Original Article

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Evaluation of Endometrial Thickness by Transvaginal Sonography in Postmenopausal Women with Bleeding: A Cross-sectional Study

Obstetrics and Gynaecology Section

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ABSTRACT

Introduction: Abnormal Uterine Bleeding (AUB), occurring atleast one year after menopause, is one of the most concerning complaints among gynaecological patients. Endometrial atrophy is the most common endometrial finding in women with Postmenopausal Bleeding (PMB), approximately 10-15% of whom have endometrial carcinoma. Earlier studies suggested that obesity, Type 2 diabetes mellitus, and hypertension are risk factors for endometrial hyperplasia. Diabetes mellitus, obesity, and hypertension form the triad of endometrial cancer.

Aim: To assess endometrial thickness by Transvaginal Sonography (TVS) and compare it with histopathological findings in women with PMB, evaluating whether an endometrial thickness of <4 mm on TVS is more suggestive of malignancy.

Materials and Methods: The present cross-sectional study was conducted in the Department of Obstetrics and Gynaecology at King George Hospital, Vishakapatnam, Andhra Pradesh, India, from January 2022 to December 2022, comprising n=100 subjects. After routine necessary investigations for PMB, a transvaginal ultrasound examination was carried out to calculate endometrial thickness and compare it with the results of histopathological diagnosis of the endometrium. The parameters assessed were endometrial thickness and appearance, Type 2 Diabetes Mellitus (T2DM), hypertension, and Body Mass Index (BMI). The data was compiled and compared using the Chi-square test, with a p-value of ≤0.05 considered highly significant.

Results: The results showed normal atrophic and thickened endometrium in 36% of subjects each, and abnormal endometrium such as hyperplasia, carcinoma, and polyps were recorded in 14%, 8%, and 6% (n=6) of cases, respectively. The histopathological results showed normal endometrium such as atrophic, secretory, and proliferative endometrium in 49%, 6%, and 19% of subjects, respectively. Abnormal endometrial findings such as endometrial hyperplasia, carcinoma, and polyps were observed in 14%, 7%, and 5% of cases, respectively. The majority of cases (58%) had endometrial thickness ≤4 mm, followed by 36% of cases with 5-10 mm and 6% of cases >11 mm, with mean and Standard Deviation (SD) values of 5.8±3 mm. Statistical analysis data on the association between TVS findings and Histopathological Examination (HPE) findings was observed to be statistically significant (p<0.001). A statistically significant association was observed between T2DM, and BMI >25 kg/m^2 together, DM+hypertension+BMI (Triad) and endometrial thickness, respectively.

Conclusion: The TVS is easy, simple, non invasive, and involves no complications. Therefore, it can be used as the first diagnostic step in the investigations of women with PMB, combined with histopathological assessment.

Keywords: Histopathological analysis, Hypertension, Obesity, Type 2 diabetes mellitus

INTRODUCTION

Menopause is defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity [1]. The average age of menopause for Indian women is 47 years [2-4]. Abnormal Uterine Bleeding (AUB), occurring atleast one year after menopause, is called PMB [5]. It is one of the significant complaints of postmenopausal women, accounting for 5-10% of all gynaecological patients [1].

Endometrial atrophy is the most common endometrial finding in women with PMB, accounting for 60% of such bleeding. As a symptom of varied aetiology and its strong association with malignancy, it requires prompt and thorough evaluation. Even without amenorrhoea or irregularity, menstruation continuing after the age of 55 years should be investigated [6].

Atleast 20-25% of women with PMB are said to have a neoplastic lesion; approximately 10-15% of which have endometrial carcinoma. The carcinoma of the endometrium is one of the most common female pelvic malignancies and ranks as the fifth most common cancer in females after cervix, breast, oral cavity, and ovarian malignancies. The relatively low mortality for this cancer is probably due to the fact that most of these patients seek consultation at an early stage with symptoms of PMB [7,8].

