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RESEARCH ARTICLE

ACCURACY OF TRANSVAGINAL SONOGRAPHY IN DETECTING ENDOMETRIAL ABNORMALITIES IN WOMEN WITH PERI AND POSTMENOPAUSAL BLEEDING

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Abstract

Background: In most women with peri n post menopausal bleeding have non malignant endometrial changes. However' uterine curettage is mandatory to exclude malignant changes. Diagnostic curettage has been the method of choice for many years to diagnose cancer of endometrium in patients with post menopausal bleeding. Although it is a simple technique, however it is an invasive and uncomfortable procedure and not without danger. For this reason many different methods have been developed to minimize the need of curettage. Trans-vaginal sonography and color doppler of uterine artery have shown good accuracy in detecting normal endometrium from abnormal.

Objectives: Aim of this work is to evaluate the role of TRANS VAGINAL SONOGRAPHY study of endometrium and Doppler velocimetric measurement of uterine artery as non invasive screening procedures to detect endometrial pathology in peri n post menopausal bleeding and to correlate the sonographic results with hispathological finding in order to discriminate normal from pathological endometrium.

Methodology: This study was carried out in Department of Obstetrics and Gynaecology with collaboration of Department of Pathology and Department of Radiology. 100 patients were selected and they were presented with chief complaints of peri and post menopausal bleeding and subjected to Trans-vaginal sonography, color Doppler n diagnostic curettage. The data obtained from the ultrasound and Doppler examinations is compared to the results of the Histopathological Diagnosis After curettage.

Results: In this study, women with peri and post menopausal bleeding and an abnormal endometrium was: 7.36 ± 3.225 mm n 12.54 ± 4.64 as compared to ET thickness in normal group. 6.72 ± 1.25 and 5.05 ± 1.148 mm, with a p-value of less than .001 which is statistically significant. AT cut off pt. off 6mm in peri menopausal gp. Sensitivity n specificity was seen 83.3% percent n 78.2 percent respectively and at cut off pt. of 4mm in post menopausal group. Sensitivity n specificity was 87.5% and 77.3% which was highest in my study. These were the best cut off point values in my study where maximum sensitivity and specificity was achieved. Also the values of resistance index and pulsatility index of uterine artery in normal benign group was higher than abnormal group. Resistance index of normal group was 85 ± 0.36 and abnormal group was 0.73 ± 0.78 and for pulsatility index were 3.88 ± 0.43 and 1.65 ± 1.17 shows that levels were significantly lower in patients with abnormal endometrium. For resistance index best cut off point of uterine artery was at 0.83 where sensitivity and specificity was 92.3% and

66.67% respectively and for pulsatility index of uterine artery was at 3.80 where sensitivity n specificity are 92.6% n 73.9%. which was maximum in this study.

Conclusion: This study showed that patients with abnormal endometrial pathology had a mean endometrial thickness that was significantly higher than patients with normal endometrium. And similarly Doppler indices showed levels that were significantly lower in patients with abnormal endometrial pathology. Both transvaginal sonography endometrial thickness n doppler velocimetric study of uterine artery possess high sensitivity and specificity that makes each of them clinically useful as a single screening tool in discriminating normal from abnormal pathological endometrium in cases with peri and post menopausal bleeding. Yet the present study emphasizes the importance of combined techniques to increase screening accuracy.

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INTRODUCTION

Postmenopausal bleeding is often the first and principal symptom of endometrial cancer and should be regarded as a symptom of genital tract malignancy until proved otherwise¹. Even though most women with perimenopausal and postmenopausal bleeding have non-malignant endometrial changes like atrophic changes of the endometrium on histopathological findings. Uterine curettage is mandatory to exclude malignant endometrial changes².

Diagnostic curettage has traditionally been for many years the method of choice to diagnose cancer of the endometrium. It is a simple technique, however it is an invasive and an uncomfortable procedure³.

With the introduction of vaginal ultrasonography, examination of the uterus has become very easy and quick⁴. It has been shown that a normal appearance of the endometrium in postmenopausal women reliably excludes significant pathology⁵.

