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### RESEARCH ARTICLE

## POSTMENOPAUSAL BLEEDING: THE VALUE OF TRANS-VAGINAL SONOGRAPHY VERSUS SALINE INFUSION SONO-HYSTEROGRAPHY IN IDENTIFYING THE UTERINE CAUSES FOR BLEEDING.

Dr. Amal Hussein Tayah (M.B.Ch.B, DMRD)<sup>1</sup>, Dr. Enas Adnan (F.I.B.M. , C.A.B.S/G.O)<sup>2</sup>, Dr. Suha Hussien Hayyawi (F.I.B.M. , C.A.B.S/G.O)<sup>3</sup>, Dr. Takwa Nihad Mohammad (C.A.B.S/G.O)<sup>3</sup> and Dr. Wasan Ismail Al-Saadi (F.I.B.M.S / radiology)<sup>4\*</sup>.

1. Radiology department , Al-Immamain Al-Kadhimain Medical City.
2. Gynaecology & Obstetric department , College of Medicine , Al-Nahrain University.
3. Gynaecology & Obstetric department Al-Immamain Al-Kadhimain Medical City.
4. Radiology unit , Surgery department , College of Medicine , Al-Nahrain University.

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### Abstract

**Background:-** Postmenopausal bleeding (PMB) is relatively common problem and a cause for concern due to increased incidence of endometrial carcinoma in this age group

**Objective:-** To evaluate the diagnostic accuracy of transvaginal sonography (TVS) and saline infusion sonohysterography (SISH) in the assessment of endometrium state in patients with PMB

**Methods:-** prospective study included 37 patients with PMB . All the patients underwent TVS & SISH , the endometrium was assessed for maximum thickness , regularity , echogeneity , homogeneity , the presence of mass. The final diagnoses was obtained from histopathology .

**Results:-** according to the histopathology 16 patients(34.24)% had normal endometrium , 6 patients(16.22)% had benign endometrial polyp, 12 patients(32.43)% had endometrial hyperplasia , 2 patients (5.41)% had submucosal fibroid and 1 of the patients (2.70)% had endometrial carcinoma . Both TVS and SISH were 100% accurate in making the diagnosis of endometrial Polyp, sub mucosal fibroid and endometrial carcinoma however, TVS overestimated 4 cases of normal endometrium as endometrial hyperplasia giving an accuracy of 89.19% , on the other hand SISH accurately defined all the cases of endometrial hyperplasia

**Conclusion:-** Both TVS and SISH have comparable accuracy in the assessment of endometrial pathology in women with PMB , however TVS may overestimate endometrial hyperplasia

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### Introduction:-

Postmenopausal bleeding (PMB) is a common problem representing 5% of all gynecological out patients attendance (Moodley and, Robert, 2004) and it is always a cause for concern due to increased percentage of endometrial carcinoma in this age group. Although the most common cause is vaginal atrophy (Munot and Lane ,

**\*Corresponding Author:- Dr. Wasan Ismail Al-Saadi .**

Address:- Radiology unit , Surgery department , College of Medicine , Al-Nahrain University.

2008), it is generally accepted that PMB should be suspected as malignant, until proved otherwise (National Institute For Health And Care Excellence Clinical Guideline, 2005). Several etiological factors may be responsible for PMB, in addition to vaginal atrophy as the use of hormone replacement therapy (HRT), endometrial hyperplasia whether simple or complex (Harding, 2014), or, endometrial cancer (with estimated probability of a woman presenting with PMB to have endometrial cancer is 10-15%) (Escoffery et al, 2002; Lin et al, 1993), endometrial polyps (with estimated prevalence of endometrial polyps in patients with PMB and increased endometrial thickness measured with trans-vaginal sonography (TVS) of around 40% (Epstein et al, 2001 b; Timmermans et al 2008), cervical cancer, Ovarian cancer, especially estrogen-secreting (theca cell) and granulosa ovarian tumors (Harding, 2014). Imaging plays vital role in the assessment of patients with PMB after excluding other clinically obvious causes related to the vagina, vulva or uterine cervix. The choice of imaging is determined according to the appropriateness criteria set by the American college of radiologists (American College of Radiology. ACR Appropriateness Criteria, 2014). The guidelines are addressing PMB and therefore aimed at excluding cervical cancer, endometrial carcinoma or precancerous lesions of the endometrium (Epstein, 2004 a; Munro, 2014). According to these guidelines TVS, saline infusion sonohysterography (SISH) and trans-abdominal ultrasound, are the first line imaging modalities in the assessment and follow up of patients with PMB.

