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Original Research

Etiological Distribution Of Abnormal Uterine Bleeding Using The Palm Coein Classification & Its Clinicopathological Co-Relation At Tertiary Care Centre

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ABSTRACT

Aim: To categorize the causes of AUB in age group 35 -55 years women in context to PALM-COEIN classification system and its clinicopathological correlation.

Materials and method: This prospective observational study was carried out in the Gynecological OPD (Out Patient Department) at Hind Institute of Medical Sciences, Mau, Ataria, Sitapur, Uttar Pradesh. After fulfilling the inclusion and exclusion criteria, 150 women of age group (35 – 55 years) with any type of menstrual complaints attending Gynecological OPD and IPD were included in the study.The structured history of menstrual pattern, contraceptive history and other details, followed by general physical, systemic and thorough gynecological examination in context touterus, cervix and adnexa was assessed. Endometrial samples were collected through procedures like by endometrial biopsies, then analyzed histopathologically. Causes of AUB were classified using the PALM-COEIN system, which includes categories like polyps, adenomyosis, leiomyoma, malignancy, coagulation disorders, ovulatory disorders, endometrial disorders, iatrogenic causes, and those not yet classified. Relevant investigations included Complete Blood Count, Coagulation profile, Iron profile, Thyroid Function Test, and Blood Sugar levels. These results were correlated with clinical and histopathological findings to establish a comprehensive understanding of AUB causes in the study population.

Results: The study included 150 women 35-55 with AUB, classified using the PALM-COEIN system. Key findings revealed a diverse range of AUB causes: polyps (12.67%), adenomyosis (18%), leiomyomas (26%), ovulatory.dysfunction (23%), endometrial issues (9.33%), iatrogenic causes (4.67%), and unclassified cases (1.33%). There was a high prevalence of comorbidities, including obesity (42%), thyroid disorders (37.5%), hypertension (24%), and diabetes (27%). Frequent and heavy menstrual bleeding were common symptoms across various AUB subtypes.

Conclusion: Our study contributed to the growing body of literature on AUB, providing insights into its multifaceted nature, diagnostic challenges and tailored therapeutic strategies. Further research is required to refine diagnostic algorithms and treatment protocols.

Keywords: Abnormal uterine bleeding, FIGO, Hysterectomy, PALM–COEIN

INTRODUCTION

Abnormal Uterine Bleeding (AUB) stands as a prevalent condition prompting patients to seek counsel within gynecological outpatient departments. Approximately one-third of individuals within the reproductive age bracket and nearly two-thirds of those in the peri or post-menopausal phase, expressing concerns related to abnormal uterine bleeding and around 30%of women report experiencing heavy menstrual bleeding at some juncture in their lifetimes.[1,2]Abnormal uterine bleeding (AUB) may stem from diverse underlying factors, encompassing conditions such as anovulation, polycystic ovary syndrome, structural irregularities (e.g., polyps, fibroids), endometrial hyperplasia, malignancies, presence of foreign bodies, complications associated with pregnancy, hemostatic disorders, trauma, and infections.[3]

A menstrual cycle characterized by aduration of fewer than 21 days or exceeding 35 days, or a menstrual flow persisting for fewer than two days or extending beyond seven days, is deemed aberrant. During menstruation, average blood flow is around 30 ml. It is considered to be abnormal when this amount exceeds 80 ml.[1] In India its prevalence has been reported to range from 9 to 14% in reproductive age group women and overall prevalence is reported to be around 17.9%. AUB has a direct impact on the lives of women affected by it. It affects their social, physical, emotional and material well-being. AUB is associated with the high burden of hysterectomies.[2]

In recent years, hysteroscopy has emerged as a useful alternative to D&C as it permits the direct visualization of uterine cavity and can be used as an officetechnique in the evaluation of endometrial disorders. Unlike dilatation and curettage, it can be used as an office procedure. It offers a valuable extension of gynaecologist's armamentarium by giving assessment of endocervical and uterine cavity pathology.[4]Apart from the usefulness of hyseteroscopy in visualization of anatomy of endometrialmcavity, it also helps in localization of pathology if any, from where target biopsy can be taken which can be even therapeutic.

