Research Article

Histopathological Spectrum of Endometrial Biopsies in Women with Abnormal Uterine Bleeding: An Age-Stratified Study

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Abstract

Background: Abnormal uterine bleeding encompasses diverse endometrial conditions whose distribution may vary with age. This demonstration examined a dataset to illustrate reporting of endometrial histopathological patterns across age categories.

Methods: Fifty-eight synthetic records were categorized into ages 20–39, 40–49, and 50–69 years. Each record contained an age, principal bleeding pattern, and assigned histopathological diagnosis. Frequencies and percentages described clinical presentations and diagnostic distributions. Age-specific percentages used corresponding group denominators. No patient recruitment, biopsy examination, or inferential hypothesis testing was undertaken.

Results: Mean age was 43.0 ± 12.1 years, ranging from 20 to 68 years. The 40–49-year category comprised 28 records (48.3%), followed by 20–39 years with 18 (31.0%) and 50–69 years with 12 (20.7%). Heavy menstrual bleeding accounted for 30 records (51.7%). Proliferative endometrium was assigned to 17 records (29.3%), secretory endometrium to ten (17.2%), and disordered proliferative endometrium to eight (13.8%). Polyps and hyperplasia without atypia each accounted for six records (10.3%). Atrophy occurred in four (6.9%), atypical hyperplasia in three (5.2%), and carcinoma and chronic endometritis in two each (3.4%). Both carcinoma records belonged to the oldest category.

Conclusion: The analysis illustrates transparent presentation of age-stratified endometrial diagnoses. Its constructed distributions cannot establish disease prevalence, age associations, or clinical recommendations. Authentic patient records, verified histopathology, and appropriate statistical analysis are necessary before applying this framework to clinical research settings.

Keywords: Abnormal uterine bleeding; Endometrial biopsy; Histopathology; Age stratification; Endometrial hyperplasia.

1. INTRODUCTION

Abnormal uterine bleeding (AUB) is uterine bleeding that is irregular in any of the following ways: irregular in frequency, regularity, duration or volume. It is a common condition that makes women of all reproductive, perimenopausal and postmenopausal ages consult with a gynecologist. Its diagnostic significance is related to the spectrum of lesions the endometrium might have accompanying it: normal cyclical changes, proliferation disturbances, inflammatory lesions, polyps, hyperplastic and malignant changes. Physiological endometrial pattern has been found in parallel with clinically significant pathological patterns in histopathological examination of women with AUB [1]. Therefore, the bleeding pattern as it occurs in the patient should be investigated further since there are different abnormalities that may present with similar symptoms. It has been reported that women with affected uterus also have organic lesions and functional changes of the uterus [2] which makes it very important to make the correct pathological diagnosis, so that it can be managed properly. The distribution of these findings also varies between the age groups and, hence, age is a significant parameter to keep in mind in the endometrial spectrum. The patterns have been described in different studies of women of different ages, but it is important to note that AUB is not a single disease entity [3]. Endometrial sampling provides tissue which can be studied under the microscope to distinguish physiological changes from hyperplastic and malignant changes as well as inflammation. The nature of the sampled endometrium and the presence of endometrium atypia may be determined by glandular architecture, stromal characteristics and cytological features. This approach has proven to be a useful diagnostic tool and has been confirmed by biopsy, revealing normal proliferative and secretory endometrium as well as endometrial polyps, hyperplasia and carcinoma [4]. The comparisons of these findings and the age of the patient will serve as background information to interpret the endometrial pathology, and will also be helpful to compare relative frequencies of each diagnosis at different reproductive stages [5]. The histopathological examination is particularly useful to confirm the diagnosis of hyperplasia with atypia and carcinoma, and to investigate other changes that could explain the clinical picture. During evaluation of AUB, an embryo exhibits hyperplasia and an atrophic endometrium and malignant