There is good evidence that women who present with postmenopausal bleeding in whom TVS has demonstrated endometrial thickness $\leq 4\text{mm}$ have a very small risk of endometrial carcinoma. Those women with an endometrial thickness $\geq 5\text{mm}$ should have endometrial sampling or hysteroscopy⁶.

A number of studies have suggested that measurement of endometrial thickness using transvaginal sonography is helpful in detecting endometrial pathology, including endometrial carcinoma^{4,7} and in assessing myometrial invasion⁸.

OBJECTIVE

The aim of this work is to: Evaluate the role of transvaginal sonographic study of the endometrium as non-invasive screening procedure to detect endometrial pathology in case of peri and postmenopausal bleeding and to correlate the sonographic results with histopathological finding in order to discriminate normal from pathological endometrium.

MATERIAL AND METHODS

This study was carried out in the Postgraduate Department Obstetrics and Gynecology, Department of Radiology and Department of Pathology, Government Medical College Srinagar for a period of two years. One hundred (100) patients were selected from patients presenting inpatient Department of Lalla Ded Hospital with chief complaints of peri and postmenopausal bleeding and were subjected to TVS and diagnostic curettage. The women with: (i) Age group 40-70 years, (ii) no medical disorder like ITP, (iii) no HRT replacement therapy, and (iv) no bleeding disorders were included in the study. While as (i) Patients < 40 or > 70 years of age (ii) Patients who are seeking HRT therapy, and patients with history of any other drug intake were excluded from the study. General and a proper gynaecological examination was done in all patients.

Including height, weight, general appearance, vital signs (pulse, temperature, blood pressure), chest and heart examination.

Proper Abdominal and Pelvic examination:

Including speculum and per-rectal examination to assure freedom of any organic clinically detectable pathological lesions (cases in which an evident organic cause was found were excluded from the study). All baseline investigations were done.

TVS was performed

Evaluation of the endometrium as regarding: (a) Thickness, (b) Structure and echogenicity, (c) Endometrial margin, (d) The presence of intrauterine fluid. After that all patients underwent diagnostic curettage.

For statistical analysis SPSS (Version 20.0) and Microsoft Excel were used. Student's independent t-test was employed for comparison of quantitative data. Sensitivity, specificity and predictive values were used in diagnosis of normal endometrial pattern among peri and post menopausal women. P-value less than 0.05 was considered statistically significant.

RESULTS

A total number of patients taken were 100 in numbers in which 70 were in perimenopausal group (Group A) and 30 in postmenopausal group (Group B). Menarche in perimenopausal group (Group A) was 12.70 ± 0.92 years and in postmenopausal group (Group B) it was 12.50 ± 0.08 with a p value of 0.363 which was statistically insignificant.

Table 1: Endometrial histopathology in women with perimenopausal and postmenopausal bleeding of all studied women							
Histopathological diagnosis		Perimenopausal (Group A)		Postmenopausal (Group B)		Total	
		No.	%age	No.	%age	No.	%age
Normal end	Atrophic	16	22.86	12	40.00	28	28
	Proliferative	13	18.57	9	30.00	22	22
	Secretary	17	24.29	4	13.33	21	21
Abnormal end	hyperplasia	18	25.71	1	3.33	19	19
	Polyp	4	5.71	1	3.33	5	5
	Cancer	2	2.86	3	10.00	5	5
Total		70	100	30	100	100	100

In group A, majority of patients i.e. 48% were having endometrial changes suggesting of ovulatory disorders while as in group B, majority of patients were having atrophic endometrial changes.

Table 2: Histopathological diagnosis correlated with endometrial thickness				
Histopathologic diagnosis	No.	Endometrial thickness (mm)		
		Mean	SD	Range
Atrophic	28	5.18	1.142	3.6-8.0
Proliferative	22	5.34	0.960	3.8-7.1
Secretary	21	3.85	1.021	2.5-6.0

Hyperplasia	19	6.62	1.942	4.1-9.7
Polyp	5	6.94	1.568	4.2-8.0
Cancer	5	15.76	2.124	13.1-18.2

In both the studied groups with increasing endometrial thickness on TVS, the pathological findings on histopathology were observed.