The Menstrual Disorders Working Group of the International Federation of Gynaecology and Obstetrics (FIGO), proposed aclassification system, called as 'PALM- COEIN' classification of AUB and FIGO in the year 2018 came up with modification of 'PALM-COEIN' classification.This classification provides a structured approach to categorize the causes of AUB into structural (PALM: Polyp, Adenomyosis, Leiomyoma, Malignancy and Hyperplasia) and non-structural (COEIN: Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, and Not yet classified) categories.

This study aimed to evaluate the distribution of AUB causes in perimenopausal women using the PALM-COEIN system and to correlate clinical findings with histopathological results.

MATERIAL AND METHODS

After taking clearance from institutional ethical committee, this prospective observational studywas carried out in the Gynecological OPD (Out Patient Department) at Hind Institute of Medical Sciences, Mau, Ataria, Sitapur, Uttar Pradesh.

Study subjects: All women of age group (35 – 55 years) with any type of menstrual complaintsattending Gynecological OPD and IPD at Hind Institute of Medical Sciences,Mau, Ataria, Sitapur,Uttar Pradesh.

Sample size: Sample size was calculated using Cochrane's formula [Woolson RF, Bean JA, Rojas PB. Sample size for case-control studies using Cochran's statistics. Biometrics. 1986 Dec 1:927-32.]. The sample size obtained was of 150cases.

$$\boldsymbol{n = z2 \cdot p \cdot p}$$
$$\boldsymbol{e2}$$

Z = 1.96

p=0.11 (AUB is reported to occur in 9 to 14% women)

25.q=100-p = 0.89e =0.05

N=(1.96)2x0.11x0.89 /0.052= 150

Inclusion criteria

- All women's in the age groups of 35-55 years who have attendedGynecology OPD &IPD with the complaint of Abnormal Uterine Bleedingand willing & consenting to participate in this study.

Exclusion criteria

- Pregnancy
- Post-menopausal Bleeding
- Age group <35 years
- Bleeding due to cervicitis & vaginitis

Methodology

Informed written consent was taken from the patient. A proforma was filled by obtaining the detailed history. Demographic details was noted. The structured history ofmenstrual pattern, contraceptive history and other details, followed by general physical, systemic and thorough gynecological examination in context touterus, cervix and adnexa was assessed. Followed by USG to determine the endometrial thickness in all the participants and HPE examination as per requirement.Pelvic ultrasound was done to detect the pelvic pathology. Appropriate and relevant investigations was offered to all the study participants. Endometrial tissue collected through sampling procedures such as Dilatation &Curettage and endometrial biopsy, was send to the pathology laboratory for further evaluation. Endometrial biopsy

and Hysterectomy (where indicated) specimenswere obtained. Gross and microscopic features on hysterectomy specimens was noted.

The causes were categorized as per PALM-COEIN classification. The patients identified withpolyp, adenomyosis and leiomyoma after per speculum & per vaginal examination was categorized under AUB-P, AUB-A and AUB-L, respectively. Bleeding due to endometrial carcinoma diagnosed on endometrialbiopsy, hysterectomy or on histopathological examination was included under AUB-M category. The patients taking anti-coagulants or with defective coagulation profile was grouped under AUB-C category. Ovulatory disorders (AUB-O) were designated based on unpredictable timing and variable amount of bleeding.In cases of Iatrogenic (AUB-I) causes, history of steroidal hormones intake or contraceptiondevice usage was noted. The others not fitting in any category were included in "Not yet classified" category (AUB-N). The histopathological evaluation (HPE) was done for re-allocation of the categories.The various categorized causes of AUB were co-related withhistopathological based diagnosis. Following a thoroughhistoryand complete clinical examination.

Investigations

Complete Blood Count, Coagulation profile, Iron profile, when applicable (for all previously known cases of defects of coagulation from younger age and AUB dating backfrom menarche), Thyroid Function Test and Blood Sugar level estimations weredone and the results were correlated with the clinical allocation.

Bleeding pattern was defined by following FIGO 2018 criteria's.

Examination includes

A physical examination was carried out to exclude underlying pathology. For example, petechiae, purpura, ecchymosis or gum bleeding might suggest a bleeding disorder. However, the clinical history was much stronger predictor of an underlying bleeding disorder.On General examination were done to exclude the systemicdisorders such as thyroid disease, hyper androgenism or Cushing's. Abdominaland pelvic examination was usually recommended to assess for pelvic tumors and other specific pathologies. Followed by physical andSystemicexamination, a thorough gynecological examination (per speculum & per vaginal) in context tothe uterus, cervix and adnexa were assessed.