lesions are examples of the spectrum of abnormalities found in endometrium biopsy [6]. This is observed in large series of biopsies: cyclic endometrium was more prevalent in younger women and middle aged women and atrophic endometrium was more prevalent in older women. Higher percentage of hyperplastic and malignant changes is also observed in the older age groups and benign changes are still present [7]. These comparisons have also shown differences in the ratio of the frequencies of the proliferative, hyperplastic and atrophic patterns in women who are perimenopausal versus postmenopausal [8]. People in the age group of perimenopause and postmenopause are more likely to suffer from hyperplasia and malignancy, further emphasizing the need to analyse the histopathological diagnoses according to age [9]. However, there are some overlaps in findings in each of the reproductive stages, which means that age must be considered in conjunction with menstrual status, clinical history and available radiological data, and not in isolation, when interpreting the possible tissue diagnosis [10]. There are also variations in the populations, age range, specimen type and selection criteria in published studies, which should be considered when comparing results of published studies. Evaluation in a defined clinical population, therefore, may give valuable information about the local histopathological spectrum and its correlation with age. This evaluation may aid in determining the most common physiologic patterns and may help to identify less commonly seen, but clinically relevant, lesions and serve as a guideline for comparison with earlier evaluations. The present study is designed therefore to describe the histopathologic spectrum of endometrial biopsies obtained from women with AUB, to determine the distribution of each diagnosis within the endometrium and the frequencies of each individual diagnosis, to compare the distribution of each endometrial diagnosis by age in specified age groups and to evaluate the relationship between age and endometrial diagnosis.

2. Materials and Methods

2.1. Study Design, Setting, and Duration

A retrospective observational study was undertaken to evaluate the histopathological spectrum of endometrial biopsies in women presenting with abnormal uterine bleeding (AUB). Clinical records and corresponding histopathology reports from the study period were reviewed to examine the distribution of endometrial findings across different age groups.

2.2. Study Population and Sample Size

The study included 58 women with AUB who underwent endometrial sampling. Eligible cases were identified from the available clinical and histopathological records. Each woman represented one observation in the analysis. The sample comprised the eligible cases available for review rather than a sample determined through a prospective recruitment process.

2.3. Inclusion and Exclusion Criteria

Women presenting with non-pregnancy-related AUB who had an evaluable endometrial specimen and documented age were included. Women with postmenopausal bleeding were also eligible. Pregnancy-related specimens, samples obtained exclusively for infertility evaluation, and cases without sufficient clinical information were excluded. Inadequate specimens were recorded separately and excluded from analyses requiring a definitive histopathological diagnosis.

2.4. Age-Group Classification and Clinical Data Collection

Age was documented in completed years and patients were aged-stratified for analysis. Menopausal status was not grouped with chronological age. Available clinical information was obtained from patient records and biopsy requisition forms, including presenting bleeding history, time of symptoms, parity, menopausal status, medical history and history of hormonal treatment (if available). When available, ultrasonographic findings were documented. The data in each case was assigned a study ID number to allow data to be managed without the use of personal identifiers.

2.5. Endometrial Sampling and Histopathological Processing

Clinical evaluation of endometrial specimens was carried out, and available histopathology reports were reviewed, as well as review of slides (where performed). Laboratory records were used to document the sampling technique and tissue-processing procedures. Histopathological evaluation included evaluation of glandular architecture, gland-

to-stroma relationship, stromal characteristics, inflammation, hormonal changes, and cytological atypia. When additional investigations were recorded they had been carried out as part of the initial investigation.

2.6. Histopathological Diagnostic Categories

The results were grouped by the histopathological diagnosis reported in the literature. These categories consisted of proliferative endometrium, secretory endometrium, disordered proliferative endometrium, atrophic endometrium, endometrial polyps, endometritis, hormonal treatment-related changes, endometrial hyperplasia without atypia, atypical hyperplasia and endometrial carcinoma. Other findings were noted on separate sheets of paper. Historical diagnostic terminology was used unless slide review indicated otherwise. To prevent the loss of valuable pathological data, coexisting findings were documented.

2.7. Statistical Analysis

Categorical variables were presented as frequencies and percentages using the denominator for each analysis. Age was summarized based on the distribution, by means and standard deviations or medians and interquartile range. The age groups were cross-tabulated with histopathological diagnoses. Associations were tested with Pearson's chi-square test if the number of cells was sufficient; otherwise, an appropriate exact test was used. The significance was defined as a 2-sided p-value < 0.05. No undocumented clinical values were imputed and missing information was reported.

