

and endometrial sampling. All patients were treated with 20 mg of tamoxifen daily.

Transvaginal ultrasonography and hysterosonography were performed with a 6.5 MHz endovaginal transducer attached to a Hitachi Spazio.

Before starting the procedure a bimanual pelvic examination was performed to verify the accessibility and safety of the procedure. Then the transvaginal probe was inserted and the uterus was scanned both sagittally and coronally to determine the regularity of the endometrium. An antero-posterior measurement of endometrial thickness was recorded at the widest point observed. After the vaginal scanning was completed, a number 5.3 F catheter (Goldstein SHG catheter, Cook Ob/Gyn) was introduced into the uterine cervix and a 10-ml syringe containing sterile saline solution was attached to the catheter.

Under sonographic vision, physiologic saline was injected into the uterus through the catheter. A range between 3 and 10 ml was usually sufficient to define the endometrial cavity. The transducer was moved in the long and transverse section without missing any portion of the uterine cavity.

The mean duration of tamoxifen treatment was  $12.8 \pm 6.8$  months (range 6–40) and mean patient age was  $58.2 \pm 9.6$  years (range 42–74). Forty-eight examinations (64%) showed endometrial thickness less than 8 (negative group) and 27 (36%) showed endometrial thickness of 8 mm or more (positive group). Transvaginal sonography showed an inhomogeneous and thickened endometrium in 17 patients of the positive group, in the remaining 10 patients the sonographic appearance was suggestive for endometrial polyps.

The uterine cavity of the 27 patients was immediately evaluated by sonohysterography. In the 10 patients (37%) in whom transvaginal sonography had revealed an echogenic mass suggestive for a polyp, sonohysterography identified an

endocavitary polyp surrounded by regular, thin endometrium, which were all confirmed at operative hysteroscopy and at histological assessment. 9 of the 17 patients (63%) in whom transvaginal sonography had shown only a thickened endometrium, were identified by sonohysterography to have one or more endometrial polyps confirmed at operative hysteroscopy and histology. Overall, 19 patients (70%) were diagnosed to have endometrial polyps.

Of the remaining 8 patients, 5 were identified at sonohysterography to have a normal thin endometrium with typical subendometrial microcysts induced by tamoxifen; 3 patients had an irregular thickened endometrium. Hysteroscopy and histologic assessment confirmed atrophy in the first 5 patients, 1 simple hyperplasia and 2 cases of endometrial adenocarcinoma. Overall sonohysterography accurately diagnosed endometrial disease in 100% of these patients. There was no false-negative diagnosis.

Sonohysterography is more accurate than transvaginal sonography alone, and less invasive than hysteroscopy, which sometimes requires general anaesthesia to obtain adequate information. Sonohysterography can be a useful diagnostic tool for the assessment of endometrial diseases in asymptomatic postmenopausal breast cancer patients treated with tamoxifen, who were diagnosed by transvaginal sonography to have a thickened endometrium.

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*European Journal of Cancer*, Vol. 34, Suppl. 4, pp. S35–S36, 1998  
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Printed in Great Britain  
0959-8049/98\$—see front matter

PII: S0959-8049(98)00103-8

### III.5 Saline Infusion Sonohysterography is a Good Approach for Additional Assessment of the Endometrium

S.J.M. Neele,<sup>1</sup> W.M. van Baal,<sup>2</sup> M.J. van der Mooren,<sup>2</sup> P. Kenemans<sup>2</sup> and J.C. Netelenbos<sup>1</sup>

<sup>1</sup>Division of Endocrinology, Department of Internal Medicine; and <sup>2</sup>Department of Obstetrics and Gynecology, Academic Hospital Vrije Universiteit Amsterdam, The Netherlands

We describe the results of endometrial assessment with transvaginal ultrasound (TVU) and saline infusion sonohysterography (SIS) in healthy, asymptomatic early postmenopausal women. We used cross-sectional data obtained from women who were screened prior to participation in a clinical trial for prevention of osteoporosis, with either hormone replacement therapy, placebo or a selective oestrogen receptor modulator. © 1998 Elsevier Science Ltd. All rights reserved.