Budding screening modalities for endometrial cancer include TVS, saline infusion sonohysterography, 3D Colour Doppler ultrasound, endometrial sampling through endometrial aspiration biopsy, dilatation and curettage, hysteroscopy, and guided biopsy [9].

TVS is a simple, non invasive procedure useful for detecting changes in the endometrial thickness in patients who have undergone a biopsy (endometrial thickness >4 mm) and also aids in the detection of any other organic pathology [10].

The T2DM, a chronic disease increasing rapidly worldwide, is established to be a strong risk factor for progression to malignancies [11] and a high-risk factor for the incidence of endometrial cancer [12]. T2DM is also associated with a high-risk of cardiovascular and microvascular complications and cancer [13]. The relative risks associated with T2DM are greater than two-fold for liver, pancreatic, and endometrial cancer [14]. Gressel GM et al., study results evidenced that in women with T2DM, the risk of endometrial cancer and endometrial hyperplasia is doubled and quadrupled, respectively [15].

The most prominent clinical sign of T2DM is hyperglycaemia, an environment that contributes to tumour progression through multiple pathways leading to increased proliferative, antiapoptotic, and metastatic cancer activity [16]. However, the potential biological links between T2DM and the malignant progression of endometrial hyperplasia are unclear and not completely understood.

The majority of diabetic patients are obese or overweight [17]. The incidence of Endometrial Cancer (EC) is increasing due to the prevalence of obesity, increased prevalence of diabetes, and changes in reproductive behaviour (e.g., nulliparity) [18,19]. Obese patients with a BMI >30 kg/m^2 have higher relative risks for cancers than overweight (BMI >25 and <30 kg/m^2) patients [20].

In addition, weight gain was observed to increase the risk of female reproductive organ neoplasms, namely, cancers of the endometrium, breast, and cervix [21-23]. The global prevalence of obesity was associated with an increased risk of DM and EC, and the summary relative risk for EC was 1.52 [24]. Besides, obesity has been demonstrated to be related to an overall increased risk of death and recurrence of cancer, among which there was a roughly 2-fold increase in EC mortality [25]. The excessive secretion of endogenous oestrogen promotes the growth and proliferation of endometrial cells, thereby resulting in an increased risk of EC [26].

A review of the literature shows that there are studies combining endometrial thickness and their association with diabetes mellitus, hypertension, and obesity [27,28].

For many years, diagnostic curettage has been the method of choice to diagnose endometrial abnormalities [29]. Subsequently, hysteroscopy combined with histological examination became the "gold standard" for such evaluation [30]. Currently, the focus has shifted to TVS as a simple, non invasive alternative method to hysteroscopy and curettage [31], as it has reduced risks, is relatively inexpensive, and is recommended for the evaluation of the endometrium.

The present study aimed to assess endometrial thickness by TVS, compare it with the histopathological findings in women with PMB, and evaluate whether endometrial thickness of >4 mm on TVS is more suggestive of malignancy. Also, assess the role of T2DM, BMI, hypertension (alone and together in combination) in the progression of endometrial hyperplasia.

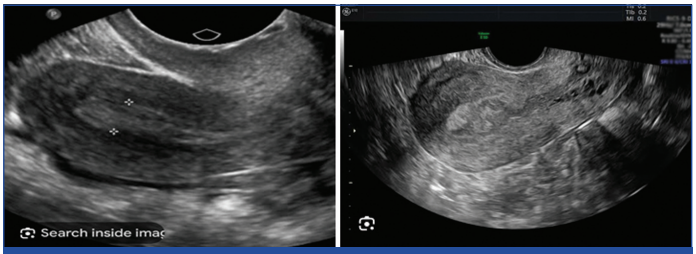
MATERIALS AND METHODS

A cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, King George Hospital, Visakhapatnam, Andhra Pradesh, India from January 2022 to December 2022. The study was approved by the institutional human ethics committee (385/IEC/AMC/NOV2021), and informed written consent was obtained from all study participants.