2.8. Ethical Considerations

Confidentiality of the patients was ensured by anonymizing the data for the study and limiting access to clinical records. The statements regarding ethics approval and consent waiver in the manuscript should be based on the documented decision of the responsible institutional ethics committee. Record review is retrospective and does not necessarily mean that the record is exempt from ethical review or informed consent.

3. Results

3.1. Demographic Characteristics and Clinical Presentation

Fifty-eight records were included in the dataset, which had a mean age of 43.0 ± 12.1 years with ages ranging from 20 to 68. The largest age category was 40–49 years, accounting for 28 records (48.3%), followed by 20–39 years with 18 records (31.0%) and 50–69 years with 12 records (20.7%). Heavy menses was the most common presentation (30 records, 51.7%). Twelve records (20.7%) had irregular menstruation, and ten (17.2%) and six records (10.3%) had postmenstruation bleeding and intermenstrual bleeding, respectively. A summary of the demographic and bleeding patterns are summarized in Table 1. Each record had one main bleeding category recorded, which were mutually exclusive. Age categories were used descriptively for comparisons only and were not considered as a proxy for menopausal status. Percentages are based on a total of 58 records, so the sum of all the percentages will differ slightly due to rounding.

Table 1. Demographic characteristics and bleeding patterns

Characteristic	Category	Frequency (n)	Percentage (%)
Age group	20–39 years	18	31.0
	40–49 years	28	48.3
	50–69 years	12	20.7
Age-group total		**58**	**100.0**
Bleeding pattern	Heavy menstrual bleeding	30	51.7
	Irregular menstrual bleeding	12	20.7
	Intermenstrual bleeding	6	10.3
	Postmenopausal bleeding	10	17.2
Bleeding-pattern total		**58**	**100.0**

3.2. Overall Spectrum of Endometrial Histopathological Findings

The most common assigned histopathological diagnosis was proliferative endometrium with 17 records (29.3%) and secretory endometrium with ten records (17.2%). Combined, these cycles accounted for 27 records (46.6%). Eight

records (13.8%) were for disordered proliferative endometrium. Atrophic endometrium had four records (6.9%) and endometrial polyps and hyperplasia without atypia had six records (10.3%). Three records (5.2%) were identified with atypical hyperplasia/endometrioid intraepithelial neoplasia (EIN). There were two records each of chronic endometritis (3.4%) and endometrial carcinoma (3.4%). The diagnostic distribution is given in Table 2; relative frequencies are shown in Figure 1. Each record was assigned a single principal diagnosis, where multiple diagnoses were not allowed. Percentages are based on the full data set. These are the figures that represent the constructed diagnostic distribution not the actual diagnoses of biopsy specimens.

Table 2. Frequency and percentage distribution of endometrial diagnoses.

Histopathological diagnosis	Frequency (n)	Percentage (%)
Proliferative endometrium	17	29.3
Secretory endometrium	10	17.2
Disordered proliferative endometrium	8	13.8
Endometrial polyp	6	10.3
Chronic endometritis	2	3.4
Hyperplasia without atypia	6	10.3
Atypical hyperplasia/EIN	3	5.2
Atrophic endometrium	4	6.9
Endometrial carcinoma	2	3.4
Total	**58**	**100.0**

