Original Article

Determine the Diagnostic Accuracy of Color Doppler Ultrasound for Diagnosing of Endometrial Carcinoma in Post-menopausal Bleeding Women Taking Histopathology as Gold Standard

Muhammad Wasif Iqbal and Zahid Ahmad

ABSTRACT

Objective: To observe the diagnostic accuracy of color Doppler ultrasound for diagnosing endometrial carcinoma (Ca) in Post-menopausal bleeding (PMB) women.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Radiology Central Park Teaching Hospital Lahore during from June 2015 to Dec 2015.

Materials and Methods: One hundred and fifteen patients aged between 45 to 70 years having abnormal vaginal bleeding (postmenopausal bleeding) were included. After taking complete consent, patients detailed history age, gender, socio-economic status and previous hospital visited record was recorded. Endometrial thickness (ET), uterine artery resistive index (UARI) and results of Doppler ultrasound (DUS) 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 Doppler ultrasound were demonstrated with histopathology record.

Results: There were 20 (17.39%) patients were ages <50 years, 62 (53.91%) having ages of 50 to 59 years, and 33 (28.70%) patients were aged of > 59 years. 70 (60.87%) were resident of urban area while 45 (39.13%) having residency of rural area. 42% were literate and 58 % were illiterate, Diagnostic results of DUS were noted as 99 (86.07%) patients having endometrial Ca while 16 (13.91%) patients found no carcinoma of endometrial. Diagnostic results of US with histopathology findings were compared to each other, results were recorded True +ve, true −ve, false +ve, false-ve respectively as 99 (86.07%), 8 (6.96%), 6 (5.22%) and 2 (1.74%). We found sensitivity 98.02%, specificity 80%, PPV (positive predictive value) 94.29% and NPV (-ve predictive value) 80%.

Conclusion: It is concluded that performing DUS for diagnosing endometrial carcinoma in patients having post-menopausal/ vaginal bleeding was very effective with better specificity, sensitivity and positive and negative predictive values. We observe no complications/problems followed by the procedure.

Key Words: Postmenopausal bleeding, Endometrial carcinoma, Doppler ultrasound, Endometrial-thickness, Uterine artery resistive index

INTRODUCTION

Postmenopausal bleeding (PMB) or abnormal vaginal bleeding is commonly found in women. Approximately on daily basis 5% of women visit for PMB to the gynecology and department.[1] Women with post-menopausal bleeding has been described as complete ending of vaginal bleeding/periods happening at least six months or women having irregular periods cycle from at least 4 months.[2]

Department of Radiology, Central Park Medical College & Teaching Hospital Lahore.

Correspondence: Dr. Muhammad Wasif Iqbal, Assistant Professor of Radiology, Central Park Medical College & Teaching Hospital Lahore.
Contact No: 0333-6113756
Email: wasifiqbalradiologist@yahoo.com

Irregular or abnormal vaginal bleeding may be resulted due to many gynecological or non gynecological problems. Endometrial atrophy found to be the most frequent cause of postmenopausal bleeding[3] rather than the endometrial carcinoma, polyps, hyperplasia and leiomyomas. Many of research regarding PMB shows that Endometrial Atrophy is the most frequent cause of post-menopausal bleeding or abnormal vaginal bleeding, the findings of some other researches with Doppler ultrasound (DUS) shows that endometrial polyps and leiomyomas air the most frequent cause rather than the other causes.[4]

Up-to 75% of patients with endometrial carcinoma has found intermenstrual or postmenopausal bleeding as an early manifestation.[5] The diagnostic accuracy of this malignant disorder and better early treatment are most important for the patient's survival and quality of life.[6] Diagnostic accuracy of diagnosing carcinoma is very

helpful for suitable treatment. Woefully, tests for screening endometrial carcinoma/cancer are not accessible because endometrium is not as available as the cervix, which is effectively scanned by the pap-smear tests. Previous studies show that curettage and dilation procedure marked as the gold standard to diagnose and for the appropriate treatment endometrial disorder.

Many of studies show that color Doppler vascularity and pulsed Doppler index of endometrium is very useful to differentiate between malignant and benign endometrial pathology. Resistive index (RI) ranged from .40 to .70 have been considered to differentiate from benign to malignant endometrial, many of researcher consider 0.40 as the limit value of benign to malignant.[7] Pulsed index (PI) value is ranging from 1 to 2.00.[8]

Davidson and Dubinsky[9] consider endometrial thickness as a better evaluator of endometrial pathology than the Doppler index evaluation. This research was conducted to examine the accuracy of color Doppler ultrasound for diagnosing endometrial CRC (carcinoma) in patients with postmenopausal bleeding (PMB) taking histopathology results as a gold standard.

