SOGS
ESTD-1970

Abnormal Uterine Bleeding

December 2021

SOGS E-magazine volume 4

Topic: ABNORMAL UTERINE BLEEDING (AUB)

President's Message
Dr. Jagruti Desai

Respected Seniors and Dear Colleagues,
Greetings from SOGS.

“Education is the most powerful weapon, we can use to change the world.” – Nelson Mendela

“An investment in knowledge pays the best interest.”

It is my honour and privilege to write this message. It is indeed a pleasant task to announce the release of the second issue of E Magazine of SOGS on the topic of “Abnormal Uterine Bleeding” with latest scientific advances and rich academic content.

AUB (Abnormal Uterine Bleeding) is the most common gynaecological consultation with varied causes. It can be physiological due to anovulatory cycles or pathological in the form of premalignant or malignant lesion of uterus. The diagnosis is being made more often now with help of advanced technologies and newer frontiers have opened up in the management which has added a list of procedures for conservative surgical management with fertility preservation. The management needs to be individualized and tailor made to improve the quality of life of women.

I deeply appreciate and acknowledge the strong and consistent support by our chief editor Dr Jitesh Shah to bring forth this E Magazine. I also thank the librarian Dr Noopur Chhasatia, Dr Ruta Vekariya and Dr Hitanshu Bhatt for their hard work and sincere efforts for making it a grand success. I am grateful to all experts for reviewing articles with adequate precision. I am immensely indebted to our authors for whole hearted contribution towards their scripts.

I believe, this magazine will provide an excellent academic coverage and will benefit all of you with useful and practical tips from basic to recent updates.

“The capacity to learn is a gift; The ability to learn is a skill; The willingness to learn is a choice.”-Brian Herbert.

Happy Learning; Happy Reading.

President, SOGS 2021-22

Dr. Jagruti Desai

Dr. Kaajal Mangukiya

Message from Secretary Desk 🖊️

“A person’s most useful asset is not a head full of knowledge but a heart full of love, an ear ready to listen and a hand willing to help others”

Ages ago, when I became a member of Surat Obey Society with the aim of getting updated about recent studies and learning from the seniors. I have come a long way from being the EC member to librarian to secretary and the journey has been tremendous.
I have tried to justify my each and every role for our society. I remember very clearly that last year I got the opportunity as a librarian to spread the knowledge and in spite of all the ups and downs of the pandemic, my passion for my profession and for our society has never gone down. We found a way through an e-magazine. With God's grace and all your support, we have successfully published two editions.

Today As a secretary, it gives me immense pleasure that we are releasing our 4th issue with the theme of “Abnormal Uterine Bleeding”
I’d like to say this to all the readers that we come up with this in-depth Clinical discussion about common causes of Abnormal Uterine Bleeding, Recent advances and few common case scenarios that we see on a regular basis.

And as they quote “Coming together is a beginning, keeping together is progress and working together is success”.
I’d like to Thank the authors and the scrutinisers from the bottom of my heart
Thanks to the president Dr. Jagruti Desai, librarian Dr Nupoor Chattasiya, chief editor Dr Jitesh shah for his enthusiastic commitment as an editor, great efforts taken by him are seen on every page.
Thank you Dr. Ruta Vekarya and Dr. Hitanshu Bhatt for all the support.

Special thanks to all the sponsors and thank you Surat obstetrics and gynaecology society members for making this issue successful.
And Hope for this support in future too.

Together we achieve
Regards
Dr. Kaajal Mangukiya
Hon. Secretary SOGS

Message from Librarian
Dr. Noopur Chhasatia

Dear Members,

It is time for the new edition of the SOGS magazine and it is my pleasure to present it to you again as the librarian of the SOGS. This time the theme is AUB - Abnormal Uterine Bleeding, which is a common problem faced by gynaecologists.

This volume includes articles on the latest classification of AUB. In addition, we have also included aspects of management with a focus on ultrasound, endometrial sampling, medical and surgical management of AUB.

The MCQ section is included too with the hope that it will provide an opportunity to self-assess the understanding of the topics discussed.

I take this opportunity to thank all the authors and the faculty who dedicated their valuable time to preparing and reviewing the material. Our editor, Dr.

Jitesh Shah, has been an astute help throughout, and I thank him for his guidance. I also extend my gratitude to president Dr. Jagruti Desai and secretory Dr Kajal Mangukiya for providing this opportunity to me.

We are heartend and encouraged by the response to the previous edition and the credit for that goes to the enthusiasm of our audience and for that, I thank our readership.

Sincerely,
Dr. Noopur Chhasatia
Librarian SOGS 2021-2022

Letter from the Editor
Dr. Jitesh Shah

Dear SOGS members,

It is my privilege to take the opportunity as an editor of E- journal on Abnormal uterine bleeding. During the current pandemic situation, our aim is to update SOGS members by sharing knowledge and interesting cases by this platform.

AUB affects up to 30% of women at some point of time in their lives. AUB has a major impact on a woman's quality of life. E magazine on AUB covers the topic in detail including puberty menorrhagia and postmenopausal bleeding.

This task will continue in future with recent and evidence based articles.

Dr. Jitesh Shah

Editor, SOGS

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CLINICAL DISCUSSION

ABNORMAL UTERINE BLEEDING: DEFINITION AND CLASSIFICATION

DR. AISHWARYA NAIK

(UNDER G/O DR JITESH SHAH)

THIRD YEAR RESIDENT

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ABNORMAL UTERINE BLEEDING (AUB)

AUB affects up to 30% of women at some point of time in their lives. AUB has a major impact on a woman's quality of life.

DEFINITION- Abnormal uterine bleeding is any bleeding from the genital tract which is a deviation from the normal menstrual cycle in quantity, frequency or cyclicity.

International Federation of Gynaecology and Obstetrics (FIGO) has redefined normal limits of menstrual parameters using median,5th and 95th percentile.

Character	Descriptive term	Normal limits
Duration of menstrual cycle(days)	Frequent Normal Infrequent	<24 24-35 >35
Regularity of menses: cycle-to-cycle variation over 12 months(days)	Absent Regular Irregular	 +/- 2-20 >20
Duration of flow(days)	Prolonged Normal Shortened	>8 4-8 <8
Volume of monthly blood loss(mL)	Heavy Normal Light	>80 5-80 <5

The following terminologies are not used nowadays

- Menorrhagia
- Metrorrhagia
- Polymenorrhoea
- Oligomenorrhoea
- Hypermenorrhoea

Acute AUB

An episode of bleeding in a woman of reproductive age, who is not pregnant, that is of sufficient quantity to require immediate intervention to prevent further blood loss.

Chronic AUB

Bleeding from the uterine corpus that is abnormal in duration, volume, and/or frequency and has been present for the majority of the last 6 months.

Classification of AUB:

FIGO has suggested a new etiological classification system called **PALM-COEIN** classification in 2010 to standardize the terminology, investigations, diagnosis and management of AUB in non-pregnant women of reproductive age group.

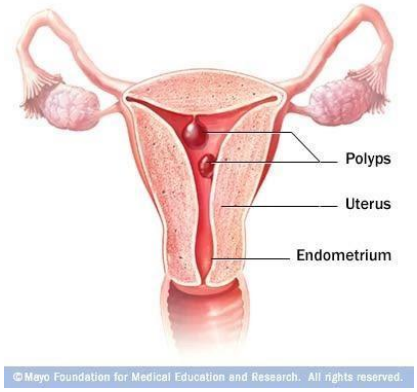
P-Polyp
A-Adenomyosis
L-Leiomyoma
M-Malignancy or hyperplasia

C-Coagulopathy
O-Ovulatory dysfunction
E-Endometrial causes
I-Iatrogenic
N-Not yet classified

The first 4 entities of PALM group include structural etiologist of AUB. They can be diagnosed by imaging methods with or without histopathology. The COEIN group includes functional etiologist of AUB.

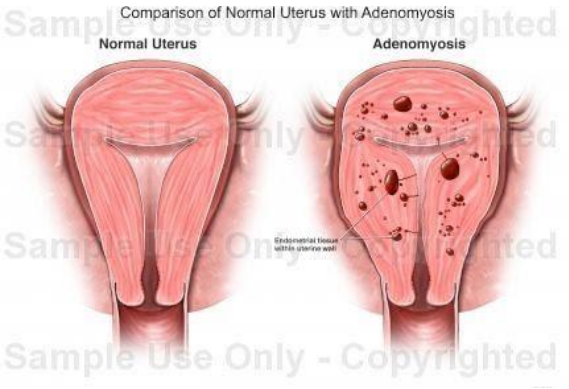
AUB-P (Polyps)

Endometrial polyps are epithelial proliferation arising from endometrial stroma or glands. Polyps often cause abnormal bleeding, most likely due to vascular fragility, chronic inflammation and surface erosions.



AUB-A (Adenomyosis)

Adenomyosis is a disorder characterized by extension of endometrial glands and stroma into the myometrium. Some women develop focal nodular lesions called adenomyomas, which are exaggerated myometrial proliferation around foci of ectopic endometrium, which resemble leiomyomas clinically. On transvaginal ultrasonography, symmetric thickening and heterogeneity of myometrium are suggestive features, while myometrial cysts are the most specific diagnostic criterion.



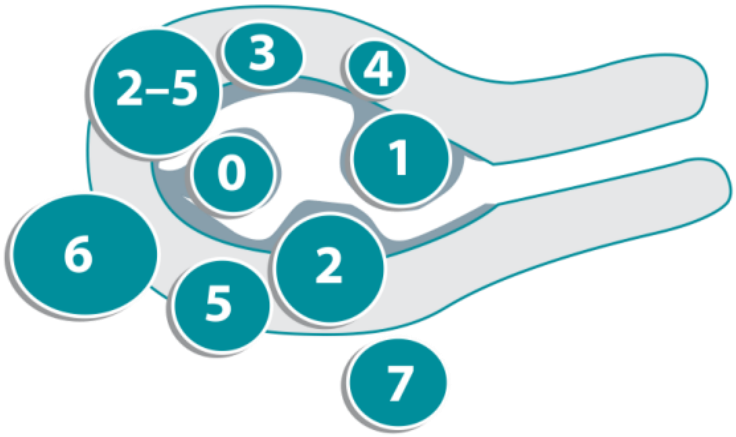
AUB-L (Leiomyoma)

Leiomyoma also known as fibroids are benign fibromuscular tumours of myometrium and are extremely common.

In PALM-COEIN system, primary classification represents presence(L1) or absence(L0) of myoma irrespective of location, number and size.

The secondary classification includes further subdivision of leiomyoma into submucous (SM) and others(O). It helps to distinguish myomas which lie adjacent to mucosa as they tend to cause AUB.

