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Correlation Between Endometrial Histopathology in Postmenopausal Uterine Bleeding and Transvaginal Colour Doppler

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ABSTRACT

Background: Correlation Between Endometrial Histopathology in Postmenopausal Uterine Bleeding and Transvaginal Colour Doppler.
Aim of the work: To evaluation of transvaginal ultrasound and transvaginal color doppler of uterine arteries compared to endometrial histopathology in Postmenopausal uterine bleeding.
Patients and methods: Prospective comparative observational cohort study. This study involving 90 patients complaining postmenopausal bleeding recruited from those attending in the Gynecology clinic in Obstetrics & Gynecology Department at " Mansheat El-Bakery Hospital".
Results: The result found patients with endometrial carcinoma significantly in older age (P =0.009), with higher body mass index (BMI) (P <0.001). There was no statistically significant difference as regard parity and, medical disorders (DM and HTN) (P >0.05). 5 mm endometrial thickness (ET) used the cutoff point to differentiate between malignant and benign malignancy. Malignant endometrial had a significantly (ET) compared to benign endometrium being ≥ 5mm (P <0.001).
Conclusion: Regarding transvaginal ultrasound examination, 5 mm (ET) is used as the cutoff point for differentiating malignant from benign endometrium.

Keywords: *Transvaginal Colour Doppler; Transvaginal sonography; Histological Endometrial.*

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INTRODUCTION

A preceding caesarean birth is the key risk factor for Postmenopausal bleeding (PMB) bleeding from the genital tract occurring one year at least after menopause [1]. (PMB) is always a cause for concern, as it is the earliest and commonest presentation of endometrial carcinoma in this age [2].

Transvaginal Colour Doppler enabled to assessment of uterine artery and endometrial vascularization. Uses this technique to differentiate between benign and malignant endometrial [3].

Histological endometrial assessment is used in non-privileged gynecological services as the final word for diagnosis of endometrial lesion. Blind endometrial biopsy was used for many years and till now as the sole diagnostic strategy in perimenopausal and postmenopausal women, with high positive and negative results. However, the Hysteroscopy and directed biopsy is a gold standard method to evaluation of endometrium from any focal endometrial cancer [4].

PATIENTS AND METHODS

Prospective comparative observational cohort study. This study involving 90 patients complaining postmenopausal bleeding recruited from those attending in the Gynecology clinic in Obstetrics & Gynecology Department at " Mansheat El-Bakery Hospital".

Inclusion Criteria: Natural menopause **"** is absence of menstruation at least 1 year **"** in older women. This amenorrhea not explained by medication or disease **[1].**

(PMB)**:** 'Any vaginal bleeding in a postmenopausal woman who is not undergoing (HRT).

Exclusion Criteria: (HRT, coagulation disorders, hypothyroidism and liver disease).

METHODS: All patients were submitted to:

Full history taking (age, menstrual history including history of PMB, Obstetric history, medical and surgical history), Complete general examination, Complete Gynecological examination, Laboratory investigation: (CBC, ALT, AST, Kidney function

and coagulation profile), Transvaginal sonography (TVUS) and Colour Doppler Study:

When the blood vessels are identified a pulse of the sample volume Doppler was activated to show a flow velocity wave (FVW).

(RI), (PSV, cm/s) and (PI) was automatically calculated from three consecutive waves (FVWs).

According to power Doppler show flow mapping of three different vascular patterns [2].

Multiple vessel pattern (pattern A): Show multiple vessels found within the endometrium and myometrium. This pattern characteristic of endometrial cancer.

Single vessel pattern (pattern B): Show a single prevalent vessel penetrating the endometrium.
Scattered vessel pattern (pattern C): Show scanty vessel within the endometrium. This pattern characteristic of endometrial hyperplasia.

HISTOPATHOLOGICAL STUDY: Including fractional biopsy for cervix and endometrial biopsy guided by hysteroscopy.

STATISTICAL ANALYSIS:
All findings were recorded and statically analyzed to correlate transvaginal ultrasound and Doppler ultrasound findings with the histopathological results.

STATISCAL METHODS:
Patients divide into 3 groups, according to the results of endometrial histo-pathological examination:

Group 1: patients having endometrial carcinoma, Group 2: patients having endometrial hyperplasia and Group 3: patients having free endometrium.

For statistical purpose, histological diagnosis in group 2 and group 3 were combined as "the benign endometrium group" and group 1 remained as "the malignant endometrium group".

