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A study on abnormal uterine bleeding and its management in reproductive age women in tertiary care hospital

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Abstract
Background: Abnormal Uterine Bleeding (AUB) is a common gynaecological complaint in reproductive-age women and requires systematic evaluation. The FIGO PALM-COEIN classification provides a standardized framework for diagnosing and managing AUB.
Objectives: To classify reproductive-age women with AUB according to the FIGO PALM-COEIN system and to establish individualized management protocols for each etiological group.
Methods: This observational study was conducted on 200 women attending the Gynaecology Outpatient Department at Modern Government Maternity Hospital, Petlaburz, Hyderabad. Detailed history, clinical examination, and laboratory investigations were performed for all participants. Endometrial samples were obtained through dilatation and curettage under aseptic precautions and evaluated histopathologically. Medical management included mefenamic acid, tranexamic acid (500 mg TID during menstruation), norethindrone acetate (5-10 mg, days 5-25), combined oral contraceptives, and levonorgestrel-releasing intrauterine system (LNG-IUS). Surgical management was provided where indicated.
Results: The majority of participants were aged 40-44 years (57%) and were predominantly multiparous. Heavy menstrual bleeding was the most common presenting pattern (69%). Proliferative endometrium was the most frequent histopathological finding. Hormonal therapy along with tranexamic acid and mefenamic acid demonstrated good efficacy in controlling AUB. Surgical interventions included hysterectomy in 78.5% of hyperplasia/malignancy cases, 45.7% of leiomyoma cases, and 20% of adenomyosis cases. Myomectomy was performed in 11.4% of leiomyoma cases. LNG-IUS was effective in 60% of adenomyosis patients.
Conclusion: The FIGO PALM-COEIN system proved effective in classifying AUB and guiding targeted management. Most women responded well to medical therapy, while surgical treatment was reserved for structural causes and refractory cases. Tailored management based on classification improves outcomes and reduces unnecessary interventions.

Keywords: Abnormal Uterine Bleeding (AUB), proliferative endometrium, leiomyoma, adenomyosis, endometrial hyperplasia, hysterectomy

Introduction
Abnormal Uterine Bleeding (AUB) is a common condition affecting the women of reproductive age that has a significant social and economic impact. It has a negative impact on women's health and well-being including anemia, absenteeism and social embarrassment. It occurs in 9-14% of women between menarche and menopause, significantly impacting quality of life and imposing financial burden [1, 2].
AUB may be defined as any variation from the normal menstrual cycle, and includes changes in regularity and frequency of menses, in duration of flow, or in amount of blood loss. Under category of AUB further definitions may be subdivided based on volume of menstruation, regularity, frequency, duration, flow and timing related to reproductive status.
The most frequent cause of irregular bleeding in the reproductive age group is hormonal, although other causes such as pregnancy related bleeding (spontaneous abortion, ectopic pregnancy) should always be considered. History and physical examination will help to establish the cause of the abnormal bleeding, to direct further investigations, and to guide options for management [3, 4].
The International Federation of Gynaecology and Obstetrics in November 2010 accepted a new classification system for causes of AUB in the reproductive years. The system based on the acronym PALM-COEIN (polyps, adenomyosis, leiomyoma, malignancy and hyperplasia, coagulopathy, ovulatory disorders, endometrial causes, iatrogenic, not classified) was developed in response to concerns about the design and interpretation of basic science and clinical investigation that relates to the problem of AUB.

Materials and Methods
200 cases of AUB were selected from patients who report to outpatient department, at department of

obstetrics and gynaecology, modern government maternity Hospital, Petlaburz, Hyderabad, Telangana from December 2020 to November 2022.

Methods for collection of data

- **Design of study:** This an observational study.
- **Duration of the study:** From December 2020 to November 2022.
- **Sample size:** 200 cases who full filled the inclusion criteria.
- **Inclusion Criteria:** Women aged 20-44 with Clinical evidence of AUB.
- **Exclusion Criteria:** Bleeding caused by pregnancy and pregnancy related factors, Puberty menorrhagia and Perimenopausal bleeding.
- **History:** A careful current menstrual history of Cycle length, duration of flow in days and amount of bleeding in each period-scanty/moderate/heavy, Assessment made on subjective experience of patients number of pads used per day, history of passing clots. Associated with lower abdominal pain. History of amenorrhea before the onset of bleeding and last menstrual period. History of intermenstrual bleeding and history of past menstrual cycles, obstetric history, history of comorbid conditions, any history of previous surgeries and history of previous medications, family history. After detailed history, thorough physical and pelvic examinations was done and patients were sent for investigations.

