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Original Article

Disparities in Use of Laparoscopic Hysterectomies: A Nationwide Analysis

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ABSTRACT **Study Objective:** To determine patient and hospital characteristics that were associated with undergoing laparoscopic hysterectomy compared with abdominal hysterectomy.

Design: Canadian Task Force Classification II-3.

Methods: In this retrospective cohort study, we analyzed the 2010 Healthcare Cost and Utilization Project Nationwide Inpatient Sample database. All women who underwent laparoscopic or abdominal hysterectomy for either menorrhagia or leiomyoma were included based on *International Classification of Diseases, Ninth Revision* coding. A linear model with binomial distribution and logit link function was used to determine patient and hospital characteristics associated with hysterectomy approach.

Main Results: A total of 32 436 patients were included in this study. Of these, 32% patients underwent laparoscopic hysterectomies, and 67% underwent abdominal hysterectomies. With regard to patient characteristics, women younger than 35 years old were more likely to undergo laparoscopic hysterectomy when compared with each of the other age categories ($p < .001$). White women were more likely to undergo laparoscopic hysterectomy than black women, Hispanic women, or women classified as "other" races ($p < .001$ for all comparisons). With regard to median income, patients from the lowest national quartile were less likely to undergo laparoscopic hysterectomy when compared with each of the other 3 national quartiles for income ($p = .01$, $p < .001$, $p = .001$, respectively). Payment by private insurance was associated with laparoscopic hysterectomy when compared with payment by Medicare or payment by insurance category "other" ($p < .001$ for both). With regard to hospital characteristics, hospitals in the Northeast were more likely to have laparoscopic hysterectomies than hospitals in the Midwest or South ($p < .001$ for both comparisons); urban hospitals were more likely than rural hospitals ($p < .001$); teaching hospitals were more likely than nonteaching hospitals ($p < .001$); and government-owned hospitals were less likely than private, nonprofit or private, investor owned ($p < .001$ for both comparisons).

Conclusions: Despite the increased popularity of and training in laparoscopic hysterectomies, there remains an obvious disparity in its delivery with regard to patient and hospital characteristics. Further investigation is needed on the etiology of this disparity and interventions that may alleviate it. Journal of Minimally Invasive Gynecology (2014) 21, 223–227 © 2014 AAGL. All rights reserved.

Keywords: Disparities; Laparoscopic hysterectomy; Nationwide Inpatient Sample

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The benefits of laparoscopic hysterectomy over abdominal hysterectomy are well known. When compared with abdominal hysterectomy, laparoscopic hysterectomy is associated with less postoperative pain, shorter hospital stay, faster return to normal daily activity, less blood loss, fewer postoperative complications, and reduced hospital cost [1–3]. Unfortunately, national data from the 1998 to 2002 and 2005 Healthcare Cost and Utilization Project Nationwide Inpatient Sample (HCUP-NIS) database shows

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that there has been a disparity in those who have access to laparoscopic surgery based on socioeconomic status and race [1,4]. The purpose of this study was to evaluate whether, given the increase in laparoscopic hysterectomy use, there remains a disparity in its availability.

Materials and Methods

Patient Sample

After obtaining exemption from the University of Texas, Medical Branch in Galveston Institutional Review Board, we performed a retrospective cohort study using data from the 2010 HCUP-NIS. This is a uniform, multistate database containing information of approximately 8 million hospital inpatient stays per year of data. Using a stratified, random sampling design, the NIS approximates a 20% sample of community hospitals in the United States. These samples are from 46 states, giving a representation of approximately 97% of the United States population.