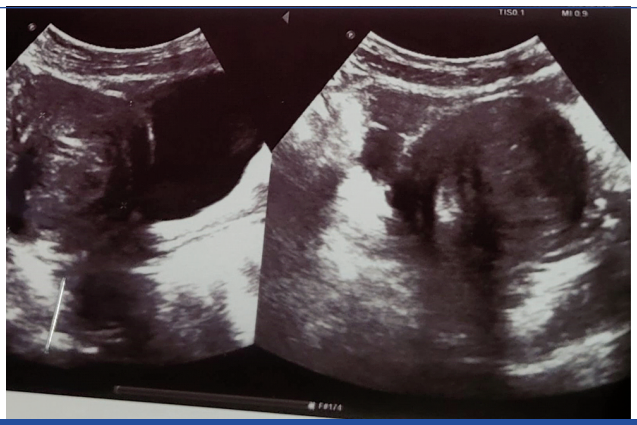
Inclusion and Exclusion criteria: The inclusion criteria involved postmenopausal women (n=100) with complaints of spotting and bleeding per vagina. Patients with vaginal infection, premalignant and malignant lesions of the vagina, vulva, and cervix, cervical and endocervical pathology, bleeding disorders, adnexal masses, and patients on tamoxifen and hormonal therapy were excluded from the study.

Study Procedure

TVS and Histopathological Examination (HPE) were performed on all the women participants of the study group population as part of the evaluation of PMB. Thorough per abdominal, per speculum, and pervaginal examination was conducted to rule out any local cause of abnormal bleeding. After routine necessary investigations for PMB, a transvaginal ultrasound examination was carried out to calculate endometrial thickness and morphology. The subjects were asked to empty their bladder before the examination. A small amount of gel was applied over the transducer tip, and the probe was covered by a condom. The endometrium was imaged in a sagittal plane [Table/Fig-1-3]. Both anterior and posterior layers of the endometrium were measured. Histopathological diagnosis of the endometrium was obtained from specimens obtained by dilatation and curettage or by hysterectomy in patients who underwent hysterectomy.



[Table/Fig-1]: TVS image- endometrial thickness of 8 mm.
[Table/Fig-2]: TVS image- endometrial thickness of 10 mm. (Images from left to right)



[Table/Fig-3]: TVS image- endometrial thickness of 16.3 mm.

The parameters studied on TVS included endometrial characteristics, endometrial appearance, and endometrial halo. Two groups were divided based on the histopathology report, which included atrophic endometrium, senile cystic atrophy, hyperplastic endometrium, disordered proliferative, endometrial polyp/fibroid, secretory endometrium, thickened endometrium, and endometrial carcinoma.

STATISTICAL ANALYSIS

The descriptive analysis was carried out using the mean and standard deviation for continuous variables, and frequency and proportion for categorical variables. All quantitative variables were checked for normal distribution within each category of the explanatory variable by using visual inspection of histograms and normality Q-Q plots. All the aforementioned data were compiled and statistically analysed using the International Business Machine (IBM) Statistical Package for Social Sciences (SPSS) 16.0 software package. The data were compared using the Chi-square test, and a p-value ≤0.05 was considered significant.

RESULTS

The present study data showed that the majority (46%) of the subjects with PMB belonged to the age group 50-59 years, followed by 25% of subjects in the age group 40-49 years, 24% in the 60-69 years category, and 5% in the 70-79 years category. The mean age of the women recorded in the study was 55.09±7.66 years, with a minimum age of 40 years and a maximum of 74 years.

The majority (23%) of the cases had a parity of 3, followed by 22% of subjects with a parity of 4, 21% with a parity of 2, 17% with a parity of 5, 8% with a parity of 1, 6% with a parity of 6, and 3% of the subjects were nulliparous women.

The majority (69%) of the subjects attained menopause less than five years ago, followed by 13% of subjects who attained menopause 11-15 years ago, 12% within 6-10 years, and only 6% who attained menopause more than 16 years ago. The mean and SD values were 5.20±5.21 years, with a range of 1-20 years.

