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# Comparison of new scoring method, DEER scoring, in comparison to different endometrial pathology

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## ABSTRACT

**Background:** Abnormal uterine bleeding (AUB) is not an uncommon occurrence and accounts for about 10-30% of chief complaints reported by women, with >30% of them occurring during the premenopausal phase & >70% of visits amongst peri and postmenopausal phase. Therefore, in order to overcome the shortcomings of the current diagnostic modalities, it is important to use a simple assessment cum diagnostic tool such as DEERS which can be implemented to screen women presenting with AUB.

**Aims:** To validate a non-invasive screening tool such as Disease of Endometrium Evaluation and Risk Scoring (DEERS) in woman with abnormal uterine bleeding in comparison to endometrial biopsy

**Materials & Methods:** A cross-sectional case control hospital based study was carried out amongst abnormal uterine bleeding patients attending Department of Obstetrics & Gynecology, JSS Hospital, Mysuru with 158 cases and 158 controls. Histopathological evaluation & DEERS scoring system was carried out to understand the efficacy of the new scoring system. Quantitative data was summarized using Mean (SD) with Student *t*-test, ANOVA used to test the significance with P value as <0.05 for statistical significance.

**Results:** Amongst cases 44.67% subjects were aged 51-60 years; however, amongst controls, majority of subjects (78.67%) who were aged ≤50 years. Histopathological evaluation revealed 45 endometrial hyperplasia without atypia, 27 disordered proliferation, 18 endometrial polyp, 6 endometrial malignancy and 9 endometrial hyperplasia with atypia cases with DEERS score showing 4 (2.67%) normal endometrium, 123 (82.0%) benign pathologies, 12 (8.0%) complex hyperplasia and 11 (7.33%) endometrial malignancies with mean scores of 8.0, 12.12, 19.5 and 26.91 respectively. In benign pathologies, we found sensitivity, specificity, PPV & NPV of 94.55%, 52.50%, 84.55% and 77.78% respectively, whereas it was 27.27%, 94.24%, 27.27% and 94.24% in malignant cases.

**Conclusion:** The new scoring diagnostic method was found to be effective in determining the type of lesions seen in abnormal uterine bleeding and in the current scenario when there is a lack of studies with respect to this system; we advocate it to be used as an adjunctive diagnostic modality. Also, we recommend more studies in this regard with a consideration for more factors to understand the role of other confounding factors which may determine the exact diagnosis.

***Keywords:*** *Menopause, bleeding, histopathology, abnormality, diagnosis*

## 1. INTRODUCTION

Abnormal uterine bleeding (AUB) is not an uncommon occurrence and accounts for about 10-30% of chief complaints reported by women, with >30% of them occurring during the premenopausal phase & >70% of visits amongst peri and postmenopausal phase. It not only affects the quality of life which equates over the physical, emotional as well as the social well-being of the individuals.[1-4]

Abnormal uterine bleeding (AUB) is defined as[5] "Bleeding from the uterine corpus that is abnormal in duration, volume, frequency and/or regularity" Or "any variation from the normal menstrual cycle, including alteration in its regularity, frequency of menses, duration of flow, and amount of blood loss"[6,7]

In terms of volume of menstruation, regularity, frequency, duration, chronicity, and timing related to reproductive status, abnormal uterine bleeding has been defined by various researchers, however it is important to standardize the definition and rather classify the causes of abnormal uterine bleeding accordingly.[6]

The various reasons cited for AUB include, but are not limited to polyps, adenomyosis, leiomyoma, malignancy (endometrial carcinoma) or hyperplasia, coagulopathy, hormonal imbalance (like hypothyroidism), or hypothalamic-pituitary diseases, ovulatory disorders, endometrial, iatrogenic. In patients wherein AUB occurs without any systemic causes or any organic lesions of the genital tract and for this, the term dysfunctional uterine bleeding is advocated.[1,6]

An estimated 10% of the women with endometrial cancer report with postmenopausal bleeding, whereas it is 15% in women with endometrial hyperplasia. However, the prevalence of bleeding was found to be highest amongst women with benign intrauterine structural pathology such as endometrial polyps.[8]

Even though endometrial cancer is the most common gynaecological malignancy and the fourth most frequent site of malignant neoplasm in females, it is difficult to diagnose the disease as it comprises only 1.9% of all types of cancer.[8-10]

Further, Endometrial pathologies are hard to forecast with the patient's history, examination and routine imaging procedures in contrast to myometrial, cervical, and ovarian diseases. It is important to diagnose the condition and treat it accordingly with utmost accuracy, therefore the need for early diagnosis.[1]