Table 5: Comparison of mean endometrial thickness of normal and abnormal endometrium between peri and postmenopausal patients

Endometrium		No.	Endometrial thickness			P-value
			Mean	SD	Range	
Normal End	Perimenopausal	46	6.72	1.259	2.5-7.4	<0.08 (NS)
	Postmenopausal	25	5.05	1.148	2.9-8.0	
Abnormal End	Perimenopausal	24	7.36	3.225	3.8-18.2	<0.001 (SSD)
	Postmenopausal	5	12.54	4.648	7.4-17.2	

The above table signifies that patients in abnormal group were having endometrial thickness more as compared to the normal group of patients with a p value of < 0.001 which is statistically significant.

Table 4: Predictive values of various endometrial thickness in diagnosis normal endometrial pattern among peri-menopausal women

End. Thickness cut off	Sensitivity (%age)	Specificity (%age)	PPV (%age)	NPV (%age)
5.5	80.1	53.3	69.6	66.7
6	83.3	78.2	95.7	62.5
7	83.0	69.6	84.8	66.7

Taking 6mm as the cut-off time. Maximum specificity and sensitivity was observed in perimenopausal group.

Table 5: Predictive values of various endometrial thickness in diagnosis normal endometrial pattern among post menopausal women

End. Thickness cut off	Sensitivity (%age)	Specificity (%age)	PPV (%age)	NPV (%age)
3	100	17.3	14.5	100
4	87.5	77.3	58.3	94.4

5	100	41.2	56.5	100
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Taking 4mm as the cut-off time. Maximum specificity and sensitivity was observed in postmenopausal group.

DISCUSSION

In this study total number of patients taken were 100 with in 70 perimenopausal group and 30 in postmenopausal group with an age range of 42-48 years and 50-68 years in perimenopausal and postmenopausal groups respectively ($p < 0.005$). The menarche in perimenopausal group was in the range of 11-14.8 years and in postmenopausal group it was 11-14.3 years with a p value of 0.363 which was statistically insignificant.

ENDOMETRIAL THICKNESS

In this study the mean endometrial thickness in normal group ;

- (a) Perimenopausal group 6.72 ± 1.25 mm
 - (b) Postmenopausal group 5.05 ± 1.14 mm (P value < 0.001)
- as compared to endometrial thickness of abnormal group
- (a) Perimenopausal group 7.36 ± 3.22 mm
 - (b) Postmenopausal group 12.54 ± 4.64 mm (p value < 0.001)

Which was statistically significant.

Showing that endometrial thickness in abnormal group of patients was higher as compared to the normal group of patients.

Dijkuizen et al (1996)¹¹ who found that the mean endometrial thickness in women with perimenopausal and postmenopausal bleeding and normal endometrium were 4 mm (0.5-15) and 2 mm (0.5-10). The mean endometrial thickness in women with perimenopausal and postmenopausal bleeding and an abnormal endometrium in this study were 7.36 ± 3.22 mm and 12.54 ± 4.64 mm respectively. **Dijkuizen et al (1996)⁹** found that the median endometrial thickness of abnormal endometrium in perimenopausal women did not differ significantly from that of postmenopausal women. In this study, a statistically significant difference in the mean endometrial thickness was found between women with normal perimenopausal endometrium (6.72 ± 1.259 mm) and those with normal postmenopausal endometrium (5.05 ± 1.11 mm) ($P < 0.001$), and also between abnormal perimenopausal endometrium (7.36 ± 3.22 mm) and those with an abnormal postmenopausal endometrium (12.54 ± 4.64 mm) ($P < 0.001$).

Fleisher et al (1991)¹⁰ who suggested that in perimenopausal women, endometrial thickness greater than 14 mm should be considered for further evaluation, whereas in postmenopausal women, endometrial thickness over 10 mm should be considered abnormal.

Karlsson et al (1995)¹¹ had found from the results of their multicentric study on 1186 women with postmenopausal bleeding that the risk of finding pathological endometrium at curettage when the endometrium is 4 mm or less as measured by transvaginal ultrasonography is 5.5%. Thus, they concluded that in women with postmenopausal bleeding and an endometrium. 4 mm, it would seen justified to refrain from curettage.