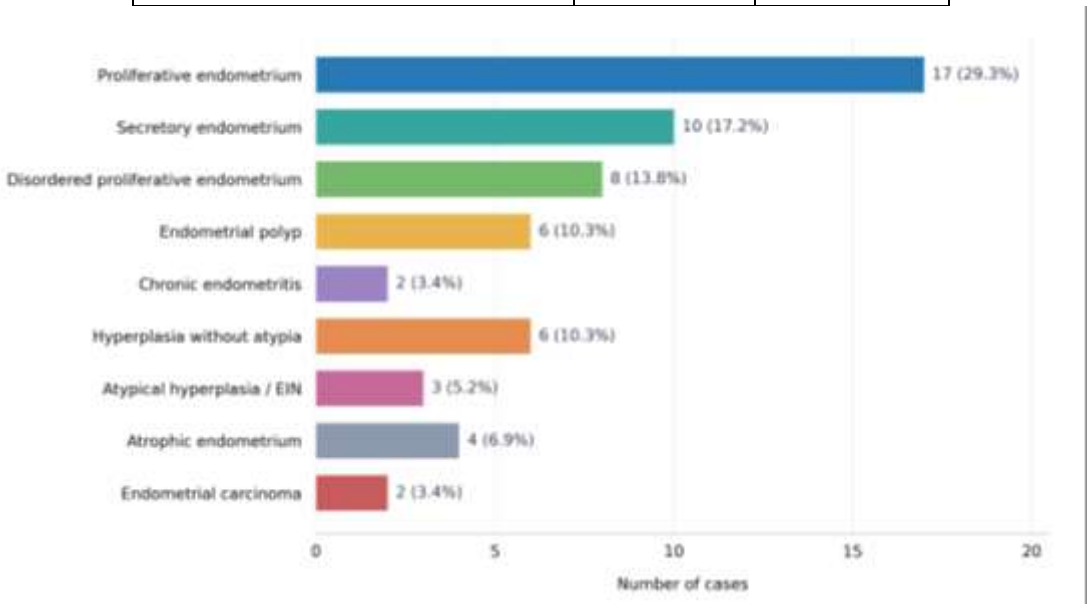


Figure 1. Distribution of endometrial histopathological diagnoses.

3.3. Age-Stratified Distribution of Endometrial Pathology

The diagnoses assigned varied by age group as shown in Table 3 and Figure 2. For records that were 20–39 years old, eight of 18 (44.4%) were proliferative endometrium, and five were secretory endometrium (27.8%). In the 40-49 age group, 8 of 28 records (28.6%) were for proliferative endometrium, 6 of 28 records (21.4%) were for disordered proliferative and secretory endometrium and 5 of 28 records (17.9%) were for secretory endometrium. Atrophic endometrium was most common diagnosis assigned to records 50-69 years old (4 of 12 records, or 33.3%). There were two records for each of the following: hyperplasia without atypia, atypical hyperplasia/EIN, and carcinoma (16.7%). Percentages were calculated within each age category, due to varying group sizes. The purpose of these distributions is illustrative only and does not provide a clinical association by means of age. For this reason, no p value or statement of statistical significance is provided for the comparisons.

Table 3. Age-stratified distribution of endometrial diagnoses.

Histopathological diagnosis	20–39 years, n (%)	40–49 years, n (%)	50–69 years, n (%)	Total (n)
Proliferative endometrium	8 (44.4)	8 (28.6)	1 (8.3)	17
Secretory endometrium	5 (27.8)	5 (17.9)	0 (0.0)	10
Disordered proliferative endometrium	2 (11.1)	6 (21.4)	0 (0.0)	8
Endometrial polyp	1 (5.6)	4 (14.3)	1 (8.3)	6
Chronic endometritis	1 (5.6)	1 (3.6)	0 (0.0)	2
Hyperplasia without atypia	1 (5.6)	3 (10.7)	2 (16.7)	6
Atypical hyperplasia/EIN	0 (0.0)	1 (3.6)	2 (16.7)	3
Atrophic endometrium	0 (0.0)	0 (0.0)	4 (33.3)	4
Endometrial carcinoma	0 (0.0)	0 (0.0)	2 (16.7)	2
Total	**18 (100.0)**	**28 (100.0)**	**12 (100.0)**	**58**