We aimed at this study to evaluate the diagnostic accuracy of Trans-vaginal sonography and Saline infusion sonohysterography in the assessment of endometrium state in patients with post menopausal bleeding in correlation with histopathological diagnosis

### **Patients and methods:-**

This was a prospective study conducted at ultrasound unit at AL-Immamain AL-Kadhimain medical city included patients with post menopausal bleeding who were referred from the gynecology department to investigate the cause of bleeding by TVS and SISH, for the period from the September 2014 to September 2015. The study was approved by the research ethical committee at Al-Nahrain College of Medicine. A verbal consent was obtained from each patient after explaining the details of the procedure. The exclusion criteria were: Patients at active stage of heavy vaginal bleeding, pelvic inflammatory disease (according to the diagnosis made by the gynecologist), Cervical stenosis, Virgin patient, Previous uterine intervention for PMB like endometrial biopsy or curettage.

The demographic criteria, relevant clinical history and detailed menstrual history were recorded. After performing TVS and SISH at the ultrasound unit, the patients were followed up and those patients for whom histopathology proof of the final diagnosis was obtained, were included in the study

### **TVS and SISH Protocol:-**

Trans-Vaginal ultrasound examination was performed using multi frequency transvaginal transducer (IC5-9-D) (Voluson E6 GE Healthcare Austria). The examination was commenced after emptying the urinary bladder. The TVS probe was covered with sterile condom after filling the tip of the condom with coupling gel, then the probe was introduced into the vagina and the images were obtained in two planes, the endometrium was assessed for maximum thickness, regularity, echogeneity, homogeneity, the presence of mass (size, texture, regularity of the margin, whether the endometrium is draped over the mass or the latter forms an acute angle with the endometrium and the multiplicity). After documentation of these findings at conventional TVS, the vaginal probe was withdrawn, a brief vaginal examination was performed to aid in locating the cervix. A sterile speculum is placed into the vagina, and the cervix is brought into view. The cervix is then cleansed with povidone-iodine solution. A Foley's catheter of 12-14Fr size placed at external cervical os using sponge forceps to introduce the catheter inside the uterine cavity, 4 ml of sterile saline used for inflating the balloon of catheter to prevent the catheter from dislodgement, later on, the speculum was removed gently and the balloon is slightly retracted to close the internal cervical os then the TV probe was introduced again through the vagina. Continuous scanning was made in two orthogonal planes while injecting the normal saline. The amount of saline injected ranged from (10-20 ml). After that the catheter was removed and the patient was reminded about the possible increase in intensity of vaginal bleeding and pelvic pain and was reassured that these symptoms are transient and minor. All the patients consulted their referring gynecologists for further management.

The parameters assessed at TVS were re-assessed and recorded after SISH. An endometrial thickness = or < 5 mm, that is of regular homogeneous distinct outlines with central echogenic line within the uterus was deemed normal. On the other hand, if the endometrium measured thicker than 5 mm, it was considered as endometrial hyperplasia. The presence of focally thickened irregular endometrium and/or irregular deformed endometrial lining were

considered endometrial carcinoma .An entire echogenic focal mass within the endometrial cavity was considered as endometrial polyp. Whereas, if the mass is isoechoic or hypo echoic in comparison to the myometrium and bears a definite relation with myometrium and is reaching the uterine cavity by pushing the endometrium then it is considered as sub mucosal fibroid. These findings were defined according to criteria published by Parsons and Lense (Parsons and Lense , 1993) .

The final diagnoses was obtained from histopathology in (37 ) patients through endometrial curettage and hysterectomy .

#### Statistical Analysis:

The diagnostic accuracy of TVS and SISH were compared using (paired test ,fisher exact test ,chi square test ). A *P* value of < 0.05 was considered statistically significant. These sensitivity, specificity and diagnostic accuracy of TVS and SISH were calculated by comparing the results of both modalities with those obtained by histological examination.

#### Results:-

A total number of 37 PMB patients were enrolled in this study ,the age range was 51-68years old (mean  $57.65 \pm 5.39$  years ) with menopausal duration of 1-20 years (mean  $6.3 \pm 4.970$  years ).

