



Healthcare Services

Implementation of Hysterectomy Pathway: Impact on Complications



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ABSTRACT

Objective: Hysterectomy is one of the most common surgical procedures in the United States. For women who need hysterectomy, it is important to ensure that minimally invasive hysterectomy procedures are used appropriately to reduce surgical complications and improve value of care. Although we previously demonstrated a reduction in total abdominal hysterectomy rates after the implementation of hysterectomy pathway treatment algorithm in 2012, this study focuses on exploring the effect of pathways implementation on surgical outcomes.

Methods: All retrospective medical records for hysterectomy surgeries performed for benign indications at University of Pittsburgh Medical Center hospitals between the fiscal years (FY) 2012 and 2014 were identified. We analyzed the health care outcomes by route of surgery and year using χ^2 test for categorical data, and non-parametric approaches for non-normal continuous variables.

Results: A total of 6,569 hysterectomies for benign indications were performed between FY 2012 and 2014. In FY 2012, 1,154 patients (59.15%) had a length of stay of 1 day or less, whereas in FY 2014 this number increased to 1,791 (74.53%; $p < .0001$). Within 3 years of implementing the pathway, surgical site infections had a reduction of 47%, with a considerable trend toward significance ($p = .067$).

Conclusions: Implementation of hysterectomy pathway has been associated with reduction of surgical complications in benign hysterectomy settings. Implementation of clinical pathways offers an opportunity for improving patient outcomes that should be investigated in various health care settings and across procedures.

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Hysterectomy is one of the most common major surgical procedures in the United States (DeFrances, Lucas, Buie, & Golosinskiy, 2008). Between 1994 and 1999, one of every nine women aged 35 to 45 years had a hysterectomy, which made hysterectomy the most common nonobstetric surgical procedure

performed on women (Matteson et al., 2006). There were more than 430,000 hysterectomies performed in the United States in 2010 (Centers for Disease Control and Prevention, 2014; Wright et al., 2013). Between 2011 and 2013, the period prevalence of hysterectomy among women 40 to 44 years of age was 10.4% (Centers for Disease Control and Prevention, 2015).

Shared decision making is viewed as fundamental to safe and effective health care, especially in situations where multiple treatment options are available to the patient (Mulley, Trimble, & Elwyn, 2012). But not all physicians are equipped to create environments where shared decisions can be made effectively (Epstein, Alper, & Quill, 2004). Decision making

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about the route of hysterectomy, like any other medical decision, should be the result of a mutual interaction between physicians and patients. To accomplish this goal, physicians need evidence-based guidelines that are outlined and supported by the specific department or service line (World Health Organization, 2005). Clinical pathways are disease-specific, structured, multidisciplinary care algorithms that are practiced locally (Campbell, Hotchkiss, Bradshaw, & Porteous, 1998), representing a shift from opinion-based practice to evidence-based practice (Rotter et al., 2010).

Of the four routes of hysterectomy, vaginal hysterectomy (VH), laparoscopic hysterectomy (LH), and robotic hysterectomy are collectively called minimally invasive hysterectomy (MIH), and the fourth, total abdominal hysterectomy (TAH), is considered a more invasive route. MIH is usually associated with fewer complications; however, not every patient is a good candidate. In particular, considerations by the surgeon and the patient should include the appropriateness of the patient for MIH regarding underlying comorbidities, the suitability of the condition for MIH, the risks and benefits of TAH procedure versus MIH, and the proficiency of the surgeon and the treatment facility with the respective techniques. However, it is difficult for individual physicians or physician groups to recognize variations in their practices that indicate possible overuse of TAH. Engaging physicians in collaborative dialogue, as well as effectively analyzing data on practice variation, is critically important for improving quality of care and for the practice of evidence based medicine (Tomson & van der Veer, 2013).