It was observed that 17% of cases had obesity alone, 10% had diabetes mellitus alone, 7% had hypertension alone, 9% had diabetes and hypertension, and 4% had all three: diabetes, hypertension, and obesity [Table/Fig-4].

Co-morbidities	n (%)
Diabetes Mellitus (DM)	10 (10)
Hypertension	7 (7)
Obesity	17 (17)
Diabetes+Hypertension (HTN)	9 (9)
Diabetes+Obesity	15 (15)
Hypertension+Obesity	3 (3)
DM+HTN+Obesity	4 (4)

[Table/Fig-4]: Distribution of associated co-morbidities in cases among the study population (n=65).

In the present study, all the study group cases were subjected to TVS. The results recorded showed normal endometrial findings such as atrophic endometrium among 36% (n=36) subjects and thickened endometrium among 36% (n=36) cases. Abnormal endometrium such as hyperplasia of the endometrium was recorded in 14% (n=14) cases, carcinoma of the endometrium in 8% (n=8) subjects, and endometrial polyp in 6% (n=6) cases.

Normal endometrium such as atrophic endometrium was observed in 45% of subjects, secretory endometrium in 6% of subjects, and proliferative endometrium in 19% of cases. Abnormal endometrial findings such as endometrial hyperplasia were recorded in 14% of cases, endometrial carcinoma in 7% of cases, and endometrial polyp in 5% of cases [Table/Fig-5].

HPE findings	Percentage (%)
Atrophic	45
Senile cystic atrophy	4
Ca endometrium 1c	4
Ca endometrium 2a	2
Ca endometrium 2b	1
Simple hyperplasia	7
Complex atypical hyperplasia	3
Complex hyperplasia	4
Polyp	5
Proliferative	19
Secretory	6
Total	100

[Table/Fig-5]: Distribution of Histopathological Examination (HPE) findings of endometrium among the study group population (n=100).
Ca: Carcinoma

In the present study, 36% of the subjects had diabetes mellitus. Among the subjects with a normal endometrium, 25.7% had diabetes mellitus, whereas among the cases with abnormal endometrium, 65.4% of women had diabetes (p-value=0.001). There was no statistically significant association observed between hypertension and HPE findings (p=0.471). Similarly, there was no statistically significant association between BMI and HPE findings (p=0.071) [Table/Fig-6].

In the present study, the results of the histopathological findings with a thin line (n=0) and diffuse with regular margin (n=17) were considered as normal endometrium, whereas diffuse with irregular margins (n=8) and focal with a regular margin (n=1) were considered as abnormal endometrium (p-value=0.001). Additionally, 26.9% of study group cases with abnormal endometrium had a heterogeneous appearance, while 73.1% of subjects with abnormal endometrium had a homogenous appearance (p-value=0.001). A statistically significant association was observed between endometrial halo and HPE (p<0.001) [Table/Fig-7].

Co-morbidities		HPE findings		Total
Diabetes mellitus		Abnormal	Normal	n (%)
Absent (n=64)		9 (34.6%)	55 (74.3%)	64 (64%)
Present (n=36)		17 (65.4%)	19 (25.7%)	36 (36%)
Total		26 (100%)	74 (100%)	100 (100%)
p-value		< 0.001		
Hypertension				
Absent	n (%)	23 (88.5%)	61 (82.4%)	84 (84%)
Present	n (%)	3 (11.5%)	13 (17.6%)	16 (16%)
Total	n (%)	26 (100%)	74 (100%)	100 (100%)
p-value		0.471		
BMI				
<25	n (%)	12 (46.2%)	49 (66.2%)	61 (61%)
>25	n (%)	14 (53.8%)	25 (33.8%)	39 (39%)
Total	n (%)	26 (100%)	74 (100%)	100 (100%)
p-value		0.071		

[Table/Fig-6]: Association between diabetes mellitus, hypertension, BMI, and Histopathological Examination (HPE) among study group population (N=100).
Chi-square test

