Original Investigation

Understanding Patient Preference in Female Pelvic Imaging: Transvaginal Ultrasound and MRI

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Rationale and Objectives: Women with pelvic pain or abnormal uterine bleeding may undergo diagnostic imaging. This study evaluates patient experience in transvaginal ultrasound (TVUS) and magnetic resonance imaging (MRI) and explores correlations between preference and symptom severity.

Materials and Methods: Institutional review board approval was obtained for this Health Insurance Portability and Accountability Act-compliant prospective study. Fifty premenopausal women with pelvic symptoms evaluated by recent TVUS and MRI and without history of gynecologic cancer or hysterectomy were included. A phone questionnaire used validated survey instruments including Uterine Fibroid Symptoms Quality of Life index, Testing Morbidities Index, and Wait Trade Off for TVUS and MRI examinations.

Results: Using Wait Trade Off, patients preferred TVUS over MRI (3.58 vs 2.80 weeks, 95% confidence interval [CI] –1.63, 0.12; $P = .08$). Summary test utility of Testing Morbidities Index for MRI was worse than for TVUS (81.64 vs 87.42, 95%CI 0.41, 11.15; $P = .03$). Patients reported greater embarrassment during TVUS than during MRI ($P < .0001$), but greater fear and anxiety both before ($P < .0001$) and during ($P < .001$) MRI, and greater mental ($P = .02$) and physical ($P = .02$) problems after MRI versus TVUS. Subscale correlations showed physically inactive women rated TVUS more negatively ($R = –0.32$, $P = .03$), whereas women with more severe symptoms of loss of control of health ($R = –0.28$, $P = .04$) and sexual dysfunction ($R = –0.30$, $P = .03$) rated MRI more negatively.

Conclusion: Women with pelvic symptoms had a slight but significant preference for TVUS over MRI. Identifying specific distressing aspects of each test and patient factors contributing to negative perceptions can direct improvement in both test environment and patient preparation. Improved patient experience may increase imaging value.

Key Words: Patient preference; pelvic ultrasound; magnetic resonance imaging; uterine fibroids; health related quality of life; Wait Trade Off; Testing Morbidities Index; abnormal uterine bleeding; pelvic pain.

INTRODUCTION

Patient preference in diagnostic testing, including imaging, is an area of emerging interest as the practice of medicine evolves to incorporate patient-centered care and support patient autonomy (1–3). Women with pelvic pain or abnormal uterine bleeding because of fibroids or other conditions frequently undergo diagnostic imaging examinations such as transvaginal ultrasound (TVUS) or magnetic resonance imaging (MRI) to evaluate for treatable causes of their symptoms. These imaging examinations differ in both diagnostic efficacy and patient testing experiences. Although ultrasound (US) is usually the most appropriate initial imaging study for women with pelvic pain or abnormal uterine bleeding (4,5), MRI provides additional anatomic and functional information and, in some cases, may be the preferred initial (or only) test if the patient cannot tolerate TVUS. Each examination has distinct diagnostic utility, and the purpose of patient preference assessment is not simply to shift decision-making from physicians to patients, but to identify factors that impact testing experiences and patient-centered value in imaging.

In our own practice, some gynecologist providers have identified patient discomfort and intolerance among the obstacles to expanding MRI utilization. Understanding patient experiences, and therefore drivers of preference in imaging, could provide a valuable roadmap for more patient-centered care. Therefore, we sought to test the hypothesis that patients prefer TVUS over MRI because of better testing experience with TVUS. This study evaluates patient preference and experience with TVUS and MRI and explores correlations between imaging experiences and symptom severity.

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MATERIALS AND METHODS

Participants

Institutional review board approval was obtained for this Health Insurance Portability and Accountability Act-compliant prospective study, with data collected between June 2014 and June 2016. Women were recruited into the survey research population via two methods. In arm 1, women were recruited for an imaging-based research protocol that provided MRI and TVUS examinations to participants to evaluate adenomyosis and fibroids (not further detailed in the present study); in arm 2, women who had previously undergone pelvic MRI and TVUS examinations on a routine clinical basis were identified through a radiology information system search and approached by mail or telephone to complete a survey. Arm 1 participants (research imaging and survey) received $50, whereas arm 2 participants (survey only) received $20 at study completion. In arm 1, the order of imaging examinations was alternated, whereas in arm 2 TVUS preceded MRI in all cases. In arm 1, the women were scanned by a single ultrasonographer. In arm 2, the women were scanned by any ultrasonographer in the department, all of whom were women and Registered Diagnostic Medical Sonographer certified.