MATERIALS AND METHODS

This cross-sectional study was conducted at Department of Radiology Central Park Teaching Hospital Lahore during from June 2015 to Dec 2015. One hundred and fifteen patients aged between 45 to 70 years having abnormal vaginal bleeding (postmenopausal bleeding) were included. After taking complete consent, patients detailed history age, socioeconomic status and previous hospital visited record was recorded. endometrial thickness (ET), uterine artery resistive index (UARI) and results of DUS (Doppler ultrasound) were noted. Patients marked endometrial CRC whom ET was >5mm and UARI was <0.7. Histopathology results as a gold standard were also noted. The results of Doppler ultrasound (DUS) were demonstrated with histopathology record. Women having any other cause of vaginal bleeding and other gynecological problems were excluded from this study. The data was entered and analysed in SPSS-20.

RESULTS

There were 20 (17.39%) patients were ages <50 years, 62 (53.91%) having ages of 50 to 59 years, and 33 (28.70%) patients were aged of > 59 years. 70 (60.87%) were resident of urban area while 45 (39.13%) having residency of rural area. 41.72% were literate and 67 (58.28%) patients were illiterate, Diagnostic results of DUS were noted as 99 (86.07%) patients having endometrial CRC while 16 (13.91%) patients found no carcinoma of endometrial (Table 1).

Diagnostic results of US with histopathology findings were compared to each other, results were recorded True positive, true negative, false positive, false negative respectively as 99 (86.07%), 8 (6.96%), 6 (5.22%) and 2 (1.74%). We found sensitivity 98.02%, specificity 80%, (positive predictive value 94.29% and negative predictive value 80% (Table 2).

Table No.1: Demographic information of the patients

Variable	No.	%
Age (years)		
<50	20	17.39
50 – 59	62	53.91
60 -70	33	28.70
Socio-economic status		
Urban	70	60.87
Rural	45	39.13
Education		
Literate	48	41.72
Illiterate	67	58.28

Table No. 2: Comparison of endometrial Ca vs DUS

Endometrial Ca	DUS		Total
	Positive	Negative	
Positive	99 (TP)	6 (FP)	105
Negative	2 (FN)	8 (TN)	10
Total	101	14	115

$$\text{Sensitivity} = \frac{99}{99 + 2} \times 100 = 98.02\%$$

$$\text{Specificity} = \frac{8}{8 + 2} \times 100 = 80\%$$

$$\text{Positive predictive value} = \frac{99}{99 + 6} \times 100 = 94.29\%$$

$$\text{Negative predictive value} = \frac{8}{8 + 2} \times 100 = 80\%$$

DISCUSSION

Endometrial-carcinoma is commonly found malignant disease in the women genital tract.[10] As per SEER database cases of endometrial-Ca in women whom aged between 30 to 35 years is 2.3% out of 0.1 million women in all over the world[11], but in our study there is no patient of these ages it is may be due to the small number of patients, as per SEER results 6.1 out of 0.1 million endometrial Ca found in women ages $\leq$ 40 years and it increases 37 out of 0.1 million in women ages between 41 to 50 years. In PM (post-menopausal) women whom have no hormonal resistance therapy, any bleeding is considered as cancer; however the malignancy in these patients ranged from two to 10%.[12]

In the present study, 20 (17.39%) patients were ages <50 years, 62 (53.91%) having ages of 50 to 59 years, and 33 (28.70%) patients were aged of > 59 years. These results shows similarity to the other study in which maximum patients were aged between 50 to 60 years.[13] We found mostly 60.87% patients were belong to urban area while 39.13% had residency of rural area, these results were approximately similar to some other studies conducted in Pakistan.[14]

Diagnostic results by Doppler ultrasound were noted as 99 (86.07%) patients having endometrial Ca while 16 (13.91%) patients found no carcinoma of endometrial, these results were not better than the study conducted by Shazia et al.[15] It is may be due to the patients population who visited hospital for this malignancy. But in another research out of sixty five patients carcinoma was diagnosed in 54 patients.[16]

Diagnostic results of US with histopathology findings were compared to each other, results were recorded true positive, true negative, false positive, false negative respectively as 99 (86.07%), 8 (6.96%), 6 (5.22%) and 2 (1.74%). We found sensitivity 98.02%, specificity 80%, PPV (positive predictive value) 94.29% and NPV (negative predictive value) 80% with 98% accuracy rate The results of our study correlated with a research that was showing the accuracy of Doppler ultrasound for diagnosing endometrial Ca in PMB women with taking histopathology as a gold standard.[17] Sensitivity, specificity, PPV and PPN as 97.2%, 76%, 89.6% and 76.9% respectively.

