ORIGINAL ARTICLE

Endometrial Carcinoma: Diagnostic Accuracy of Color Doppler Ultrasound in Diagnosis

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ABSTRACT

Aim: The objective of this research was to observe the diagnostic accuracy of color Doppler ultrasound for diagnosing endometrial Ca (carcinoma) in PMB women.

Study Design: Cross-sectional Study

Place and Duration: Radiology Department of Hayatabad Medical Complex, Peshawar for duration from December 2020 till May 2021

Method: One hundred and sixty patients with abnormal vaginal bleeding (postmenopausal bleeding) were included. Patient's ages were ranging between 45 to 75 years. After taking complete consent, patients detailed history age, gender, socio-economic status and previous hospital visited record was recorded. ET (endometrial thickness), UARI (uterine artery resistive index) and results of DUS (Doppler ultrasound) were noted. Patients marked endometrial Ca whom ET was >5mm and UARI was <0.7. Histopathology results as a gold standard were also noted. The results of DUS (Doppler ultrasound) were demonstrated with histopathology record.

Results: Mean age of patients was 62.36±8.44 years. Mean BMI was 28.24±2.38 kg/m^2. Endometrial carcinoma was found in 129 (80.63%) patients by Doppler ultrasound while histopathological findings revealed that 125 (78.13%) patients had endometrial carcinoma. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of DUS were recorded as 96.80%, 77.14%, 93.80%, 87.10% and 92.50% respectively.

Conclusion: Doppler ultrasound is very useful diagnostic modality for diagnosing endometrial carcinoma in patients having post-menopausal bleeding.

Keywords: Postmenopausal Bleeding, Endometrial Carcinoma, Doppler ultrasound, Endometrial Thickness, Uterine Artery Resistive Index

INTRODUCTION

In women, abnormal vaginal bleeding, or PMB (postmenopausal bleeding), is prevalent. Approximately 5% of women attend the gynaecologist and department daily for PMB treatment. At least six months of vaginal bleeding/periods have ended for post-menopausal women, or women who have irregular periods for at least four months have been referred to as post-menopausal women. Many gynaecological and non-gynecological conditions can cause irregular vaginal bleeding. Endometerial atrophy, rather than endo-CRC (carcinoma), polyps, hyperplasia, and leimyomas, was revealed to be the most common cause of postmenopausal bleeding [3]. PMB (postmenopausal bleeding) is the most common cause of abnormal vaginal bleeding in women, according to a large number of studies. However, the findings of certain other studies using Doppler ultrasound (DUS) reveal that endometrial polyps and liemyomas are the most common causes. Approximately 75% of patients with endometrial CRC (carcinoma) have experienced intermenstrual or postmenopausal bleeding as an early symptom. [5] The patient's survival and quality of life depend on accurate diagnosis and early treatment of this malignant illness. [6] Accuracy in diagnosing CRC (carcinoma) is critical for determining the best course of action. It is unfortunate that diagnostics for screening endometrial Ca (carcinoma/cancer) are not as readily available as pap-smear tests, which efficiently scan the cervix. The gold standard for diagnosing and treating endometrial disease is the curettage and dilation operation, according to previous research.

A number of research have shown that Color Doppler vascularity and Pulsed Doppler index of endometerium are quite beneficial in distinguishing between malignant and benign endometrial pathologies. The RI (resistive index) ranges from.40 to.70, and many researchers estimate 0.40 to be the limit value of benign to malignant endometrium. [7] There is a wide range of PI (Pulsed Index) values, from 1 to 2. [8]

ET (endometrial thickness) is considered a better indicator of endometrial disease than the Doppler index evaluation by many other researchers. [9] Color Doppler ultrasound (CDU) was used in this study to evaluate the accuracy of CDU in the diagnosis of endometrial CRC (carcinoma) in individuals with postmenopausal bleeding (PMB).

MATERIALS AND METHODS

The study was conducted at Radiology Department of Hayatabad Medical Complex, Peshawar for duration from December 2020 till May 2021. Total 160 patients with abnormal vaginal bleeding (postmenopausal bleeding) were included in this study. Patients ages were ranging between 45 to 75 years. Following the completion of the

consent process, the patient's comprehensive history, including age, gender, socioeconomic status, and past hospital visits, was noted. The endometrial thickness (ET), the uterine artery resistance index (UARI), and the results of the DUS (Doppler ultrasound) were all measured and recorded. Patients with endometrial CRC who had an ET greater than 5mm and a UARI less than 0.7 were identified. It was also mentioned that histopathology results were used as a gold standard. Using histopathological records, it was possible to display the outcomes of DUS (Doppler ultrasound). Those with any other source of vaginal bleeding, as well as women with other gynaecological disorders, were precluded from participating in this research.

All the data was analyzed by SPSS 24.0. Mean±SD was obtained. Frequencies and percentages were recorded. Chi-square test was applied to compare the DUS and histopathological findings. P-value <0.05 was taken as significant.

RESULTS

Mean age of patients was 62.36±8.44 years. 32 (20%) patients had ages between 45 to 55 years, 75 (46.88%) patients were ages between 56 to 65 years and 53 (33.13%) patients had ages above 65 years. Mean BMI was 28.24±2.38 kg/m^2.