Endometrial characteristics	HPE findings		Total
	Abnormal n (%)	Normal n (%)	
Diffuse, irregular	8 (30.8%)	1 (1.4%)	9
Diffuse, regular	17 (65.4%)	37 (50%)	54
Focal, regular	1 (3.8%)	2 (2.7%)	3
Thin line	0	34 (45.9%)	34
Total	26 (100%)	74 (100%)	100
p-value	<0.001		
Appearance			
Heterogenous	7 (26.9%)	1 (1.4%)	8 (8%)
Homogenous	19 (73.1%)	73 (98.6%)	92 (92%)
Total	26 (100%)	74 (100%)	100 (100%)
p-value	<0.001		
Endometrial halo			
No	7 (26.9%)	0	7 (7%)
Yes	19 (73.1%)	74 (100%)	93 (93%)
Total	26 (100%)	74 (100%)	100 (100%)
p-value	<0.001		

[Table/Fig-7]: Association between endometrial appearance and Histopathological Examination (HPE) among study group population (N=100).
Chi-square test

In the present study, the data on the association between TVS findings and HPE among the study group subjects (n=100) showed that among n=36 cases with atrophic endometrium in TVS, they had a normal endometrium in HPE. Similarly, among n=36 patients with thickened endometrium by TVS, it was found that n=33 cases had a normal endometrium, whereas n=3 cases had abnormal endometrium by HPE (p<0.001) [Table/Fig-8]. Statistical analysis

TVS findings	HPE findings		Total
	Abnormal n (%)	Normal n (%)	n (%)
Atrophic	0	36 (48.6%)	36
Carcinoma endometrium	7 (26.9%)	1 (1.4%)	8
Hyperplasia	12 (46.2%)	2 (2.7%)	14
Polyp	4 (15.4%)	2 (2.7%)	6
Thickened	3 (11.5%)	33 (44.6%)	36
Total	26 (100%)	74 (100%)	100 (100%)

[Table/Fig-8]: Association between TVS findings and Histopathological Examination (HPE) findings among study group population (N=100).
Chi-square test

showed a statistically significant association between endometrial thickness and endometrial abnormality (p<0.001) [Table/Fig-9].

Endometrial thickness	HPE findings		Total
	Abnormal n (%)	Normal n (%)	
≤4 mm	1 (3.8%)	57 (77%)	58
5-10 mm	20 (76.9%)	16 (21.6%)	36
≥11 mm	5 (19.2%)	1 (1.4%)	6
Total	26 (100%)	74 (100%)	100 (100%)
p-value	<0.001		

[Table/Fig-9]: Association between endometrial thickness and Histopathological Examination (HPE) among the study group population (N=100).
Chi-square test

In the TVS findings [Table/Fig-10], among n=8 cases of endometrial carcinoma, n=2 cases were overdiagnosed as it turned out to be benign non pathological findings. Additionally, n=2 cases of endometrial carcinoma were missed and were diagnosed as proliferative endometrium. Among the n=14 cases of endometrial hyperplasia, n=3 cases were overdiagnosed, with n=1 case diagnosed with endometrium atrophy, n=1 case with proliferative endometrium, and n=1 case with secretory endometrium. Among the cases with endometrial polyp (n=6), n=3 cases were correctly diagnosed, whereas n=3 cases were overdiagnosed, with n=2 cases diagnosed with proliferative endometrium and n=1 case with secretory endometrium by HPE findings.

HPE findings	TVS findings					Total
	Atrophic	Caendometrium	Hyperplasia	Polyp	Thickened	
Atrophic	32	0	1	0	12	45
Ca endometrium 1c	0	3	0	0	1	4
Ca endometrium 2a	0	2	0	0	0	2
Ca endometrium 2b	0	1	0	0	0	1
Complex atypical hyperplasia	0	0	3	0	0	3
Complex hyperplasia	0	0	4	0	0	4
Polyp	0	0	2	3	0	5
Proliferative	0	2	1	2	14	19
Secretory	2	0	0	1	3	6
Senile cystic atrophy	2	0	0	0	2	4
Simple hyperplasia	0	0	3	0	4	7
Total	36	8	14	6	36	100

[Table/Fig-10]: Association between findings of HPE and TVS among subjects in the study group subjects (N=100).
Ca: Carcinoma

Among n=36 cases diagnosed with endometrial atrophy using TVS, it was found that n=4 cases were overdiagnosed. HPE findings showed n=1 case each with complex hyperplasia and secretory endometrium, whereas n=2 cases were diagnosed as senile cystic atrophy by HPE.