There is tertiary classification of myoma as follows



SM Type 0-Pedunculated intracavitary
SM Type 1-<50% intramural
SM Type 2- >=50% intramural
O Type 3-Contacts endometrium;100% intramural
O Type 4- Intramural
O Type 5- Subserous >=50% intramural
O Type 6- Subserous <50% intramural
O Type 7- Subserous pedunculated
O Type 8- Those which do not involve the myometrium and include cervical, broad ligament and parasitic leiomyoma.

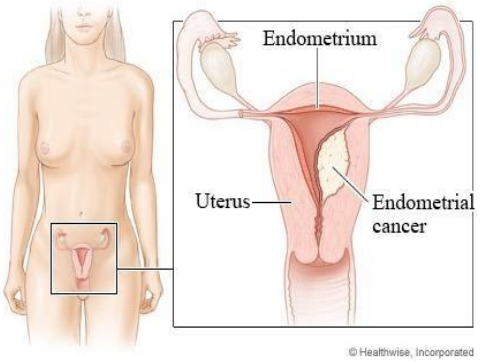
Hybrid leiomyomas (impact both endometrium and serosa)	Two numbers are listed separated by a hyphen. By convention, the first refers to the relationship with the endometrium while the second refers to the relationship to the serosa. One example is below	
	2–5	Submucosal and subserosa's. each with less than half the diameter in the endometrial and peritoneal cavities, respectively.

AUB-M (Malignancy and hyperplasia)

Endometrial hyperplasia is a histologic diagnosis based on findings of proliferating glands of varying size and shape and a greater gland-to-stroma ratio than is observed in normal endometrium. Endometrial hyperplasia results almost exclusively from unopposed chronic estragon stimulation. According to the new WHO classification (2014), endometrial hyperplasia is classified as follows

Endometrial hyperplasia without atypia-<1% risk of endometrial cancer

Endometrial hyperplasia with atypia-25-33% risk of endometrial cancer



AUB-C (Coagulopathy)

The possibility of coagulopathy should be particularly kept in mind for adolescents whose menstrual history is short and not yet well defined. The most common cause of AUB in adolescents is anovulation, but up to a third may have a coagulation defect, including von-Willebrand disease, Glanzmann thrombasthenia and idiopathic thrombocytopenic purpura. Previous history of postpartum haemorrhage or excessive bleeding with surgery, dental procedures or trauma should raise suspicion, but heavy menstrual bleeding since menarche may be the only clue. Coagulation defects are not that rare and may be found in 10-20% women with unexplained heavy menses.

AUB-O (Ovulatory dysfunction)

An ovulatory bleeding (previously called dysfunctional uterine bleeding) describes the spectrum of abnormal bleeding patterns that can occur in anovulatory women due to

abnormal pattern of steroid hormone stimulation. An ovulation and oligoovulation can result from a variety of endocrinologic disturbances either directly involving or influencing the functioning of HPO axis, including

- Thyroid disease
- Hyperprolactinemia
- PCOS
- Hypothalamic dysfunction from nutritional deficiency, systemic illness or stress.

AUB-E (Endometrial)

AUB due to endometrial dysfunction comes in this category. It is usually due to increased production of vasodilators like prostaglandin F2 and prostacyclin locally in endometrium with decreased local production of vasoconstrictors like endothelin-1 and prostaglandin F2Alpha.It includes bleeding due to.

- Acute endometritis (postpartum or postorbital)
- Subclinical Chlamydia trachomatis infection
- Pelvic tuberculosis
- Pelvic inflammatory disease

AUB-I (Iatrogenic)

A variety of different medications can predispose to abnormal bleeding, by interfering with haemostasis, by affecting concentration of endogenous or exogenous hormone or by disrupting the HPO axis. Drugs associated with abnormal menstrual bleeding include.

- Hormonal contraceptives
- Menopausal hormone therapy
- Digitalis
- Anticonvulsants
- Anticoagulants
- Psychopharmacologic medications.

Abnormal bleeding pattern are commonly reported in association with both copper and LNG containing intra-uterine device (IUD) use.

AUB-N (Not otherwise classified)

This remains the vaguest category of the new classification system. Chronic endometritis can be placed under this category given that the exact mechanism contributing to nor clinical implications of this histologic entity are entirely clear. Women with symptomatic chronic endometritis typically present with AUB, which can vary from intermenstrual spotting and postcoital bleeding to heavy menstrual bleeding. Abnormal bleeding associated with arterio-venous malformation can also be categorized in this section.

REFERENCES-

1) SPEROFF'S CLINICAL GYNECOLOGIC, ENDOCRINOLOGY AND INFERTILITY

2) FIGO CLASSIFICATION SYSTEM FOR CAUSES OF ABNORMAL UTERINE BLEEDING IN NONGRAVID WOMEN OF REPRODUCTIVE AGE.

Role of Imaging in AUB

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Definition: -

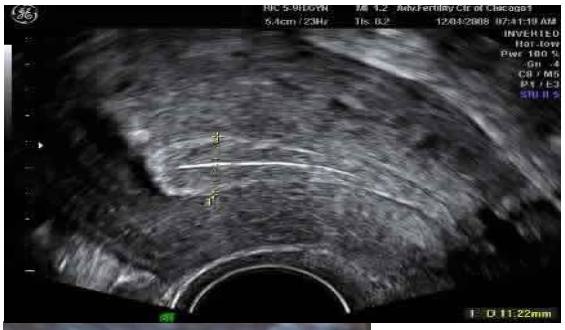
- Abnormal uterine bleeding (AUB) is a broad term that describes irregularities in the menstrual cycle involving frequency, regularity, duration, and volume of flow outside of pregnancy.
- A normal menstrual cycle has a frequency of 24 to 38 days, lasts 7 to 9 days, with 5 to 80 millilitres of blood loss.
- Variations in any of these 4 parameters constitute abnormal uterine bleeding.
- Abnormal (dysfunctional) uterine bleeding (**AUB**) is defined as abnormal uterine bleeding in the absence of organic disease.
- Affects 10-30% of reproductive aged women.
- Upto 50% of perimenopausal women.

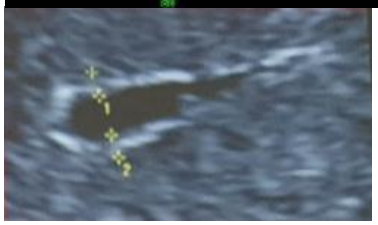
Imaging in AUB:-

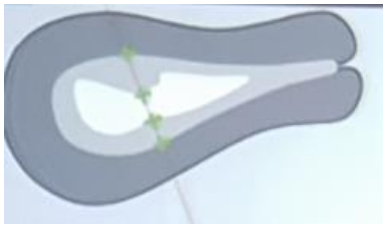
Gynaecologists usually rely more on sonography. CT and MRI are rarely used, especially when malignancy is suspected. So, in this article, we are discussing only sonography as imaging modalities in diagnosis and management of AUB.

- History and clinical findings should be noted before starting the scan
- TAS and TVS are Complementary to each other
- Systematic approach – Uterus (endometrium, myometrium, cx), Ovaries, adnexa, POD and beyond.
- Carefully and systematically observe 2D. It gets clearer as one continues to observe
- Timings of USG:-
  1. Endo. Polyps:- Proliferative Phase (D10 to 12)
  2. 3D – Ut. Anomaly, SM Fibroid:- Secretory Phase
  3. Ovarian Cysts:- Post menstrual

Measurement of ET:-

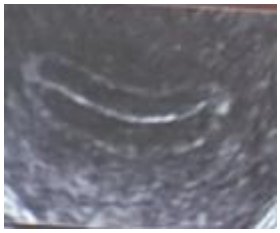




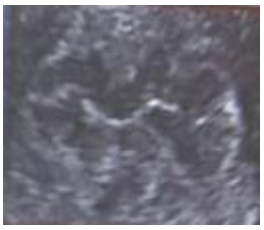


- Line drawn from endometrial-myometrial interface – (“outer to outer”)
- Superior to inferior aspects of endometrial cavity
- Within 5-10 mm of the fundal aspect of endometrium – at maximum endometrial thickness, perpendicular to the endometrial midline
- When there is intracavitory fluid, both single layers of endometrium are measured and the sum of two is recorded as ET
- Ultrasound zones of the endometrium
  1. 2 mm thick area surrounding zone 2
  2. Hyperechoic outer layer
  3. Hypoechoic inner layer
  4. Endometrial cavity

Endometrial Midline:-



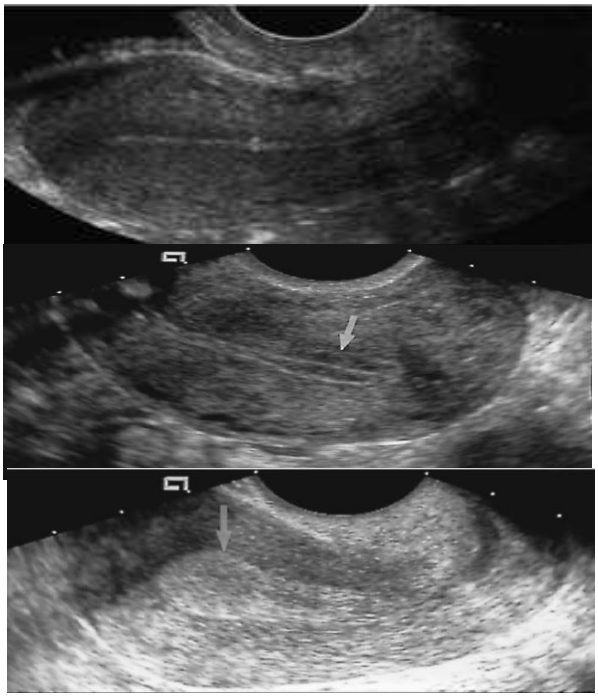
- Normal – Linear



- Non-Linear

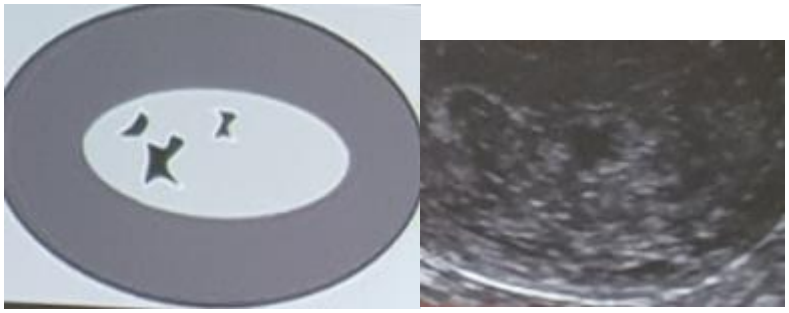
- Ill defined

Endometrial pattern in various phases:-

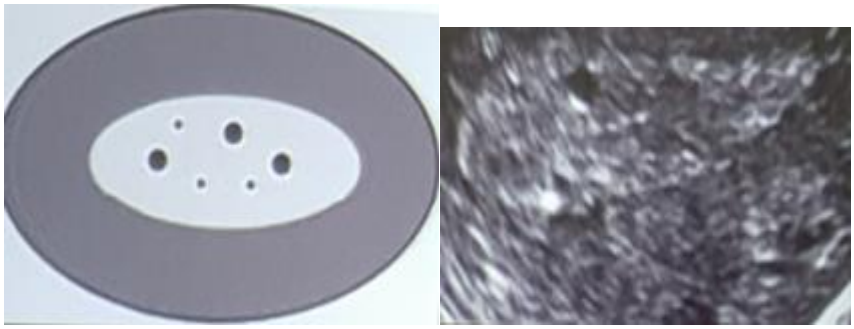


- Early proliferative phase – thin continuous echogenic line
- Late proliferative phase – starting around d8-10 – trilaminar pattern
- Secretory phase
- Diffuse hyperechoic