Investigations as Blood grouping and typing, Complete blood count, Bleeding time and Clotting time, Coagulation profile, Thyroid profile, Random blood sugar and Ultrasound abdomen and pelvis.

After thorough history, clinical examination and investigations, the diagnosis of AUB was established. Endometrial biopsy was taken for all patients using dilatation and curettage under aseptic precautions. Samples were sent for histopathological examination. Women were given Tab Mefenamic acid and Tranexamic acid 500mg TID during menstruation, after evaluation some of them were treated by medical management using Norethindrone acetate 5-10mg daily from 5^{th}-25^{th} day, Levonorgestrel, Releasing Intrauterine System Low dose COC pills, Some were treated by surgical management.

Results

The true incidence of AUB is difficult to establish because most patients are treated on OPD basis and the normal variation in menstrual cycle during the transition phase may be considered as abnormal bleeding by the patient.

Table 1: Prevalence according to PALM-COEIN Classification

PALM-COEIN Classification		Number of cases	Percentage
P	Polyp	20	10
A	Adenomyosis	20	10
L	Leiomyoma	70	35
M	Hyperplasia & G Malignancy	14	7
C	Coagulopathy	0	0
O	Ovulatory dysfunction	72	36
E	Endometrial	4	2
I	Iatrogenic	0	0
N	Not classified	0	0

Out of 200 cases, maximum cases had AUB due to Ovulatory Dysfunction (36%), followed by Leiomyoma (35%), Adenomyosis (10%), Polyp (10%), Malignancy and Hyperplasia (7%), Endometrial (2%). No cases of Coagulopathy, Iatrogenic and Not classified was found.

Table 2: Distribution of age in study group

Age	Number	Percentage
20-24	11	5.5%
25-29	8	4%
30-34	12	6%
35-39	55	28.5%
40-44	114	57%

In our study majority of age group were found to be between 40 to 44 years (57%), followed by 35 to 39 years age group (28.5%), followed by 30 to 34 years (6%), followed by 20 to 24 years age group (5.5%) and 25 to 29 years age group (4%) respectively.

Table 3: Correlation between age and PALM-COEIN Classification

	P	A	L	M	O	E	Total
20-24	0	0	0	0	11	0	11
25-29	1	1	2	0	3	1	8
30-34	0	1	2	0	8	1	12
35-39	7	5	21	5	15	2	55
40-44	12	13	45	9	35	0	114
Total	20	20	70	14	72	4	200

P=0.053

In our study, most common cause for AUB in 20-24 year age group was AUB-O, in 25-29 year age was AUB-O, in 30-34 year age group was AUB-O, in 35-39 year age group was AUB-L, in 40-44 year age group was AUB-L. Most common age of presentation for all structural causes of AUB was 40-44 years, whereas non-structural causes, for AUB-O was 40-45 years, AUB-E was 35-39 years. As $p>0.05$, it is not statistically significant.

Table 4: Distribution of parity in study group

Parity	Number	Percentage
Nullipara	13	6.5%
Primipara	23	11.5%
Multipara	136	68%
Grand multipara	28	14%

In our study, multipara woman were more i.e. 68%, which is followed by grand multipara woman (14%) followed by Primipara (11.5%) and Nullipara (6.5%) woman respectively.

Table 5: Distribution of bleeding pattern in study group

Bleeding patterns	Bleeding pattern	Percent
Heavy menstrual bleeding	138	69.0
Inter menstrual bleeding	12	6.0
Prolonged bleeding	27	13.5
Frequent menstrual bleeding	18	9.0
Infrequent menstrual bleeding	5	2.5
Total	200	100.0

Heavy menstrual bleeding was the most common symptom accounting for 69% followed by prolonged bleeding 13.5% and least being infrequent menstrual bleeding 2.5%.

Most common bleeding pattern in Polyp was with heavy menstrual bleeding (65%). The most common bleeding pattern in Adenomyosis was heavy menstrual bleeding (80%). The most common bleeding pattern in Leiomyoma was Heavy menstrual

bleeding (65.7%). The most common bleeding pattern in Malignancy and Hyperplasia was Heavy menstrual bleeding (64.2%). The most common bleeding pattern in Ovulatory Dysfunction was heavy menstrual bleeding (69.4%). The most common bleeding pattern in Endometrial was heavy menstrual bleeding (100%). As the $p<0.05$, it is statistically significant.

