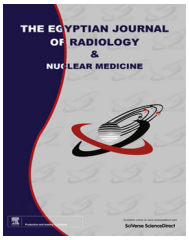
The Egyptian Journal of Radiology and Nuclear Medicine (2013) **44**, 953–958

Egyptian Society of Radiology and Nuclear Medicine

The Egyptian Journal of Radiology and Nuclear Medicine

www.elsevier.com/locate/ejrnm
www.sciencedirect.com



ORIGINAL ARTICLE

Sonohysterography for evaluation of endometrial abnormalities associated with tamoxifen therapy for breast cancer

Hesham El Sheikh [a,*], **Khaled Atwa** [b], **Mohamed Abdulmajed Sammour** [c]

[a] *Department of Diagnostic Radiology – Benha University, Cairo, Egypt*
[b] *Department of Obstertric and Gynecology – Suez Canal University, Cairo, Egypt*
[c] *Ain Shams University, Cairo, Egypt*

Received 21 March 2013; accepted 1 July 2013
Available online 1 August 2013

KEYWORDS

Sonohysterography;
Endometrial biopsy;
Endometrial polyp;
Tamoxifen

Abstract *Objective:* To evaluate sonohysterography for the diagnosis of endometrial abnormalities in women treated with tamoxifen for breast cancer.
Patients and methods: We assessed 37 women treated with tamoxifen for breast cancer who underwent sonohysterography and correlative endometrial biopsy for evaluation of postmenopausal bleeding or thickened endometrium greater than 8 mm. In 14 patients, endometrial biopsy was followed by endovaginal sonography to ensure removal of endometrial pathology. Sonohysterography findings were compared with histopathology results.
Results: Sonohysterography findings coincided with histopathology results in 27 of 37 cases including 19 of 23 cases of endometrial polyps, 6 of 8 cases with thickened endometria and two cases had normal endometrium. Sonohysterography findings did not coincide with histopathology in 3 of the 14 cases who underwent endovaginal sonography after endometrial biopsy compared to 7 of the 23 cases who did not undergo such examination and 4 of these missed 7 cases were for endometrial polyps.
Conclusion: Sonohysterography is a useful procedure for the diagnosis of endometrial abnormalities in tamoxifen-treated women. Endometrial abnormalities are better diagnosed on sonohysterography than on endometrial biopsy which has the limitation of some missed endometrial polyps, a problem that may be minimized by performing endovaginal sonography after endometrial biopsy.

* Corresponding author. Tel.: +20 00966598181340.
E-mail address: heshamus@hotmail.com (H. El Sheikh).
Peer review under responsibility of Egyptian Society of Radiology and Nuclear Medicine.

ELSEVIER **Production and hosting by Elsevier**

0378-603X © 2013 Production and hosting by Elsevier B.V. on behalf of Egyptian Society of Radiology and Nuclear Medicine.
Open access under CC BY-NC-ND license. http://dx.doi.org/10.1016/j.ejrnm.2013.07.001

1. Introduction

Tamoxifen citrate is a selective estrogen receptor modulator that is widely used for the treatment of breast cancer; it has also been used recently for the prevention of breast cancer in high-risk women (1–3). Large trials have shown that in women with estrogen receptor-positive breast cancer, tamoxifen treatment for 5 years reduces the annual breast cancer recurrence rate by 50%, reduces the annual death rate by 28%, and decreases the risk of contralateral breast cancer by 39% regardless of receptor status (1–3). The Breast Cancer Prevention Trial documented a 50% reduction in the rate of breast cancer among high-risk women who received tamoxifen treatment as compared with control subjects (2).

Tamoxifen inhibits estrogen-dependent tumor growth by competing with estrogen at receptor sites. This competition for receptor sites may result in either antiestrogenic or weakly estrogenic effects, depending on tissue site and receptor status. In the uterus, tamoxifen has an estrogenic effect that produces endometrial abnormalities such as endometrial polyps, hyperplasia and carcinoma (4–7).