Diagnostic curettage has been conventionally used over the years to diagnose endometrial abnormalities, which was slowly replaced with hysteroscopy along with histologic examination, which has been deemed as the "gold standard" for assessment.[8,11]

However, in the current scenario, the measure of normal vs abnormal endometrial, which predicts Endometrial Thickness via Transvaginal Sonography is being advocated and used as it is simple, non-invasive substitute in comparison to hysteroscopy and curettage. Further, advancements with the armamentarium has tremendously changed the way of diagnostics by providing better visualization of the endometrium which is most commonly appreciated with high resolution transvaginal probes.[1,8,12]

Even with the availability of Hysteroscopy guided endometrial biopsy as the diagnostic technique of choice to detect endometrial pathology, the lack of affordability makes endometrial biopsy by Dilatation and Curettage (D&C), the diagnostic modality, especially amongst the developing countries.[7]

Transvaginal sonography is a precise tool for the assessment of the endometrium in menstruating as well as postmenopausal women to an extent of >4 mm as well as other changes in women with abnormal uterine bleeding. TVS delineates the myometrial, ovarian, cervical lesions efficiently in comparison to other diagnostic techniques.[1,8,13,14]

Further, the use of TVS has reduced the risks and is less of a burden to patients on an economic basis as it costs less. However, the lack of a standardized cutoff value for normal/abnormal ET makes it difficult to predict the exact stage of the disease process and the complexity of the test, as well as unavailability of reliable data makes it difficult to enforce it in clinical data.[1,8,13]

Alternatively, 3D/4D ultrasound, power Doppler, serum markers, and angiography have also been advocated for the screening of endometrial cancers. Owing to the has limited their use in clinical practice.[1]

A broad range from normal to malignant endometrium can be identified with this kind of system, the appeal of DEERS lies in its simplicity, cost-effectiveness, non-invasiveness collectively with its high efficacy in forecasting any premalignant/malignant lesions of endometrium which may be responsible for the abnormal uterine bleed. Further, it adds guidance to the diagnostician while providing care to the women with abnormal uterine bleeding.[1]

Therefore, this study was carried out to validate a non-invasive screening tool such as Disease of Endometrium Evaluation and Risk Scoring (DEERS) in woman with abnormal uterine bleeding in comparison to different reports on endometrial biopsy.

## 2. AIMS & OBJECTIVES

To validate the Disease of Endometrium Evaluation and Risk Scoring (DEERS) system as a non-invasive screening tool in woman with abnormal uterine bleeding in comparison to different reports on endometrial biopsy

## 3. MATERIALS & METHODS

A cross sectional study was conducted amongst 316 subjects, wherein 158 patients with abnormal uterine bleeding who were planned for endometrial sampling and/or planned for hysterectomy in Department of Obstetrics & Gynecology, JSS who

meet the inclusion criteria were considered during a span of 18 months & remaining 158 subjects were controls.

All required approvals were obtained by the Institutional Ethics Board, whilst incorporating any recommendations improving the study. All patients consent was obtained before the start of the study, after a detailed explanation was provided about the study, including their risks, if any.

**Inclusion Criteria:**

Patients consenting to be a part of the study

**Cases** - Women with abnormal uterine bleeding planned for endometrial biopsy/ curettage

**Control** - All women planned for hysterectomy for reasons other than endometrial pathologies.

**Exclusion Criteria:**

If samples were reported as inadequate for opinion

If endometrium is reported as " pill endometrium" or " lytic endometrium "

In patients with multiple factors affecting the outcome

**Sample size**

A total of 316 subjects were recruited as a part of the study, wherein they were grouped into 2 groups as

**Group I:** 158 Patient with AUB in whom cervical, myometrial ovarian and endocrinological causes were ruled out and were planned for endometrial biopsy are recruited as cases for the study

**Group II:** 158 women planned for hysterectomy, for reasons other than endometrial pathologies

## 4. METHODOLOGY

In both groups, the required patient data was carefully elicited and documented. Transvaginal sonography (TVS) was conducted using an ultrasound system equipped with a multi-frequency (6–12 MHz) endo-vaginal probe. To ensure the reliability and reproducibility of the TVS features, specific prerequisites were followed. The sagittal section image of the uterus, from the fundus to the external os, was focused so that it occupied approximately 75% of the screen. This positioning allowed for the accurate tracing of the endometrial lining from the fundus down to its merging into the endocervical canal. In this view, the maximum endometrial thickness was measured. Additionally, the endometrial-myometrial junction was traced in its entirety. The echotexture of the endometrium was classified as homogeneous, heterogeneous, or with multiple cystic spaces, depending on the visual findings. Any presence of polyps or endometrial collections was carefully noted if evidenced. The scoring system utilized in the study encompassed two main categories: patient characteristics, which included five parameters, and TVS features, which also comprised five parameters. Both categories were scored accordingly to provide a comprehensive evaluation. Finally, histopathological evaluation and reports were collected and correlated with the TVS findings to ensure accuracy and comprehensive analysis.

