

Comparative study of hysteroscopy & transvaginal sonography and saline infusion sonography with endometrial biopsy in detection of endometrial pathology in women with postmenopausal bleeding

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Abstract: Objectives: To compare the accuracy of both 2D - transvaginal ultrasound, saline infusion sonography and hysteroscopy with endometrial samples in the detection of endometrial pathology in women with postmenopausal bleeding and to know the most sensitive method in diagnosis. **Methods:** A prospective, comparative study included 100 patients with postmenopausal bleeding were subjected to transvaginal ultrasound, saline infusion sonography, diagnostic hysteroscopy and curettage followed by the histopathological examination of the specimens. **Results:** Overall sensitivity rates were 88% for TVS, 91% for SIS and 98% for HS, while overall specificity rates were 67%, 80% and 83%, respectively. HS had PPV of 88% and NPV of 97%, whereas PPV was determined to be 85 versus 87% and NPV was 70 versus 89% for TVS and SIS, respectively. **Conclusion:** Measurement of endometrial thickness using ultrasound is of limited value. saline infusion sonography is superior to ultrasound & very close to hysteroscopy, especially with intra - cavitary lesions. Hysteroscopy remains the gold standard for assessment of the uterine cavity, but cannot replace the histopathology.

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1. Introduction

After the age of forty-five years, a half year after cessation of menstruation, any vaginal bleeding is called as postmenopausal bleeding (PMB). It may be heavy bleeding, just simply spotting or simply like a usual monthly cycle. Postmenopausal bleeding is quite common and worrisome symptom accounting for 5% of all gynecological outpatients' specialization attendances (Munro, 2013).

Postmenopausal bleeding can be due to benign or malignant pathologies. Approximately 3–10% of women with post-menopausal bleeding have endometrial cancer rendering strict exclusion of endometrial carcinoma to be essential among this population (Bingol et al., 2011).

Having the capacity to recognize the distinctive conditions enables the doctor to decide the fitting treatment method. Dilatation and curettage (D & C) is the present acknowledged strategy for diagnosing diffused endometrial conditions, for example, endometrial cancer and endometrial hyperplasia. However, when focal endometrial conditions, (for example, endometrial polyps and leiomyomas) or myometrial conditions, (for example, adenomyosis) are existing, D & C isn't fit for diagnosing them (Hobson et al., 2008).

Transvaginal ultrasound (TVUS) is a technique routinely utilized for discriminating between the reasons for uterine bleeding, for example, Adenomyosis, endometrial polyp, and leiomyomas. However, in TVUS pictures it is hard to recognize a thickened endometrial lining and other diffuse or focal endometrial abnormalities (Maged et al., 2017).

An improved TVUS method is saline infused sonohysterography (SIS) which enables uterine anomalies to be seen more clearly by pushing apart the walls of the uterine cavity with saline infused into the cavity (Maged et al., 2017).

Hysteroscopy with biopsy has become the gold standard for evaluation of the uterine cavity, as a reliable and safe method in routine outpatient settings. Transvaginal sonography (TVS) is an alternative non-invasive method that is commonly used for examination of the endometrium and uterine cavity in postmenopausal patients. In pre- and postmenopausal patients with abnormal bleeding, the diagnostic potential of TVS in experienced hands has been found to be in line with that of hysteroscopy, but not when less experienced operators performed the examination (Otify et al., 2015).

In the present study, we aimed to compare hysteroscopy, transvaginal sonography, and saline infusion sonography with endometrial samples in the

detection of endometrial pathology in women with postmenopausal bleeding and to know the most sensitive method in diagnosis.

2. Material and Methods

Settings: A prospective, comparative study included 100 patients with postmenopausal bleeding attending the outpatient clinic in Obstetrics and Gynecology Department in Al-Hussein university hospital and some private hospitals in Mansoura during the period from January 2017 to January 2018.