In cases where hysterectomy is necessary, it is important that minimally invasive surgical procedures are used, as appropriate, to reduce surgical complications. The gynecologic literature strongly supports the use of VH and LH in the majority of benign cases. This has led to the publication of the American College of Obstetricians and Gynecologists (ACOG) Committee Opinion No. 444, establishing a clear national opinion supporting the use of MIH (ACOG, 2009). Patients undergoing MIH often have a more favorable experience (including less pain, quicker recovery, and better short-term quality of life) compared with those undergoing TAH (Garry et al., 2004). MIH has proven to be as effective as TAH surgery for many clinical conditions, and benefits the patient with shorter recovery time, less time in the hospital, less pain, a reduced infection rate, fewer complications, and faster return to normal activities (ACOG, 2009; Nieboer et al., 2009; Walsh, Walsh, Tang, & Slack, 2009).

Our goal at Magee-Womens Hospital of the University of Pittsburgh Medical Center (UPMC) Health System was to develop an evidence-based clinical decision pathway based on best practice and literature evidence (Kovac, 2004) with the following objectives: to decrease overuse of TAH where unnecessary and promote the use of MIH, to improve clinical outcomes and quality of patient care, and to reduce unnecessary variations in physician practice. As a follow-up to our previously published paper (Sanei-Moghaddam et al., 2016) showing a significant decline (from 27.8% in FY 2012 to 17.0% in FY 2014; $p < .001$) in the proportion of TAH after implementing the hysterectomy pathway in 2012, this article investigates the effect of implementing the pathway on complication rates (surgical site infections [SSI] and blood transfusions) and health care outcomes (30-day readmission rates, length of stay [LOS], and duration of operation [DO]) within 3 years after pathway development and implementation. The overarching goal of this research is identification of strategies to improve value of care by improving quality and reducing costs.

Materials and Methods

Pathway Development

The process of our hysterectomy pathway development can be broken down into four steps: 1) quality analysis, 2) pathway definition, 3) physician engagement, and 4) electronic medical record pathway integration.

Two Diagnosis Related Groups, a list of procedure codes (*International Classification of Disease, 9th Revision*), and severity levels were used, allowing us to compare similar cases, analyze the quality of care, and exclude any cases that would be affected by elements, such as cancer-related procedures or hysterectomies prompted by acute conditions.

At the beginning of the process, a project team, consisting of physicians, nurses, PhD-level researchers, and health care managers was created and engaged in pathway definition and development. Simultaneously, transparent and integrated communication with a broader group of physicians within the department took place.

The hysterectomy pathway is the first one developed for the Ambulatory eRecord (EpicCare), and consists of a documentation flow sheet and decision support tool to streamline the surgery and preoperative ordering process. The flow sheet gives ACOG recommendations for scheduling imaging, MIH, or TAH. It then cascades as the provider answers questions about hysterectomy indications, uterine size, suspicion of extrauterine disease, ability to perform MIH safely, contraindications to MIH, and several others (Sanei-Moghaddam et al., 2016). After the provider answers all the questions, pathways offer a suggestion about the most optimal procedure route for this particular patient. If a physician chooses to do a procedure not consistent with pathway, he or she has to document the reason for that choice. As of the end of 2012, the update of pathways was 100% for participating hospitals and approximately 80% for physicians. This study was inclusive of all UPMC facilities practicing hysterectomies. Entities included in this study had no options about participation, because this research was exempt (no human subjects involvement) by the University of Pittsburgh Institutional Review Board. Once completed, the provider is prompted to close the section and a Best Practice Alert will fire that provides ACOG recommendations regarding the type of surgery. Order sets are embedded into the Best Practice Alert so the provider can initiate the scheduling process. If the provider disagrees with the recommendation, he or she can select an acknowledgment reason and proceed with placing an alternative order.

Based on the data provided by the UPMC Health Plan, we investigated whether pathway implementation was associated with changes in complication rates (SSI and blood transfusions) and health care outcomes (30-day readmission rate, LOS, and DO) between 2012, when the pathway was introduced, and 2014. DO was measured as the number of minutes each patient spent in the operating room between the start and the end of procedure. Any preoperative care in a separate unit or recovery time in a postanesthesia care unit was not included in this measure.

Data Analysis

After finalizing the pathway integration into the UPMC system, a retrospective review of medical record data was conducted for complications associated with hysterectomy surgeries performed for benign indications at UPMC-affiliated hospitals between the FY 2012 and FY 2014. All study procedures and data

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