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STUDY OF ADOLESCENT ABNORMAL UTERINE BLEEDING (AUB) AND ITS OUTCOME- IN TERTIARY CENTRE K.I.M.S. KARAD

Manisha M. Laddad¹, Nitin Kshirsagar², Sanjaykumar Patil³, Gauri Shinde⁴, Rajashree Bhosale⁵

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ABSTRACT: BACKGROUND/AIMS: Menstruation is a normal part of adolescence, but for girls with excessive uterine bleeding, it can be associated with significant morbidity. Menstrual disorders and abnormal uterine bleeding (AUB) are among the most frequent gynaecological complaints of adolescents. AUB has been defined in the past by a variety of terms and there have been inconsistencies and lack of categorization of various potential causes of AUB. To have standard nomenclature internationally, palm coein Classification of AUB was introduced in 2011 by FIGO Menstrual disorder group for non-pregnant, reproductive age women. In the present study we aimed to evaluate cases of adolescent AUB by investigations and palm coein approach. **METHODS:** The study was conducted prospectively on all adolescent girls attending OPD at Krishna institute of medical sciences Karad, Menstrual complaints were classified according to palm coein approach after a thorough history taking, examination and investigations. **RESULTS:** Prevalence of menstrual disorders in adolescents was 64.5%, of which 86.90% were attributed to AUB. Palm coein approach was applied to AUB cases. Ovulatory disorders (AUB-O) formed a major chunk of adolescent AUB (96.90%), of which 60.60% were due to immaturity of Hypothalamic Pituitary Ovarian axis, 27.87% due to polycystic ovarian syndrome and 8.48% due to Thyroid disorders. Contribution of coagulopathy to AUB was 2.42%. Polyps and leiomyoma were seen in 1.2% and 0.6% of cases respectively. All cases were classified when palm coein was applied. **CONCLUSION:** AUB in adolescents can also be classified by palm coein to standardize nomenclature and abandonment of terms like menorrhagia, metrorrhagia and dysfunctional uterine bleeding and treated it successfully. **KEYWORDS:** Abnormal uterine bleeding, Adolescents, Palm coein.

INTRODUCTION: The term Adolescence, derived from Latin word "adolescere" is the growing up period between childhood and maturity.¹ it is characterized by a set of development changes in physical maturation, psychological adjustment and social relations.

WHO defines adolescent as a group of the youth in the age group of 10-19 years, who form an important segment of society.²

Gynecologic problems of adolescent occupy a special space in the spectrum of gynecologic disorders of all ages. Menstrual disorders and abnormal uterine bleeding (AUB) are among the most frequent gynecologic complaints of adolescents.^{3,4}

Abnormal uterine bleeding (AUB) is a term coined to incorporate bleeding that is excessive or occurs outside of normal cyclic menstruation.⁵ its importance lies in the fact that AUB has a major impact on women's quality of life, productivity and utilization of healthcare services.⁶

A revised terminology system was introduced in 2011 by the International Federation of Gynecology and Obstetrics (FIGO) to approach AUB in non-pregnant reproductive age women.⁷ This classification system was referred to by the acronym - palm coein.

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The system was developed by FIGO Menstrual Disorders Group (FMDG) with contribution from an international group of both clinical and non-clinical investigators from 17 countries on six continents. It was developed to have standardized nomenclature and to abandon terms like menorrhagia, metrorrhagia and DUB.⁸

As very few of the studies so far applied palm coein to adolescent AUB, this prospective study was undertaken to analyze adolescent AUB-by palm coein approach in Tertiary centre.

MATERIAL AND METHODS: This study of adolescent AUB was undertaken prospectively on young girls (10-19 years of age) attending the adolescent clinic and gynecologic out-patient department at Sir Krishna institute of medical sciences, Karad between June 2014 to June 2015. All adolescents were subjected to detailed and confidential evaluation.

A through history including presenting complaints with emphasis on detailed menstrual history like number of days of bleeding, number of pads used, any history of passage of clots, etc. was taken. Any need for medication, absenteeism from school or any prior treatment was also taken into account. Sexual history was also elicited after assuring confidentiality. Note was made of non-menstrual complaints too.