Endometrial Echogenicity:-



- Homogenous background with irregular cystic areas



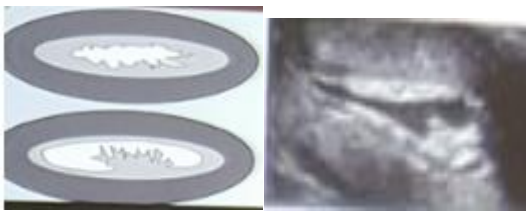
- Heterogenous background without cystic areas

Endometrial Outline:-

- Smooth - Normal

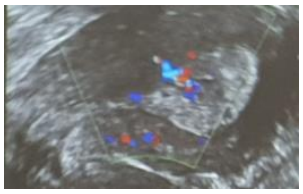
- Endometrial Folds

- Polypoid

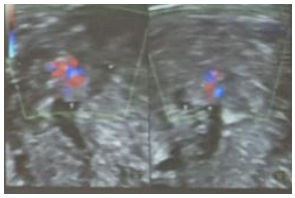


- Irregular

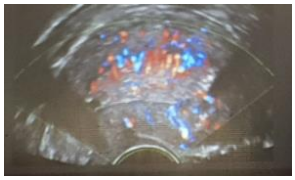
Endometrial Outline:-



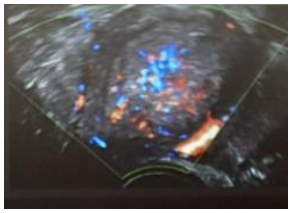
- Dominant single vessel with origin at EMJ – Endometrial Polyp



- Multiple vessels with focal origin at EMJ – Focal endometrial Carcinoma

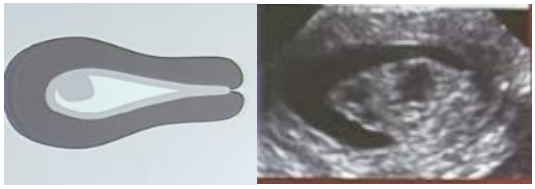


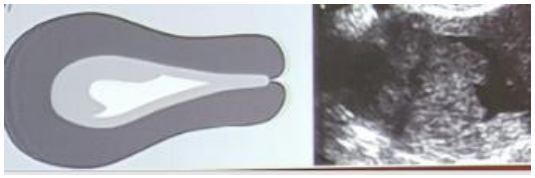
- Multiple linear vessel origin at EMJ – Endometrial hyperplasia/ Secretary Phase



- Multiple scattered vessels without origin at EMJ – Endometrial Carcinoma

Extension of Endometrial Lesion:-

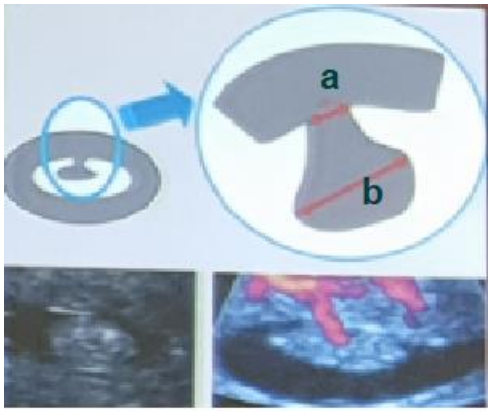




1. Localized – If the base of the lesion involves <25% of endometrial Surface

2. Extended – If the base of the lesion involves >/=25% of endometrial Surface

Type of Localized Endometrial Lesion:-



Localised lesion is

- Pedunculated if a/b <1
- Sessile if a/b >1

Where a= maximum diameter of the lesion at the base of the lesion at the level of endometrium and b= maximum transverse diameter of the lesion

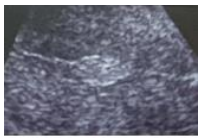
Endometrial Hyperplasia:-

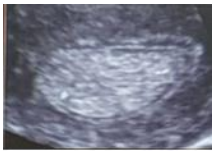
- Thick echogenic endometrium with normal histology
- ET>14mm – Premenopausal
- ET>5 mm – Postmenopausal
- EMJ – Well maintained
- Colour Doppler:- Regularly Placed Vessels

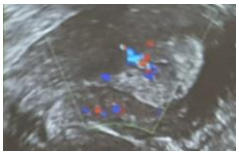
Endometrial Malignancy:-

- Thickened endometrium localized/generalized
- Hypo/hyperechoic areas within endometrium
- -Irregular endonym. junction interface
- Heterogenous texture +/- fluid in cavity
- EMJ – Obliterated
- Colour Doppler:- Heterogenous distribution of vessels with irregular branching. PI<0.4
- 3D:- Dichotomous branching (100% Sensitivity, ppv :- 83.3%, npv:- 100%)

Endometrial Polyp:-

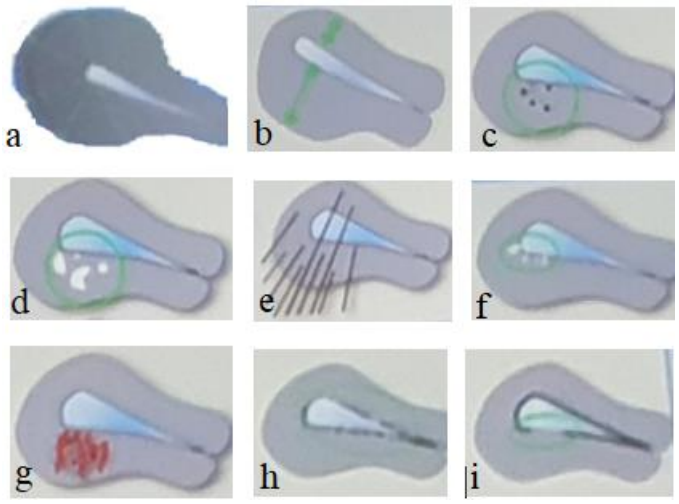






- Solid Projectile Lesion from the endometrial walls into endometrial cavity
- Abnormal curve in the central line
- 'Bright Edge' – the echo formed by the interface between an intracavitary lesion and the endometrium
- Punctate cystic areas within endometrium
- SSG is useful to diagnose very large/ very small polyps
- Color Doppler: - Single or Max. 2 vessels arising at EMJ with RI >0.45

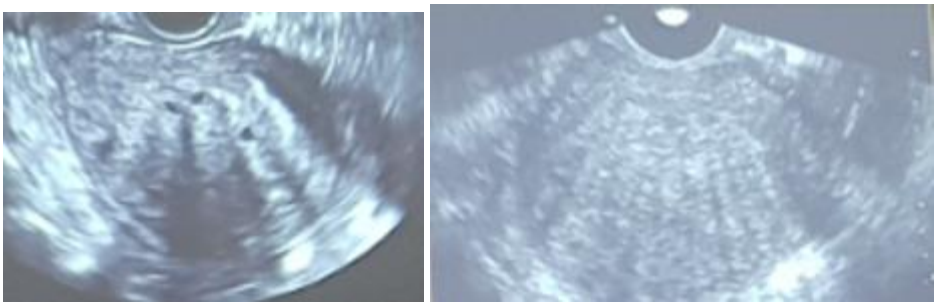
Adenomyosis:-



MUSA (Morphologic Uterus Sonographic assessment) criteria for diagnosis of adenomyosis

a) Globular
b) Asymmetric Thickening
c) Cysts
d) Hyperechoic Islands
e) Fan shaped Shadowing ("Sunray" Appearance)
f) Hyperechoic sub endometrial Lines and buds
g) Focal Transmural Vascularity
h) Irregular EMJ
i) Interrupted/Ill defined EMJ

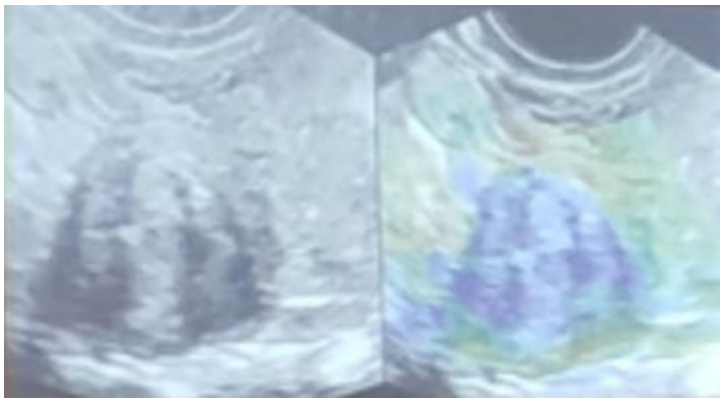
- Symmetrical/Asymmetrically Enlarged Uterus
- Shape of endometrial cavity is maintained with loss of EMJ
- Invasive lesion with indistinct margins
- Asymmetrical myometrial thickening
- Increased Vascularity with vascular clumps
- Heterotopic endometrial glands and stroma within the myometrium with adjacent smooth muscles give varied echogenicity – Echogenic spots alternating with anechoic areas (myometrial cysts) – "Salt and Pepper" appearance.
- Myometrial/Subendometrial cysts <5mm due to dilated cystic glands/hemorrhagic foci in the endometrial glands



- Alternate zones of hyper and hypoechogenicity leads to typical ultrasound appearance described as –
- "Sunray" appearance
- "Swiss Cheese" appearance
- "Rain in forest" appearance
- "Vanishing Blind" appearance

Feature	Fibroid	Adenomyosis
Uterine Contour	Regular/Lobulated	Regular
Margins	Well defined, Smooth	Poorly defined, Irregular
Shape	Round/Oval/Lobulated	Irregular
Shadowing	Internal linear shadows and edge shadowing	Internal linear shadows. No edge shadows
Vascularity	Peripheral (Circumferential)	Intralesional/Central
Junctional Zone	JZ well defined, may be stretched over fibroid	JZ ill defined, irregular thickened tiny cystic spaces and hogenic lines/buds