IN TOTAL, 147 healthy, non-hysterectomised early postmenopausal women aged 47–60 years were screened. Inclusion criteria were amenorrhoea of 6–24 months, no use of hormone replacement therapy up to 6 months before gynaecological examination and serum FSH levels > 30 mU/l. Clinical history of gynaecological events was noted.

Each participant had transvaginal ultrasound (TVU) for evaluation of uterine anatomy, dimensions and endometrial thickness. After that, a thin catheter was inserted through the cervix allowing sterile saline infusion into the uterine cavity (SIS). Evaluation of the uterine cavity for detection of focal or diffuse thickening of the endometrium is then possible. Endometrial thickening of more than 5 mm on TVU was defined as abnormal. Abnormalities on SIS were classified in submucous myomas, polyps, focal thickening or single layer endometrial thickening of more than 3 mm.

### RESULTS

A total of 147 TVU were followed by 135 SIS. In 10 women SIS was not possible due to cervical stenosis, 2 women withdrew from further participation. TVU showed no endometrial abnormalities in 127 women, but 8 women had endometrial thickening of > 5 mm. SIS was normal in 105 women, and abnormal in 30 women. We found 25 endometrial abnormalities, 4 submucous myomas and 1 woman with an uterus bicornis (Table 1). A normal TVU with abnormal endometrium on SIS was found in 24 women. In 13 women a polyp was seen, but only 10 hysteroscopic biopsies were obtained. Pathology showed an atrophic polyp in 7 women, leiomyoma in 2 women and cystic hyperplasia in 1 woman. The other 11 women had diffuse endometrial thickening, 5; submucous myoma, 4; focal thickening, 1; or a uterus bicornis, 1. From the 8 women with endometrial thickening of more than 5 mm on TVU, SIS showed 2 women with normal endometrium and 3 women with single layer endometrial thickening of more than 3 mm. Biopsies in 2 women showed proliferative endometrium. One woman had focal endometrial thickening, biopsy only showed atrophic endometrium and 2 women had both a polyp and a

Table 1. Results of screening for endometrial abnormalities

	TVU		Total (%)
	Normal (%)	Endometrium > 5 mm (%)	
	127 (94.0)	8 (6.0)	135 (100)
SIS			
SIS normal	103 (76.3)	2 (1.7)	105 (78.0)
SIS endometrial abnormalities	24* (17.7)	6 (4.3)	30 (22.0)

\*One uterus bicornis included.

Table 2. SIS-detected endometrial abnormalities

	SIS abnormalities			
	Polyp	Endometrium > 3 mm	Focal thickening	Submucous myoma
TVU normal endometrium (13.3%)	10	4	1	2
TVU normal, uterus myomatosis (4.4%)	3	1		2
TVU endometrium > 5 mm	2	3	1	
Total	15	8	2	4

submucous myoma which were confirmed by hysteroscopy and biopsies. The results are summarised in Table 2.

We conclude that a normal appearance of the endometrium on TVU did not exclude endometrial abnormalities in 17.7% of these asymptomatic women. In the presence of myomas on TVU, accurate assessment of the endometrium may be difficult (4.4%). SIS-detected abnormalities that were confirmed by biopsy or hysteroscopy, show that SIS can be an accurate method for additional assessment of the endometrium. The indications for SIS in general practice, however, need to be further established.

*European Journal of Cancer*, Vol. 34, Suppl. 4, pp. S36–S37, 1998  
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Printed in Great Britain  
0959-8049/98\$—see front matter

PII: S0959-8049(98)00104-X

## III.6 Tamoxifen-induced Changes of the Uterus: MRI Features

L. Van Hoe,<sup>1</sup> S. Gryspeerdt,<sup>1</sup> H. Bloemen,<sup>1</sup> D. Timmerman,<sup>2</sup> P. Neven,<sup>3</sup> G. Marchal<sup>1</sup>  
and I. Vergote<sup>2</sup>

<sup>1</sup>Department of Radiology; <sup>2</sup>Department of Gynaecology, University Hospitals Leuven; and <sup>3</sup>Department of Obstetrics and Gynaecology, St-Jan Ziekenhuis, Brussels, Belgium