Detailed general physical and systemic examination was done after informed verbal consent from the patient and her accompanying guardian. Per vaginal/per rectal examination was done as and when required. Out of all the girls attending OPD, adolescents with non-menstrual complaints, primary amenorrhea and dysmenorrhea were excluded. Finally girls with complaints of heavy period, irregular cycles and oligomenorrhoea (AUB) formed the study group.

Complete blood count, PT/aPTT, kidney function test, liver function test and random blood sugar and Thyroid Function Test (TFT) were done in all girls. If PT/aPTT was deranged then further coagulation profile was done. Trans abdominal ultrasonography (USG) was done in all and Trans rectal (USG) was done as and when required.

MRI and CT were also done as per needed. In suspected PCOS cases and girls with obesity, oligomenorrhoea and hirsutism additional tests like Follicle Stimulating Hormone (FSH), Leutinizing Hormone (LH), Serum Prolactin level, Free Testosterone and insulin levels were done.

AUB was finally classified using the palm coein which is described in detail below:

Palm coein classification system is **stratified** into nine basic categories.⁷

Palm group has discrete entities that are measurable visually or histopathologically.

P - POLYP. Either present or absent as defined by USG hysteroscopy. It is diagnosed by USG or saline infusion sonography or by direct visualization of endometrium hysteroscopy:

A - Adenomyosis. Diagnosed by uterine Imaging.

L - Leiomyoma. FMDG created primary, secondary and tertiary classification system.

Primary: Presence or absence of leiomyoma as diagnosed by USG.

Secondary: Myomas are distinguished between involving endometrial cavity (SM-submucosal) and others.

Tertiary: Categorizes submucosal group according to Wamsteker system.⁹

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SM - <u>Submucosal</u>	0 <u>Pedunculate Intraeavitary</u>
	1 <50% intramural
	2 >50% <u>imramural</u>
S- <u>Others</u>	3 Contacts endometrium: 100% intramural
	4 Intramural
	5 <u>Subserosal</u> > 50% intramural
	6 <u>Subserosal</u> < 50% intramural
	7 <u>Subsrosal pedunculated</u>
	8 Other (specify, cervical, parasitic)
Hybrid <u>leiomyomas</u>	2-5 <u>Submucosal</u> and <u>subserpsal</u> , each with less than half the Diameter in the endometrial and peritoneal cavities.

M - Malignancy and hyperplasia. AUB may be a potential finding for underlying malignancy which is further sub classified by WHO or FIGO system.

coein group includes entities that are not defined by imaging or histopathology.

C - Coagulopathy (Systemic disorder of hemostasis). Diagnosed by abnormalities in coagulation profile.

O - Ovulatory Disorders are spectrum of disorders resulting from an ovulation due to various causes.

Immaturity of Hypothalamic Pituitary Ovarian axis (HPO) PCOS was diagnosed by Rotterdam's criterion.¹⁰ the presence of two or more of the following:

Oligo/Amenorrhea,

Clinical and/or biochemical hyperandrogenism, Polycystic ovaries. Other endocrine causes like hypothyroidism and hyperprolactinemia.

E - Endometrial. These are the causes when AUB occurs due to primary disorder residing in endometrium. Ovulation is normal with predicted and cyclic menstruation. Heavy menstrual bleeding occurs due to imbalance between local hemostatics and vasoconstrictors and vasodilators and clot lysis.

I - Iatrogenic. These causes contribute to AUB due to exogenous use of gonadal steroids or LNG-IUS.

N - Not Classified. This category includes entities which are extremely rare, poorly defined or inadequately examined e.g. AVM, Myometrial hypertrophy. With this knowledge of palm coein classification in background, adolescents with abnormal uterine bleeding were classified.

RESULTS: A total of 300 adolescents attended OPD, of which 193 girls (64.5%) presented with menstrual complaints and 107 (35.6%) with non-menstrual complaints (Fig. 1). Adolescent girls with non-menstrual complaints were treated accordingly.