Table 6: Correlation of bleeding pattern & cause

Cause	Bleeding Pattern					Total
	Heavy Menstrual bleeding	Inter menstrual Bleeding	Prolonged bleeding	Frequent Menstrual bleeding	Infrequent	
Polyp	13	7	-	-	-	20
Adenomyosis	16	1	2	1	-	20
Leiomyoma	46	3	8	9	4	70
Malignancy and Hyperplasia	9	1	4	-	-	14
Ovulatory Dysfunction	50	-	13	8	1	72
Endometrial	4	-	-	-	-	4
Total	138	12	27	18	5	200

P=0.004

Table 7: Correlation of histopathology and PALM-COEIN Classification

Cause	Histopathology					Total
	Proliferative	Secretory	Endometrial hyperplasia	EIN	Carcinoma	
Polyp	15	5	0	0	0	20
Adenomyosis	19	1	0	0	0	20
Leiomyoma	65	5	0	0	0	70
Hyperplasia & G Malignancy	0	0	11	2	1	14
Coagulopathy	0	0	0	0	0	0
Ovulatory dysfunction	67	5	0	0	0	72
Endometrial	4	0	0	0	0	4
Iatrogenic	0	0	0	0	0	0
Not classified	0	0	0	0	0	0
Total	170	16	11	2	1	200

P=0.0023

Out of 72 cases of Ovulatory Dysfunction, 67(93%) cases were proliferative followed by 5(7%) cases secretory. Out of 70 leiomyoma cases, 65(92.8%) were proliferative type of endometrium, followed by 5(7.2%) secretory. Out of 20 cases of Polyp, 15(75%) were proliferative, followed by 5(25%) cases secretory. Out of 20 cases of Adenomyosis, 19(95%) were proliferative, 1(5%) was secretory. Out of 14 cases of AUB-M, 11 cases of endometrial hyperplasia, 2 cases of EIN and 1 case of endometrial carcinoma were present. 4(100%) cases of AUB-E were proliferative. As $p<0.05$, it is statistically significant.

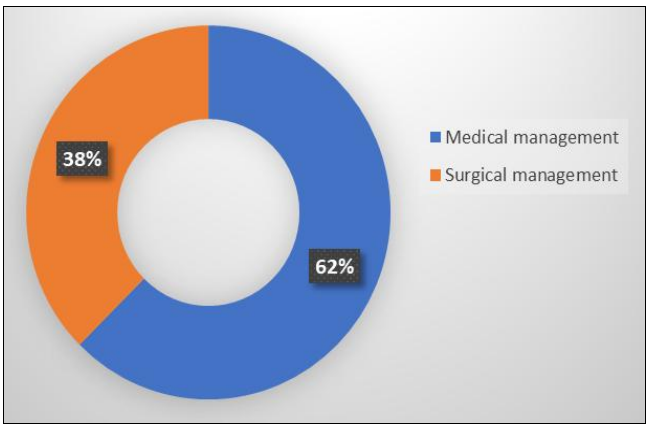

Fig 1: Treatment in patients of study

86(43%) women were given progestins either oral (71) or LNG-IUS (15), 11 cases (5.5%) received COC pills, 4(2%) cases received GnRH agonist injection & 24(12%) cases were given tranexamic acid along with mefenamic acid. Total 125(62.5%) cases were managed medically. 75(37.5%) cases were managed surgically. Out of which 46(23%) underwent Total Abdominal Hysterectomy, 20(10%) underwent polypectomy, 8(4%) underwent Myomectomy & 1(0.5%) underwent Radical Hysterectomy. As $p<0.05$, it is statistically significant.