The histopathological results of the specimens obtained at surgical intervention revealed that 16/37 (43.24) % had normal endometrium , 6/37 (16.22) % had benign polyp ,12/37 (32.43) % had endometrial hyperplasia , 2/37 (5.41) % had sub mucosal fibroid and 1/37 (2.70)% had endometrial carcinoma

AT TVS , 16 patients were found to have endometrial hyperplasia with endometrial thickness rang of (4-17mm, mean =  $8.19 \pm 3.46$  mm) comparing these results with that of histopathology only 12 patients were found to have hyperplasia with other 4 found to have normal endometrium , indicating an accuracy of 89.19 % for TVS for the diagnosis of endometrial hyperplasia, on the other hand SISH demonstrated that 12 of the patients were found to have endometrial hyperplasia with endometrial thickness ranging from 3-15mm ( mean=  $6.97 \pm 3.06$  mm) , comparing these results with that of histopathology , SISH was found to have an accuracy of 100% for the diagnosis of endometrial hyperplasia .However both modalities showed comparable high accuracy for the diagnosis of endometrial polyps (table 1)

Comparing the endometrial thickness estimation between the two modalities , TVS gave higher estimation for the endometrial thickness than SISH ( mean endometrial thickness in TVS = ( $8.19 \pm 3.46$  mm ) and in SISH = ( $6.97 \pm 3.04$  mm ) .

No significant statistical differences was found between the TVS and SISH in their ability in differentiating normal from abnormal endometrium ( *p* value =0.4725) (table 2).

For the two cases of sub mucosal fibroids , both TVS and SISH were able to make confident diagnosis , as well as for the one case with endometrial carcinoma.

The sensitivity ,specificity and accuracy for each modality ( TVS and SISH) for each specific pathology are shown in table 3

**Table 1:-** the TVS and SISH findings in patients with PMB

FINDINGS	TVS	SISH
	NO. (%)	NO. (%)
Normal endometrium	12 (32.43)	16 (43.24)
Polyp	6 (16.22)	6 (16.22)
Endometrial hyperplasia	16 (43.24)	12 (32.43)
sub mucosal fibroid	2 (5.41)	2 (5.41)
Endometrial carcinoma	1 (2.70)	1 (2.70)

**Table 2:-** Comparison between TVS and SISH defining normal from abnormal state according to histopathological diagnosis

Finding	TVS		SIS		P value
	No.	%	No.	%	
Normal	12	32.43	16	43.24	0.4725
Abnormal	25	67.57	21	56.76	

**Table 3:-** Sensitivity , specificity and accuracy of TVS and SISH in comparison to histopathological findings.

Finding		TVS	SISH
Normal	Sensitivity	75%	100%
	Specificity	100%	100%
	Accuracy	89.19%	100%
Polyp	Sensitivity	100%	100%
	Specificity	100%	100%
	Accuracy	100%	100%
Endometrial hyperplasia	Sensitivity	100%	100%
	Specificity	84%	100%
	Accuracy	89.19%	100%