USG Examination

TVS examination was performed by the candidate with the vaginal probe.[6]The USG deviceused to assess Endometrial Echo complex, uterine size, contour and Doppler flow pattern of endometrial vessels in the same examination settings and noted.

Endometrial biopsy

Endometrial sampling was performed (25 – 27 days) during the premenstrual period in the patients with cyclic bleeding cases. In patient with atypical bleeding cases, the procedure was undertaken immediately postmenstruation. It was performed on the same day in the patients withcontinuous bleeding.

RESULTS AND OBSERVATIONS

Out of total 150 patients 62.7% patients belonged to 40-50 years age group followed by less than 40 years (30%) and more than 50 years (7.3%). Mean age was 43.32±5.27. Maximum patients (42.7%) presented with heavy menstrual bleeding as a chief complaint followed by Intermenstrual bleeding (31.3%), frequent menses (14.7%) and INFREQ menses (11.3%). Obesity was the chief comorbidity associated with 42% patients followed by Thyroid disease (37.5%),Diabetes mellitus (27%) and hypertension (23%). (Table 1)

In this study involving 150 patients with AUB, the distribution according to thePALM-COEIN classification was as follows: 19 patients (12.67%) had polyps(AUB-P), 27 patients (18.00%) had adenomyosis (AUB-A), 39 patients (24.00%) had leiomyoma (AUB-L), 35 patients (23%) had ovulatory dysfunction(AUB-O), 14 patients (9.33%) had endometrial causes (AUB-E), 7 patients (4.67%) had iatrogenic causes (AUB-I), and 2 patients (1.33%) had not yet classified causes (AUB-N). 2 patient had AUB-M (malignancy) 1.33%.2 patients (1.33%) had both polyp and leiomyoma (AUB-P+L), 1 patient (0.67%) had both adenomyosis and endometrial causes (AUB-A+O), 2 patients (1.33%) had bothleiomyoma and ovulatory dysfunction (AUB-L+O), and 1 patient (0.67%) had both polyp and adenomyosis (AUB-P+A). (Table 2)

Heavy Menstrual Bleeding (HMB) was the most common complaint observed, particularly prevalent in AUB-A (66.67%), AUB-L (53.85%), AUB-E (50%), AUB-A+O (100.00%), and AUB-L+O (50.00%). Intermenstrual heavy bleeding is frequent in AUB-P (47.37%), AUB-A (18.52%), AUB-L (33.33%), AUB-O (5.71%), AUB-E (0%), AUB-I (57.14%), AUB-N (50.00%), and universally present in AUB-P+L (100.00%) and AUB-P+A (100.00%). (Table 3)

AUB-L (Leiomyoma) included maximum 36 cases, with a significant number presenting with Leiomyoma (28 cases) and Normal endometrium (6 cases) followed by AUB-O (Ovulatory Dysfunction) had 19 cases, primarily showeda diagnosis of Bulky (15 cases) and Normal endometrium (4 cases).AUB-A (Adenomyosis) had 27 cases, predominantly showedAdenomyosis (23 cases) with additional findings in Bulky (4 cases). (Table 4)

AUB-O (Ovulatory Dysfunction) had all 19 cases managed conservatively with no additional classifications.AUB-P (Polyp), all 14 cases were managed conservatively (polypectomy) with no further classification.AUB-A (Adenomyosis) had 9 cases managed conservatively, with 17 cases classified as adenomyosis, 1 as premalignant, and none under other categories.AUB-E (Endometrial) included 16 cases managed conservatively, with 4 classified as premalignant, 16 as endometrial hyperplasia, 1 as malignant, and 2 as endometrial glandular. (table 5)

Figure1. Showing FIGO 2018 classification of abnormal uterine bleeding. Adapted from[5]