US examinations included both transabdominal and transvaginal examinations. MRI exams included administration of intravenous contrast and intramuscular glucagon, but no intravaginal gel. We do not further detail the imaging protocol here because the current study reports only survey results. Time between MRI and US examinations was ≤6 months. Inclusion criteria were identical in both groups: women were ≥18 years old, premenopausal, with a history of pelvic pain or abnormal uterine bleeding, and no history of gynecologic cancer or hysterectomy.

Questionnaire

A multipart questionnaire was developed, collecting participant demographics including age, employment status, marital status, level of education, race, and if previously pregnant, as well as validated metrics regarding baseline health-related quality of life (HRQL) pertaining to pelvic symptoms and patient testing experience. Baseline HRQL was assessed with the Visual Analog Scale (VAS) (6) and Uterine Fibroid Symptoms Quality of Life Index (UFS-QOL) (7). Testing experience was assessed using the Wait Trade Off (WTO) (8) and Testing Morbidities Index (TMI) (9) each for TVUS and MRI.

The VAS is a summary scale of baseline HRQL from 0 to 100, where 0 is death and 100 is perfect health. Patients are asked to self-assess with consideration to how their pelvic symptoms affect both physical and mental health. Examples of symptoms were provided and included pain, pressure, urinary or bowel urgency, difficulty with intercourse, and vaginal bleeding.

The UFS-QOL is a validated 37-item questionnaire evaluating symptoms and health impact of uterine fibroids and other pelvic conditions including adenomyosis (10,11). The instrument contains six subscales: concern over symptoms, activities, energy and mood, control (over pelvic symptoms and life), self-consciousness, and sexual function, where higher numbers indicate more severe symptoms. The scores from the subscales can also be expressed on a 0–100 HRQL summary scale, where 100 indicates perfect health (7).

The WTO is a time trade-off assessment of HRQL during the very short-term health state of a diagnostic test. The WTO provides an indirect assessment of test preference by offering the patient an imaginary ideal test alternative and asking how long she would be willing to wait for results (and opportunity for treatment to relieve pelvic symptoms) to avoid the real-world test in question (TVUS or MRI in this study). The WTO process was performed separately for TVUS and MRI. For example, for MRI, the patient is asked if she would rather have the MRI (with results immediately available) or have an imaginary, ideal test free of risks, pain, and discomfort that takes only a few minutes but wait 12 weeks to get the results. If she dislikes the MRI so much that she would wait 12 weeks to have the results of the ideal test, the WTO is 12 weeks. If she would rather have the MRI than wait 12 weeks for results, the choice is given for 6 weeks and so on for 3 weeks, 2 weeks, and 1 week until the indifference point is reached: when the wait for results from the ideal test balances the negative testing experience she would be avoiding. Higher numbers indicate more negative testing experiences.

Finally, the TMI (originally published as the Temporary Utilities Index) uses seven questions to assess HRQL during the very short-term health state of a diagnostic test, from preparation to recovery (9,12). Each question reflects seven elements including fear and anxiety before and after the test, pain before and during the test, embarrassment related to the test, and mental and physical status after the test. The experience is graded on a scale from 1 to 5, where higher scores reflect a worse experience. Using a standardized method, the scores are then converted to a summary scale from 0 to 100 by summing scores over possible score ranges and subtracting from 100. Higher scores on the summary scale therefore reflect a better testing experience (13). Question sets were repeated separately for TVUS and MRI. The questionnaire was administered over the telephone by a research assistant within 60 days of completion of the second examination.

Statistical Analysis

Results were analyzed using counts and percentages for categorical data and means for continuous variables. Published methods for subscale and summary analyses were used for the UFS-QOL and TMI (7,12). Correlations between UFS-QOL subscales and TMI elements were explored in a correlation matrix for each patient and expressed using Pearson correlation coefficients. All analysis was performed using Excel (Microsoft, Redmond, WA) and SAS 9.3 (SAS Institute, Cary, NC).