Of 193 adolescents with menstrual complaints, 168 (87.04%) presented with AUB which includes girls with heavy periods, irregular periods and oligomenorrhoea (Table 1). This formed the study group, three out of these were either lost to follow up or did not consent to be a part of study.

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Thus finally 165 girls with AUB were further investigated and classified by palm- coein approach (Fig. 1).

On applying palm coein approach, most common etiology of AUB in adolescents was ovulatory disorder accounting for 96.90% of cases followed by coagulopathy (2.42%) (Table 2).

On further evaluation of ovulatory disorders causing AUB, contribution of immaturity of HPO axis, PCOS, thyroid disorders were 60.60%, 27.87% and 08.48% respectively (Table 2).

DISCUSSION: India is a country of over one billion population. Adolescent girls constitute nearly 1/10th of the population forming an important segment of society.

Abnormal uterine bleeding (AUB), the term was coined to incorporate any bleeding which is excessive in amount and occurs outside normal cyclic menstruation. In our study, 64.5% of adolescent population had some form of menstrual complaints of which abnormal uterine bleeding accounted for 87.04% of cases, dysmenorrhea in 07.77% and primary amenorrhea in 5.18%.

Demiretal and Metinetal in their studies reported prevalence of AUB in adolescents to be 45.5% and 48% respectively.^{11,12} Mean age of adolescents presenting with menstrual complaints was 16 years.

Fig. 1

Fig. 1 Study Flow Chart: To standardize terminology and have international symmetry, palm-coein classification system for AUB was undertaken in non-pregnant reproductive age women. Similarly an attempt was made to classify our adolescent girls on the same PALM-COEIN approach.

Ovulatory disorders are the major contributors of AUB in adolescents. These are spectrum of disorders occurring in the setting of anovulation resulting from any abnormality at any level of HPO axis which causes interruption of ovulatory cycles. Anovulation results in continued endometrial proliferation without progesterone withdrawal induced shedding and bleeding. Thus AUB-O is the result of effects of chronic unopposed estrogen on endometrium as this endometrium is fragile, vascular and lacking stromal support.

In our study ovulatory disorders accounted for 93.7% cases of AUB in consistent with other studies.^{13,14} Most common cause of anovulation leading to AUB after initial years of menarche is the immaturity of HPO axis. Maturation of HPO axis occurs slowly in the first 18-24 months after menarche and may last upto 5 years.¹⁵

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Mcdonough and Gantt et al.¹⁴ observed in their study that 55-82% of adolescents had anovulation post menarche due to HPO axis immaturity, our incidence being 60.60%.

The World Health Organization conducted a 2-year longitudinal study on menstrual and ovulatory patterns in females aged 11 to 15 & found that 19% of girls had regular cycles in first three cycles and 67% had regular cycles by the end of 2 years.¹⁵

Age, mean (SD), years	16(16.6)
Menstrual complaints	
Heavy periods	80 (47.61%)
Irregular periods	55 (32.73%)
Oligomenorrhoea	20 (11.90%)
Anemia	30 (17.85%)
Hypothyroidism	14 (8.33%)
Data expressed, as n (%)	

Table 1: Clinical characteristics of enrolled subjects with abnormal bleeding (n=168)

Classification	N (%)
PALM	
Polyp	2 (1.2)
Adenomyosis	0 (0)
Leiomyoma	1 (0.6)
Malignancy	0 (0)
COEIN	
Coagulopathy	4 (2.42)
Ovulatory disorder	160 (96.90)
Immaturity of HPO	100 (60.60)
PCOS	46 (27.87)
Thyroid disorders	14 (8.48)
Endometrial	1 (0.6)
Idiopathic	0 (0)
Non-specified	0 (0)
PCOS, polycystic ovarian syndrome	

Table 2: Distribution of subjects with AUB by PALM COEIN classification (n=165)

Another important cause of anovulation is polycystic ovary syndrome (PCOS). It is recognized as a heterogeneous disorder that results in overproduction of androgens, primarily from the ovary, leading to anovulation and hirsutism and is associated with insulin resistance. Prevalence of PCOS ranges from 3% to 23% in general population.¹⁶

Reported rates of PCOS amongst adolescents with AUB has a wide range across globe: 9-72%.^{17,18} We classified PCOS by standard Rotterdam's criteria.¹⁰ and found that 32% cases of AUB were due to PCOS.^{19,20}

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Thyroid dysfunction contributed to 8.48% cases of ovulatory disorder resulting in AUB in the present study. Both hypothyroidism and hyperthyroidism may result in menstrual disturbances.²¹

Hyperthyroidism reduces menstruation and hypothyroidism causes menorrhagia. Wilansky et al.²² showed a prevalence of 22% of early hypothyroidism in menorrhagic women, that is much higher than that found in general female population as well as in our study.

