ORIGINAL ARTICLE

Diagnostic Accuracy of Transvaginal Ultrasound with Histopathological findings in Postmenopausal Bleeding

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ABSTRACT

Background: Postmenopausal bleeding (PMB) is bleeding from the vagina that occurs after a woman has stopped having regular menstrual periods due to menopause. Depending on the endometrial cancer prevalence, a strategy with TVS as an initial investigation is cost effective. TVS is a reliable tool for prediction of endometrial carcinoma as cause of PMB but in studies mentioned above has contradiction. So resolve this controversy, we conducted this study.

Aim: To determine the diagnostic accuracy of transvaginal ultrasound for detection of endometrial malignancy in females presenting with PMB taking histopathology as gold standard.

Methodology: This cross sectional study was done on 159 cases with PMB. Then TVS was done by a single radiologist. Patients were labeled as positive if ET>4mm on TVS. Endometrial sampling was taken by dilatation and curettage. Endometrial sample was sent for histopathology to pathology laboratory of hospital for confirmation of endometrial cancer.

Results: The mean age of the patients was 65.56±6.11 years. The mean PMB duration was 8.69 ±4.63 months. The mean duration of menopause was 9.59±6.45 years. The sensitivity of TVS was 86.3% with specificity of 93.0%, PPV was 91.3%, NPV was 88.9% and diagnostic accuracy was 89.9% taking histopathology as gold standard.

Conclusion: Our study concluded that the TVS is safe, acceptable and easily available procedure for detection of endometrial malignancy in females presenting with PMB.

Keywords: Abnormal Uterine Bleeding, AUB, Postmenopausal, Transvaginal Ultrasonography, TVS

INTRODUCTION

Postmenopausal bleeding (PMB) is bleeding from the vagina that occurs after a woman has stopped having regular menstrual periods due to menopause. Any vaginal bleeding that occurs 12 months after a woman's last menstrual period (LMP) is considered PMB[1]. Any bleeding should be considered abnormal in postmenopausal women except for those with predictable withdrawal bleeding taking hormone replacement therapy (HRT)[2].

Common causes for PMB include atrophic vaginitis, uterine polyp, leiomyoma, endometrial hyperplasia/cancer, coagulopathy, and lesions of adjacent structures (cervix, vulva or bladder)[3]. Patients with PMB have 10% - 15% chance of having endometrial carcinoma. As PMB is the commonest symptom of endometrial carcinoma, so patients presenting with it should be worked up on priority basis for early detection and management of endometrial carcinoma. The gold standard modality of investigation to visualize the uterine cavity is hysteroscopy, but ultrasonographic scanning is recommended as the first line investigation to select those who need further diagnostic evaluation. Ultrasonographic endometrial thickness (ET) of <4 mm is not associated with malignancy, and endometrial sampling is not recommended below this cutoff value[4].

Hysteroscopy should be performed in women with a thickened endometrium on scan and women with recurrent episodes of bleeding despite negative scan findings[1]. Recent studies have reported that endometrial malignancy was diagnosed in 22.7% - 24%[5,6]. Transvaginal ultrasound (TVS) is more easily available, rapid, and less invasive, does not require anesthesia and can detect all intra-cavity

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and also adenexal abnormalities[7]. In a study, conducted in 2012, ET<4mm is not associated with abnormal pathology, i.e. sensitivity was 100% and specificity was 72.73%[8]. In another study conducted in 2014, found that sensitivity of TVS was 96.0% and specificity was 13.8%[9]. But Aslam et al., reported that sensitivity and specificity of TVS were 71.4% and 67.7%, respectively[10].

So the aim of this study was to assess the accuracy of TVS for assessment of endometrial malignancy. TVS is a reliable tool for prediction of endometrial carcinoma as cause of PMB but in studies mentioned above has contradiction. So resolve this controversy, we want to conduct this study. So that we may be able to implement the results of this study. This will help to diagnose PMB patients on early basis and unnecessary surgeries can be prevented.

The objective of the study was to determine the diagnostic accuracy of transvaginal ultrasound (TVS) for detection of endometrial malignancy in females presenting with postmenopausal bleeding taking histopathology as gold standard.

MATERIAL AND METHODS

This cross sectional study was conducted during July 2015 to December 2015 in the Department of Obstetrics & Gynaecology, Fatima Memorial Hospital, Lahore. Sample size of 159 cases was calculated with 95% confidence level, and taking expected percentage of endometrial malignancy i.e. 24% and sensitivity and specificity of TVS i.e. 71.43% with 12% margin of error and 67.7% with 11% margin of error taking histopathology as gold standard. Non-probability consecutive sampling technique was used.

Inclusion criteria: patients of age 55-75 years with PMB (bleeding that occurs after 1year of amenorrhea in a

woman who is not receiving hormonal replacement therapy) and blood stained discharge confirmed on per speculum & bimanual examination undergoing biopsy for suspicion of endometrial carcinoma.