The benefits of tamoxifen for breast cancer treatment far outweigh any potential endometrial abnormalities that may occur (2). However, because tamoxifen-treated women have an increased frequency of endometrial neoplasia and premalignant conditions such as atypical hyperplasia, it is important to develop adequate methods for diagnosing endometrial complications resulting from tamoxifen and there is interest in screening this population for endometrial abnormalities. The value of screening has not been established, and the optimum method of surveillance has not been determined (2,4–7). Several groups of investigators have shown the usefulness of sonohysterography for the diagnosis of endometrial abnormalities, particularly in women with abnormal uterine bleeding (8–12).

We designed this study to evaluate sonohysterography for the diagnosis of endometrial abnormalities in women who are undergoing tamoxifen treatment for breast cancer.

2. Patients and methods

This prospective study was conducted from April 2008 to October 2012 for 39 tamoxifen-treated women referred for sonohysterography. Thirty-seven sonohysterograms were completed and two studies were unsuccessful because of difficult cannulation of the cervix and were excluded from the study. All women had been undergoing tamoxifen therapy for a mean of 2.5 years (range, 1–4 years). The mean patient age was 48 years (range, 37–72 years). Women were referred for sonohysterography because of postmenopausal bleeding ($n = 6$) and endometrial thickening greater than 8 mm detected on preliminary transvaginal sonography ($n = 31$). Endometrial thickness measurements were obtained in the anteroposterior dimension on sagittal images, and any endometrial cystic spaces or polyps were also documented.

Sonohysterography was performed by an experienced radiologist using an endovaginal curved 4–9 MHz transducer (of Medison SONOACE 6000 °C unit). The procedure was explained to the patient in detail and informed consent had been obtained for all studies.

Sonohysterography was performed in a standard manner as previously described (13). All studies were performed with a 5 French or 7 French Zinnanti HS catheter (Thomas medical. Inc. Blomet, waterton industrial estate, Bridgend, CF13XA, UK). Briefly, after cleaning the cervix with povidone-iodine, a sterile 5 or 7-French occlusive balloon catheter that has been flushed with sterile saline to eliminate the air is then guided into the endocervical canal. The catheter is advanced past the external cervical os for a variable distance (usually 2–7 cm) and the catheter balloon was filled with fluid to avoid artifact. The speculum is then carefully removed, allowing the catheter to remain in place. Transvaginal scanning is then performed during the instillation of sterile saline solution. After assessment of the fundus and upper uterine segment, the balloon was decompressed while injecting more fluid to ensure adequate visualization of the lower uterine segment. The amount of saline solution required for the adequate distention of the endometrial cavity varied, ranging from approximately 10 to 40 ml depending on cervical leakage. The examination usually lasts 5–10 min.

The presence of endometrial thickening, polyps, subendometrial cysts and other abnormalities was recorded. Endometrial measurements were obtained in the sagittal plane. The anterior and posterior single thickness measurements were added together for a double-layer endometrial measurement. For tamoxifen-treated women, a double-layer thickness of 8 mm or less was considered normal (6,7,14).

On sonohysterography, polyps appear as echogenic, smooth, intracavitary masses outlined by fluid (15,16). Color Doppler images may show a single feeding artery at the base of attachment, a finding frequently seen with polyps (17).

All sonohysterograms were followed by endometrial biopsy with dilatation and curettage and the sonohysterography findings were compared with histopathology results. After performing sonohysterography for 23 patients and comparing their sonohysterography findings with histopathology results, we found that sonohysterographic findings did not coincide with histopathology results in 7 patients and 4 of them had characteristic sonohysterographic appearance for endometrial polyps but normal endometria were found at histopathology. We identified these 23 patients as group A.

We thought that performing endovaginal sonography in the operation room (OR) immediately after endometrial biopsy aiming to obtain normal endometrial thickness (less than 5 mm) on vaginal sonography may ensure removal of any missed endometrial pathology. Therefore, in the remaining 14 patients, endometrial biopsy was immediately followed by transvaginal sonography in the OR and the procedure was done by the same radiologist and the same US machine used in pre-operative assessment in the radiology department which was brought into the OR for each of the 14 patients. The sonographic findings were compared with those seen in the preliminary endovaginal sonography and sonohysterography and re-curettage were done for cases with residual thickened endometrium. We identified these 14 patients as group B.

Sonohysterography findings for each group and for all patients were compared with histopathology results after dilatation and curettage.