Maria et al (1996)¹² on 47 patients who presented with postmenopausal bleeding or sonographic endometrial abnormalities after menopause, found no endometrial pathology with endometrial thickness < 4 mm and the endometrium was invariably greater than 5 mm in cases of endometrial pathology.

Vento et al (1999)¹³ detected three cases of adenocarcinoma from among 291 postmenopausal women. The mean endometrial thickness of these cases was 8.3 mm. Based on the data described by **Karlsson (1995)¹¹**, it seems reasonable to conclude that an endometrial thickness of less than 4 mm as measured by transvaginal ultrasonography in woman with postmenopausal bleeding carries a very low risk of being abnormal.

When searching for a cut off limit for the endometrial thickness in this study, it was kept in mind the main aim of this work was to evaluate the usefulness of endometrial thickness measurement only as an initial diagnostic tool. Accordingly on optimal cut off point for diagnosis of normal endometrium would be one that gave the highest sensitivity and specificity and hence the least false negative and false positive results. Different cut off points were tested for their sensitivity and specificity. Accordingly a cutoff point of 6mm seemed to be appropriate in cases with perimenopausal bleeding, as this was associated with a sensitivity of 83.3% and specificity of 78.2%. As regards the postmenopausal women, 4mm cut off value with a sensitivity of 87.5% and specificity of 77.3% with positive predictive value 58.3% and negative predictive value 94.4% for endometrial thickness (double layer) was chosen as our standard in the diagnosis of upper limit of atrophic endometrium.

This selection was also proposed by **Osmer et al., (1990)**; **Varner et al., (1991)**; **Smith et al., (1991)**; **Ghanem et al., (1993)**; **Karlsson et al., (1995)**; and **Maria et al., (1996)**^{7,11,12}.

Increasing the cut off value to 5mm as proposed by **Nasri and Cost (1989)**; **Goldstein et al., (1990)**; **Granberg et al., (1991)**; **Cacciatore et al., (1994)**; and **Wolman et al., (1996)**^{5,14,4,8,15} resulted in remarkable increase in the false positive rate for diagnosis of atrophic endometrium. At a cut off limit of 4mm for endometrial thickness, the sensitivity of transvaginal sonography for detecting a histopathologically abnormal endometrium was 88.9%, the specificity 74.5%, the positive predictive value 40% and the negative predictive value 97.2%. These figures correspond well with **Gupta et al., (1996)**¹⁶, (Sensitivity 83%, specificity 77%, a positive predictive value 54% and a negative predictive value 94%), **Karlsson et al. (1995)**¹¹, (sensitivity 94%, specificity 78%, Positive predictive value 69% and negative predictive value 96%) and with that of **Granberg et al. (1991)**⁴, (sensitivity 100%, specificity 96%, Positive predictive value 87% and negative predictive value 100%). **Emanuel et al (1995)**¹⁷, Had studied 279 patients with abnormal uterine bleeding with transvaginal ultrasonography for detection of intrauterine abnormalities and found that transvaginal sonography seems to be an effective procedure to exclude endometrial and intrauterine abnormalities with a sensitivity of 96% and specificity of 89% and could be implemented as a routine first step procedure in patients with abnormal uterine bleeding to select those for need for further diagnostic evaluation.

In a recent study, **Love et al. (1999)**¹⁸ found that using endometrial thickness 4mm, the sensitivity of ultrasound to detect the endometrial malignancy was 92.9%, the specificity was 50% and the positive and negative predictive values were 24.1% and 97% respectively.

CONCLUSION

This study suggests a cut off limit of 6mm for the diagnosis of normal endometrium in perimenopausal patients, and 4mm in postmenopausal patients. These cut off limits were associated with a sensitivity of 83.3% and 87.5% respectively, while the specificity was 78.2% and 77.3% respectively. Transvaginal sonographic endometrial thickness possesses high sensitivity and specificity that makes it clinically useful screening tool in discriminating normal from abnormal pathological endometrium in cases with peri and postmenopausal bleeding.

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