Among the cases with thickened endometrium (n=36) diagnosed using TVS, it was observed that n=12 cases were the same, whereas n=1 case was diagnosed as endometrial carcinoma, n=14 cases as proliferative endometrium, n=3 cases as secretory endometrium, n=2 cases as senile cystic atrophy, and n=4 cases as simple hyperplasia by histopathological findings.

In the present study, 80.8% of cases with PMB having abnormal HPE showed abnormal TVS, and 19.2% of cases having abnormal HPE showed normal TVS. Additionally, 9.5% of subjects having normal HPE showed abnormal TVS, and 90.5% of cases having normal HPE showed normal TVS [Table/Fig-11].

TVS diagnosis	Abnormal HPE	Normal HPE	Total
Abnormal	21 (80.8%)	7 (9.5%)	28 (28%)
Normal	5 (19.2%)	67 (90.5%)	72 (72%)
Total	26 (100%)	74 (100%)	100 (100%)

[Table/Fig-11]: Association between findings of HPE and TVS among the study group subjects (N=100).

DISCUSSION

In the present study, the mean age of the women was 55.09±7.66 years, and the majority (46%) of the subjects with PMB belonged to the age group between 50-59 years. Similar results were observed in the study conducted by Kaur M et al., comprising 112 patients, where the mean age was 57±6.41 years, and the majority of the patients (80%) belonged to the age group 51-60 years [32]. Similarly, Thulasi P et al., reported that among 75 patients, the majority of the patients (33.3%) belonged to the age group 46-55 years [33].

In the present study, all the patients were subjected to TVS and recorded normal endometrial findings such as atrophic endometrium in 36% of cases and thickened endometrium in 36% of cases. Abnormal endometrium such as hyperplasia of the endometrium was recorded among 14% of cases, carcinoma of the endometrium among 8% of cases, and endometrial polyp among 6% of women. Similar results were reported by Singh P et al., with 38.3% of cases having a normal endometrium, 30% of cases having endometrial hyperplasia, 10% of subjects having an endometrial polyp, and 11.7% of cases having endometrial growth [9].

The histopathological assessment remains the gold standard diagnosis for endometrial evaluation. The cases subjected to HPE of the endometrium showed normal endometrium such as atrophic endometrium in 49% of cases, secretory endometrium in 6% of subjects, and proliferative endometrium among 19% of cases. Abnormal endometrial findings such as endometrial hyperplasia, endometrial carcinoma, and endometrial polyp were observed among 14%, 7%, and 5% of subjects, respectively.

Similarly, Kaur M et al., study results showed that 53.6% of cases had endometrial atrophy followed by 17.9% cases of endometrial hyperplasia, 14.3% cases of endometrial carcinoma, 10.7% cases of an endometrial polyp, and 3.6% cases had pyometra [32]. Singh P et al., study reports showed that 10% of cases had a normal endometrium, 38.33% had atrophic endometrium, 18.3% had simple hyperplasia, 13.3% had endometrial carcinoma, 11.7% had disordered endometrium, 5% had atypical endometrium, and 3.3% had an endometrial polyp [9]. Similar results were reported by Thulasi P et al., with 40% of cases having endometrial hyperplasia, 4% having endometrial atrophy, and 2.7% having carcinoma endometrium [33]. Mathew M et al., reported that 29.7% of cases had disordered proliferative endometrium, 15.1% had proliferative

endometrium, 30.3% had secretory endometrium, 5.9% had hyperplasia endometrium, 1.1% had carcinoma endometrium, and 18% had another type of endometrium [34].