The relation of group 2 (endometrial hyperplasia) and group 1 (endometrial carcinoma) were also statistically compared.

Descriptive data: Mean and standard deviation $(\pm SD)$.

For quantitative data. Frequency and distribution for qualitative data. P value <0.05 was considered statistically significant (*), while P value >0.05 statistically insignificant and P value <0.01 was considered highly significant (**).

RESULTS

Histological diagnosis	N (%)	Mean±SD
Atrophic endometrium	26 (28.9%)	2.5±0.86
Hyperplasia without atypia	36 (40%)	5.2±1.7
Hyperplasia with atypia	18 (20%)	8.1±2.1
Endometroid adenocarcinoma	10 (11.1%)	13.5±5.5

Table 1: The table shows the different histological diagnoses of the endometrial samples and their percentages. Atrophic endometrium was the most common finding, while the prevalence of endometrial carcinoma was 11.11%.

Variable	Endometrial carcinoma (10)	Benign endometrial lesion not malignant (62)	Hyperplasia With atypia (18)	Test	P value
Vessel pattern Single Scattered Multiple	1(10.0) 2(20.0) 7(70.0)	30(48.4) 32(51.6) 0(0.0)	8(44.4) 10(55.6) 0(0.0)	^33.74	0.001**
Endometrial thickness mean ±SD Range	13.5±5.52 5-22	5.63±3.23 1-14	8.1±2.1 2-18	#6.64	0.001**
RI mean ±SD Range	0.42±0.05 0.33-0.51	1.0±0.38 0.58-1.96	0.78±0.24 0.41-1.23	#4.84	0.001**
PI mean ±SD Range	0.75±0.10 0.57-0.90	1.44±0.43 0.67-2.45	1.06±0.32 0.61-1.89	#5.02	0.001**

*#=student t test ^= FET **=highly significant. RI=resistance index. PI= (pulsitility index).*

Table 2: The carcinoma group showed a significantly higher mean endometrial thickness. Mean RI, PI were significantly lower than those of benign lesion group (P <0.001). Carcinoma group had significantly multiple vessel pattern while single vessel and scattered vessel pattern is highly suggestive for benign endometrium.

Endometrial thickness(mm)	Benign endometrial lesions (n=80)	Endometrial carcinoma (n=10)	P value
≥5	44 (55.0%)	10 (100.0%)	<0.001
<5	36 (45.0%)	0 (0.0%)	

Table(3) Endometrial thickness of 5 or more mm was highly statically significant in the endometrial carcinoma group.

VARIABLE	ENDOMETRIAL CARCINOMA (N=10)	Hyperplasia with atypia (N=18)	Hyperplasia without atypia (N=36)	Atrophic endometrium (N=26)
MULTIPLE VESSEL(A)	7(70.0)	0(0.0)	0(0.0)	0(0.0)
SINGLE VESSEL(B)	1(10.0)	*8 (44.4)*	25 (69.4)	5 (19.2)
SCATTERED VESSEL(C)	2(20.0)	10 (55.6%)	11 (30.6)	21(81.8)

Table 4: Were found endometrial carcinoma by histopathology in seven women. The malignant endometrium is significantly in multiple vessels (Pattern A). While the benign endometrium suggestive in single and scattered vessels (Pattern B and C).

DISCUSSION

Postmenopausal bleeding is a frequent manifestation in menopause, and at the rate of at least 1 in every 10 women seeks medical care for it during their lifetime. PMB is the most typical sign of endometrial cancer (90%), which is the most frequent type of gynaecological tumor [5].

The thickness of endometrium is measured by transvaginal ultrasound which is the most convenient, non-invasive investigation for diagnosis of endometrial pathogenesis , but it is a non-specific clinical attestation for uterine cancer [6].

Measuring thickness of endometrium via Ultrasound made it possible to divide women with PMB into two groups low-risk and high-risk groups. If the endometrial thickness is less than 4.5 mm this indicates low risk of endometrial malignancy. If it is 4.5 mm or more, this indicates high risk of endometrial malignancy. In the low-risk group, expectant management if possible, sample is not needed; however, they are advised to follow-up if the bleeding reoccurs [7].

Women with postmenopausal bleeding and thick endometrium must undergo endometrial sampling, in fear of the high risk of endometrial cancer. However, normal endometrial thickness did not exclude endometrial cancer, especially in women with significant predisposing factors [8].

Other tools of diagnosis, include doppler ultrasound. Since unrestricted tumor growth is dependent upon angiogenesis, mechanism of new vessels development or growth of current ones.