**Statistical methods**

Statistical representations were presented in the form of frequency & percentages. Inferential statistics were analysed with the help of Chi square test for comparing two independent proportions, wherever required. We also calculated sensitivity, specificity, positive predictive value and negative predictive value. All the statistical analysis was carried out using statistical software SPSS 21.0

## 5. RESULTS

67 (44.67%) case subjects were aged 51-60 years, followed by ≤50 years with 64 (42.67%) subjects. In case of controls, 118 (78.67%) subjects were aged ≤50 years, followed by 51-60 years with 32 (21.33%) subjects, which was found to be statistically significant.

Amongst cases, the mean score across various pathologies was found to be 8.0, 12.12, 19.5 and 26.91 respectively in 4(2.67%) normal endometrium, 123 (72.67%) benign pathologies, 12 (6.67%) complex hyperplasia and 11 (17.33%) endometrial malignancies.

In normal endometrium, the mean score was found to be 8.0 and 7.26 amongst cases and control group respectively, which was found to be statistically insignificant. Herein, we found sensitivity, specificity, PPV & NPV of 0.0%, 96.67%, 0.0% and 87.67% respectively.

In case of benign pathologies, the mean score was found to be 12.12 and 9.55 amongst cases and control group respectively, which was found to be statistically significant. Further, we found sensitivity, specificity, PPV & NPV of 18.18%, 93.29%, 16.67% and 93.92% respectively.

In case of benign pathologies, a correlation between the pathology and the histopathology report showed sensitivity, specificity, PPV & NPV of 94.55%, 52.50%, 84.55% and 77.78% respectively.

In case of malignancies, a correlation between the pathology and the histopathology report showed sensitivity, specificity, PPV & NPV of 27.27%, 94.24%, 27.27% and 94.24% respectively.

## 6. DISCUSSION

Abnormal uterine bleeding (AUB) is not rare and accounts for 10-30% of primary complaints reported by women, with >30% happening during the premenopausal phase and >70% occurring throughout the peri- and postmenopausal phases. It has an impact not only on persons' quality of life, but also on their physical, emotional, and social well-being.[1-3]

Even though endometrial cancer is the most common gynecological malignancy and the fourth most frequent site of malignant neoplasm in females, it is difficult to diagnose the disease as it comprises only 1.9% of all types of cancer.[1,3,6]

A non-invasive screening technique to predict endometrial pathology is needed for better patient care. The DEERS score is a valuable screening tool for assessing and predicting endometrial cancer alongside other pathologic diseases in patients with irregular uterine bleeding.[1,15]

44.67% case subjects were aged 51-60 years, followed by ≤50 years with 64 (42.67%) subjects and least being 19 (12.66%) aged >60 years. However, amongst controls, we found a 78.67% control subjects who were aged ≤50 years with 32 (21.33%) subjects aged 51-60 years, which was statistically significant.

Prathipaa R et al.,[16] also found a peak incidence of 51-60 years (42.19%), whereas a lower age group of 41-55 years amongst perimenopausal women was reported by Pandey D et al.,[1] & 40-45 years by Mahapatra and Mishra et al.,[6] (37.2%) & Nahar K et al.,[17] (94.07%) respectively.

The higher frequency of excessive bleeding from the uterus in this age group (41-50 years) could be attributed to the patients being in their climacteric period. As women approach menopause, their periods shorter and become intermittently anovulatory due to a decrease in their number of ovarian follicles along with their increased susceptibility to gonadotrophic stimulation, resulting in a decrease in estradiol levels, which cannot keep the normal endometrium developing.

On further assessment we recorded 78 postmenopausal women, trailed by 28 perimenopausal, and then 44 were premenopausal women. Nevertheless, there were 94 premenopausal women, 39 postmenopausal & 17 peri-menopausal women controls.

Amongst cases, 123 (82.0%) benign pathologies, 12 (8.0%) complex hyperplasia and 11 (7.33%) endometrial malignancies with mean scores of 12.12, 19.5 and 26.91 was found, which was statistically significant.

