



ORIGINAL ARTICLE

Evaluation of the uterine cavity by magnetic resonance imaging, three dimensional hysterosonography and diagnostic hysteroscopy in women with pre- and post-menopausal bleeding



Reda A. Ahmad *, Somayya M. Sadek, Ahmad S. Ragheb

Faculty of Medicine, Zagazig University, Egypt

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KEYWORDS

Uterus;
Premenopausal;
Postmenopausal bleeding;
MRI;
3D hysterosonography;
Hysteroscopy

Abstract Objective: To compare the diagnostic potential of magnetic resonance imaging (MRI), three dimensional (3D) hysterosonography and diagnostic hysteroscopy in evaluation of the uterine cavity in women with premenopausal and postmenopausal bleeding.

Design: Comparative study.

Setting: Zagazig University hospital.

Materials and methods: 30 patients with premenopausal bleeding and 30 patients with postmenopausal bleeding scheduled for hysterectomy were submitted to MRI, 3D hysterosonography and hysteroscopy to evaluate the endometrial cavity. Results were compared with histopathologic examination at hysterectomy (the gold standard).

Results: In the premenopausal group; the sensitivity of MRI was 71.43%, 3D hysterosonography 85.71% and hysteroscopy 80.95%, the specificity of MRI was 55.56%, 3D hysterosonography 66.67% and hysteroscopy 88.89% and the degree of agreement with histopathology was 0.47 for MRI, 0.65 for 3D hysterosonography and 0.73 for hysteroscopy ($P = .000, 0.000$ and 0.000 , respectively). In the postmenopausal group; the sensitivity of MRI was 88.24%, 3D hysterosonography 88.24% and hysteroscopy 88.24%, the specificity of MRI was 69.23%, 3D hysterosonography 84.61% and hysteroscopy 84.61% and the degree of agreement with histopathology was 0.60 for MRI, 0.72 for 3D hysterosonography and 0.73 for hysteroscopy ($P = .000, 0.000$ and 0.000 , respectively) and for both groups; the sensitivity of MRI was 78.75%, 3D hysterosonography 86.84% and hysteroscopy 84.21%, the specificity of MRI was 63.64%, 3D hysterosonography 77.27% and

* Corresponding author. Address: Department of Obstetrics and Gynecology, Faculty of Medicine, Zagazig University, Egypt. Mobile: +20 1002223725.

E-mail address: redaamr71@gmail.com (R.A. Ahmad).

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hysteroscopy 86.36% and the degree of agreement with histopathology was 0.54 for MRI, 0.69 for 3D hysterosonography and 0.73 for hysteroscopy ($P = .000, 0.000$ and 0.000 , respectively).

Conclusions: Hysteroscopy is the best method in evaluation of uterine cavity in women with premenopausal and postmenopausal bleeding; but more invasive. MRI is the best method for detection of submucous myoma especially when the cavity is large or tumor is small.

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1. Introduction

Abnormal uterine bleeding is a common gynecologic complaint and it may involve females at any age group. Thirty-three percent (33%) of women referred to gynecologic clinics have abnormal bleeding and this figure rises to 69% in premenopausal and postmenopausal women (1). Abnormal uterine bleeding is caused by both functional and organic causes such as endometrial polyp, hyperplasia, cancer and submucosal myoma that require medical and/or surgical treatment. Thus, differential diagnosis of these causes is essential to diagnose and treat intrauterine lesions in abnormal uterine bleeding (2).

At present, diagnostic techniques for intrauterine diseases include transabdominal sonography (TAS), transvaginal sonography (TVS), sonohysterography (SHG), diagnostic hysteroscopy, computed tomography (CT), and magnetic resonance imaging (MRI) (3).

Transvaginal ultrasonography is frequently used in the investigation of the endometrial cavity. Two-dimensional hysterosonography (2-DHS, a B-mode transvaginal ultrasonographic method with instillation of a sterile saline solution into the endometrial cavity) is usually performed. However, 2-DHS does not permit detailed examination of the uterine cavity and lesions that may be present (4). Few studies have shown that 3-dimensional hysterosonography (3-DHS) is more precise than 2-DHS and can reduce the incidence of false-positive results (5,6), but these studies were limited to the assessment of endometrial thickness and polyps in postmenopausal women (4).

Hysteroscopy permits direct visualization of the cervical canal and uterine cavity, enabling observation of intrauterine abnormalities. An accurate diagnosis may result in surgical or medical treatment directed at the specific pathology and may avoid the need for major surgery (7). Hysteroscopy has become the standard method for evaluating the uterine cavity. However, hysteroscopy is an invasive procedure that is associated with discomfort. It is an operator-dependent technique and its sensitivity is therefore not as optimal as that of a histological examination (8).

Magnetic resonance imaging (MRI) is a powerful noninvasive but costly technique with a demonstrated, promising potential for visualization of uterine myoma. However, data on MRI visualization of endometrial polyps are scarce (9). MRI has limitations for the evaluation of intrauterine lesions because they need high medical expenses due to the use of expensive equipment (10).

This study was planned to compare diagnostic potential of magnetic resonance imaging, three dimensional hysterosonography and diagnostic hysteroscopy in evaluation of the uterine cavity in women with premenopausal and postmenopausal bleeding scheduled for hysterectomy.

2. Materials and methods

The study was conducted in the Department of Obstetrics and Gynecology, Cytogenetic and endoscopy unit, and Radiology Department Zagazig University hospitals between April 2010 and April 2011. 33 women with premenopausal bleeding and 32 women with postmenopausal bleeding scheduled for hysterectomy were selected to share in the study.

All patients included in the study were above the age of forty and before the onset of menopause (premenopausal group) or after at least 1 year amenorrhea (postmenopausal group). Women with severe vaginal bleeding, malignancy, other pelvic pathology (adnexal mass), pregnancy complication (in the premenopausal group) and under hormonal therapy were excluded from the study. The indication of hysterectomy was abnormal uterine bleeding.

One patient with premenopausal bleeding refused to have MRI examination and another patient with postmenopausal bleeding was diagnosed to have renal carcinoma and referred to Urosurgery Department, this left 32 premenopausal and 31 postmenopausal patients. They were properly counseled and gave informed consent. The local ethics committee approved the study. All patients underwent magnetic resonance imaging followed by 3D hysterosonographic examination of the uterus in the same day and within 2 weeks before hysterectomy. Hysteroscopy was done under general anesthesia just before hysterectomy. Hysterectomy specimens were sent for histopathological examination.

2.1. Magnetic resonance imaging (MRI)

MRI was done for all patients using GE (signa contour) 0.3 TESELA radiofrequency. Patients were asked about any contraindication such as cardiac pace maker and artificial valves and they were instructed to remove any metallic object. They were asked to avoid coughing during the acquisition time.

Patient is positioned supine and she must be well centralized. Patients were imaged with the body coil. Evaluation of the pelvis was done using axial, coronal and sagittal non contrast T1 and T2 weighted images. All images were reviewed by an expert in MRI.

2.2. 3D hysterosonography

3DUS was performed for patients with empty bladder, in the lithotomy position. Examinations were performed using a Voluson 730 Pro V (GE Medical Systems, Zipf, Austria) ultrasound machine. All examinations were performed with real time 4D Endocavitary probe RIC 4–9 MHz. A baseline 2D endovaginal ultrasound is first performed. The endovaginal probe is then removed and a sterile speculum is inserted. The

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