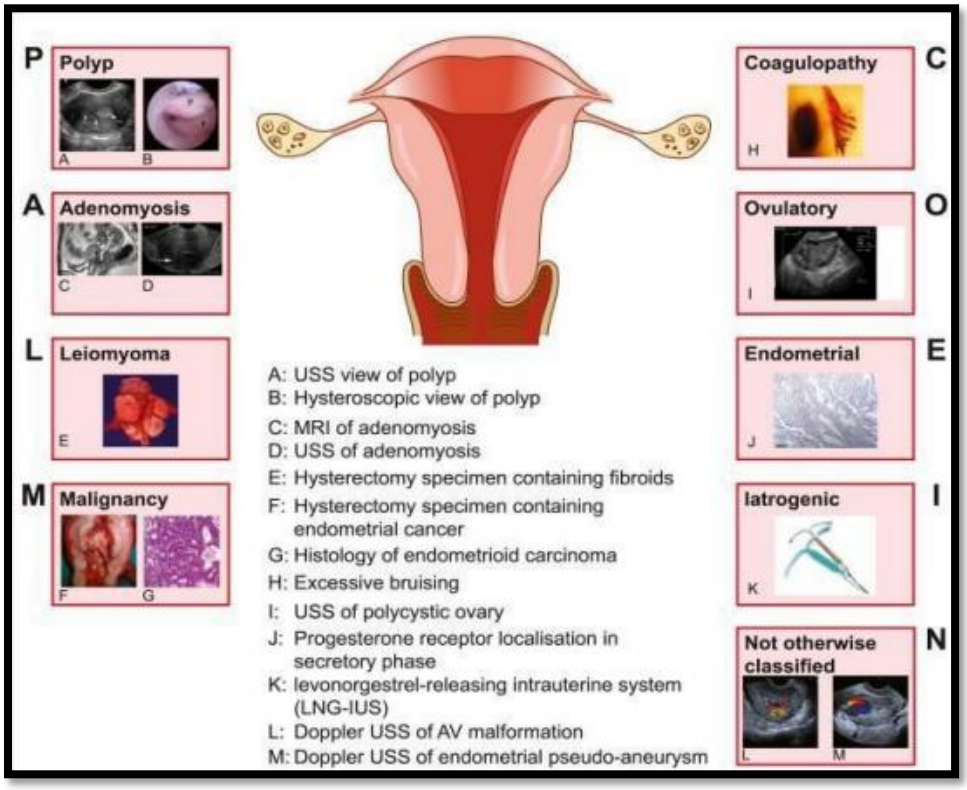

Table 1: Distribution of study population according to Age, Chief complaints and Comorbidities

		No.	%	Mean±SD (Range)
Age (years)	<40	45	30.0	43.32±5.27 (34-55)
	40-50	94	62.7	
	>50	11	7.3	
Chief complaints	Frequent menses	22	14.7	
	Heavy menstrual bleeding	64	42.7	
	INFREQ menses	17	11.3	
	Intermenstrual bleeding	47	31.3	
Comorbidities	Hypertension	35	24	
	Diabetes mellitus	28	27	
	Thyroid disease	42	37.5	
	Obesity	45	42	

Table 2: Distribution of patients according to PALMCOEIN categorization

Category	Abbreviation	Number(n)	Percentage(%)
Polyp	AUB-P	19	12.67
Adenomyosis	AUB-A	27	18
Leiomyoma	AUB-L	39	26
Ovulatory Dysfunction	AUB-O	35	23
Endometrial	AUB-E	14	9.33

Iatrogenic	AUB-I	7	4.67
Not yet classified	AUB-N	2	1.33
Malignancy	AUB-M	2	1.33
Combined Categories			
Polyp + Leiomyoma	AUB-P+L	2	1.33
Adenomyosis +Endometrial	AUB-A+O	1	0.67
Leiomyoma + Ovulatory Dysfunction	AUB-L+O	2	1.33
Polyp + Adenomyosis	AUB-P+A	1	0.67
Total		150	100