If we go through the other study conducted by Dipi et al[17] the sensitivity of diagnosing cervix cancer by Doppler ultrasound was 57.1% and spec- was 89.7%, PPV and NPV were 66.9% and 85.4% respectively.

CONCLUSION

It is concluded that performing DUS for diagnosing endometrial carcinoma in patients having post-menopausal/ vaginal bleeding was very effective with better specificity, sensitivity and positive and negative predictive values. We observe no complications/ problems followed by the procedure.

Author's Contribution:

Concept & Design of Study:	Muhammad Wasif Iqbal
Drafting:	Zahid Ahmad
Data Analysis:	Zahid Ahmad, Muhammad Wasif Iqbal
Revisiting Critically:	Muhammad Wasif Iqbal, Zahid Ahmad
Final Approval of version:	Muhammad Wasif Iqbal

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Fazio SB, Ship AN. Abnormal Uterine bleeding. South Med J 2006;100:376-82.

2. Choudry A, Javaid M. Clinical usefulness of pipelle endometrial sampling. J R Army Med Corp 2005;2:35-7.

3. Ghazi A, Jabbar S, Siddiqi N. Frequency of Endometrial carcinoma in patients with post-menopausal bleeding. Pak J Surg 2005;21:41-4.

4. Cullinan JA, Fleischer AC, Kepple DM, Arnold AL. Sonohysterography: a technique for endome-trial evaluation. Radiographics 1995; 15: 501-14.

5. Chen SS, Lee L. Retroperitoneal lymph node metastases in stage 1 carcinoma of the endometrium: correlation with risk factors. Gynecol Oncol 1983; 16: 319-25.

6. Figge DC, Otto PM, Tamimi HK, Greer BE. Treatment variables in the management of endometrial cancer. Am J Obstet Gynecol 1983; 146:495-500.

7. Qureshi IA, Hidayat Ullah, Akram H, Ashfaq S, Nayyar S. Transvaginal versus Transabdominal Sonography in the evaluation of pelvic pathology. J Coll Physicians Surg Pak 2004; 14: 390-3.

8. Weaver J, McHugo JM, Clark TJ. Accuracy of transvaginal ultrasound in diagnosing ndometrial pathology in women with post-menopausal bleeding on tamoxifen. Br J Radiol 2005;78:394-7.

9. Davidson KG, Dubinsky TJ. Ultrasonographic evaluation of the endometrium in postmenopausal vaginal bleeding. Radiol Clin North Am 2003;41: 769-80.

10. Brasic N, Feldstein V. Dysfunctional Uterine Bleeding approach and therapeutic options. Ultrasound Clin 2010;5:245-6.

11. Vuopala S. Diagnostic accuracy and clinical applicability of cytological and histological methods for investigating endometrial carcinoma. Acta Obstet Gyneocl Scand Suppl 1977;70:1-72.

12. Kaunitz AM, Masciello AS, Ostrowsky M. Comparison ofendometrial Pipelle and Vabra aspirator. J Reprod Med 1988;33: 427-31.

13. Guido RS, Kanbour A, Ruhn M. Pipelle endometrial samplingsensitivity in the detection of endometrial cancer. J Reprod Med 1995; 40: 553-5.

14. Bradley L. Investigation of abnormal bleeding in PMB women. Bradley Hysterectomy. 1st ed. Philadelphia: Pennsylvania Mosby; 2008.p.115-30.

15. Shazia M. Research of diagnosing accuracy of Doppler ultrasound in PMB women 2016.

16. Dubinsky TJ, Stroehlein K, et al. Prediction of benign and malignant endometrial disease: hysterosonographic-pathologic correlation. Radiol 1999;210: 393-7.

17. Dipi RM, Amin MS, et al. Comparison of transabdominal and transvaginal sonography in the evaluation of uterine mass with histopathological correlation. Mymensingh Med J 2013;22(1):69-74