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# CORRELATION OF ULTRASONOGRAPHY AND HISTOPATHOLOGICAL FINDINGS IN PERIMENOPAUSAL WOMEN WITH ABNORMAL UTERINE BLEEDING

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**Background:** Abnormal uterine bleeding is a frequently encountered gynecologic complaint in perimenopausal woman. The objective of the study was to correlate the ultrasonographic finding with histopathological examination in perimenopausal AUB.

**Methods:** This prospective study was carried out over 6 months in a teaching hospital. A total of 100 women in the age group of 40-51yrs who presented with AUB were included. After selecting the patient with eligibility criteria, detailed clinical history, systemic, gynecological examinations and investigations were done as per proforma. USG study of endometrial pattern and thickness was measured followed by dilatation and curettage and HPE was done. The data collected was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0 (Trial Version)

**Result:** The commonest menstrual irregularity was heavy and prolonged menstrual bleeding (49%). Endometrial thickness >15 mm on USG was seen in (43%) patients, 9-15mm thickness(44%). On HPE, secretory phase endometrium(37%), proliferative phase (36%), endometrial hyperplasia(22%), disordered proliferative endometrium (2%) & endometrial carcinoma (3%) was seen.

**Conclusion:** USG should be the first diagnostic step in evaluation of AUB. HPE is done to confirm the diagnosis. Accurate diagnosis of the causative factor of AUB is imperative for appropriate management.

**Keywords:** Abnormal uterine bleeding, Heavy menstrual bleeding, Histopathological examination, Endometrial hyperplasia, Dilatation and Curettage

## INTRODUCTION

Abnormal uterine bleeding (AUB) is any change seen in the frequency of menstruation, duration of the flow or amount of blood loss experienced by a woman. Perimenopause is defined as period of 2-8 yrs preceeding menopause & 1 yr after the final menses (WHO), literally means “around menopause”[1,2] can last for up to 10 years.

AUB in perimenopausal women is associated with endometrial carcinoma in approximately 10 % of the total number of cases.[3] In perimenopausal women, sonography should be included as the first choice of investigation. Endometrial biopsy including other methods of detecting endometrial hyperplasia or carcinoma must be considered early in the investigation workup.[4]

AUB in perimenopausal women accounts for almost 70 % of total gynaecological outpatient visits.[5] This signifies that perimenopausal AUB may be the only clinical presentation

 

seen in endometrial cancer in most instances. Using a non-invasive and a convenient diagnostic technique such as USG is preferable at the first instance for studying the endometrial patterns and its thickness accurately and at the same time to exclude organic uterine pathology in AUB followed by the invasive technique of dilatation and curettage (D and C).[6,7] Dilatation and curettage remain the standard diagnostic procedure for assessment of AUB and for early detection of atypical or typical endometrial hyperplasia, but it has a drawback of being a blind procedure with a chance of missing of a small or focal lesion.[8,9]

Aim and objective of the present study was to study the various types of menstrual abnormalities prevalent in perimenopausal women and to correlate the ultrasonographic findings eg. endometrial thickness and pattern with histopathological examination as obtained from dilatation and curettage (D&C).

## METHODS

The study was conducted on 100 perimenopausal patients with menstrual irregularity fulfilling the above criteria. Written informed consent was taken after explaining the complete procedure to the patient. After taking detailed history of the patients, thorough clinical examination and all routine hematological investigations were done. Ultrasonography was performed. D&C was done and endometrial curetting were sent for histopathological examination. Correlation of ultrasonography findings with the histopathological examination report was done.

**INCLUSION CRITERIA**:-

1. Perimenopausal patients with abnormal uterine bleeding (age group 40-51 years).

**EXCLUSION CRITERIA**:-

1. Age less than 40 or more than 51 years of age.
2. Women who have attained menopause.
3. Women on hormonal treatment at the time of first presentation.
4. Women with intrauterine device in situ.
5. Women with endocrine disorders.
6. Women with bleeding disorders.
7. Women opting for medical management for abnormal uterine bleeding.
8. Women with adnexal pathology.
9. Pregnancy and related causes of bleeding per vaginum.