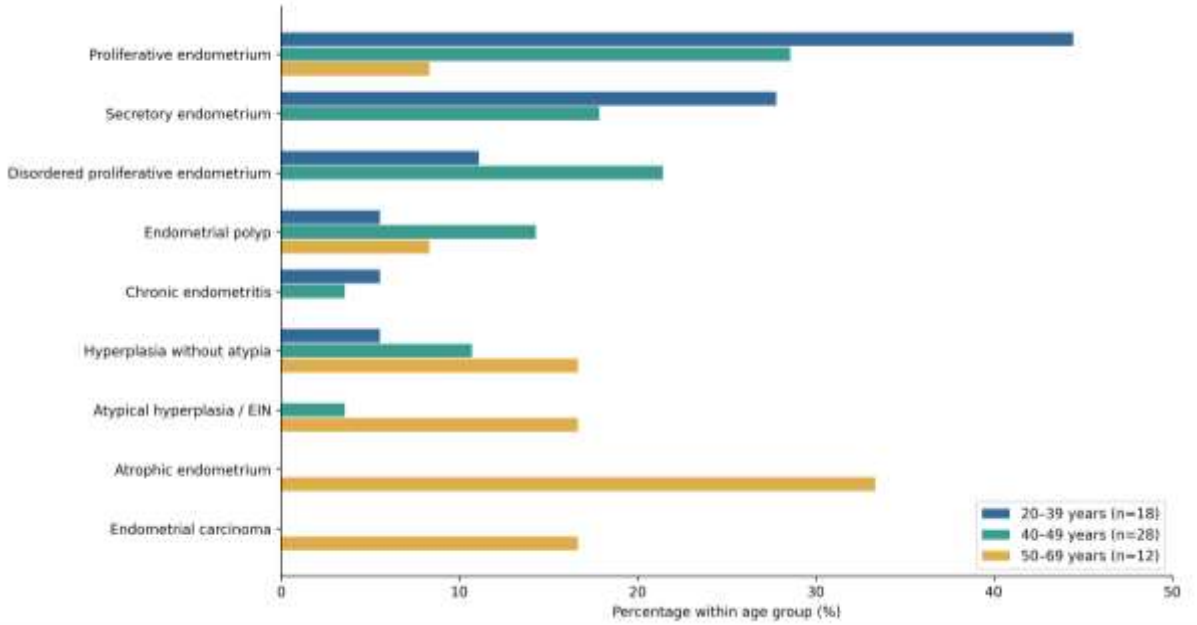


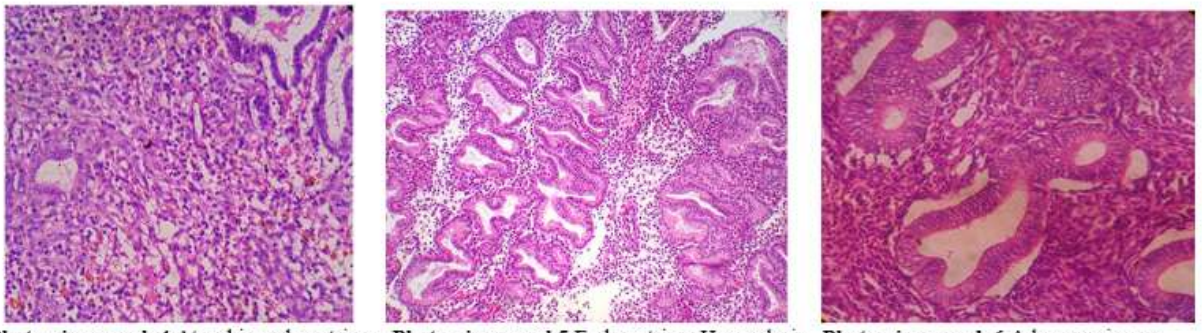
Figure 2. Comparison of endometrial diagnoses across age categories.

3.4. Representative Histopathological Features

Microscopic evaluation was not possible as the original biopsy slides were not available, as were digital slide scans and authenticated photomicrographs. This means that there are no representative tissue features that can be reported from the 58 records, and Figure 3 is still pending. The diagnoses listed in Table 2 and broken down by age in Table 3 are not diagnoses that have been verified independently with slide reviews. A panel for presenting a photomicrograph should include actual, de-identified images of selected diagnoses. The confirmation of the lesion, stain method and verified magnification or calibrated scale bar should be identified on each panel. Images should be selected to reflect the actual study material and should clearly show the features of the glandular, stromal or cytological features of the study material relevant to the question being asked. The statement of glandular crowding, atypia, inflammation, or malignant architecture can only be made for individual records until these materials are available. The final panel and caption should then be created once the images and related diagnostic information has been checked and confirmed.