Adenomyoma:-

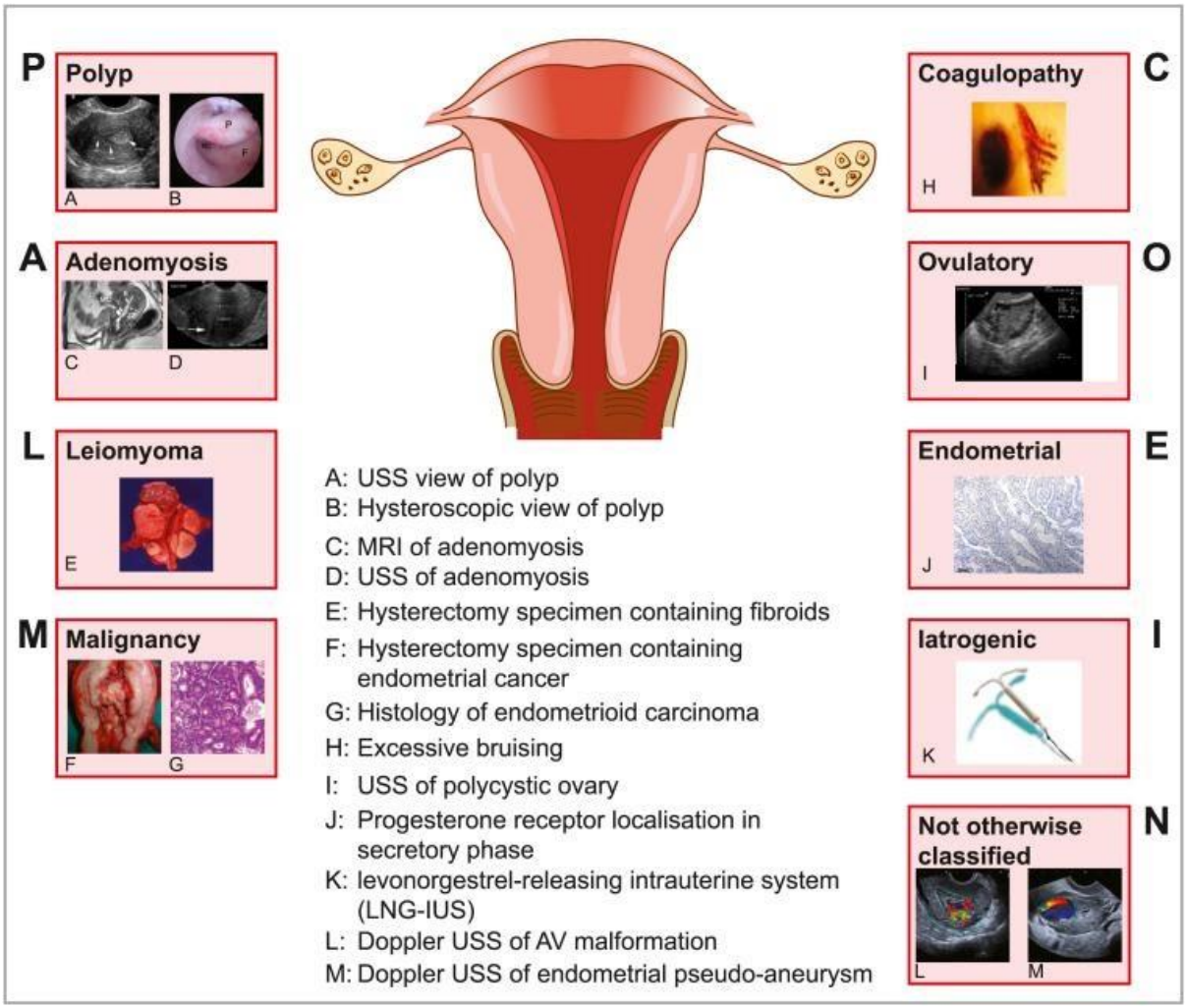


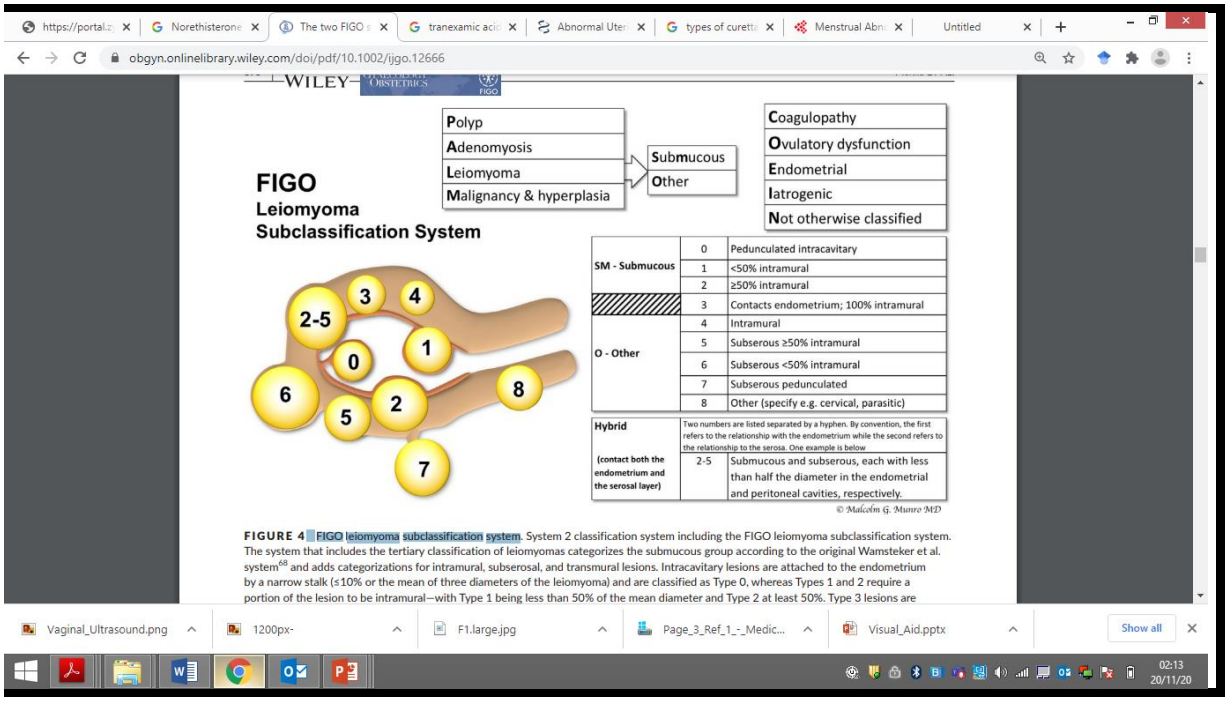
- Focal area of adenomyosis,
- Not well defined
- Shows “fan shaped” striations
- Increased intralesional vascularity, which may be radial or penetrating. Alternating Echogenicity with various phases of Menstrual cycle.

Fibroids:-

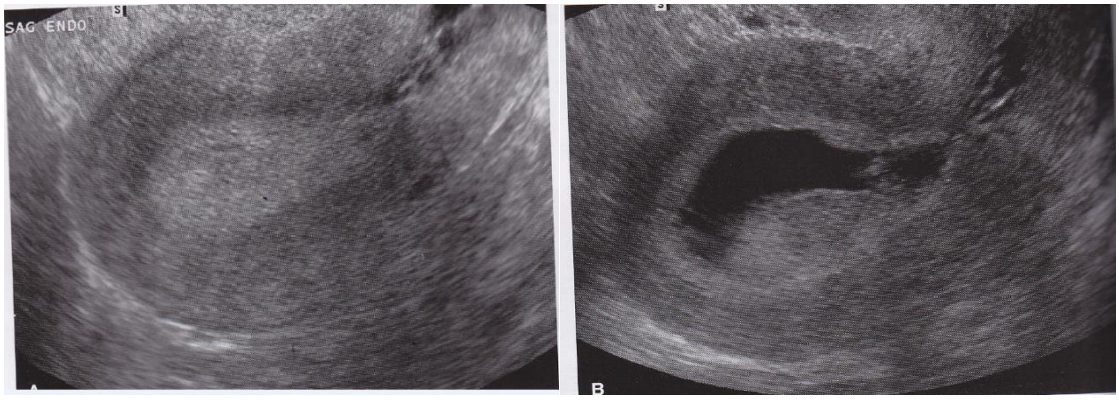
- Round/Oval well defined solid masses within/arising from uterus
- Echogenicity varies depending upon proportion of muscle and fibrous tissue and presence of degeneration from Hypoechoic to hyperechoic
- Edge shadow and Linear fan shaped internal acoustic shadowing
- May show calcification and cavitation
- Doppler – Typical peripheral/ Pericapsular vascularity

FIG of Classification of causes of AUB and Subclassification of Fibroids





Saline Infusion Sonography: -



- Small catheter threaded through on into endometrial cavity and saline is infused.
- SIS Differentiates lesions as being – endometrial/sub mucous/intra mural
- SIS is not useful in diffuse lesions like hyperplasia & cancer

Sonographic endometrial pattern and management of AUB:-

Endometrial pattern	Hormonal status	Treatment
Single line	Low E	Estrogen f/b progesterone
Three lines	Low/Normal E	progesterone
Atypical poorly developed	Low/Normal E	progesterone
Hyperechoic	Normal E & P	No treatment
Hyperechoic thickened	May be ass. with polyp, fibroid, Ca	biopsy
Absent endometium	Endometrium not imaged	Atrophic endometrium

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Endometrial sampling

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Abstract Endometrial biopsy is an office procedure helpful in diagnosing various uterine abnormalities. The technique is fairly easy to learn . The biopsy is obtained through the use of an endometrial suction catheter that is inserted through the cervix into the uterine cavity. Endometrial biopsy is useful in the work-up of abnormal uterine bleeding, cancer screening, endometrial dating and infertility evaluation. Contraindications to the procedure include pregnancy, acute pelvic inflammatory disease, and acute cervical or vaginal infections**.**

Keywords: Pipelle; dilation and curettage; endometrial sampling; endometrial carcinoma; endometrial hyperplasia

Endometrial biopsy is a safe and accepted method for the evaluation of abnormal or postmenopausal bleeding. The procedure is often performed to exclude the presence of endometrial cancer or its precursors. Endometrial biopsy is a blind procedure and should be considered part of the evaluation that could include imaging studies such as transvaginal ultrasonography