Detailed menstrual, contraceptive, obstetric, medical and surgical history of the eligible candidates were taken along with H/O presenting complains and general, physical, systemic and gynecological examination was done as per proforma. Every patient was subjected to following laboratory investigations including CBC, blood group, RBS, coagulation profile, liver and kidney function tests, urine routine and microscopy and UPT. All the eligible candidates were subjected to USG, various sonographic parameters such as endometrial thickness, uterine pathology, adnexal and any other pelvic pathology was noted.

 

**TABLE 1:-The endometrial thickness in different phases of the menstrual cycle is described as follows**

| **Menstrual Phase** | **Endometrial thickness (full thickness) in mm(ET)** |
|---|---|
| Menstrual (Late) | 0.5 - 1 |
| Proliferative (follicular phase) | 4 – 8 |
| Peri-ovulatory phase | 6 – 10 |
| Secretory ( Luteal phase) | 10 – 12 |
| Post Menopausal | 1 - 3 |

**TABLE 2:-Correlation of normal menstrual cycle anatomy and physiology with ultrasound endometrial patterns**

| **Menstrual Cycle Phase** | **Ultrasound Pattern** |
|---|---|
| Menses (Early) | Hyper echoic: Resembles a luteal phase endometrium with anechoic areas indicating endometrial breakdown. |
| Mid Menses | Mixed pattern with hyperechoic and anechoic areas indicating blood and tissue endometrium per se noted |
| Late | As two thin hyperechoic lines outlining the endometrial cavity. Single line: Thin line representing the endometrial cavity |
| Early Follicular phase | Three line: The two outer hyperechoic lines represent the endometrial myometrial junction. The central line is the endometrial cavity. |
| Late Follicular phase | Three line: Thickening of the anechoic endometrial layer between the hyperechoic three lines. |
| Early Luteal phase | Transitional: Thickening of the hyperechoic three lines and irregular hyper echoic filling of the previously anechoic endometrial layers |
| Late Luteal phase | Hyperechoic: Uniform hyperechoic (White) endometrium |
| Premenstrual | Hyperechoic: With small anechoic collections. |

**TABLE 3:- Atypical endometrium patterns and corresponding sonographic findings**

| **Atypical Patterns** | **Sonographic findings** |
|---|---|
| Atrophic endometrium | Uniform thin echogenic line |
| Cystic atrophic endometrium | Abnormally thickened endometrium with multiple small cystic spaces ( Swiss cheese endometrium) |
| Endometrial Hyperplasia<br>Focal,<br>Diffuse | Thickening of the endometrial stripe and often appears homogeneously ecchogenic |
| Cystic hyperplasia | Echogenic endometrium with detectable small cysts |
| Atypical hyperplasia | Inhomogenous, Irregular endometrial stripe |

| | |
|---|---|
| Endometrial carcinoma | Thick, Solid, Heterogenous ill defined endometrial tissue.<br>Enlarged uterus from 2-5 cm ( AP Uterine Diameter) to 9-14 cm ( cervico- fundal uterine diameter)<br>Distended Uterine Cavity -Lobular uterus, loss of incomplete central hyperechoic line, Hypo or hyper echogenic uterine body, preservation of endometrial halo indicates superficial invasion, absence of halo indicates deep invasion. |

The D and C procedure performed under short general anesthesia in OT. The endometrial tissue sample for histopathological examination was fixed in 10% formalin and sent to the college pathology department for analysis.

## STATISTICAL ANALYSIS

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Normality of data was tested byKolmogorov-Smirnov test. If the normality was rejected then non parametric test was used.Statistical tests were applied as follows-

1. Quantitative variables were compared using ANOVA/Kruskal Wallis test (when the data sets were not normally distributed) between HPE of endometrial biopsy.
2. Qualitative variables were correlated using Chi-Square test.

A p value of $\leq 0.05$ was considered statistically significant.

The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0 (Trial Version)

## RESULTS

Most women were in the age group of 46-50 years (53%) with Maximum patients were with parity 3 and above (60%).

**TABLE 4**

| Age Group | Cases | |
|---|---|---|
| | Frequency | Percentage(%) |
| 41-45 | 47 | 47.00 |
| 46-50 | 53 | 53.00 |
| Mean ± SD | 46.2 ± 1.3 | |
| Parity | | |
| ≤3 | 73 | 73.00 |
| ≥4 | 27 | 27.00 |

Maximum patients had heavy and prolonged menstrual bleeding (HPMB) that is (49%) followed by intermenstrual bleeding (IMB) in 33% cases. Heavy menstrual bleeding was observed in 18% cases.