The data represent approximately 20% of admissions to United States hospitals. Diagnostic and procedural codings are classified according to the *International Classification of Diseases, Ninth Revision, Clinical Modification.*

Inclusion criteria were women with a primary discharge diagnosis of uterine leiomyomas or menorrhagia who underwent abdominal or laparoscopic hysterectomy as classified by *International Classification of Diseases, Ninth Revision* codes. These codes were as follows: 626.2, 626.6, 626.8, or 627.0 for menorrhagia; 218, 218.0, 218.1, 218.2, 218.9, 219, 219.1, 219.8, 219.9 for leiomyoma; 68.31 (laparoscopic supracervical hysterectomy), 68.41 (laparoscopic total abdominal hysterectomy), 68.51 (laparoscopically assisted vaginal hysterectomy), 68.61 (laparoscopic radical abdominal hysterectomy), and 68.61 (laparoscopic radical vaginal hysterectomy) or any hysterectomy coded with 54.21, 65.01, 65.31, 65.41, 65.53, 65.63, or 65.64 (laparoscopy codes) for laparoscopic hysterectomy; and 68.39 (subtotal abdominal hysterectomy), 68.49 (total abdominal hysterectomy), or 68.89 (modified radical abdominal hysterectomy) for abdominal hysterectomy.

Variables Studied

Database variables studied included age, race, median household income, insurance type, hospital region, hospital location, teaching status of hospital, hospital size, hospital ownership, and multihospital system status. Age was divided into the following categories: less than 35 years, 35 to 39 years, 40 to 44 years, 45 to 49 years, and 50 years and older. Race was divided into white, black, Hispanic, and other. Median household income was divided by national quartiles (the first quartile being the lowest income quartile and the fourth quartile being the highest income quartile) depending on the patient's zip code. Insurance type was divided into the following categories: Medicaid, Medicare, private insurance, or other. Hospital region was defined according to the region in the United States: Northeast, Midwest, South, and West. Hospital location was defined according to rural versus urban location. Teaching status was defined as a teaching versus a nonteaching hospital. Hospital size was defined by hospital bed size and categorized as small, medium, or large. The number of beds used to define each category varied according to region in the United States, teaching status, and hospital type (rural vs urban). Hospital ownership was divided into the following categories: public hospital, nonprofit private hospital, and investor-owned private hospital. Hospitals were characterized as either a member or nonmember of a multihospital system (2 hospitals or more).

Statistical Analysis

A generalized linear model with binomial distribution and logit link function was used to assess the effects of age, race, median household income, insurance type, hospital region, hospital location, hospital teaching status, hospital ownership, and multihospital system status on the incidence of laparoscopic hysterectomy. Reference categories were age less than 35 years, white race, lowest national quartile median household income, private insurance, Northeast hospital region, rural hospital location, nonteaching hospital, small hospital size, government hospital ownership, and nonmember of a multihospital system. STATA statistical software (version 11.1; STATA Corp, College Station, TX) was used for all analyses.

Results

Our final sample size consisted of 32 436 patients who underwent either laparoscopic or abdominal hysterectomy in 2010. Among these patients, 10 621 (32%) patients underwent laparoscopic hysterectomy, and 21 815 (67%) patients underwent abdominal hysterectomy. Descriptive statistics for abdominal and laparoscopic hysterectomy are shown in the first 2 columns of Table 1. The odds ratios for undergoing laparoscopic hysterectomy and associated p values are depicted in the last 2 columns of Table 1.

Discussion

The results of our study suggest that despite the more frequent use of laparoscopic hysterectomies, there remains a disparity in its availability across the United States. Unfortunately, our findings are not dissimilar to the results of similar studies performed a decade ago. In their analysis of 341 487 hysterectomies using the 1998 to 2002 HCUP-NIS database, Abenhaim et al [1] reported a significant association of laparoscopic hysterectomies and patients with a median household income greater than $25 000, white race, and private insurance (versus Medicaid or Medicare). At that time, however, laparoscopic hysterectomies comprised only 9.9% of all hysterectomies [5]. In 2005, the percent of laparoscopic hysterectomies slowly increased to 14% [6,7]. Despite this slight increase, Jacoby et al [7] continued to find