Exclusion criteria: Virgin female and cases with stenosed vagina, INR>2, Patients taking hormonal replacement therapy, Local trauma (vaginal pessary) on medical record and clinical evaluation

One hundred and fifty nine women of amenorrhea more than one year who are not receiving hormonal replacement therapy complaining of vaginal bleeding or discharge presenting through Gynaecology outdoor department was included in study. After informed consent and ensuring their confidentiality the detailed history was taken including age, parity, duration of menopause, postmenopausal bleeding and vaginal discharge. Then transvaginal ultrasonography was done by a single radiologist. Patients were labeled as positive if ET>4mm and negative if ET<4mm. Endometrial sampling was taken by dilatation and curettage. Endometrial sample was sent for histopathology to pathology laboratory of hospital. On *histopathology,* presence of an intraepithelial neoplasm (atypical and/or complex endometrial hyperplasia), serous, clear cell, mucinous, squamous, transitional cell, mesonephric, and undifferentiated. The result of histopathological findings was compared with the results of transvaginally ultrasonography findings. All information was recorded in proforma.

Data analysis: All collected information was entered and analyzed on SPSS version 17. Age, parity and duration of menopause were presented as mean and standard deviation. Parity was presented as frequency and percentage. A 2x2 table was constructed for sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of transvaginal ultrasonography by taking histopathological findings as gold standard for diagnosis of endometrial cancer. Stratification with respect to age and parity was done.

RESULTS

In this present study total 159 cases were enrolled. The mean age of the patients was 65.56±6.11 years. The mean duration of menopause was 9.59±6.45years. The mean PMB duration was 8.69±4.63 months (table 1).There were 17(10.7%) females who were nulliparous, 34(21.4%) had parity 1, 48(30.2%) had parity 2, 33(20.8%) had parity 3 while 27(16.98%) had parity 5 (fig 1).

There were 90(56.6%) cases of benign tumor while 69 (43.4%) patients had malignant tumor detected on TVS scan. There were 86(54.1%) cases of benign tumor while 73(45.9%) had malignant tumor on histopathology. The sensitivity of TVS was 86.3% with specificity of 93.0%, while the PPV of TVS was 91.3%, NPV was 88.9% and diagnostic accuracy of TVS was 89.9% taking histopathology as gold standard (table 2).

The data was stratified for age of patients. Among patients of age 56-65 years, on TVS 48 were malignant out of which histopathology confirmed 43 malignant and 5 benign cases. Similarly, among 24 benign cases on TVS of similar age groups, had 22 histopathological confirm benign cases while 2 were malignant. Among patients of age 66-

75 years, on TVS 21 were malignant out of which histopathology confirmed 20 malignant and 1 was benign. Similarly, among 66 benign cases on TVS of similar age groups, had 58 histopathological confirm benign cases while 8 were malignant. The difference was significant in both age groups (P<0.05). The data was stratified for parity of patients. Among nulliparous patients, on TVS 11 were malignant out of which histopathology confirmed 8 malignant and 3 benign cases. Similarly, among 6 benign cases on TVS of similar age groups, had 4 histopathological confirm benign cases while 2 were malignant. The difference was insignificant (P>0.05). Among patients with parity 1-2, on TVS 45 were malignant out of which histopathology confirmed 42 malignant and 3 were benign. Similarly, among 37 benign cases on TVS of similar parity, had 32 histopathological confirm benign cases while 5 were malignant. Among patients with parity 3-4, on TVS 13 were malignant and all were confirmed on histopathology. While, among 47 benign cases on TVS of similar parity, had 44 histopathological confirm benign cases while 3 were malignant. The difference was significant in later parity groups (P<0.05) (table 3).

Sensitivity: 86.3%, Specificity: 93.0%, PPV: 91.3%, NPV: 88.9% and Diagnostic Accuracy: 89.9%

Table 1: Baseline characteristics of patients

N	159
Age (years)	65.56±6.11
Menopause duration (years)	9.59±6.45
PMB duration (Months)	8.69±4.63

Table 2: Comparison of TVS and histopathology

TVS	Histopathology		Total
	Malignant	**Benign**	
Malignant	63 (86.3%)	6 7%)	69(43.4%)
Benign	10 (13.7%)	80(93%)	90(56.6%)
Total	73 (100%)	86(100%)	159(100%)

Fig 1: Frequency distribution of parity
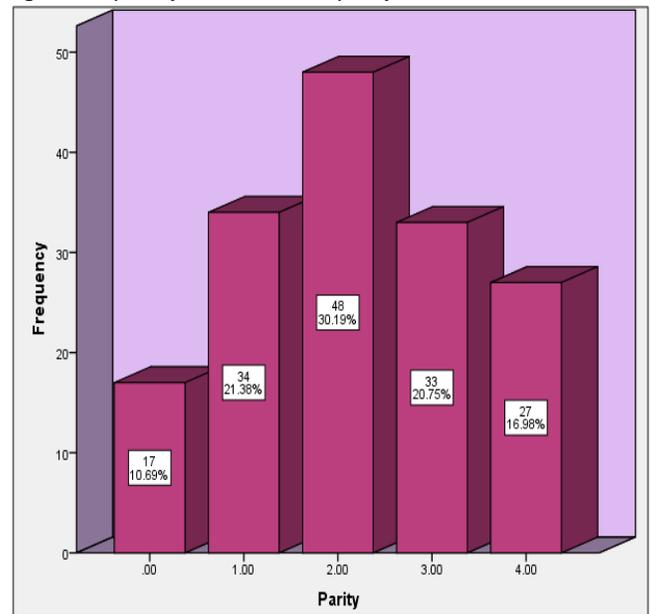
Table 3: Comparison of TVS findings with histopathology in stratified groups