**TABLE 5**

| Bleeding patterns | Frequency | Percentage |
|---|---|---|
| Heavy and prolonged | 49 | 49.00 |

 

| | | |
|---|---|---|
| menstrual bleeding | | |
| Intermenstrual bleeding | 33 | 33.00 |
| Heavy menstrual bleeding | 18 | 18.00 |

Irregular bleeding pattern was observed in 52% of cases. Dysmennorhoea was associated in 40% of the total.

The most common ultrasonographic findings were of uterus normal in size shape and echotexture, followed by bulky uterus and endometrial thickening.

In this study, 43% patients had endometrial thickness >15 mm on USG and 57% had <15mm of endometrial thickness on USG.

**TABLE 6a Ultrasonography Finding (Uterus)**

| **ULTRASONOGRAPHY FINDING** | **Frequency** | **Percentage (%)** |
|---|---|---|
| **Uterus** | | |
| Normal in size, shape and echotexture | 62 | 62.00 |
| Endometrial thickening | 13 | 13.00 |
| Bulky | 25 | 25.00 |

**TABLE 6b**

| **Endometrial Thickness** | Cases | Frequency |
|---|---|---|
| ≥16mm | 43 | 43.00 |
| 9-15mm | 44 | 44.00 |
| 5-8mm | 12 | 12.00 |
| ≥4mm | 1 | 1.00 |

On histopathological reports as obtained from D&C, 37% patients had secretory phase endometrium, 36% were in the proliferative phase, 22 % had endometrial hyperplasia, 2 % had disordered proliferative endometrium & 3% had endometrial carcinoma (adenocarcinoma).

**TABLE 7 Histopathology of Endometrial Biopsy**

| **HISTOPATHOLGY** | **Frequency** | **Percentage(%)** |
|---|---|---|
| ENDOMETRIAL PATTERN | | |
| Secretory phase endometrium | 37 | 37.00 |
| Proliferative phase endometrium | 36 | 36.00 |
| Disordered proliferative endometrium | 2 | 2.00 |
| ENDOMETRIAL HYPERPLASIA | | |
| Simple hyperplasia | 14 | 14.00 |

 

| | | |
|---|---|---|
| Complex hyperplasia | 5 | 5.00 |
| Simple atypical hyperplasia | 2 | 2.00 |
| Complex atypical hyperplasia | 1 | 1.00 |
| ENDOMETRIAL CARCINOMA (Adenocarcinoma) | 3 | 3.00 |
| **Total** | **100** | **100.00** |

Ultrasonographic finding of normal uterus or bulky uterus without any endometrial thickening showed proliferative and secretory endometrial patterns on histopathology. Complex typical and complex atypical hyperplasia was also seen only in cases with endometrial thickness >15 mm (5 and 1 cases respectively). Endometrial carcinoma (Adenocarcinoma) was seen only in cases with endometrial thickness >15 mm (3 cases). Endometrial cancer was seen only in cases with bulky uterus (2 cases) or uterus with asymmetrical endometrial thickening (1case). There was a strong significant correlation between uterine findings on USG and Endometrial biopsy findings ($p < 0.0001$). There was a very significant correlation between endometrial thickness (USG) and endometrial biopsy findings from D &C. ($p < 0.0002$)