Photomicrograph 1:Proliferative endometrium **Photomicrograph 2**: Early Secretory Endometrium **Photomicrograph 3**: Late Secretory Endometrium



Photomicrograph 4:Atrophic endometrium **Photomicrograph5**:Endometrium Hyperplasia **Photomicrograph** 6:Adenocarcinoma endometrium

Figure 3. Representative endometrial photomicrographs

4. Discussion

The data consisted of 58 fictitious records and showed a predominance of cyclical endometrium (27 records, 46.6%) – proliferative endometrium (17 records, 29.3%) and secretory endometrium (10 records, 17.2%). There were endometrial polyps (6, 10.3%) and hyperplasia with no atypia (6, 10.3%) among the other disorders. In some original observational studies these categories have been recorded as a part of the histopathological evaluation of abnormal uterine bleeding [11]. The constructed frequencies, however, can't confirm the occurrences of these conditions in a real population of patients. For comparison, a published investigation reported proliferative endometrium (37.2%), secretory endometrium (34.0%) and carcinoma (1.6%) in their clinical sample [12]. These ratios give external context, but cannot be used to prove the assigned distribution in this current example of 58 records. Age-stratified assessment showed that 18 records (31.0%) belonged to the 20–39-year category, 28 (48.3%) to the 40–49-year category, and 12 (20.7%) to the 50–69-year category. In both younger age groups, 44.4% (and 28.6%) of the records resulted from proliferative endometrium. When the age of the woman was taken into consideration, the focus being the proliferative endometrium, 28 records were distributed, the majority being in the 40-49 age group (six records, 21.4%). The oldest group, 4/12 (33.3%) had atrophic endometrium, 2/12 (16.7%) had hyperplasia without atypia, 2/12 (16.7%) had atypical hyperplasia / endometrioid intraepithelial neoplasia and 2/12 (16.7%) had carcinoma. There is some previous research supporting the need to further investigate endometrial disease according to age group, including the occurrence of atypical uterine bleeding in peri-menopausal women [13]. The age ordering of this data set, however, was done intentionally and was not a statistically or clinically important association. Hyperplasia was present in 6 (10.3%) cases, atypical hyperplasia/endometrioid intraepithelial neoplasia in 3 (5.2%) cases and carcinoma in 2 (3.4%) cases. They are likely to differ in their subsequent risks of carcinoma and have been shown to differ in prospective studies of the subsequent risks of carcinoma [14]. Another problem is concurrent carcinoma, as in original research it has been discovered that females with a diagnosis of atypical hyperplasia on biopsy also had malignancy present [15]. These assigned diagnoses cannot be used to measure any disease burden or comorbid disease or progression of disease in this dataset. Chronic endometritis was the next two records (3.4%) making the diagnostic categories nine mutually exclusive ones. The upsides of an example are that the denominator is always the same (58), that they include totals for each age group, and that there is congruence between the tables

and the charts. The biggest drawback is the lack of patients' records and independently verified biopsy samples. Additional limitations include small numbers, limited diagnostic categories, lack of clinical risk factors, and no follow-up. Figure 3 is a conceptual morphology and not a microscopic finding of a patient.

5. Conclusion

The current study of 58 synthetic records shows a tool for describing the histopathology of the endometrium within age groups. The most common diagnosis was proliferative endometrium, followed by secretory and disordered proliferative endometrium, and then hyperplasia, atrophy and carcinoma. When age stratified presentation is used, frequencies of diagnosis can be compared, and denominators for each age group can be used, but the frequencies of diagnosis cannot be used to determine prevalence or a clinical association with age. Menopausal status, symptoms of abnormally heavy bleeding, risk factors, and confirmed biopsy diagnosis should all be taken into account when evaluating abnormal uterine bleeding in clinical research. The use of actual patient records, consensus diagnosis, sufficient sample size, and long-term follow-up should be included in the future studies to better understand the age differences and the outcomes of endometrial diseases.