	TVS	Histopathology		Sen	Spec	PPV	NPV	DA
		Malignant	Benign					
56-65 years	Malignant	43	5	95.6	81.5	89.6	91.7	90.3
	Benign	2	22					
66-75 years	Malignant	20	1	71.4	98.3	95.2	87.9	89.7
	Benign	8	58					
Nulliparous	Malignant	8	3	80	57.1	72.7	66.7	70.6
	Benign	2	4					
Parity 1-2	Malignant	42	3	89.4	91.4	93.3	86.5	90.2
	Benign	5	32					
Parity 3-4	Malignant	13	0	81.3	100	100	93.6	95
	Benign	3	44					

DISCUSSION

This present descriptive cross sectional study was done in department of Obstetrics & Gynaecology, Fatima Memorial Hospital, Lahore to determine the diagnostic accuracy of transvaginal ultrasound (TVS) for detection of endometrial malignancy in females presenting with postmenopausal bleeding taking histopathology as gold standard.

Abnormal uterine bleeding has a prevalence of about 11-13% in the general population and has significant impact on the quality of life[11]. Several invasive and non-invasive methods like dilatation and curettage, hysteroscopy, TVS and power Doppler have been useful for early detection of endometrial abnormality in women with AUB, but still there is insufficient data comparing the diagnostic accuracies of all three modalities.

In our study, there were 90(56.6%) cases of benign tumor while 69(43.4%) patients had malignant tumor detected on TVS scan. But when histopathology was done, it was revealed that there were 86(54.1%) cases of benign tumor while 73(45.9%) had malignant tumor.

According to our study results the diagnostic accuracy of TVS was 89.9% with sensitivity and specificity of 86.3% & 93% respectively taking histopathology as gold standard. The NPV and PPV values were 91.3% & 88.9% respectively. Some of the studies have been discussed below showing the results in favor of our study.

TVS measurement of the endometrial thickness is a non-invasive method which can be used to differentiate benign and malignant lesions of endometrium[12]. The results of our study were in accordance with the study of Conoscenti G et al. in which TVS showed sensitivity, specificity, PPV and NPV of 69.3%, 82.7%, 74.1% and 72.1% respectively[13].

Smith P et al. reported a good agreement between histology and ultrasound at endometrial thickness ≥8 mm where sensitivity, specificity, PPV and NPV were 67%, 75%, 14% and 97% respectively[14]. Mayurita et al in their study showed that taking histopathology as the gold standard, the sensitivity, specificity, PPV and NPV of TVS for diagnosis of endometrial abnormalities were 78.6%, 87.8%, 81.5% and 85.7% respectively (p value <0.001). At a cut-off for endometrial thickness of ≥8 mm for PMB women, TVS showed sensitivity, specificity, PPV and NPV of 90.9%, 87.5%, 80.0% and 94.5% respectively[15].

In a study, conducted in 2012, ET<4mm is not associated with abnormal pathology, i.e. sensitivity was 100% and specificity was 72.73%.[8]In another study

conducted in 2014, found that sensitivity of TVS was 96% and specificity was 13.8%[9]. A study by Aslam M et al reported that the overall diagnostic accuracy of TVS was 75.3% which is almost equivalent to our study findings[10]. The TVS plays an vital role in the assessing of AUB but its ability to screen pathology within the endometrial cavity is variable and limited to some extent[16,17].

Nazim et al showed in their study that TVS to be highly reliable in detecting endometrial hyperplasia with 100% sensitivity however; it was not proven as sensitive before[18]. In the MEM Aboul-Fotouh et al study all cases diagnosed as endometrial carcinoma had endometrial thickness of ≥8 mm. measured by TVS, so raising the cut of value to 8 mm also had 100% sensitivity, but with much higher specificity, positive predictive value, and diagnostic accuracy (80.4%, 73.7% and 75%, respectively)[19].

In another study by Yildizhan et al demonstrated that the sensitivity, specificity, PPV and NPV of TVS were 65.2%, 87.9%, 81% and 76.1%, respectively, in detecting endometrial polyps and 95.8%, 95%, 85.1% and 98.7%, respectively in detecting fibroids[20]. Indu Kaul et al resulted in their study that the sensitivity and specificity of TVS was 100% and 80% respectively and a predictive value as a positive test, as a negative test and accuracy was 76.9%, 100% and 89% respectively. This study shows that TVS allows detection of endometrial pathology in vast majority of women and it is relatively easy, cheap, non-invasive and does not require anesthesia[21].

CONCLUSION

TVS is a sensitive tool in the diagnosis of endometrial abnormalities in postmenopausal women. Our study concluded that the TVS is safe, acceptable and easily available procedure for detection of endometrial malignancy in females presenting with postmenopausal bleeding taking histopathology as gold standard.

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