**FIGURE 1 DISTRIBUTION OF MENSTRUAL IRREGULARITY**

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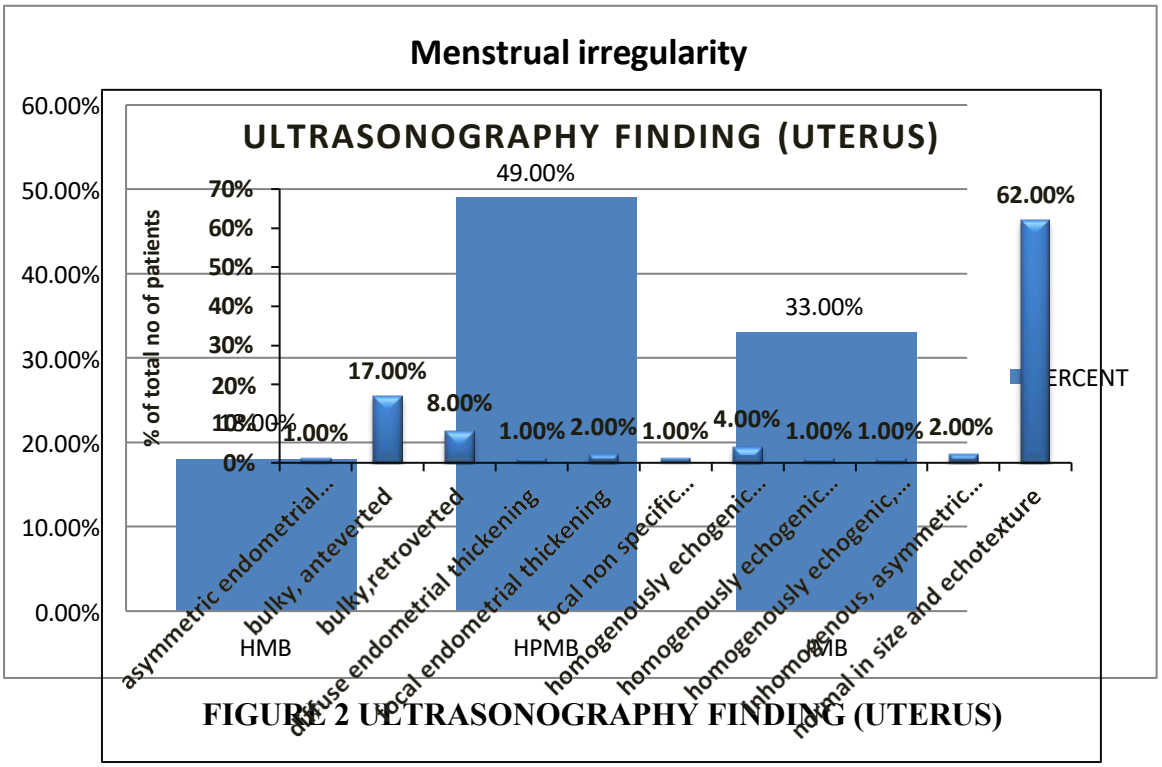