Table 8: Management of cases in present study

Polyp	Cases
Polypectomy	20
Adenomyosis	
Progestins	16(80%)
TAH	4(20%)
Total	20
Leiomyoma	
Progestins	16(22.8%)
COC pills	10(14.2%)
GnRH agonist	4(5.7%)
Myomectomy	8(11.4%)
TAH	32(45.9%)
Total	70
Malignancy and Hyperplasia	
Progestins	3(21.4%)
TAH	10(71.4%)
Radical hysterectomy	1(7.2%)
Total	14
Ovulatory Dysfunction	
Progestins	48(66.6%)
Tranexamic +Mefenamic Acid	24(33.4%)
Total	72
AUB-E	
Progestins	3
COC pills	1
Total	4

All cases of polyp underwent polypectomy. 38 Out of 20 cases, 16(80%) cases were treated with progestins, oral (4), LNG-IUS (12), 4 (20%) cases underwent TAH. Out of 70 cases of Leiomyoma, 32(45.9%) cases underwent TAH, 16(22.8%) cases

were treated with Progestins (oral), 10(14.2%) cases were treated with COC pills, 4(5.7%) cases were treated with GnRH agonist & 8(11.4%) cases underwent Myomectomy. Out of 14 cases of Malignancy and Hyperplasia, 10(71.4%) cases underwent TAH, 3(21.4%) cases were treated with Progestins (LNG-IUS) & 1(7.2%) underwent Radical Hysterectomy. Out of 72 cases, 48(66.6%) cases were treated with Progestins (oral), 24(33.4%) cases were treated with Tranexamic + Mefenamic acid. And underlying identified cause was treated. Out of the 4 cases, 3(75%) cases were treated with Progestins and 1(25%) cases were treated with COC pills.

Table 9: Age-wise distribution and indications of Hysterectomy cases

Age	No of hysterectomy cases	Percentage
20-24	0	-
25-29	0	-
30-34	0	-
35-39	3	6.5%
40-44	43	93.5%
Indications		
Leiomyoma	32	69.5%
Malignancy and Hyperplasia	10	21.7%
Adenomyosis	4	8.8%

Out of 46 hysterectomy cases, 3 cases (6.5%) were in age group of 35 to 39 years, 43 cases (93.5%) were in age group of 40 to 44 years. Out of 46 cases of hysterectomy, 32(69.5%) cases were of Leiomyoma, 10(21.7%) cases were of Malignancy and Hyperplasia and 4(8.8%) cases were of Adenomyosis.

Discussion

The present study was conducted in Department of Obstetrics and Gynaecology, Modern Government Maternity Hospital, Peltaburz from the year December 2020 to November 2022 on 200 patients of AUB attended to Gynaecology OPD. Prevalence of Adenomyosis (10%) and AUB-E (2%) was comparable to Singh PB, *et al.* [5] study i.e., 13.5% and 4% respectively. Prevalence of Polyps (10%), Leiomyoma (35%) and Malignancy and Hyperplasia (7%) was more than Singh PB *et al.* [5] study. Whereas prevalence of Ovulatory Dysfunction (36%) was less compared to Singh PB, *et al.* [5] 5 study.

In present study 9.5% were in age group of 21-30years, which is similar with results of studies by Muzaffar *et al.* [6], Saraswathi *et al.* [7] which range from 11.5% to 20.8%, respectively. 33.5% were in age group of 31-40 years, which is in concordance with results of Muzaffar, *et al* [6] (39.2%) and Singh PB, *et al.* [5] (31.8%).

Abnormal uterine bleeding is the most frequent complaint seen in patients attending outpatient department. Majority of cases of AUB are seen age group 40-44 years (57%), this might be because of decline in ovarian function with more anovulatory cycles and hyperestrogenism. On looking at age distribution of various causes of AUB, cause of AUB in age group 20-24 years was Ovulatory Dysfunction (100%). AUB-O is more common in this age group mostly because of ovulatory dysfunction ovulation in extremes of age. Approximately 90% of uterine bleeding due to Ovulatory Dysfunction result from anovulation, and 10% of cases occur with ovulatory cycles. The reason behind this irregular bleeding is due to dysfunction of Hypothalamic Pituitary (HPO) axis. Failure of ovulation leads to absence of corpus luteum formation and no secretion of progesterone, causing unopposed estrogen effect on endometrium. Estrogen causes unopposed endometrial proliferation manifesting as breakthrough bleeding. The major factors affecting HPO axis are polycystic ovarian syndrome, thyroid disorders and hyperprolactinemia, other factors are obesity, anorexia, mental stress.

Table 9: Parity wise distribution in AUB

Parity	Lotha *et al.* [8] (%)	Sadia Khan [9] (%)	Present Study (%)
Nulliparous	6.1	5.4	6.5
Primiparous	10.8	-	11.5
Multiparous	64.9	54	63
Grand multiparous	18.2	35.6	14

In present study, nulliparous, primiparous, multiparous, grandmultiparous were comparable to Lotha *et al.* [8] and SadiaKhan *et al.* [9] study.

