30 d, n = 641	≤30 d, n = 369
Surgery	309 (31)	153 (24)	156 (42)
Medication	107 (11)	70 (11)	37 (10)
Symptom	77 (8)	62 (10)	15 (4)
Paperwork	67 (7)	31 (5)	36 (10)
Medical clearance	220 (22)	152 (24)	68 (18)
Scheduling	196 (19)	155 (24)	41 (11)
Not documented	34 (3)	18 (3)	16 (4)

Table 5

Perioperative outcomes

Characteristic	Wait time >30 d, n = 106	Wait time ≤30 d, n = 171	p-value*
Intraoperative data			
ASA, n (%)			.252
1	4 (4)	6 (4)	
2	63 (59)	118 (69)	
3	39 (37)	47 (69)	
Approach, n (%)			.441
Abdominal	56 (53)	75 (44)	
TLH	8 (8)	17 (10)	
LAVH	18 (17)	33 (19)	
TVH	24 (23)	43 (25)	
Robotic	0 (0)	3 (1.8)	
EBL, n (%)			.514
<1000	94 (89)	147 (86)	
≥1000	12 (11)	24 (14)	
Intraoperative complications, n (%)	9 (8)	19 (11)	.482
Intraoperative transfusion, n (%)	6 (6)	7 (4)	.549
Postoperative data			
Length of hospital stay, d, median (IQR)	2 (1−3)	2 (1−3)	.122
Postoperative complications, n (%)	28 (26)	32 (19)	.13
Readmission, n (%)	13 (12)	8 (5)	.02
Uterine weight, g, median (IQR)	298.7 (748.9−153.5)	251 (553.8−138.5)	.216

ASA = American Society of Anesthesiologists; EBL = estimated blood loss; IQR = interquartile range; LAVH = laparoscopically assisted vaginal hysterectomy; TLH = total laparoscopic hysterectomy; TVH = total vaginal hysterectomy.
Data are presented as median (IQR) and number (%).
* Pearson chi-square or Kruskal-Wallis where appropriate.

group with surgical wait times >30 days were 2.85 times more likely to be readmitted than the patients in the group with surgical wait times ≤30 days (95% CI, 1.14−7.12). After controlling for HTN as a potential confounder, the association persisted, and those in the group with surgical wait times >30 days were 3.22 times more likely to be readmitted (95% CI, 1.27−8.19). No other covariates (age, BMI, Charlson Comorbidity Index score, insurance carrier, perioperative complications, EBL, or surgical approach) were significant confounders. Readmission indications are listed in Table 6. Although there were no readmissions among the patients who underwent laparoscopic or robotic hysterectomies, the remaining were distributed between abdominal (n = 9) and vaginal (n = 12) hysterectomies (data not shown).

A total of 12 patients had both a surgical wait time >30 days and a readmission. Most of these patients did not have clear documentation of the reason for the delay to surgery (n = 5) or had a delay owing to the need for medical clearance (n = 3). Other reasons for delay in this readmission group for the remaining 5 patients included a positive drug screen on the day of surgery (n = 1), surgical coordination with plastic surgery for a joint procedure (n = 1), anemia (n = 1), use of leuprolide acetate preoperatively (n = 1), and inactivation of insurance (n = 1).

Discussion

In our study of patients undergoing hysterectomy for benign indications, increased surgical wait time was

Table 6

Readmission indications

Readmission indication*, n (%)	Wait time >30 d (n = 13)	Wait time ≤30 d (n = 8)
Surgical site infection	4 (31)	3 (38)
Gastrointestinal	5 (38)	0 (0)
Small bowel obstruction	2 (15)	
Ileus	2 (15)	
Nausea/vomiting	1 (8)	
Venous thromboembolism	1 (8)	1 (13)
Nonsurgical site infection	0 (0)	2 (25)
Cuff dehiscence	0 (0)	1 (13)
Noninfectious wound complication	1 (8)	0 (0)
Pain	1 (8)	0 (0)
Vaginal bleeding	0 (0)	1 (13)
Other	1 (8)	0 (0)

* No statistically significant differences between wait time >30 days and wait time ≤30 days, p = .121.

associated with increased healthcare use. Patients with wait times >30 days had increased telephone calls and visits between their preoperative visit and surgery date. In addition, although patients with surgical wait times >30 days did not have an increased rate of perioperative complications, they were 3.22 times more likely to be readmitted after their hysterectomy than patients with surgical wait time ≤30 days.

Preoperative healthcare use has been shown to be a driver of readmission in surgical patients [16,17]. Our data suggests that increased surgical wait times in patients awaiting hysterectomy for benign indications have a significant impact on how healthcare is used and may be a marker of healthcare quality; thus, a deeper understanding of the factors that contribute to this waiting time is warranted.

In our study, we found that patients planning hysterectomy for benign indications with surgical wait times >30 days have an increased level of healthcare use. A study by Walker et al [18] examined pain-related healthcare use among Canadian women awaiting gynecologic surgery. The authors found that approximately one-third of participants experienced unpleasant symptoms (mental distress, pain interference with daily activities, moderate to severe pain intensity) during the preoperative period, and the average number of pain-related visits during the year preceding surgery was 3.5 visits per person. These findings underscore the additional burden on the health system when preventable delays occur. If the women underwent their planned surgery in a timely manner, the additional healthcare use would have been avoided leading to decreased expenditures and greater capacity to care for other patients waiting to be seen. Thus, measures that reduce wait times may reduce barriers to care.