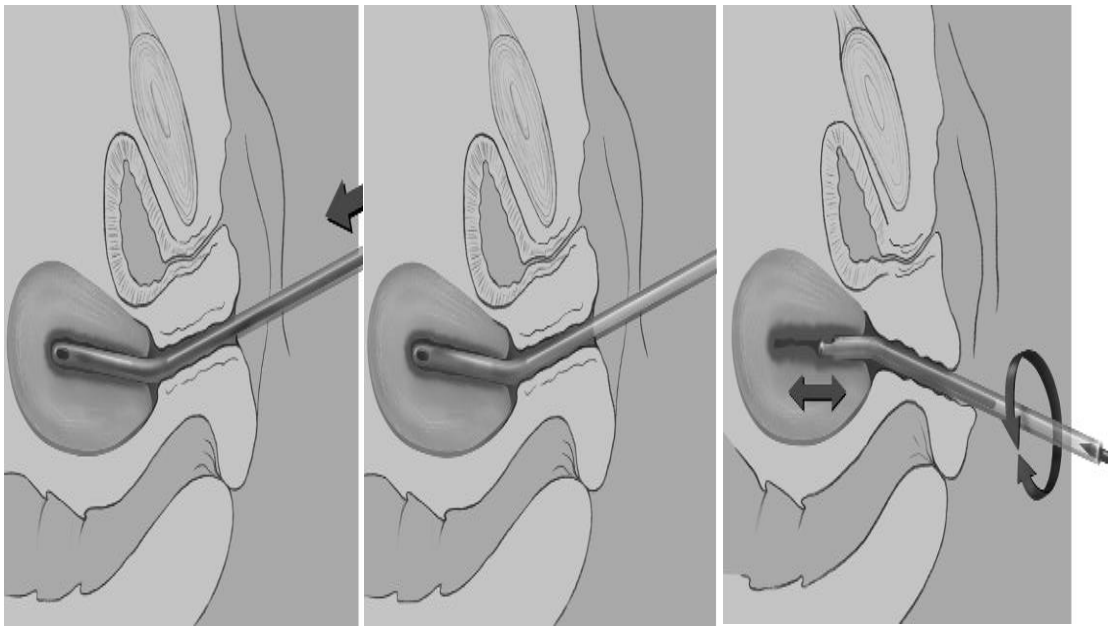
Procedure: Office endometrial suction catheters are easy to use, and several have been reported to have diagnostic accuracy that is equal or superior to the dilatation and curettage (D&C) procedure. Suction is generated by withdrawing an internal piston from within the catheter and the tissue sample is obtained by twirling the catheter while moving it up and down within the uterine cavity. While a negative study is reassuring, further evaluation is warranted if a patient demonstrates continued abnormal bleeding.

Indications for Endometrial Biopsy

1. Abnormal uterine bleeding
2. Postmenopausal bleeding
3. Detection of precancerous hyperplasia and atypia
4. Endometrial dating
5. Follow-up of previously diagnosed endometrial hyperplasia
6. Evaluation of uterine response to hormone therapy
7. Evaluation of patient with one year of amenorrhea
8. Evaluation of local intrauterinre lesion e.g tuberculosis endometritis
9. Abnormal Papanicolaou smear with atypical cells favouring endometrial origin

Contraindications for Endometrial Biopsy

1. Pregnancy
2. Acute pelvic inflammatory disease
3. Clotting disorders (coagulopathy)
4. Acute cervical or vaginal infections
5. Cervical cancer



Endometrial suction catheter.

(A) The catheter tip is inserted into the uterus fundus or until resistance is felt.
(B) Once the catheter is in the uterus cavity, the internal piston is fully withdrawn.
(C) A 360-degree twisting motion is used as the catheter is moved between the uterus fundus and the internal os.

Endometrial Sample Collection-

Pipelle endometrial sampling is usually conducted in the gynaecological outpatient clinic. If the tissue obtained is considered inadequate under visual assessment, the procedure is

repeated to optimize sampling. The endometrial tissues obtained is fixed in 10% buffered formalin [normal saline if tb is suspected] and transported to the pathology laboratory for histopathological studies.

If chosen procedure is D & C-usually when both diagnostic as well as therapeutic treatment is indicated, the patient is transferred to the operating room for D&C under general anaesthesia. The D&C is performed according to hospital protocols.
In the Pipelle group, adequate material for pathology diagnostics is obtained in 86-88% of the patients with normal BMI. In the group of overweight and obese women, the success rate is about 75%.

In the D&C group, adequate material for pathology diagnostics is obtained in 92% of patients with normal BMI and in 90 % of overweight and obese women. The success rates are lowest in postmenopausal bleeding patient. D &C at times has incidental therapeutic effect

Expected endometrial histopathological evaluation-

- Proliferative phase
- Secretory phase
- Hyperplasia with atypia
- Hyperplasia without atypia
- Adenocarcinoma
- endometrial polyps
- irregular ripewning/shedding/atrophic pattern

Current recommendations for EB and D& C:

- Pipelle biopsy is not commonly used in our country and most endometrial tissue assessments are conducted using conventional (blind) D&C typically performed as an inpatient procedure in the operating rooms.
- D &C-It causes temporary reduction of menstrual blood flow for first month but at following cycles, the same menstrual pattern recurs. Hence D & C is considered obsolete now as treatment of AUB.
- The introduction of Pipelle endometrial sampling in ambulatory care settings is needed to improve the rate of early diagnosis of endometrial pathologies, to help curb the increasing costs of gynaecologic care and to improve overall patient outcomes.
- In older age group due to postmenopausal atrophy of the endometrial tissue and endometrial cavity obliteration or narrowing, less/no endometrial tissue may be available for sampling.
- Gold standard is hysteroscopy guided targeted biopsy& histopathological examination
- D & C should no longer be used as first line method of investigating AUB in most cases

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Puberty Menorrhagia

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Excessive menstruation between puberty and 19 years of age is called puberty menorrhagia. Excessive menstruation is defined as bleeding > 80 ml and/or lasting for more than 7 days.

CAUSES:

- **Dysfunctional uterine bleeding:** (95%) Anovulatory cycles→ unopposed estrogen→ endometrial hyperplasia→ prolonged and heavy periods
- **Endocrine dysfunction:**
  - Polycystic ovary syndrome(PCOS)
  - Hypo- or hyperthyroidism
- **Hematological:**
  - Idiopathic thrombocytopenic purpura
  - Von-Willebrand's disease
  - Leukemia
- **Pelvic tumors:**
  - Fibroid uterus
  - Estrogen producing ovarian tumor
  - Cervical and vaginal neoplasms
- **Pregnancy complications** (abortions)
- **Other causes:** breakthrough bleeding from use of OC pills, bleeding from genital trauma etc.

Assessment:

Careful history taking and thorough clinical examination is important. Take vitals and look for anaemia.

Ask following questions:

- Family history of bleeding disorders, tuberculosis
- Excessive bleeding associated with minor injuries(e.g. small cuts, dental procedures),phlebotomy or their first period
- Frequent or prolonged nose bleeds
- Easy bruising, purpura or petechiae

Bimanual P/V examination is avoided but per rectal examination is helpful.

INVESTIGATIONS:

- CBC with peripheral smear
- Coagulation profile
- Thyroid profile
- USG

MANAGEMENT:

- First educate and counsel the patient as well as her parents in order to relieve their fears and anxiety. Patient should keep a menstrual calendar with precise recording of quantity of blood loss or preferably pictorial blood loss assessment charts.
- Hematinic
- Adolescents who are hemodynamically unstable or actively bleeding heavily should be hospitalized for management. Volume expansion with crystalloid and PCV for severely anaemic patients.
- Use of antifibrinolytics such as tranexamic acid to stop bleeding.
- In the absence of contraindications to estrogen, hormonal therapy for acute heavy menstrual bleeding can consist of intravenous conjugated estrogen 25 mg IV every 4–6 hours; alternatively, monophasic combined OCPs (in 30–50 microgram ethinyl estradiol formulation) can be used every 6–8 hours until cessation of bleeding
- Progesterone-only therapy is effective for cessation of bleeding for girls and adolescents in whom estrogens are contraindicated or not tolerated. Oral medroxyprogesterone 10–20 mg every 6–12 hours or norethindrone acetate 5–10 mg every 6 hours can be used.
- After correction of acute heavy menstrual bleeding, maintenance hormonal therapy can include combined hormonal contraceptives, oral and injectable progestins and LNG-IUDs.
- Adolescents with puberty menorrhagia have an excellent prognosis and most outgrow the problem within 3-5 years of menarche. Regular menstrual cycles will be established once the hypothalamo-pituitary axis is matured.
- Examination under anesthesia and nonmedical management is indicated if patient is unresponsive to medical management.

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Postmenopausal bleeding

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Abstract-

Postmenopausal bleeding is defined as uterine bleeding occurring after at least 1 year of menopause[amenorrhea]. Its incidence is about 10%–15%. A physical examination is recommended in women with postmenopausal bleeding within 4 weeks due to the high risk of endometrial cancer (5-10 %). Prroper history taking and details of any drug treatment including HRT is a must.Further evaluation by diagnostic hysteroscopy with endometrial biopsy is the gold standard of diagnosis.Treatment is otherwise dependent on findings during the diagnostic evaluation.

Keywords: Postmenopausal bleeding, HRT, Pipelle; dilation and curettage; endometrial sampling; endometrial carcinoma; endometrial hyperplasia

Definition Uterine bleeding in postmenopausal women (>1 year after last menstrual bleeding).

Incidence – Its incidence is about 10%–15%.

Etiology/pathogenesis Most common causes of postmenopausal bleeding are:

• vaginal atrophy (59 %)
• endometrial hyperplasia (10 %)
• endometrial polyp (9 %)
• uterine cancer (5-10 %)
• bleeding related to the use of HRT

Rare causes of postmenopausal bleeding include:
• uterine fibroids
• adenomyosis (often during HRT usage)
• cervical polyp
• cervical cancer
• vaginal cancer
• tubal- and ovarian cancer

Risk factors

• overweight (increases the risk of endometrial hyperplasia and endometrial cancer)
• HRT - Oral oestrogen treatment
- detailed clinical and drug history is important as some over-the-counter drugs such as "ginseng" can cause PMB

Diagnostic evaluation A physical examination is recommended in women with postmenopausal bleeding within 4 weeks due to the high risk of endometrial cancer (5-10 %).

Primary evaluation Primary evaluation of women with postmenopausal bleeding should include medical history, clinical examination, transvaginal ultrasound with evaluation of endometrial lining thickness, cervical cytology and endometrial biopsy. Outpatient endometrial sampling devices such as Pipelle in low-risk woman may be used. Outpatient hysteroscopy is the preferred method for endometrial sampling

Secondary evaluation In case of repeated bleeding episodes and normal findings on primary evaluation it is recommended to consider a follow up consultation including:

• vaginal ultrasound evaluation possibly combined with saline infusion into the uterine cavity (SIS/hydrosonography)

• repeated endometrial biopsy

• diagnostic hysteroscopy with endometrial biopsy [gold standard]

• dilatation and curretage (D&C)

Discussion-

- A thorough clinical examination is carried out to rule out cervical, vulval, and vaginal cancer, atrophic vaginitis, and urinary and anal causes for bleeding
- The risk of endometrial cancer is low when the endometrial thickness is less than 4 mm.
- Women with PMB with an endometrial thickness of ≤3–4 mm in the transvaginal scan do not require endometrial sampling unless they are at a high risk for EC or bleeding is episodic.
- The sensitivity for detecting EC at 3 mm is 98%, at 4 mm is 95%, and at 5 mm is 90%.
- In an asymptomatic early postmenopausal woman, an endometrial thickness of >11 should prompt an endometrial biopsy [IMS guidelines]
- In women with homogeneous and normal morphology, those on MHT, and

  hypertensive medication, the acceptable combined thickness is 6 mm

- A focal increased echogenicity or a diffuse heterogeneity in the endometrium even in a thin endometrium warrants further investigations
- With non-representative/uncertain findings on endometrial biopsy, the cause of bleeding can be atrophic endometrial lining, however, malignancy should be excluded.