Another important cause of AUB in adolescents is systemic disorder of hemostasis or more commonly called as coagulopathy. It is a significant cause of abnormal uterine bleeding with prevalence ranging from 3 to 44% in various studies.^{23,24,25} Coagulopathy accounted for 2.42% cases of AUB in our study. VWD and platelet dysfunction are the commonest hemostatic abnormalities which are seen in adolescents with AUB^{26,27,28} However we did not encounter any such case.

Polyps, which are localized endometrial intrauterine overgrowth, that may be single or multiple, may measure from few millimetre to centimeters and may be sessile or pedunculated are among the important differential diagnosis of AUB.²⁹ Most common symptom associated with polyp is AUB. In the present study, polyp accounted for 1.2% cases of AUB. All of them were diagnosed by USG. Prevalence of polyps has been reported from 7.8% to 34.9% in women of reproductive age group.^{30,31,32}

Leiomyoma being the commonest gynecological tumour of reproductive age group is extremely rare in adolescence with a prevalence of <1%.³³ Only one case of leiomyoma was seen in our adolescent population.

Adenomyosis typically presents in adult women in the third or fourth decade of life and is again a common cause of AUB in reproductive age women with a prevalence of 31%-61%.³⁴ Although rare but it is a possible cause of AUB and pelvic pain in adolescent patients. Mostly these days it can be easily diagnosed by USG. No case of Adenomyosis was seen in our study.

Malignancy and hyperplasia are common attributors to AUB in peri-menopausal age group with mean age at diagnosis being 65 years. In various studies from 2005 to 2009, incidence of endometrial cancer in adolescence was just 0.2 per 100,000 women.^{35,36} In our study no case was seen.

Endometrial causes of AUB are mainly due to disease affecting the local hemostatic mechanism of endometrium. A shift to endometrial conversion of prostaglandin endoperox-thromboxane, and increased fibrinolytic activities.³⁷ All these factors seem to have a role in AUB. Inflammatory changes in the anovulatory endometrium was observed in 0.6% of the cases, which correlates with findings by other workers.^{38,39}

Iatrogenic causes also contribute to AUB. Specific medications to look for include hormonal contraceptive agents, anticoagulants, aspirin, and nonsteroidal anti-inflammatory drugs (NSAIDs). None of the case in our study was due to extrinsic medication. Similarly there was no case which could be attributed to not specified category.

Thus to conclude we see that we can successfully apply palm coein approach to adolescent AUB. Although bulk of adolescent AUB is due to ovulatory disorder, but a standard nomenclature can be given and terms like menorrhagia, metrorrhagia and DUB can be abandoned.³⁹

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AUTHORS:

1. Manisha M. Laddad
2. Nitin Kshirsagar
3. Sanjaykumar Patil
4. Gauri Shinde
5. Rajashree Bhosale

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Obstetrics and Gynaecology, KIMS, DU, Karad.
2. Professor, Department of Obstetrics and Gynaecology, KIMS, DU, Karad.
3. Professor, Department of Obstetrics and Gynaecology, KIMS, DU, Karad.

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4. Assistant Professor, Department of Obstetrics and Gynaecology, KIMS, DU, Karad.
5. Senior Resident, Department of Obstetrics and Gynaecology, KIMS, DU, Karad.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Manisha M. Laddad,
Shri Sai Maternity Clinic,
75/A-Block, Vithal Housing Society,
Malkapur, Karad-415110,
Dist. Satara, Maharashtra.
E-mail: drmanishald@gmail.com

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