Selection Criteria: Postmenopausal women who presented with vaginal bleeding were included in our study and A written consent was taken for each participant in the study. While cases with uterine bleeding due to systemic disorder, any drug-induced bleeding, women with pre or perimenopausal bleeding and Bleeding in the childbearing period were excluded.

Ethical consideration: Agreement for this study was obtained from the hospital's ethical committee, and an informed oral and written consent was taken from all patients included in the study after a very clear explanation of both procedure, adequate providing of information about the study necessities, purpose, and dangers.

Procedures: After taking consent from each patient, all the patients were subjected to the following:

1. Full history taking: Full detailed medical history was taken from each subject stressing on; Present history of bleeding, Previous menstrual history and Past history of hormonal treatment, hormonal contraception, use of IUD (intra-uterine device), previous hysteroscopy or fractional curettage.

2. Systemic clinical examination: Examination included general, abdominal and pelvic examination; both bimanual and sterile speculum examination.

3. Laboratory investigations: Investigations done were complete blood count, coagulation profile, fasting, and post-prandial blood sugar, liver and kidney functions test.

4. Conventional two-dimensional transvaginal ultrasounds: To measure the uterine size & endometrial thickness, and look for any possible pathology such as endometrial polyps or fibroids.

5. Saline-infusion sonohysterography: Sonohysterography was performed for all patients at the same setting of transvaginal sonography.

6. Diagnostic hysteroscopy: Detailed hysteroscopic examination was performed under general anesthesia.

7. Endometrial curettage: Endometrial curettage was done to all patients, and specimens were fixed in Formalin 10% solution for histopathological examination. Patients in whom endometrial polyps

were found by hysteroscopy, had polypectomy performed before curettage.

8. Histopathological examination: All curettage & polypectomy specimens (formalin-fixed, paraffin wax-embedded) were subjected to histopathological examination.

Statistical analysis:

Data were analyzed using Statistical Program for Social Science (SPSS) version 18.0. Data were expressed as “mean \pm standard deviation (SD)” and as the percentage (%) where appropriate. The sensitivity, specificity, PPV, and NPV of SIS, TVS, and HS were calculated by comparing the results of each of the methods with those obtained by pathological diagnosis as the gold standard. The 95% CI for all parameters was also calculated. The diagnostic accuracy was calculated for each uterine disease separately.

3. Results

This study is a prospective study in which 100 patients with postmenopausal bleeding were recruited from the outpatient gynecology clinic, Al-Hussein university hospital, Al-Azhar University and some private hospitals in Mansoura. The study was conducted between January 2017 and January 2018.

The age ranged between 50 and 74 with a mean of 57.83. also, the average of weight, Height, and BMI of the studied cases was 92.54kg, 162.46 cm and 35.24 respectively, with average Gravidity of 4.14 and average Parity of 3.19. the mean of Endometrial thickness by TVS was 13.12 mm with a Standard Deviation of 7.99. **Table (1)**

The majority of cases had a medical history of DM and HTN or both; 13,14 and 15 respectively. 31% had a previous history of uterine surgery, 27% had a previous history of endometrial biopsy and 28% had a previous history of hormonal therapy. Out of 100 cases, 8 cases had a fibroid, 6 adenomyosis and 5 had ovarian cyst while 81cases had no associated lesion. **Table (2)**

In our study TVS was able to detect 37% of the studied cases had endometrial hyperplasia, 5% had atrophic endometrium, 4% had a fibroid and 10 of 15 cases had endometrial carcinoma in comparison with histopathology. SIS was able to detect 10 of 15 cases had endometrial carcinoma in comparison with histopathology and the endometrial polyp was found in 19 cases in comparison with 18 cases confirmed by histopathology. Hysteroscopy was able to detect almost 100% of the actual diagnosis in compare to D & C, it gave just 1 false negative result by missing one case of simple endometrial hyperplasia. Hysteroscopy had the highest frequency of cancer detection compared to the other two methods with a significant difference by using the chi-square test. **Table (3)**

Diagnostic accuracy of each imaging method in the diagnosis of atrophy, hyperplasia polyp lesions, fibroid and cancer of the endometrium with respect to endometrial biopsy as the gold standard is given in **Table 4**. Overall sensitivity rates were 88% for TVS,

91% for SIS and 98% for HS, while overall specificity rates were 67%, 80%, and 83%, respectively. HS had PPV of 88% and NPV of 97%, whereas PPV was determined to be 85 versus 87% and NPV was 70 versus 89% for TVS and SIS, respectively. **Table (4)**

Table 1: Demographic characteristics of the studied cases.