The aim of Doppler ultrasound to enhance specificity for endometrial malignancy. The value of Doppler and color Doppler U/S is to extinguish between benign and malignant endometrial disease is disputed. It has been proposed that minimal resistance of blood flow at Doppler U/S can be accompanied with malignancy. High focal vascularity may be seen by color Doppler U/S in both benign and malignant diseases in the uterine lining. Major interference in Doppler indices (i.e., peak systolic velocity, resistive index (RI), pulsatility index (PI)) in benign and malignant endometrial procedures minimizes the value of Doppler U/S in identifying endometrial masses [9].

The estimation of blood flow depends on in endometrial vessels and uterine arteries is crucial role to distinguish between benign and malignant endometrial pathologies. However, the non-invasive strategies of endometrial evaluation, including Transvaginal Ultrasound and Power Doppler imaging, are depended on measurement of blood flow in endometrial vessels and uterine arteries, they are not accurate enough to exclude endometrial pathology, combining both can give the best results when both are negative, the prospect of cancer is less than 5% [9].

The histopathological diagnosis done by curettage has been utilize as a gold-standard method for differentiating between typical and atypical endometrium, in spite of the fact that it encompasses a false negative rate of 1-10% due to failure of examining the full depth. Moreover, it is obtrusive, lacks comfort and risky procedure. It also holds a little but genuine hazard of morbidity and mortality particularly in elderly patients.

The aim of this study to detect malignancy in postmenopausal women obtained by Colour Doppler Ultrasound in uterine artery and endometrial histopathology. The study performed in 90 patients complaining postmenopausal bleeding to find the cause of the bleeding. Eighty patients have been diagnosed benign endometrial lesion, but 10 patients diagnosed malignant endometrial by histopathology. Statistical comparison between benign and malignant groups was done in the following tables, ROC and regression analysis [6].

The histopathological diagnosis in the two groups (n=90). Atrophic endometrium was the most common finding (26/90=28.9%), hyperplasia without atypia in (36/90=40.0%), hyperplasia with atypia (18/90=20.0%) and. Endometrial carcinoma was found in (10/90=11.11%). This shows the danger of PMB, as it was due to endometrial hyperplasia with atypia (potentially malignant) in of patients and malignancy in 11.11% of patients, which is a very high incidence in our group of 90 PMB patients.

The postmenopausal women divided into two class according measurement of endometrial thickness by Ultrasound. If the endometrial thickness is less than 4.5 mm or less is the lower risk division of malignancy but, if the endometrial thickness 5 mm or more is the high risk division of malignancy[7]. In women with thick endometrium the sampling must be taken to exclude malignancy because these women are high incidence of endometrial cancer [8].

Estimation of the endometrial thickness by transvaginal ultrasound (TVUS) in postmenopausal women could be a non-invasive strategy to evaluate women. An endometrial thickness of ≥5 mm had a sensitivity of 83 % and a specificity of 72 % for recognizing endometrial carcinoma, which are lower than in symptomatic women [10].

Based on the appearance of the typical vascular networks of endometrial cancer and hyperplasia show in three different power Doppler vascular patterns **(A, B, C)** were found to differentiate between endometrial carcinoma and hyperplasia [7]**.**

The study of uterine arteries Colour Doppler shows the (RI) significantly is lower in case of malignancy than benign lesion. The decrease (RI) value in malignancy case due to reflection of neovascularization occurring inside and around the tumor tissue.

Examination of the uterine artery in endometrium is highly diagnostic value, especially when compared with histopathological sampling. Each of them was clinically useful, helpful and non-invasive screening tools in diagnostic endometrial malignancy.

CONCLUSION

Regarding Transvaginal Ultrasound examination, (5 mm) endometrial thickness (ET) is used as the cutoff point for differentiating malignant from benign endometrium. Regarding Transvaginal Colour Doppler, and uterine artery indices (RI and PI) are good diagnostic tool in predicting endometrial carcinoma. Regarding Power Doppler blood flow mapping of the endometrium, multiple vessel pattern is highly suggestive of malignancy. The Receiver Operating Characteristics (ROC) curve analysis and Resistance index (RI) is the best predictor to diagnostic endometrium malignancy in women with postmenopausal bleeding, but this method can't distinguish between endometrial hyperplasia with atypia or without atypia. The Colour and Power Doppler Ultrasound helpful to diagnose the endometrial cancer by showing blood flow mapping of endometrium artery, and classify the malignancy to high and low risk group.

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