In the present study most common bleeding pattern was heavy menstrual bleeding (69%) and least common was infrequent menstrual bleeding (2.5%). In the present study, bleeding patterns like heavy menstrual bleeding were comparable whereas, intermenstrual bleeding and frequent menstrual bleeding was less. We observed prolonged bleeding in 13.5% cases and oligomenorrhoea in 2.5% cases which were nil in Dr. Kusum [10] study.

Table 10: Comparison of correlation of bleeding pattern & cause

	Most common bleeding pattern	Present study (%)	Comparative study (%)
P	HMB	65	40 (Singh PB *et al.*) [5]
A	HMB	80	66.7 (Singh PB *et al.*) [5]
L	HMB	65.7	51 (Sun *et al.*) [11]
M	HMB	64.2	59.3 (Yelmaz *et al.*) [12]
O	HMB	69.4	61.4 (Singh PB *et al.*) [5]
E	HMB	100	80 (Singh PB *et al.*) [5]

The percentage of patients who presented with HMB was comparable to present study and Yelmaz *et al.* [12] for AUB-M and AUB-O. Whereas in other causes percentage of patients with HMB was more in present study than others.

The cause of abnormal uterine bleeding in different etiologies is different. In Polyp, it may be due to stromal congestion within the polyp leading to venous stasis and apical necrosis. In Adenomyosis, it may be due to increased uterine volume causing increased uterine surface area and possibly affecting normal myometrial contractility. In Leiomyoma, symptoms depend on location and size of fibroids. AUB may be due to increase in endometrial surface area, presence of engorged vasculature in perimyoma environment. In Malignancy and Hyperplasia, it may be due to hyperplasia of endometrium. In Ovulatory Dysfunction, it may be due to unopposed estrogen acting on endometrium. In Endometrial, it may be due to dysfunction of local endometrial hemostasis, likely deficiency in vasoconstriction (endothelin-1, prostaglandin F2a) and more production of plasminogen leading to increased lysis of clot. In present study, endometrial histopathological patterns like endometrial hyperplasia and Carcinoma were comparable. Whereas, proliferative type of endometrium was found to be more i.e. 85% and secretory type was found to be less 8% as compared to Nadia *et al.* [13] study. The most common histopathological pattern of endometrium was proliferative type in Polyp (75%), Adenomyosis (95%), Leiomyoma (92.8%), and ovulatory Dysfunction (93%) AUB-E (100%) in present study.

The cause of AUB in present study is diagnosed by patient's history, examination, investigations, by endometrial biopsy with D&C, transvaginal and transabdominal ultrasonography and

PAP smear. In the present study, 62.5% were managed medically. In the present study 37.5% were managed surgically. However, in study by Coulter *et al*. [14], 54% of woman needed surgery by one year. Hysterectomy remains an alternative when conservative treatment fail.

Table 11: Comparison of indications of hysterectomy

Indication for Hysterectomy	Chanderdeep *et al*. [15] 2014 (%)	Dr. K Indira Surya Kumari *et al*. [1] (%)	Present Study No (%)
Leiomyoma	50.3	57	69.5
Hyperplasia & Malignancy	15.3	5	21.9
Adenomyosis	14.7	5	8.6

This table shows the indications for hysterectomy. In the present study most common cause for hysterectomies in AUB is Leiomyoma (69.5%) which is more compared to Chandradeep *et al*. [15], Dr. K Indira Surya Kumari *et al*. [1] 1 where the most common indication was also fibroid (50.3%) and (57%) respectively.

Management of Polyps

Risk factors for polyps are age, tamoxifen use, obesity, increased level of estrogen, Lynch syndrome. Endometrial polyps can accurately be diagnosed using transvaginal ultrasonography and Saline infusion sonography. All (100%) cases of polyp in present study were treated by polypectomy as they were symptomatic similar to study by Yuk, [16].

Management of Adenomyosis

Adenomyosis was most commonly found in fourth decade but now increasingly diagnosed in young women with infertility, dysmenorrhea and AUB. Although histopathology is the Gold Standard in diagnosing Adenomyosis, FIGO now suggests MUSA (Morphological Uterus Sonographic Assessment) using transvaginal ultrasonography for diagnosis. Treatment goal is relief of pain and bleeding. In present study, 80% cases were treated with progestins. They were found to be effective by inducing endometrial atrophy lowering prostaglandin production to improve dysmenorrhea and heavy menstrual bleeding according to studies by Muneyyirci-Delale [17]; Osuga, [18]. 17.8% cases were treated with GnRH agonists. 60.9% cases were hysterectomized. Hysterectomy is the definitive treatment.