Variables	Mean	Std. Deviation
Age (Year)	57.83	6.07
Weight (Kg)	92.54	12.52
Height (cm)	162.46	5.06
BMI	35.24	5.83
Gravidity	4.14	1.84
Parity	3.19	1.46
Endometrial thickness by TVS (mm)	13.12	7.99

Table 2: Past History of the studied cases.

Past History	Frequency	
Medical disorder	Free	44
	DM	13
	HTN	14
	HTN & DM	15
	HCV	4
	Bronchial asthma	2
	Ischemic heart	1
	Combined	7
Previous uterine surgery	Yes	31
	No	69
Previous endometrial biopsy	Yes	27
	No	73
Previous hormonal therapy	Yes	28
	No	72
Associated lesion	No Associated lesion	81
	Adenomyosis	6
	Fibroid	8
	Ovarian cyst	5

Table 3: Distribution and Comparison between hysteroscopy versus SIS and TVS based on Pathology reports.

Diagnosis	TVS	SIS	Hysteroscopy	Pathology	X ²	P-Value
Cancer	10	10	15	15	3.23	<0.05 S
Hyperplasia	37	5	34	35	2.6	>0.05 NS
Fibroid	4	4	4	4	2.7	>0.05 NS
Atrophy	5	1	8	8	0.9	>0.05 NS
Polyp	19	19	18	18	2.3	>0.05 NS
Normal	25	61	21	20	1.3	>0.05 NS

Table 4: Validity of Hysteroscopy, SIS, TVS versus pathology.

Variables	Sensitivity	Specificity	PPV	NPV	Accuracy
Hysteroscopy	98%	83%	88%	97%	95%
SIS	91%	80%	87%	89%	91%
TVS	88%	67%	85%	70%	87%

4. Discussions

Postmenopausal bleeding (PMB) comprises a critical extent of gynecological referrals and occurs in nearly 3% of menopausal ladies. Postmenopausal bleeding is dependably a reason for worry because of the expanded rate of endometrial carcinoma in this specific age. Diagnostic hysteroscopy alongside with endometrial biopsy is viewed as the gold standard in the diagnosis of intrauterine pathology in postmenopausal bleeding (**Choudry et al., 2010**) Also the use of TVS with SIS in the evaluation of thickened endometrium has been considered a valuable screening tool for uterine abnormality in patients experiencing irregular postmenopausal bleeding.

In the present study, the most common endometrial histopathology was endometrial hyperplasia (35%), followed by endometrial polyps (18%) and 15 cases had endometrial carcinoma.

Revel A et al., in their study on 94 cases of PMP by hysteroscopy recorded atrophic endometrium in (56%), endometrial polyp in (45%), hyperplasia in 23 patients (24%), myoma in (25.5%) and malignancy in 12 patients (**Revel et al., 2004**). **Rita et al.**, reported the histological findings were atrophy (34.8), cystic atrophy in (1.4%) normal endometrium in (7.2%), polyps in (17.4%), leiomyoma in (1.4%), non-atypical hyperplasia in (4.3%), atypical in (1.4%) and malignancy in (13%) (**Rita et al., 2001**).

Vaginal ultrasound with the high-resolution probe is a widely performed investigation prior to surgery. An assessment of the uterine mass can be particularly difficult if the endometrial lining is not well defined (**Stubert and Gerber, 2016**).

In our study TVus was able to detect 37% of the studied cases had endometrial hyperplasia, 19% had a polyp, 5% had atrophic endometrium, 4% had a fibroid and 10 of 15 cases had endometrial carcinoma in comparison with histopathology.