**FIGURE 2 ULTRASONOGRAPHY FINDING (UTERUS)**

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**FIGURE 3 ENDOMETRIAL THICKNESS ON ULTRASONOGRAPHY**

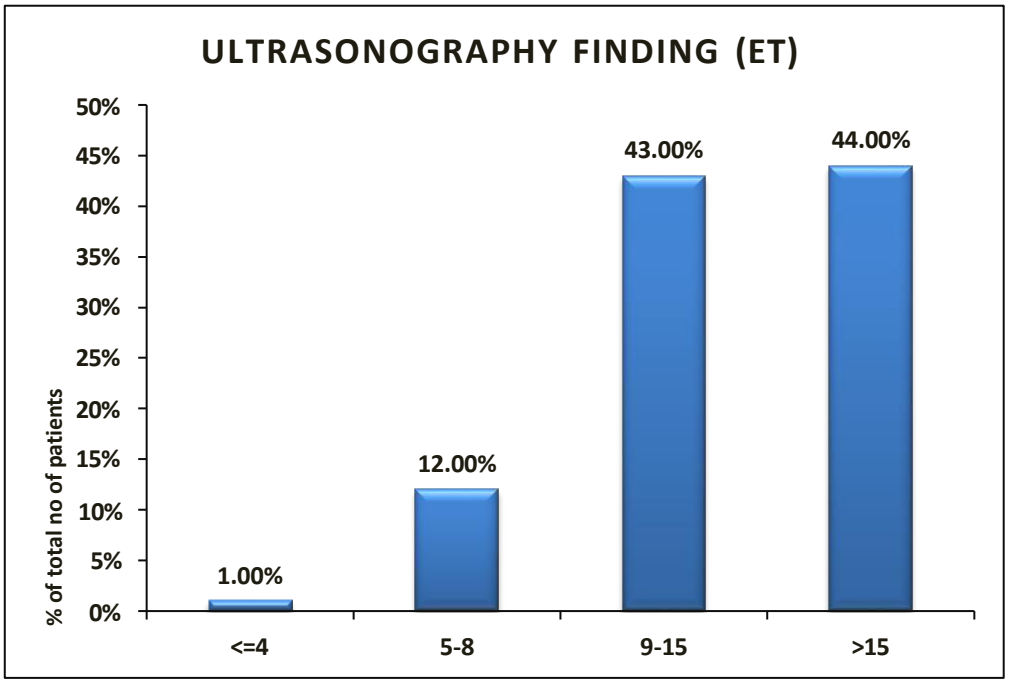

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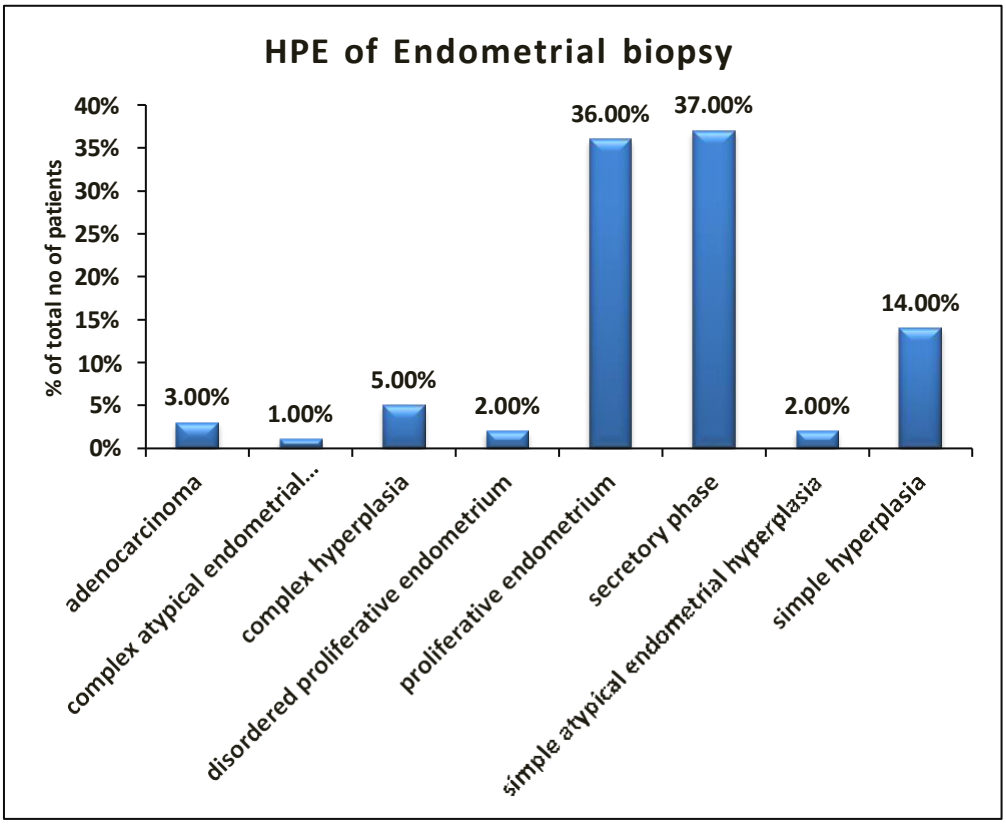
**FIGURE 4 HPE OF ENDOMETRIAL BIOPSY**



In our study, adenocarcinoma was seen only in cases with bulky uterus (2 cases) and uterus with asymmetric endometrial thickening (single case). Complex atypical hyperplasia was seen only in bulky anteverted uterus (single case). Simple atypical hyperplasia was seen only in inhomogenous asymmetric endometrial thickening (2 cases). Proliferative and Secretory endometrium were observed in normal uterus or bulky uterus without any endometrial thickening. There was a strong significant correlation between uterine findings on USG and Endometrial biopsy findings. ($p< 0.0001$) as has been shown in Table 5.