Table 1: Mean Age and BMI of all the Patients

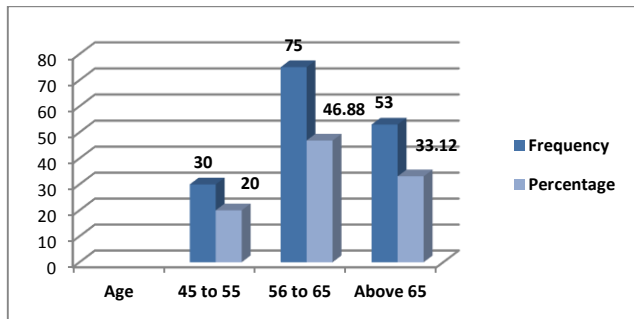| Variable	Mean	SD
Age (years)	62.36	8.44
BMI (kg/m)	28.24	2.38

Figure 1: Age wise Distribution of all the Included Patients

Endometrial carcinoma was found in 129 (80.63%) patients by Doppler ultrasound, while 31 (29.37%) patients had no endometrial carcinoma. (Table 2)

Table 2: Frequency of Endometrial Carcinoma by DUS

Variables	Frequency	%age
Positive	129	80.63
Negative	31	29.37

Histopathological findings revealed that 125 (78.13%) patients had endometrial carcinoma while 35 (31.87%) patients had no malignancy.

Table 3: Frequency of Endometrial Carcinoma by Histopathology

Variables	Frequency	%age
Positive	125	78.13
Negative	35	31.87

Diagnostic results of US with histopathology findings were compared to each other, results were recorded. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of DUS were recorded as 96.80%, 77.14%, 93.80%, 87.10% and 92.50% respectively

Table 4: Comparison of DUS with histopathology

Doppler Ultrasound	Histopathology		Total
	Positive	Negative	
Positive	TP 121	FP 8	129
Negative	FN 4	TN 27	31
Total	125	35	160

Statistic	Value	95% CI
Sensitivity	96.80%	92.01% to 99.12%
Specificity	77.14%	59.86% to 89.58%
Positive Likelihood Ratio	4.24	2.30 to 7.79
Negative Likelihood Ratio	0.04	0.02 to 0.11
Disease prevalence (*)	78.12%	70.91% to 84.27%
Positive Predictive Value (*)	93.80%	89.16% to 96.53%
Negative Predictive Value (*)	87.10%	71.68% to 94.74%
Accuracy (*)	92.50%	87.27% to

DISCUSSION

Endometrial carcinoma is the most prevalent genital cancer in women. [10] It is possible that the small number of patients in our study is to blame for the lack of patients aged between 30 and 35, as the SEER database shows that there are 2.3 percent of 0.1 million women worldwide with endometrial cancer who are between this age range. However, in our study, there were no patients of this age range. Any bleeding in post-menopausal women without hormonal resistance therapy is thought to be cancer; nonetheless, malignancy in these patients ranged from 2% to 10%. [12]

In our study, 30 patients were ages 45 to 55 years, 75 (46.88%) patients were ages between 56 to 65 years and 53 (33.13%) patients had ages above 65 years. Mean BMI of all the patients was 28.24±2.38 kg/m^2. This study's findings are comparable to those of a previous study in which the majority of patients were between the ages of 55 to 65 years. [13-14]

In present study, we found that by Doppler ultrasonography 129 (80.63%) patients had endometrial carcinoma while 31 (29.37%) patients showed negative results. Histopathological findings revealed that 125 (78.13%) patients had endometrial carcinoma while 35 (31.87%) patients had no malignancy. A study conducted by Batool S et al [15] reported that on the basis of Doppler ultrasound findings, 106 (82.8%) patients were diagnosed as having endometrial carcinoma, while 22 (17.19%) were declared negative.

Diagnostic results of US with histopathology findings were compared to each other, results were recorded. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of DUS were recorded as 96.80%, 77.14%, 93.80%, 87.10% and 92.50% respectively. Using histology as a gold standard, a previous study found that Doppler ultrasound was accurate at diagnosing endometrial Ca in PMB women. There was a 97.2 percent accuracy rate in terms of specificity, 76 percent accuracy rate in terms of specificity, and an 80.6 percent accuracy rate in terms of predictive power (PPV) [16]. A meta analysuis by Geng J et al [17]

regarding the usefulness of contrast-enhanced ultrasonography for diagnosing endometrial carcinoma, in their analysis they reported that sensitivity of CEUS in the diagnosis of EC was 84% [95% confidence interval (CI), 0.78-0.88], while the pooled specificity was 90% (95% CI, 0.86-0.92). The positive likelihood ratio (+LR) of CEUS was 8.0 (95% CI, 5.9-10.8) and the negative likelihood ratio (-LR) was 0.18 (95% CI, 0.13-0.25).

George P et al [18] reported that sensitivity and specificity of grey scale ultrasonography and colour Doppler were 100 % and 73.80 %, and when four criteria were positive, the sensitivity and specificity were 72.73 %, and 90.48 % respectively. When they analysed individual variables, status of hilum (absence / presence) has reasonably good sensitivity and specificity, positive predictive value, negative predictive value and accuracy (90.09 %, 92.90 %, 90.09 %, 92.90 % and 92.0 % respectively)

There was an earlier study that found that Doppler ultrasonography had a 57.1 percent sensitivity for diagnosing cervical cancer, while the spec- was 90.7 percent, the percentage of patients with a positive test result was 66.9 percent and 85.4 percent, respectively [19].

Drawbacks of TVUS are that it is highly operatordependent, and has limited field of view. It may overestimate myometrial invasion when the tumor is large, or patient has adenomyosis, and lymphovascular invasion. Additionally, there is inadequate information about the role of TVUS in delineating cervical invasion, parametrial extension, or lymph node involvement [20].

This is not enough research; we need to examine the relevance and factors associated with this disease in order to improve therapy and reduce morbidity and improve the quality of life for malignant patients.

CONCLUSION

As a result of this study, it can be concluded that DUS is a very successful method for identifying endometrial cancer in post-menopausal/vaginal bleeding patients. The surgery went without a hitch or hiccup.

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