La Torre et al., in their study for diagnosing endometrial focal lesions especially polyps as compared to hysteroscopy and histologic examination, 2D US diagnosed 23 polyps versus 16 confirmed at hysteroscopic and histologic examination revealing a specificity of 69.5% (**La et al., 1999**).

Bingol et al., conducted a prospective, investigator-blind trial on 137 postmenopausal women and they reported that TVS revealed false positive results concerning endometrial atrophy (2.1%), endometrial hyperplasia (5.1%) and submucosal myoma (5.8%), whereas false negative results occurred for the diagnosis of endometrial polyps (7.3%) when compared to pathological diagnosis (**Bingol et al., 2011**).

Overall TVS sensitivity rate was 88%, specificity rate was 67%, whereas PPV was 85 and NPV was 70.

In agreement with a prospective study by **Erdem et al.**, comparing TVUS and concurrent SIS findings of 100 pre- and 33 postmenopausal women. They stated that the sensitivity and specificity of TVUS in diagnosing endometrial pathologies were 83% and 70.6%, respectively.

The diagnostic efficacy of Transvaginal ultrasound is increased by using real-time intracavitary saline infusion during Transvaginal ultrasonography with a sensitivity of 93.5% and specificity of 99.4% (**Erdem et al., 2007**).

Saline infusion sonography was a reliable and accurate method for investigations of the endometrium and uterine cavity. It provides a correlative date with histological results as good as more invasive procedures.

In our study, SIS was able to detect 10 of 15 cases had endometrial carcinoma in comparison with histopathology. The polyp was found in 19 cases in comparison with 18 cases confirmed by histopathology. The sensitivity of SIS for detection of the lesion is 93-100% and the specificity is 85-96 (**Rita et al., 2001**). This is nearly corresponding with our study with a sensitivity of 91%, a specificity 80%, PPV 87%, NPV 89% and accuracy 91%.

As expected the diagnostic accuracy of diagnostic hysteroscopy was almost 100% in our study for all lesions and gave just 1 false negative result by missing one case of simple endometrial hyperplasia. Hysteroscopy is considered the most sensitive method for diagnosis of different endometrial lesions. It detects all cases of polyps, atrophy, and malignancy with a sensitivity of 98% and accuracy 95%.

The high accuracy of diagnostic hysteroscopy (approaching almost 100%) is in line with the studies of **Kelekeci et al., Karageyim Karsidag et al. and Bingol et al.**, Due to its high accuracy, it was used in some studies as the gold standard to which other modalities were compared, as in the studies of **Erdem et al. and Luterek et al.**, (**Erdem et al., 2007; Karageyim Karsidag et al., 2010; Kelekeci et al., 2005; Luterek et al., 2014**).

In conclusion, Measurement of endometrial thickness using TVS has limited value in the differentiation of causes of thickened endometrium. SIS is superior to TVS –alone– and very close to DH in the assessment of the uterine cavity. It may be used as the primary method for the detection of the uterine cavity among women with AUB. SIS improves the efficiency of TVS as a diagnostic tool, especially with intra - cavitory lesions as endometrial polyps and

submucous fibroids. DH remains the gold standard for assessment of the uterine cavity, but cannot replace the histopathology.