Differential diagnosis -Bleeding from the urinary tract or bowel.

Management

- Local oestrogen treatment in women suffering from vaginal atrophy.
- Adjusting or discontinuing HRT when bleeding is related to HRT.
- Treatment is otherwise dependent on findings during the diagnostic evaluation.
- Recommended treatment of endometrial hyperplasia and endometrial polyp.
- Treatment of malignant conditions as per the Guideline in gynecological oncology.

Complications –

Depends on the cause of postmenopausal bleeding.

References

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Management of Abnormal Uterine Bleeding

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INTRODUCTION

Abnormal uterine bleeding (AUB) is a common problem among women in the reproductive age. AUB may be accompanied by pain and discomfort, cause significant social embarrassment, and have a substantial effect on health-related quality of life. AUB leads to loss of productivity[1] and may result in surgical interventions including hysterectomy[2]. Management of such common condition in a population with wide healthcare diversity requires uniform clinical practice guidelines. A unified practice guidance, based on scientific evidence helps in standardizing clinical management practices.

AUB-COEIN: General management guidelines:

Recommendations of AUB-COEIN

Tranexamic acid is first-line therapy. Other non-hormonal option is NSAIDs Grade B; Level 1

1. In women desiring effective contraception, LNG-IUS is recommended Grade A; Level 1.
2. COCs are recommended as second line therapy in patients desiring effective contraception, but unwilling or unsuitable for LNG-IUS (Grade A; Level 4).

3. Cyclic oral progestins (from day 5 to 26), are recommended if COCs are contraindicated (Grade B; Level 1).
4. Centchroman is an option when steroidal hormones and other medical options are not suitable (Grade B; Level 3).
5. Use of cyclic luteal-phase progestins are not recommended for AUB (Grade A; Level 4).
6. GnRH agonists with add-back hormone therapy are recommended as a last resort when medical or surgical treatments for AUB have failed or are contraindicated (Grade B; Level 4).
7. Role of conservative surgery such as ablation has decreased a lot due to availability of LNGIUS which works like medical ablation.

A summary of recommendations for management of AUB is presented in **Table 5.**

Table 1: PALM-COEIN classification for the etiologies of abnormal uterine bleeding proposed by the International Federation of Gynaecology and Obstetrics (FIGO)

AUB causes	Subclass	Characteristics	
Structural causes	Polyps (**AUB-P**)	➢ Present in endometrial and endocervical canal ➢ Categorized as absent or present	
	Adenoma (**AUB-A**)	➢ The genesis is controversial but minimal criterion is identification on ultrasound testing.	
	Leiomyoma (**AUB-L**)	0: Submucosal types, do not impact endometrial cavity Othres: 1: < 50% intramural 2: ≥50% intramural 3: totally extracavitary but lean on the endometrium, 100% intramural 4: intramural leiomyomas that are entirely within the myometrium 5: subserosal and atleast 50% intramural	6: subserosal and < 50% intramural 7: subserosal and attached to serosa by stalk 8: do not involve the myometrium include cervical lesions, lesions that exist in the round or broad ligaments without direct attachment to the uterus, and parasitic lesions
	Malignancy & hyperplasia (**AUB-M**)	➢ May occur because of ovulatory disorder ➢ Sub-classification according to the WHO or FIGO system.	
Non-structural causes	Coagulopathy (**AUB-C**)	➢ Coagulopathy represents both inherited and acquired ➢ Most common is inherited von Willebrand disease	
	Ovulatory dysfunction (**AUB-O**)	➢ Can lead to amenorrhea or heavy menstrual bleeding.	

	Endometrial (**AUB-E**)	➢ Likely to occur when other abnormalities are excluded in the presence of normal ovulatory function.
	Iatrogenic (**AUB-I**)	➢ breakthrough bleeding during use of single or combined gonadal steroid therapy, intrauterine systems, or devices, systemic agents that interfere with dopamine metabolism, or anticoagulant drugs.
	Not classified (**AUB-N**)	➢ **R**are or ill-defined conditions: Chronic endometritis, arteriovenous malformations, and myometrial hypertrophy.

Table 2. International Federation of Gynaecology and Obstetrics (FIGO) system for abnormal uterine bleeding: Suggested "normal" limits for menstrual parameters for uterine bleeding

Clinical dimensions of menstruation and menstrual cycle	**Descriptive term**	**Normal limits (5^{th}–95^{th} percentiles)**
Frequency of menses, days	Frequent	<24
	Normal	24-38
	Infrequent	>38
Regularity of menses: cycleto-cycle Variation over 12 months, days	Absent	No bleeding
	Regular	Variation ± 2-20
	Irregular	Variation >20
Duration of flow, days	Prolonged	>8.0
	Normal	4.5-8.0
	Shortened	<4.5
Volume of monthly blood loss, mL	Heavy	>80
	Normal	20-80
	Light	<20

Table 3. Grading system of current GCPR

Strength of Recommendation	
A	Strongly recommended
B	Intermediate
C	Weak

D	Not-Evidence based, Panel recommended
Scale of Scientific Support	
1	Meta-analysis of randomized controlled trials and randomized controlled trials
2	Meta-analysis of non-randomized prospective or case-controlled trials, non-randomized controlled trials, prospective cohort study, and retrospective case-control studies
3	Cross-sectional studies, surveillance studies (registries, surveys, epidemiologic studies, retrospective chart reviews, mathematical modelling of database), consecutive case series, single case reports
4	Opinion/consensus by experts or preclinical study

Table 4. Common symptoms and imaging features of abnormal uterine bleeding aetiologies

Ovulatory Disorders	Signs of anovulationPolycystic ovary syndrome Oligomenorrhea Signs of insulin resistance	Uterus normal size	Polycystic ovaries on ultrasound Thickened endometrium
Endometrial	Inter-menstrual spotting Prolonged spotting	Discharge per vaginum Cervical erosion	Uterus normal size Fluid in endometrial cavity
Iatrogenic	History of medication intake Copper T use	No abnormality	Uterus normal size Copper T in situ
Not Classified	HMB	Refer to PALM-COEIN	Ultrasound, Doppler, USG- for AVM

3D-USG: 3 dimensional ultrasonography; HMB: Heavy menstrual bleeding; MRI: Magnetic resonance imaging; AVM: Arterio venous malformation

Table 5. Suggested treatment options for abnormal uterine bleeding based on PALM-COEIN etiology

Etiology	Treatment
Polyp	Hysteroscopic surgical removal Multiple polyps or polypoidal endometrium and fertility is not desired– LNG-IUS can be combined with surgical removal
Adenomyosis	LNG-IUS, if LNG IUS is not accepted– GnRH agonists with add back therapy; if it fails OCP, NSAIDs, progestogens

Leiomyoma	Intramural or sub-serosal myomas (grade 2-6) Tranexamic acid or COCs or NSAIDs, LNG-IUS, if treatment fails myomectomy depending on location In women >40 years of age, fertility is not desired, for small fibroids (< 4-5 cm)– medical management followed by hysterectomy Short-term management (up to 6 months)– GnRH agonists with add back therapy followed by myomectomy Long-term management– LNG-IUS Newer medical options: ulipristal acetate or low dose mifepristone, currently not available in India Sub mucosal myoma (grade 0-1) hysteroscopic (< 4 cm) or abdominal(open or laparoscopic for > 4 cm)
Malignancy	Atypical endometrial hyperplasia– surgical treatment Continued fertility not desired– hysterectomy Hyperplasia without atypia LNG-IUS followed by oral progestins or PRMs
COEIN	LNG-IUS or tranexamic acid, NSAIDs, followed by COCs or cyclic oral progestins Medical or surgical treatment failed or contraindicated: GnRH agonists with add-back hormone therapy When steroidal and other options unsuitable: Centchroman

PALM: Polyp, Adenoma, Leiomyoma, Malignancy and hyperplasia; LNG-IUS: Levonorgestrel intrauterine system; NSAIDs: Non-steroidal anti-inflammatory drugs; COCs: Combined oral contraceptives; OCP: Oral contraceptive pill; PRMs: Progesterone receptor modulators; GnRH: Gonadotropin releasing hormone

Medication

Estrogens, progestins, androgens, nonsteroidal anti-inflammatory drugs (NSAIDs), ergot derivatives, antifibrinolytics, and gonadotropin-releasing hormone (GnRH) agonists have been used to treat abnormal uterine bleeding (AUB). More recently, desmopressin has been used to control bleeding when associated with diagnosed bleeding disorders that do not respond entirely to traditional management.

Ergot derivatives are not recommended for treatment of AUB because they have been shown to be effective rarely in clinical studies and have many side effects.

At the onset of menses, secretory endometrium contains a high concentration of plasminogen activator. A reduction in menstrual blood loss has been demonstrated in some ovulatory patients taking ε -aminocaproic acid (EACA) or aminomethylcyclohexane-carboxylic acid (AMCHA) tranexamic acid, both potent antifibrinolytics. However, this therapeutic effect was no greater than that seen with oral contraceptive therapy. Antifibrinolytics are associated with significant side effects, such as severe nausea, diarrhea, headache, and allergic manifestations, and cannot be used in patients with renal failure. Because of the high side-effect profile and expense, these agents rarely are used today for this indication.

Estrogens

Class Summary

Very effective in controlling acute, profuse bleeding. Exerts a vasospastic action on capillary bleeding by affecting the level of fibrinogen, factor IV, and factor X in blood, as well as platelet aggregation and capillary permeability. Estrogen also induces formation of progesterone receptors, making subsequent treatment with progestins more effective.

Most AUB is secondary to anovulation. In these patients, endometrium continues to proliferate with asynchronous development. As blood supply is outgrown, irregular shedding occurs. Bleeding might be controlled acutely with high-dose estrogen for a short period of time. Several hours are required to induce mitotic activity, so most regimens require 48 h of therapy before continued bleeding is ruled a treatment failure.

Estrogen therapy only controls bleeding acutely and does not treat underlying cause. Appropriate long-term therapy can be administered once the acute episode has passed.

Conjugated equine estrogen (Premarin)

Women in perimenopause generally are estrogen deficient and might experience bouts of estrogen withdrawal bleeding. Many of these patients will recover regular menses and develop an improved sense of well-being with the initiation of hormonal replacement therapy, including estrogen and a progestin.