The impact of surgical wait time on clinical outcomes for patients awaiting hysterectomy for benign indications has not been well studied. In our study, there was no significant difference in perioperative complications between the 2 groups. However, patients with surgical wait times >30 days were more likely to call about their symptoms (10% vs 4%) during the intervening period, suggesting that patients with longer wait times were more bothered by their symptoms and seeking relief during the interim. In some respects, this is not surprising as use may be a function of time; however, some themes from the patient phone calls reflect areas where improvement in perioperative patient navigation can be useful. Thus, although increased wait times for benign gynecologic diagnoses may not affect surgical outcomes, there may be significant impact on patients' QOL. This finding is consistent with several studies that have assessed the impact of waiting for elective surgery on patient well-being as well as the well-established improvement in QOL that occurs after hysterectomy [10,12,19]. In a prospective, cross-sectional study of women's health-related QOL, Leong et al [11] found women experienced poor emotional role functioning and negative impacts on mental health while awaiting surgery for pelvic organ prolapse. In a study that examined QOL among women who underwent hysterectomy, improvements were noted in symptom severity and 8 QOL domains (concern, activities, energy/mood, control, self-consciousness, and sexual function) at 1-year compared with baseline [20]. Taken together, these findings suggest that increased surgical wait times before hysterectomy for benign indications may adversely affect patient well-being and should be minimized, always taking into account patient safety and optimizing any comorbid medical conditions where appropriate.

Although there were no significant demographic differences between the 2 groups, our study population was predominantly African American and insured under Medicaid. A national cross-sectional study describing patterns of ambulatory care use for gynecologic disorders found an association between younger age, black race, Medicaid insurance, and lower household income and increased healthcare use including emergency department and hospital outpatient department visits [21]. These associations underscore the need for continued improvement in patient access, quality of care, and education about gynecologic disorders in vulnerable populations. In our study, the primary method of healthcare use was by telephone calls. The most common reasons for these calls were discussion of the surgery, preoperative workup/medical clearance, and scheduling. By contrast, in a prospective analysis of phone calls among patients scheduled for total thyroidectomy, the most common reasons for the calls were preoperative workup, medications, and insurance/work-related [22]. In contrast to our rate of 31%, only 2% of phone calls in their study were related to questions about the surgery. Although the difference in reasons for telephone calls between our study and theirs may be related to surgery type, this contrast may reflect differences in patient demographics as their population had a lower proportion (18%) of patients insured under Medicaid. These findings underscore the impact of demographic factors on healthcare use inefficiencies and suggest that improvement in health literacy and patient-centered education about their surgery may decrease redundant healthcare use in vulnerable populations.

The 30-day unplanned readmission rate of 8% in our retrospective cohort was higher than the 2% to 3% rate that has been reported in the literature and may reflect the poor social determinants of health within our population [23−25]. Significantly, we found an increased likelihood of readmission for patients in the group with longer surgical wait time. For most of the patients with both wait time >30 days and readmission, the reasons for the increased wait times were not clearly identified from the retrospective chart review; however, in 3 of the 12 women who were readmitted, the longer surgical wait time was attributed to the need for medical clearance, which may reflect patient comorbidities more than insufficient or inefficient healthcare access. Further studies will need to examine this association and investigate the reason for the relationship between surgical wait time and risk of readmission.

Strengths and Limitations

Our study had several strengths. We included a large sample of subjects who had a hysterectomy for benign indications. Data were abstracted directly from a comprehensive electronic medical record and provided accurate and chronologic information for each subject. In an attempt to capture the true impact of the surgical wait time, a comprehensive sample of healthcare use methods was included in the analysis.

The study also had some limitations. The retrospective study design imposed a reliance on accurate provider documentation and limited the ability to discern the reasons for surgical wait times, a weakness that could have been mitigated by using a prospective study design. There were likely a lot of nuances in the reasons for prolonged surgical wait time, and better documentation of these reasons would significantly aid the conclusions that we could draw from this study. Nonetheless, our findings are a first step in exploring the impact of delay and suggest that a benign indication for hysterectomy does not suggest a lack of urgency. Our data abstraction was limited to the electronic medical record used within 1 health system, therefore, we were unable to capture interim healthcare use at outside institutions. However, given that our clinic and health system is a safety net for many of the patients in the surrounding community, we likely captured an accurate depiction of their healthcare use. Our cohort included a population of urban and predominantly African American patients from a single institution attending a resident clinic. Although this may have limited the generalizability of our findings, excluding patients from other clinics was intentional; the patient population served by the resident clinic represented a community that likely faced greater social determinants of health, and thus, had the potential to gain much from improvements in the perioperative process. Finally, we examined use during the interval from the initial preoperative visit to surgery on the basis of the practice patterns at our institution. It is possible that we did not capture the impact of the entire waiting period as a patient may have begun discussion about hysterectomy with her provider for some time before referral to the preoperative clinic.

Conclusion

Longer surgical wait times for benign hysterectomies are associated with increased healthcare use in the interim. Although patients who experience increased wait times do not have worse surgical outcomes, there may be a significant impact on QOL. These findings have particular relevance in the current setting of a global pandemic that has required postponement of elective surgeries in certain areas. Further research is needed to better characterize the surgical wait times in patients undergoing hysterectomies for benign indications to improve efficiency in healthcare use and most importantly, to improve the quality of care we provide to our patients.

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