References

- Bingol, Banu, M. Ziya Gunenc, Ali Gedikbasi, Haldun Guner, Seval Tasdemir, and Bulent Tiras. (2011): "Comparison of Diagnostic Accuracy of Saline Infusion Sonohysterography, Transvaginal Sonography and Hysteroscopy in Postmenopausal Bleeding." *Archives of Gynecology and Obstetrics* 284(1): 111–17.
- Choudry, Abeera, Irfan Shukr, Sumaira Khan, Humaira Hafeez, Shahid Jamal, and Ambreen Anwer. (2010): "Acceptability and Accuracy of Saline Infusion Sonohysterography in Women with Postmenopausal Bleeding." *Journal of the College of Physicians and Surgeons Pakistan* 20(9): 571–75.
- Erdem, Mehmet, Ufuk Bilgin, Nuray Bozkurt, and Ahmet Erdem. (2007): "Comparison of Transvaginal Ultrasonography and Saline Infusion Sonohysterography in Evaluating the Endometrial Cavity in Pre-and Postmenopausal Women with Abnormal Uterine Bleeding." *Menopause* 14(5): 846–52.
- Hobson, Maritza A., Ernest L. Madsen, Gary R. Frank, Jingfeng Jiang, Hairong Shi, et al. (2008): "Anthropomorphic Phantoms for Assessment of Strain Imaging Methods Involving Saline-Infused Sonohysterography." *Ultrasound in Medicine and Biology* 34(10): 1622–37.
- Karageyim Karsidag, A. Yasemin, Esra Esim Buyukbayrak, Bulent Kars, Orhan Unal, and M. Cem Turan. (2010): "Transvaginal Sonography, Sonohysterography, and Hysteroscopy for Investigation of Focal Intrauterine Lesions in Women with Recurrent Postmenopausal Bleeding after Dilatation & Curettage." *Archives of Gynecology and Obstetrics* 281(4): 637–43.
- Kelekci, Sefa, Erdal Kaya, Murat Alan, Yasemin Alan, Umit Bilge, and Leyla Mollamahmutoglu. (2005): "Comparison of Transvaginal Sonography, Saline Infusion Sonography, and Office Hysteroscopy in Reproductive-Aged Women with or without Abnormal Uterine Bleeding." *Fertility and Sterility* 84(3): 682–86.
- La, R Torre, C Felice De, C Angelis De, F Coacci, M Mastrone, and E V Cosmi. (1999): "Transvaginal Sonographic Evaluation of Endometrial Polyps: A Comparison with Two Dimensional and Three Dimensional Contrast Sonography." *Clinical and experimental obstetrics & gynecology* 26(3–4): 171–73.
- Luterek, Katarzyna, Iwona Szymusik, Robert Bartkowiak, and Mirosław Wielgos. (2014): "Sonohysterography in Peri- and Postmenopausal Women with Abnormal Uterine Bleeding or Abnormal Endometrial Appearance." *Neuroendocrinology Letters* 35(4): 297–300.
- Maged, Ahmed M, Ahmed L Aboul Nasr, Mostafa A Selem, Sherine H Gad Allah, and Ahmed A Wali. (2017): "Uterine Cavity Assessment and Endometrial Hormonal Receptors in Women with Peri and Post Menopausal Bleeding." *Gynecology & Obstetrics* s5(1): 1–7.
- Munro, Malcolm. (2013): "Investigation of Women with Postmenopausal Uterine Bleeding: Clinical Practice Recommendations." *The Permanente Journal* 18(1): 55–70.
- Otify, Mohamed, Joanna Fuller, Jackie Ross, Hizbullah Shaikh, and Jemma Johns. (2015): "Endometrial Pathology in the Postmenopausal Woman - an Evidence Based Approach to Management." *The Obstetrician & Gynaecologist* 17(1): 29–38.
- Revel, Ariel, Avi Tsafrir, Shaul O Anteby, and Asher Shushan. (2004): "Does Hysteroscopy Produce Intraperitoneal Spread of Endometrial Cancer Cells?" *Obstetrical & gynecological survey* 59(4): 280–84.
- Rita, Sousa, Silvestre Margarida, Sousa Luis Almeida E, Falcão Francisco, Dias Isabel, et al. (2001): "Transvaginal Ultrasonography and Hysteroscopy in Postmenopausal Bleeding: A Prospective Study." *Acta Obstetricia et Gynecologica Scandinavica* 80(9): 856–62.
- Stubert, J, and B Gerber. (2016): "Current Issues in the Diagnosis and Treatment of Endometrial Carcinoma." *Geburtshilfe und Frauenheilkunde* 76(2): 170–75.