Table 3: Bleeding Pattern and PALM-COEIN classification

Final Diagnosis	Chief Complaints	Count (n)	%
AUB-P (n=19)	Intermenstrual heavy bleeding	9	47.37
	Post coital bleeding	5	26.32
	Intermenstrual bleeding	4	21.05
	Intermenstrual heavy bleeding + Post	1	5.26
AUB-A (n=27)	Heavy menstrual bleeding	2	7.41
	HMB + dysmenorrhea	18	66.67
	Frequent menses	2	7.41
	Intermenstrual heavy bleeding	5	18.52
AUB-L (n=39)	Heavy menstrual bleeding	21	53.85
	Intermenstrual heavy bleeding	13	33.33
	Prolonged bleeding	2	5.13
	Postmenopausal bleeding	1	2.56
	Infrequent menses	2	5.13
AUB-O (n=35)	Heavy menstrual bleeding	7	20.00
	Frequent	5	14.29
	Infrequent	20	57.14
	Intermenstrual heavy bleeding	2	5.71
	Infrequent menses	1	2.86
AUB-E (n=14)	Frequent	5	35.71
	Heavy menstrual bleeding	7	50.00
	Prolonged	2	14.29
	Intermenstrual heavy bleeding	0	0
AUB-I (n=7)	Intermenstrual heavy bleeding	0	0
	Prolonged BPV	1	14.29
	Frequent menses	2	28.57
AUB-N (n=2)	Heavy menstrual bleeding	1	50.00
	Intermenstrual heavy bleeding	1	50.00
AUB-P+L(n=2)	Intermenstrual heavy bleeding	2	100.00
AUB-A+O(n=1)	Heavy menstrual bleeding	1	100.00
AUB-L+O(n=2)	Heavy menstrual bleeding	1	100.00
	Infrequent menses	1	100.00
AUB-P+A(n=1)	Intermenstrual heavy bleeding	1	100.00
Total (n=150)		150	100

Table 4: On Ultrasound, Uterus Findings in AUB Diagnosis

Final Diagnosis of AUB	N	Normal	Adeno myosis	Bulky	Leiom yoma	CuT in situ	Misplaced CuT	Polyp	Total
AUB-P	19	7	0	6	0	0	0	1	19
AUB-A	27	0	23	0	4	0	0	0	27
AUB-L	39	6	1	2	30	0	0	0	39
AUB-O	35	13	0	22	0	0	0	0	35
AUB-E	14	9	1	5	0	0	0	0	14

AUB-I	7	2	0	2	0	2	1	0	7
AUB-N	2	1	0	0	0	0	0	1	2
AUB-P+L	2	1	0	0	1	0	0	0	2
AUB- A+O	1	0	1	0	0	0	0	0	1
AUB-L+O	2	0	0	1	2	0	0	0	1
AUB-P+A	1	0	1	0	0	0	0	0	1
Total		39	26	46	35	2	1	2	150

Table 5: Correlation of histopathological reports of specimen with AUB Type

Final Diagnosis of AUB	Conservative management (n)	Adeno Myosis (n)	Leiomyoma (n)	Premalignant (n)	Endometrial Hyperplasia (n)	Malignant (n)	Endometrial Glandular (n)
AUB-P(n=19)	14	0	0	0	0	0	0
AUB-A(n=27)	9	17	0	1	0	0	0
AUB-L(n=39)	8	0	24	4	0	0	0
AUB-O(n=35)	19	2	0	0	0	1	0
AUB-E(n=14)	9	0	0	4	3	1	2
AUB-I(n=7)	7	0	0	0	0	0	0
AUB-N(n=2)	2	0	0	0	0	0	0
AUB-P+L(n=1)	2	0	0	0	0	0	0
AUB- A+O(n=1)	0	0	0	1	0	0	0
AUB-L+O(n=1)	1	0	0	0	0	0	0
AUB-P+A(n=1)	0	1	0	0	0	0	0
AUB-O+L(n=1)	1	0	0	0	0	0	0
Total	79	10	9	6	10	1	2

DISCUSSION

This study was done to categorize the causes of AUB by PALM COEIN classification system for proper evaluation and effective management. After clinical diagnosis further investigation and intervention should be done and reclassify and confirm the diagnosis particularly precancerous lesion and cancer in premenopausalwomen. Our study, abnormal uterine bleeding (AUB) in women aged 35–55 is a common gynecological condition with several causes. FIGO created the PALM-COEIN categorization system to identify and classify these causes, improving clinical and pathological correlations.In our 150-patient AUB research, the distribution was: 19 patients (12.67%) had polyps (AUB-P), 27 (18.00%) had adenomyosis, 39 (26.00%) had leiomyoma, 34 (23.00%) had ovulatory dysfunction, 14 (9.33%) had endometrial causes, 7 (4.67%) had iatrogenic causes, AUB-M 2 patients out of 150 (1.33%) and 2 (1.33%) had unclassified causes. Some patients have many categories: 2 patients(1.33%) had both polyp and leiomyoma (AUB-P+L), 1 patient (0.67%) had both adenomyosis andendometrial causes (AUB-A+L), 2 patients (1.33%) had both and ovulatory dysfunction (AUB-L+O), and 1 patient had both. Our results supported the results of the study done byMishra D et al[7]. They found a comparable frequency of polyps in AUB, underscoring their clinical relevance, whereas JetleyS et al[8] found polyps in middle-aged women. Adenomyosis, found in 18.00% of our patients, was consistent with Shukla M et al[9] and VivaranaG et al[10].