Progestins

Class Summary

Occasional anovulatory bleeding that is not profuse or prolonged can be treated with progestins. Progestins inhibit estrogen receptor replenishment and activate 17-hydroxysteroid dehydrogenase in endometrial cells, converting estradiol to the less active estrone. Medroxyprogesterone acetate (Provera) is the most commonly used progestin in this country, but other types, including norethindrone acetate (Aygestin) and norethindrone (Micronor), are equally efficacious. In some patients in which systemic progestins are intolerable due to side effects, a progestin secreting IUD (Mirena) may be considered.

Synthetic progestins have an antimitotic effect, allowing the endometrium to become atrophic if administered continuously. These drugs are very effective in cases of endometrial hyperplasia. In patients with chronic eugonadal anovulation who do not desire pregnancy, treatment with a progestin for 10-12 d/mo will allow for controlled, predictable menses and will protect the patient against the development of endometrial hyperplasia.

Some perimenopausal patients will not respond well to progestin therapy because of an inherent estrogen deficiency. Also, patients with thin, denuded endometrium occurring after several days of chronic bleeding might require induction of new endometrial proliferation by estrogen therapy first.

Avoid synthetic progestins in early pregnancy. They induce an endometrial response that is different from normal preimplantation secretory endometrium. Also, several reports suggest

an association between intrauterine exposure to synthetic progestins in the first trimester of pregnancy and genital abnormalities in male and female fetuses. The risk of hypospadias, 5-8 per 1000 male births, might be doubled with early in-utero exposure to these drugs. Some synthetic progestins might cause virilization of female external genitalia in utero.
Patients at risk for conception can be treated safely with natural progesterone preparations. These preparations induce a normal secretory endometrium appropriate for implantation and subsequent growth of a developing conceptus.

Medroxyprogesterone acetate (Provera)

Short-acting synthetic progestin. Drug of choice for patients with anovulatory AUB. After acute bleeding episode is controlled, can be used alone in patients with adequate amounts of endogenous estrogen to cause endometrial growth. Progestin therapy in adolescents produces regular cyclic withdrawal bleeding until positive feedback system matures.
Stops endometrial cell proliferation, allowing organized sloughing of cells after withdrawal. Typically does not stop acute bleeding episode but produces a normal bleeding episode following withdrawal.

Androgens
Class Summary
Certain androgenic preparations have been used historically to treat mild to moderate bleeding, particularly in ovulatory patients with abnormal uterine bleeding. These regimens offer no real advantage over other regimens and might cause irreversible signs of masculinization in the patient. They seldom are used for this indication today.
Use of androgens might stimulate erythropoiesis and clotting efficiency. Androgens alter endometrial tissue so that it becomes inactive and atrophic.

Danazol (Danocrine)

Isoxazole derivative of 12 alpha-ethinyl testosterone.

Nonsteroidal anti-inflammatory drugs
Class Summary
Blocks formation of prostacyclin, an antagonist of thromboxane, which is a substance that accelerates platelet aggregation and initiates coagulation. Prostacyclin is produced in increased amounts in menorrhagic endometrium. Because NSAIDs inhibit blood prostacyclin formation, they might effectively decrease uterine blood flow. NSAIDs have been shown to treat menorrhagia in ovulatory cycles but generally are not effective for the management of AUB.

Naproxen (Anaprox, Naprelan, Naprosyn)

Used for relief of mild to moderate pain. Inhibits inflammatory reactions and pain by decreasing activity of cyclo-oxygenase, which is responsible for prostaglandin synthesis.

GnRH agonist

Class Summary

Work by reducing concentration of GnRH receptors in the pituitary via receptor down regulation and induction of postreceptor effects, which suppress gonadotropin release. After an initial gonadotropin release associated with rising estradiol levels, gonadotropin levels fall to castrate levels, with resultant hypogonadism. This form of medical castration is very effective in inducing amenorrhea, thus breaking ongoing cycle of abnormal bleeding in many anovulatory patients. Because prolonged therapy with this form of medical castration is associated with osteoporosis and other postmenopausal side effects, its use is often limited in duration and add back therapy with a form of low-dose hormonal replacement is given. Because of the expense of these drugs, they usually are not used as a first line approach but can be used to achieve short-term relief from a bleeding problem, particularly in patients with renal failure or blood dyscrasia.

Depot leuprolide acetate (Lupron)

Suppresses ovarian steroidogenesis by decreasing LH and FSH levels.

Arginine vasopressin derivatives

Class Summary

Indicated in patients with thromboembolic disorders.

Desmopressin acetate (DDAVP)

Has been used to treat abnormal uterine bleeding in patients with coagulation defects. Transiently elevates factor VIII and von Willebrand factor.

Figure 1. Pictorial Blood Assessment Chart (PBAC) scoring for uterine bleeding

PBAC SCORING

Name of patient	Days							Score
Sanitary Pads	1	2	3	4	5	6	7	
								
								
								
Tampons								
								
								
								
Clots/Flooding								
1 Point	For each small clot (Australian 5 cent coin)							
5 Points	For each largel clot (Australian 50 cent coin)							
5 Points	For each episode of flooding							

1= Lightly stained

5=Moderately stained

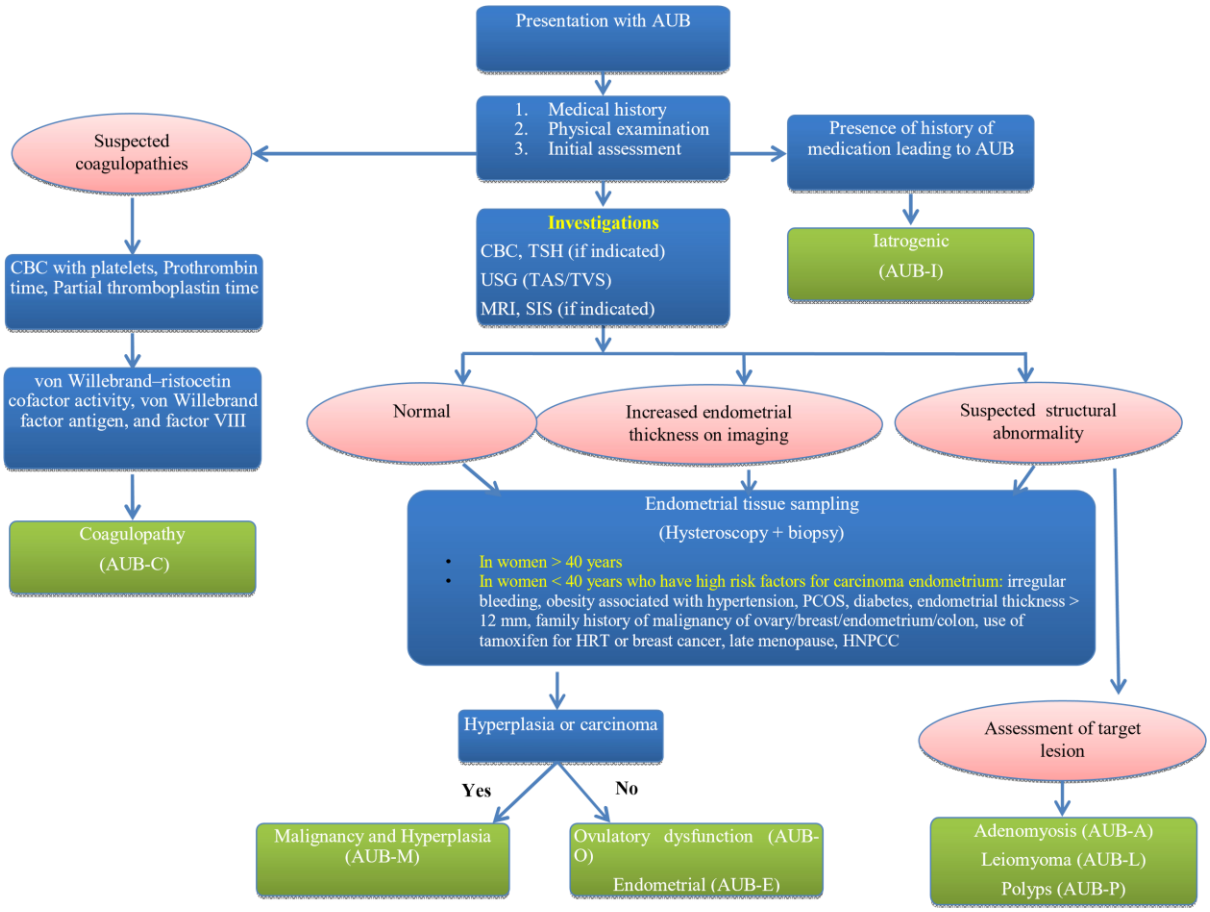
20= Completely stained

1= Lightly stained

5=Moderately stained

10= Completely stained

Figure 2. Algorithm for the diagnosis of AUB



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Surgical Management of Abnormal Uterine Bleeding (AUB)

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Abstract:-

Abnormal Uterine Bleeding (AUB) is a common Gynecological Disease and represents one of the most common reasons for hospital admission. AUB is a huge entity comprising different symptoms and different etiology – Acute or Chronic

Following PALM-COEIN system surgical treatment can be decided.

The first group of PALM is characterized by structural lesion, which can be treated by surgical management. Although hysterectomy remains the definitive choice, there are many alternative techniques available which offer more conservative approach.

AUB has multiple etiologies, in 2011 FIGO approached a new classification system (PALM-COEIN)

PALM: P – Polyp, A – Adenomyosis, L – Leiomyoma, M – Malignancy & hyperplasia (Organic/Structural anomaly which can be effectively treated surgically)

COEIN: C – Coagulopathy, O – Ovulatory Dysfunction, E – Endometrial,

I – Iatrogenic, N – Not at Classified (surgery play a very minor role)

Diagnosis:-

One should know the various diagnostic procedures to evaluate AUB.

- USG
- HysteroSonography
- CT Scan
- MRI
- Hysteroscopy
- Endometrial Biopsy

Management:-

1. Dilatation and Curettage:

- In severe acute bleeding refractory to medical management with biopsy.
- D & C required in young women if hormonal therapy fails.
- 30-40% may be cured by curettage.
- There is high failure rate.

2. Management of Polyp:

- Frequent cause in fertile women incidence 8 % to 35 %
- Rational for the treatment is to get relief from the symptoms and to obtain histopathology to rule out malignancy.
- Hysteroscopic Polypectomy: -
  It is a safe and effective method as compared to blind D & C.
- Electrosurgical loops (resectopic) is effective for removing large and sessile polyps.
- Bipolar versapoint system is an additional technique.
- All these procedures are uterus sparing and they preserve fertility.
- Endometrial ablation or resection is another treatment modality but this does not guarantee future pregnancy.

3. Management of Adenomyosis:

- Incidence 5 to 70 %
- Conservative approach is necessary if fertility and uterus preservation is needed.
- Adenomyomectomy of localized adenomyoma. Removal of adenomyoma leaves behind residual disease due to unrecognized clear margins. Efficacy of this treatment is 50%. “H” shaped incision gives better results in terms of fertility preservation and pregnancy in future.
- Myometrial electrocoagulation – it is not recommended in women who wants pregnancy due to risk of uterine rupture.
- Uterine artery embolization is a controversial treatment for adenomyosis.