Management of Leiomyoma

Fibroids are most common pelvic tumours. They can easily be diagnosed on clinical examination and transvaginal and transabdominal ultrasonography. MRI allows more accurate assessment of the size, number, and location of leiomyomas. This helps identify appropriate candidates for myomectomy. Either COC pills, Progestins can be used to induce endometrial atrophy and to decrease prostaglandin production in leiomyomas according to studies by Kriplani [19]; Sayed [20]. GnRH agonists shrink leiomyomas by targeting the growth effects of estrogen and progesterone by lowering their levels in 1 to 2 weeks after initial administration. Tranexamic acid decreased myoma volume and improved menstrual symptoms during 3 month therapy according to studies of Parsanezhad [21]; Sayyah-Melli [22]. Myomectomy is a uterus preserving surgery considered for women who desire fertility preservation or who decline hysterectomy. Myomectomy improves heavy menstrual bleeding in approximately 70 to 80% patients according to studies. Hysterectomy is definitive treatment. Benefits are balanced against risks of major surgery. In present study, 45.9% cases underwent hysterectomy, 11.4% underwent myomectomy, 22.8% were treated with progestins, 14.2% were treated with COC pills and 5.7% were treated with GnRH agonists.

Management of Malignancy and Hyperplasia

It can be predicted by transvaginal ultrasonography by measuring endometrial thickness in patients with AUB. However it is a histological diagnosis by endometrial biopsy. Management depends on patient's age, comorbid risks for surgery, desire for fertility and specific histologic features such as cytologic atypia. Hysterectomy is the most definitive treatment. Hormonal therapy using progestins lead to regression rates of 70-80% for non-atypical endometrial hyperplasia according to studies by Reed [23]. In present study, 71.4% cases underwent hysterectomy, 21.4% cases were treated using progestins and 7.2% cases underwent radical hysterectomy.

Management of Ovulatory Dysfunction

The underlying cause of anovulation are varied and need to be evaluated. If cause is treated symptoms reduce. Symptomatic management can be given until cause is corrected using tranexamic acid and mefenamic acid, COC pills and progestins. Regardless of the reason, if ovulation does not occur, no progesterone is produced and a proliferative endometrium persists and are at increased risk of endometrial hyperplasia. In those desiring contraception, COC pills and progestins can be given. In those not desiring contraception, cyclic monthly progestins will typically regulate menses according to studies by Munro [17]. In the present study, 66.6% cases were given progestins and 33.4% were given only tranexamic and mefenamic acid.

Management of AUB-E cases

It is a diagnosis of exclusion. In the present study, 75% were treated with progestins and 25% were treated with COC pills. In present study, 16.8% cases of hysterectomy were in age group of 30-40 years, comparable to study by Dr. K. Indira Surya Kumari *et al*. [1] (19%), whereas 83.2% cases of hysterectomy were in age group of above 40 years, which is more than that in study of Dr. K Indira Surya Kumari *et al* [1].

Conclusion

Following conclusions were drawn from the present study. The majority of women were in the age group 40 to 44 years. Incidence of AUB is more common in multiparous women. The commonest bleeding pattern was heavy menstrual bleeding. Proliferative type of endometrium was the commonest histopathological pattern. Majority of these patients were given Progestins as medical line of management, which was found to be superior in controlling abnormal uterine bleeding than others. All polyp patients underwent polypectomy and dilatation and curettage. Majority of patients with adenomyosis were treated with Progestins (LNG-IUS), few underwent hysterectomy. Nearly half of patients with Leiomyoma underwent hysterectomy, few underwent myomectomy. Majority of patients with AUB-M underwent hysterectomy. Majority of patients who underwent hysterectomy were in age group 40-44 years. Most common indication for hysterectomy was Leiomyoma, followed by Adenomyosis and Malignancy and Hyperplasia. Most patient with AUB-O and AUB-E were treated with Progestins.

Limitations of my study

- As it is a hospital based study, there is a chance of selection

bias.
- Regarding medical therapy, especially hormonal therapy different regimes were given according to consultant's consensus.

Conflicts of interest
Not available

Financial Support
Not available

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