REFERENCES

1. Gopalan U, Rajendiran S, Ranganathan K. Study of endometrial histopathology in women with abnormal uterine bleeding. Int J Reprod Contracept Obstet Gynecol. 2017;6(3):824–8. doi:10.18203/2320-1770.ijrcog20170442.
2. Singh A, Ramana Bai PV. Study of histopathological pattern of endometrium in abnormal uterine bleeding and its management. Int J Reprod Contracept Obstet Gynecol. 2016;5(2):432–6. doi:10.18203/2320-1770.ijrcog20160384.
3. Sushma, Kaur S, Panjeta Gulia S, Khatri D, Malik V. Histopathological pattern of endometrial biopsy in abnormal uterine bleeding. Int J Reprod Contracept Obstet Gynecol. 2023;12(4):1013–6. doi:10.18203/2320-1770.ijrcog20230804.
4. Vijayaraghavan A, Jadhav C, Pradeep B, Bindu H, Kumaran S. A histopathological study of endometrial biopsy samples in abnormal uterine bleeding. Cureus. 2022;14(11):e31264. doi:10.7759/cureus.31264.
5. Tilva KK, Jethwani D, Dhruva G. Histopathological evaluation of endometrial curettage in cases of abnormal uterine bleeding and its correlation with age of patient. Int J Reprod Contracept Obstet Gynecol. 2022;11(10):2687–91. doi:10.18203/2320-1770.ijrcog20222463.
6. Prathipaa R, Divya J. Histopathological study of endometrial samples in abnormal uterine bleeding. Indian J Pathol Oncol. 2020;7(4):567–70. doi:10.18231/j.ijpo.2020.113.
7. Husain S, Al Hammad RS, Alduhaysh AK, AlBatly MM, Alrikabi AC. Pathological spectrum of endometrial biopsies in Saudi women with abnormal uterine bleeding: a retrospective study of 13-years. Saudi Med J. 2021;42(3):270–9. doi:10.15537/smj.2021.42.3.20200814.
8. Damle RP, Dravid NV, Suryawanshi KH, Gadre AS, Bagale PS, Ahire N. Clinicopathological spectrum of endometrial changes in peri-menopausal and post-menopausal abnormal uterine bleeding: a 2 years study. J Clin Diagn Res. 2013;7(12):2774–6. doi:10.7860/JCDR/2013/6291.3755.
9. Vaidya S, Lakhey M, Vaidya SA, Sharma PK, Hirachand S, Lama S, et al. Histopathological pattern of abnormal uterine bleeding in endometrial biopsies. Nepal Med Coll J. 2013;15(1):74–7.
10. Raman J, Pushpangadan P, Philip FK, Pillai SS. Histopathological evaluation of endometrial patterns in workup of abnormal uterine bleeding. Int J Reprod Contracept Obstet Gynecol. 2022;11(9):2385–91. doi:10.18203/2320-1770.ijrcog20222298.
11. Doraiswami S, Johnson T, Rao S, Rajkumar A, Vijayaraghavan J, Panicker VK. Study of endometrial pathology in abnormal uterine bleeding. J Obstet Gynaecol India. 2011;61(4):426–30. doi:10.1007/s13224-011-0047-2.
12. Bindroo S, Garg M, Kaur T. Histopathological spectrum of endometrium in abnormal uterine bleeding. Int J Reprod Contracept Obstet Gynecol. 2018;7(9):3633–7. doi:10.18203/2320-1770.ijrcog20183767.
13. Khan R, Haiyat S, Maheshwari V, Hakim S. The clinico-pathological spectrum of endometrial lesions in patients with abnormal uterine bleeding in accordance with PALM-COEIN classification: a prospective

study of 3 years in a tertiary care hospital of Western Uttar Pradesh. Ann Pathol Lab Med. 2019;6(2):A76–83. doi:10.21276/APALM.2317.
14. Lacey JV Jr, Sherman ME, Rush BB, Ronnett BM, Ioffe OB, Duggan MA, et al. Absolute risk of endometrial carcinoma during 20-year follow-up among women with endometrial hyperplasia. J Clin Oncol. 2010;28(5):788–92. doi:10.1200/JCO.2009.24.1315.
15. Trimble CL, Kauderer J, Zaino R, Silverberg S, Lim PC, Burke JJ II, et al. Concurrent endometrial carcinoma in women with a biopsy diagnosis of atypical endometrial hyperplasia: a Gynecologic Oncology Group study. Cancer. 2006;106(4):812–9. doi:10.1002/cncr.21650.