Obesity was observed in 42%, confirming the well-known effect of obesity on menstrual health. Hyporthyroidism observed in 24% patients affect hormone levels and endometrial function, causing monthly abnormalities such AUB.[11]Jensen JT et al12and Rattan A et al[13]observed thatObesity increases estrogen production, which may cause endometrial hyperplasia and other uterine abnormalities. As our study group was obese, weight management measures must be part of AUB patients' complete treatment. Obesity,Thyroid, hypertension and Diabetes mellitus are connected and may worsen AUB.

Intermenstrual heavy bleeding was common in AUB-P (71.43%), AUB-A (18.52%), AUB-L (33.33%), O (10.53%), E (15.38%), I (57.14%) and N (50.00%). This symptom was always present in AUB-P+L (100.00%) and AUB-P+A (100.00%). These subtypes had significant rates of intermenstrual heavy bleeding, which supports its role in clinical assessment and matches studies of structural reasons including polyps and leiomyomas done by Mishra D et al[7].Post-coital bleeding was exclusively detected in AUB-P (14.29%), which may indicate cervical polyps or other uterine abnormalities as reported by VivaranaG et al[10]. One

case of postmenopausal bleeding in AUB-L (2.78%) required rapid examination for malignancy or other significant diseases.

Polyps were seen in women of all ages, peaking between 40 and 50. Histopathologically, most polyps in our sample were cervical and endometrial, which support clinical and radiological diagnosis respectively. Similar findings were reported by DoraiswamiS et al[14], Mishra D et al[7] and Khan S et al[15].

We found leiomyomas in 39(26.00%) of our patients most common findings.Mitra N et al[16] and RattanA et al[13] also found in perimenopausal women. Baird DD et al[17] reported a greater frequency among African-American. Women mean age of 42.58 year had more cases of leiomyoma supports the Mishra D et al[7]and khan S et al[15]In our study Abnormal Uterine Bleeding (AUB-A) Adenomyosis was 27(18.00%). Most commonly seen in mean age 47.89 year presented with irregularbleeding pattern and most patientS presented with heavy menstrual bleeding pattern with dysmenorrhea, indicating hormonal abnormalities Whitaker L et al[5] found the similar findings on USG. Due to its refraction to medical therapy Mishra D et al[7] found that adenomyosis commonly required surgery.

AUB -O (Ovulatory)was thesecond most common finding in our study. The difference in clinical and histopathological diagnosis was not significant ($p>0.05$). 35 out of 150 cases of AUB-O (23.00%) having mean age of 40.68 year with most common infrequent and unpredictable bleeding pattern in various amount, duration and character that makes difficult to diagnose clinically which was similar to finding of Mishra D et al[7].

The histopathological findings in the endometrial biopsy showed various patterns proliferative phase (42.67%) was common followed by the secretory phase (27.33%) and mixed endometrium phase (25%). The result was in concordance with Munro MG et al[6] and Davis E et al[18]. Of the 27 AUB-A (Adenomyosis) patients, 18 (66.67%) were operated and 9 (33.33%) were conservatively treated. Due to its refractoriness to medicinal therapy, Mishra D et al[7] found that adenomyosis commonly required surgery. 28 (77.78%) of 36 AUB-L (Leiomyoma) patients were operated on, while 8 (22.22%) were conservatively treated. Due to their severe symptoms that did not respond to medication, leiomyomas were commonly surgically removed, according to Mitra N et al[16],therapy was typically adequate. 9 of 27 AUB-A (Adenomyosis) cases were conservatively handled, with 17 diagnosed as adenomyosis, 1 as premalignant and none as other. Mitra N et al[16] found that adenomyosis symptoms commonly need surgery.

CONCLUSION

In conclusion, our study contributes to the growing body of literature on AUB, providing insights into its multifaceted nature, diagnostic challenges, and tailored therapeutic strategies. Further research is warranted to refine diagnostic algorithms and treatment protocols, ensuring comprehensive care that addresses both the immediate gynecological concerns and associated comorbidities for enhanced patient well-being and quality of life.

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