Kaur M et al., study reports [Table/Fig-12] showed that the sensitivity was 100%, and accuracy was 85.71% with a cut-off value of the endometrial thickness of 4 mm [9,32,35]. A study conducted by Singh P et al., showed that the majority of cases (40%) had endometrial thickness <4 mm, followed by 21.7% of cases with a thickness of 4.1-6 mm, 13.3% of cases between 6.1-8 mm, 15% of cases between 8.1-10 mm, and 10% of cases had a thickness >10 mm, with a mean endometrial thickness of 5.76±3.39 mm [9]. The sensitivity of endometrial thickness on TVS with ≤4 mm was 87.09%, and accuracy was 81.66%, respectively. In a study conducted by Tulasi P et al., the results showed that the majority of women (46.7%) had endometrial thickness of 8-10 mm, followed by 24% of cases with 5-8 mm, 20% of cases with 10-15 mm, 5.3% had >15 mm, and 4% of cases had <5 mm [33]. A study conducted by Mowafi DE et al., showed that the mean endometrial thickness among women with endometrial atrophy was 3.8±1.8 mm, with hyperplasia was 12.9±7.2 mm, endometritis was 12.5±0.7 mm, the polyp was 15.3±7.9 mm, and endometrial carcinoma was 21.1±9.8 mm [35]. A study done by Shrestha HK et al., showed that there was no statistically significant predictive value of abnormal endometrium with the help of endometrial thickness (p>0.05) [36]. A study conducted by Michail G et al., showed TVS accuracy in differentiating malignant lesions from benign endometrial lesions was 86% of specificity and 93.3% of sensitivity [37].

Parameters	Present study		Kaur M et al., [32]	Singh P et al., [9]		Mowafi DE et al., [35]
Cut-off ET	≤5 mm	≥10 mm	4 mm	≤4 mm	≥6 mm	5 mm
Sensitivity	96.15%	20.83%	100%	87.09%	61.29%	87%
Specificity	77.03%	98.65%	73.3%	75.86%	93.1%	73.7%
PPV	59.52%	83.33%	76.47%	79.41%	90.47%	80%
NPV	98.28%	79.35%	100%	84.61%	69.23%	82.4%
Accuracy	82%	79.59%	85.71%	81.66%	76.66%	81%

[Table/Fig-12]: Comparison of predictive values of endometrial thickness by TVS with histopathology findings in the present study with various studies [9,32,35].

Many studies have suggested that T2DM and endometrial cancer share characteristics regarding major modifiable determiner, such as low physical activity and obesity [38-40]. T2DM and endometrial hyperplasia are common conditions, and their co-diagnosis in the same individual was frequently detected [41].

As obesity is known to be accompanied by diabetes, it is, however, reasonable to suspect that diabetes-related endocrine perturbations may be responsible for a significant proportion of obesity-cancer risk [42]. Most studies have indicated that diabetes is associated with an increased risk of death from endometrial cancer [43,44].

In the present study, a statistically significant association was also observed in the cases having diabetes alone. Further studies are needed to be undertaken on large population data that can provide new insights into obesity-associated EC.

Limitation(s)

As the present study was a cross-sectional study, follow-up of the patients was not conducted. Therefore, the findings of the study cannot be generalised, as the study was conducted in a single centre.

CONCLUSION(S)

The combination of morphological features with endometrial thickness on transvaginal ultrasound increases the diagnostic accuracy compared to using endometrial thickness alone. Thus, it is better to use a combination of metric and morphological parameters when performing a sonographic assessment of the endometrium in postmenopausal women. Early screening, early detection, and appropriate management aid in the proper and prompt treatment of women with PMB. Histopathological evaluation is mandatory for ruling out malignancy in cases of PMB with ET >4 mm. Diabetes mellitus, obesity, and hypertension are the triad of endometrial cancer, closely associated with an increased risk of EC. Therefore, proper lifestyle modifications for well-controlled sugars, good physical activity to prevent obesity, and early diagnosis and treatment of diabetes and hypertension can decrease morbidity and mortality due to endometrial cancer.

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