Approximately 33% of histology reports in AUB for endometrial pathology are structurally sound which undergoes alteration to form proliferative/secretary/disordered proliferation; apart from benign pathologies such as polyps & simple hyperplasia's.[1]

The numerous causes of AUB include, but are not limited to, polyps, adenomyosis, leiomyoma, malignancy (endometrial carcinoma) or just hyperplasia, coagulopathy, hormonal imbalance (such as hypothyroidism), or hypothalamus pituitary illnesses, ovulatory abnormalities, endometrial, and iatrogenic. In patients who have AUB without any systemic reasons or pathological diseases of the vaginal tract, the word dysfunctional uterine bleeding is used.[1,6]

Histopathological diagnosis makes the final diagnosis inaccurate, with exceptions such as inadequate specimen. We recorded 45 endometrial hyperplasia without atypia, 27 disordered proliferation, 18 endometrial polyp, 6 endometrial malignancy and 9 Endometrial hyperplasia with atypia cases. Amongst controls, we had 49 submucosal fibroid, 45 secretory phase, 41 proliferatory phase and 4 disordered proliferation subjects.

Mahapatra and Mishra et al.,[6] revealed proliferative endometrium in 64 (45.7%) cases; followed by secretory endometrium in 42 (30%), hyperplastic endometrium in 17 (12.1%), Atrophic endometrium in 7 (5%) and endometrial carcinoma in 1 (0.7%) cases.

Doddamani et al.[18] reported proliferative endometrium & secretory phase in 44.7% & 23.5% of cases, which was in agreement with Siegel et al., who reported 30.9% secretory endometrium cases. Also Zawar et al.,[19] reported 43% proliferative endometrium patients in their study.

Prathipaa R et al.,[16] reported 50.39% proliferative endometrium, 21.09% Endometrial hyperplasia without atypia, 12.89% secretory endometrium, 15.08% chronic endometritis & 3.13% disordered proliferation cases.

Disordered proliferative pattern(DPE) is characterised by the absence of uniform glandular development and resembles simple hyperplasia but it is focal in the process rather than diffuse.[2] It is important to diagnose DPE at an early stage to prevent the disease progression.

Amongst cases, there were 4 (2.67%) normal endometrium, 123 (82.0%) benign pathologies, 12 (8.0%) complex hyperplasia

and 11 (7.33%) endometrial malignancies with mean scores of 8.0, 12.12, 19.5 and 26.91 respectively, which was found to be statistically significant. In our control subjects, there were 110 (73.33%) normal endometrium and 40 (26.67%) benign pathologies.

Therefore, we carried out a comparative analysis between the normal endometrium & benign pathologies subjects across both the groups, which is depicted in the table below

| | **Sensitivity** | **Specificity** | **Ppv** | **Npv** |
|---|---|---|---|---|
| **Normal endometrium** | | | | |
| Our study | 0.0 | 96.67 | 0.0 | 87.67 |
| Pandey D et al[1] | 58.57 | 76.35 | 75.38 | 59.85 |
| **Complex hyperplasia** | | | | |
| Our study | 18.18 | 93.29 | 16.67 | 93.92 |
| Pandey D et al[1] | 59.12 | 67.12 | 49.21 | 75.29 |
| **Benign pathologies** | | | | |
| Our study | 94.55 | 52.50 | 84.55 | 77.78 |
| Pandey D et al | 50.0 | 67.12 | 49.21 | 75.29 |
| **Malignancy** | | | | |
| Our study | 27.27 | 94.24 | 27.27 | 94.24 |
| Pandey D et al | 10.71 | 100.0 | 100.0 | 94.75 |

A comparison reveals a close proximity of negative predictive value between our study & that conducted by Pandey D et al.,[1] However, other parameters such as the sensitivity, specificity and positive predictive value had too much difference and requires more such studies.

The lack of studies makes it difficult to exactly compare the efficacy of the scoring system at the current scenario. Thus, we recommend to use the scoring system as an adjunct to the existing diagnostic techniques until there is more evidence to prove the efficacy of it.

To overcome the limitations of these diagnostic techniques it is critical to employ a simple assessment and diagnostic tool that may be used to screen women suffering with AUB to determine whether or not endometrial curettage is required. The diagnostic modality's capacity to identify and forecast malignancies aids in reaching a conclusive diagnosis and delivering optimal therapy for AUB women.

In our study, we found commensurate data similar to that observed by previous researchers. However, there was a clear lag in some areas, which needs to be addressed to diagnose the cause of abnormal uterine bleeding. Further, the inability to clearly establish the relationship between the causative agent and the outcome hinders the diagnosis as well as the treatment outcome.

## 7. CONCLUSION

The new scoring diagnostic method was found to be effective in determining the type of lesions seen in abnormal uterine bleeding and in the current scenario when there is a lack of studies with respect to this system; we advocate it to be used as an adjunctive diagnostic modality. Also, we recommend more studies in this regard with a consideration for more factors to understand the role of other confounding factors which may determine the exact diagnosis.

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