**Table 5 Correlation of Ultrasonographic finding of Uterus and HPE of endometrial biopsy**

| Uterus on USG | HPE of Endometrial biopsy | | | | | | | | Total | 'p' value |
|---|---|---|---|---|---|---|---|---|---|---|
| Asymmetric endometrial thickening | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (33.33) | 1 (1.00) | |
| Bulky, anteverted | 7 (18.92) | 2 (5.56) | 4 (28.57) | 0 (0.00) | 2 (40.00) | 1 (100.00) | 0 (0.00) | 1 (33.33) | 17 (17.00) | |
| Bulky, retroverted | 3 (8.11) | 1 (2.78) | 3 (21.43) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (33.33) | 8 (8.00) | |
| Diffuse endometrial thickening | 0 (0.00) | 0 (0.00) | 1 (7.14) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (1.00) | |
| Focal endometrial thickening | 0 (0.00) | 0 (0.00) | 1 (7.14) | 0 (0.00) | 1 (20.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (2.00) | |
| Focal non specific endometrial thickening | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (20.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (1.00) | |
| Homogenously echogenic asymmetric endometrial | 0 (0.00) | 0 (0.00) | 4 (28.57) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 4 (4.00) | <.0001 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| thickening | | | | | | | | | | |
| Homogenously echogenic focal endometrial thickening | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (20.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (1.00) | |
| Homogenously echogenic, diffuse endmetrial thickening | 0 (0.00) | 0 (0.00) | 1 (7.14) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1 (1.00) | |
| Inhomogenousasymmetric endometrial thickening | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (100.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (2.00) | |
| Normal in size and echotexture | 27 (72.97) | 33 (91.67) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (100.00) | 0 (0.00) | 62 (62.00) | |
| **Total** | **37 (100.00)** | **36 (100.00)** | **14 (100.00)** | **2 (100.00)** | **5 (100.00)** | **1 (100.00)** | **2 (100.00)** | **3 (100.00)** | **100 (100.00)** | |

In our study, adenocarcinoma was seen only in cases with endometrial thickness >15 mm (3 cases). Complex typical and atypical hyperplasia was also seen only in cases with endometrial thickness >15 mm(5 and 1 cases respectively). Simple atypical hyperplasia was also seen only in cases with endometrial thickness >15 mm (2 cases). Proliferative endometrium was seen with all endometrial thickenings ranging from ≤4 to >15 mm and Secretory endometrium was seen in endometrial thickenings ranging from >4 to >15 mm. There was a strong significant correlation between endometrial thickness (USG FINDING) and endometrial biopsy findings. (P=0.0002) It has been shown in Table 6.

**Table 6 Correlation of Endometrial thickness and HPE of endometrial biopsy**

| Endometrial thickness (mm) | HPE of Endometrial biopsy | | | | | | | | Total | 'p' value |
|---|---|---|---|---|---|---|---|---|---|---|
| | Secretory Endometrium | Proliferative Endometrium | Simple Hyperplasia | Atypical Endometrial Hyperplasia | Complex Hyperplasia | Complex Atypical Endometrial Hyperplasia | dered Proliferative Endometrium | Adenocarcinoma | | |
| ≤ 4 | 0 (0.00) | 1(2.78) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 1(1.00) | 0.0002 |
| 5-8 | 1(2.70) | 8 (22.22) | 1 (7.14) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (100.00) | 0 (0.00) | 12 (12.00) | |
| 9-15 | 16 (43.24) | 23 (63.89) | 4 (28.57) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 43 (43.00) | |
| > 15 | 20 (54.05) | 4 (11.11) | 9 (64.29) | 2 (100.00) | 5 (100.00) | 1 (100.00) | 0 (0.00) | 3(100.00) | 44 (44.00) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Total** | **37 (100.00)** | **36 (100.00)** | **14 (100.00)** | **2 (100.00)** | **5 (100.00)** | **1 (100.00)** | **2 (100.00)** | **3(** |

## CONCLUSION

Accurate diagnosis of the causative factor of abnormal uterine bleeding is imperative in the initiation of the appropriate management. Therefore, ultrasonography, being noninvasive, easily acceptable by the women and without any complications, is a good diagnostic tool for the evaluation of AUB as an initial procedure. If needed, the patients should be subjected to endometrial biopsy which is the gold standard in ruling out endometrial cancer.

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