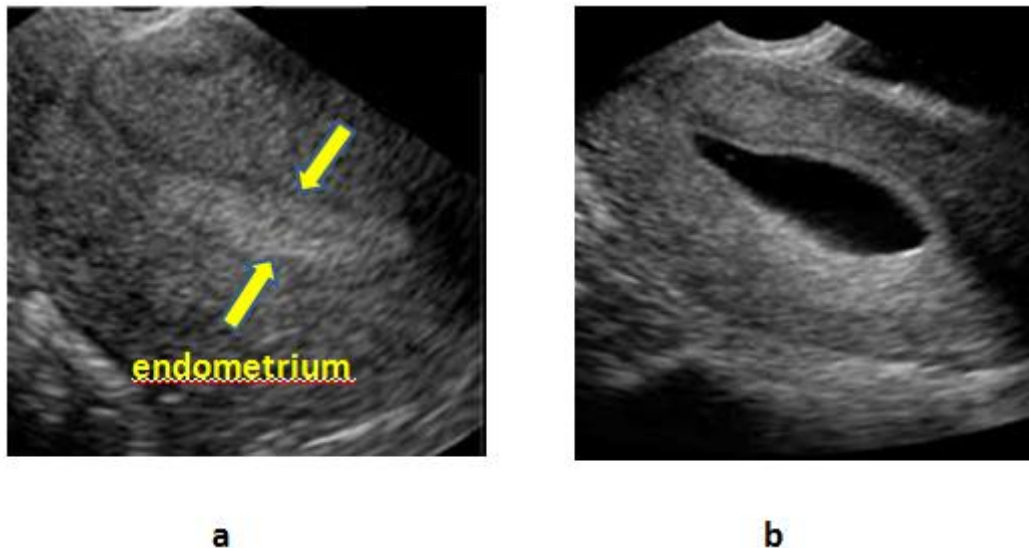
### Discussion:-

The present study evaluated the diagnostic accuracy of TVS and SISH for the detection of endometrial abnormalities in patients with PMB .The evaluation and management of post menopausal bleeding is evolving continuously as the endometrium is more difficult to measure in postmenopausal patients due to relatively poorly defined endo-myometrial border. Various techniques can be used in the diagnostic work up of women with postmenopausal bleeding. Diagnostic hysteroscopy can detect focal lesions in the uterine cavity, and a preliminary histological diagnosis can be made(Widrich et al , 1996 ; Schwrzler et al 1998) . At conventional TVS examination focal lesions in the uterine cavity may be suspected(Widrich et al , 1996 ; Schwrzler et al 1998; Baldwin et al , 1999; Atri et al , 1994; Williams and Marshburn , 1998), but confirmation by SISH, which involves instillation of saline into the uterine cavity during scanning, improves the accuracy(Widrich et al , 1996; Williams and Marshburn , 1998 ; Gaucherand et al , 1995 ).

In the current study , TVS showed high sensitivity and specificity in the assessment of endometrial pathologies . Various studies have demonstrated wide range of sensitivity and specificity of TVS in assessment of abnormal uterine bleeding in pre and post menopausal women with a sensitivity range from 24-96% and specificity range from 29-93% (Ryu et al , 2004; Bree , 1997; Aslam et al , 2007 ; Lalchandani and Phillips , 2003).On the other hand SISH showed even higher sensitivity and specificity in this study , a result that is in agreement with other several studies who reported a sensitivity and specificity of SISH as high as 85–91% and 83–100%, respectively.( Ryu et al , 2004; O’Connell et al , 1998; Alborzi et al , 2007;Wongsawaeng , 2005) . In a national study ( Murad and Ahmed , 2012) , they have found a comparable sensitivity for both modalities however SISH was much more specific with a specificity approaching 100% against 50% for TVS . What is surprising in the current study is the higher diagnostic performance of TVS in comparison with other studies , this can be attributed to several factors as the limited sample size and the exclusion of the cases with difficult SISH procedure from the study , in addition most of the cases encountered had either normal endometrium with limited cases of endometrial pathologies thus making the task of testing TVS capabilities in diagnosing different endometrial pathologies rather difficult. Comparing both modalities (TVS Vs. SISH) in the current study , TVS over estimated the endometrial thickness in 4 patients and gave false positive results of endometrial hyperplasia (figure1) while SISH correctly identified those 4 patients as having normal endometrium This false positive result obtained by TVS can be explained by the presence of blood clots within the endometrial cavity with similar echo texture to that of the endometrium so that the distinction was not possible at TVS while the instillation of saline at SISH allowed the true discrimination of the endometrium from the blood clots which appear freely mobile and avascular with no clear site of attachment to the endometrium.

the Great majority of women with pathological cavities were defined by SISH and it also can distinguish malignant and various benign conditions , so SISH after TVS allows for identification of focal abnormalities within the

endometrial cavity, which may then guide biopsy or resection (Jorizzo et al, 1999). This study demonstrated that both TVS and SISH have comparable accuracy for the diagnosis of endometrial polyp, submucosal fibroid, endometrial carcinoma and consequently this would help in selecting the patients' candidates for other interventional procedure. Several studies have dealt with the value of SISH in both pre- and postmenopausal women. Soguktas et al (Soguktas et al, 2012) suggested that SISH can replace hysteroscopy as a method of diagnosing focal lesions in the uterine cavity with high accuracy. Taking into consideration these high diagnostic accuracies, in addition to the wide availability and reproducibility, the low cost and relatively painless procedures, both modalities are when used initially in patients with PMB may obviate the need for further sophisticated or invasive procedures.



**Figure 1:-** 55 years old patient presented with PMB. (a) TVS reveals thickened endometrium. (b) SISH reveals thin and regular endometrium.

### Conclusion:-

TVS and SISH have comparable highly diagnostic accuracy for evaluation of most focal endometrial pathology but when it comes to endometrial thickening, SISH is more accurate at deciding whether it's genuine hyperplasia or merely intra-cavitary clots adding more thickness to the endometrium. SISH can be recommended in patient with postmenopausal bleeding when TVS shows endometrial hyperplasia or when the result of TVS are equivocal.

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