- M.R. guided focused ultrasound surgery gives good results for dysmenorrhea and menorrhagia.

4. Management of Leiomyoma:

- The most common female genital tract benign tumors.
- 20 to 30 % of reproductive age women are affected.
- Symptoms are present in 30%. They are AUB, recurrent miscarriage, and urinary frequency.
- Myomectomy is fertility sparing treatment.
- Hysteroscopic myomectomy for submucous myoma upto 5cm diameter is relieved in 70 to 99% of patients following.
- For intramural and sub serosal myoma laparoscopic or abdominal myomectomy is recommended (laparoscopic is better).
- Robotic Assisted laparoscopic myomectomy
- Umbilical artery embolization according to 2012 cochrane library, UAE give good patient satisfaction and less hospital stay. Higher risk of minor complication and need of further surgery within 2 to 5 years of 1st procedure.
- Localized uterine artery occlusion but not much effective.
- Leiomyoma ablation or myolysis and other technique like hypothermic ablation, hyperthermic abrasion by laser and radiofrequency electrical energy, all this technique need more study and analysis.

5. Malignancy:-

- It is less common in reproductive age group but should always kept in mind.
- Endometrial sampling is must.
- Total hysterectomy with or without bilateral salpingo-oophorectomy is a gold standard treatment.

6. Hysterectomy:-

- It is most common gynecological procedure.
- It is curative and definitive in AUB.
- Some known complication like hemorrhage, infection, thrombo- embolism, injury to viscera, neuropathy can take place.
- Hysterectomy can be by abdominal, vaginal or by laparoscopic route.
- According to Cochrane study in 2009, vaginal route is first choice followed by laparoscopy and abdominal.

Expert View

The modern trend in approaching AUB is related to the reduction of global number of hysterectomies. Conservative endoscopic surgery and medical treatment of AUB are facilitated by the use of the PALM-COEIN classification.

Minimally Invasive Methods for Treating Menorrhagia: -

Hysterectomy is a major surgery where bleeding organ is all together removed to get rid of Heavy Menstrual Bleeding. Now in modern world with lot of technical advancements we have few conservative options to destroy the endometrial lining which is responsible for the bleeding without sacrificing the uterus in toto. Here comes the two terms i.e. Ablation and Resection.

Ablation means systematic burning of the inner uterine lining to the depth that the basal layer (Basalis) is affected which is later replaced by scar tissue and not liable to grow in future. Ablation creates the permanent amenorrhea, but this secondary induced amenorrhea is not equivalent to menopause because ovaries are intact and continue to produce ova and major hormones as estrogen and progesterone. Such endometrial destructive procedures are meant basically for the women who have completed their family or wish to have pregnancy.

Hysteroscopic techniques or 1st generation techniques:

- Direct heat (Roller ball cautery) (Figure 1)
- Radiofrequency electricity (NovaSure) (Figure 2)
- Microwave endometrial Ablation (MEA)
- Laser (Neodymnium Yettrium Argon Laser ND-YAG)

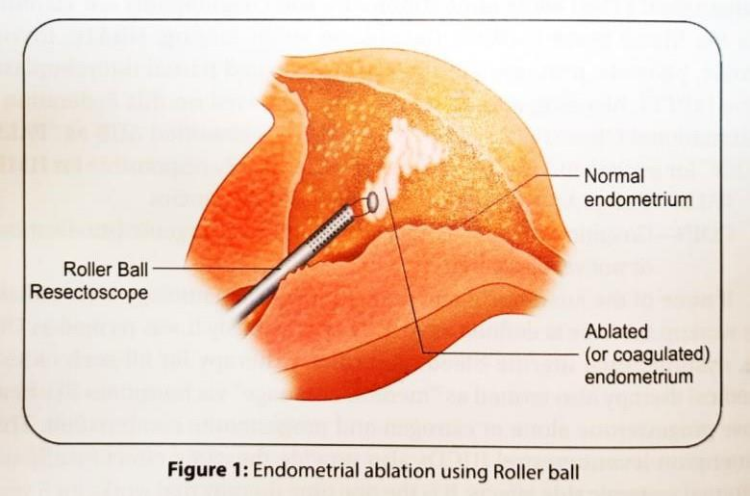

Figure 1: Endometrial ablation using Roller ball

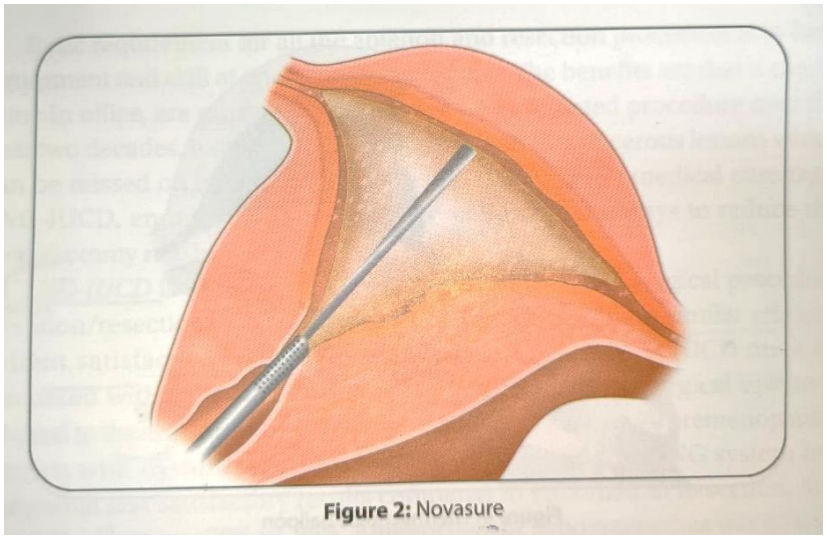

Figure 2: Novasure

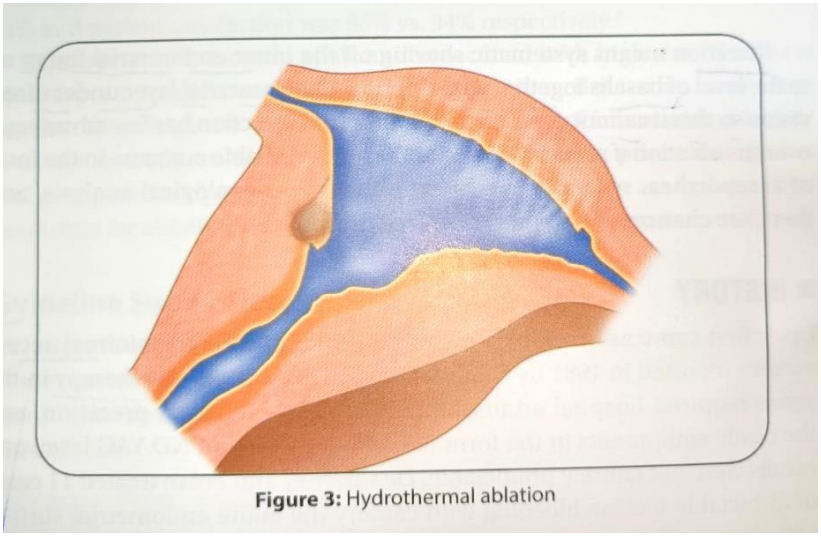

Figure 3: Hydrothermal ablation

Nonhysteroscopic/2nd generation techniques: done in office without general anesthesia

- Heated saline circulation (hydrothermal) (Figure 3)
- Hot water silicon balloon (Thermal balloon ablation (Figure 4)
- Tissue Freezing (cryoablation)done under ultrasound guidance
- Major drawback is that we don't get tissue for the histology and secondly the depth of the burns can't be assessed practically for sure all over the uterine cavity. It was found that almost 25% of cases underdoing ablation require hysterectomy few years later

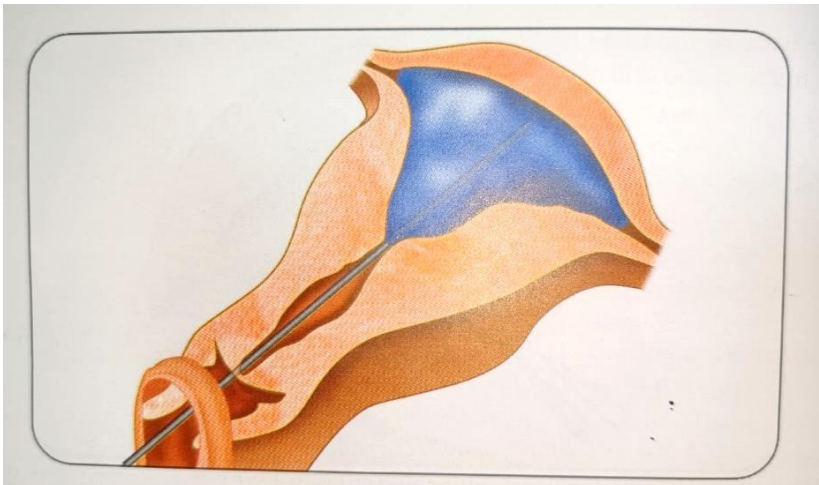

Figure 4: Thermachoice balloon

LNG-IUCD is a simple cost effective option than any surgical procedure (ablation/resection). Cochrane Syst Rev suggests both have similar efficacy, patient satisfaction. Therefore, option of progestogenic IUCD must be discussed with the patient and attendants prior to any surgical option is advised to them. A study by Pier Girgio Crosignani et al. on 70 premenopausal women with dysfunctional uterine bleeding found that LNG system has somewhat less satisfactory results compared to Endometrial Resection. At 1 year blood loss was 79% vs. 89%, Amenorrhea or hypomenorrhea was 65% vs. 71% and patient
satisfaction was 85% vs. 94% respectively.

Ablation is safe and effective minimally invasive procedure to avoid hysterectomy in AUB-N cases.

Pregnancy after Endometrial Resection

In a study on 1,621 cases of endometrial ablation without tubal ligation contacted over a mean period of 8.9 + 3.6 years.

Pregnancy status	**Who had amenorrhea**	**Who had periods**	**Total**
Pregnancy	2	30	32
Non pregnancy	674	915	1,589
Total	676	945	1,621

Out of these five were tubal ectopic pregnancies and two were cornual pregnancies.

After resection the lining is replaced and shape of the cavity gets shortened and distorted, which makes it unfavorable for implantation. Sometimes focal generation of residual endometrium may permit embryo to implant thus it is not reliable effective contraceptive.

Mortality associated with hysterectomy for the benign disease is approximately 6.0/10,000, while morbidity ranges 24-48% fir vaginal and abdominal hysterectomies respectively. Hysterectomy also is associated with cardiovascular risk, psychosexual disfunction and sometime premature ovarian failure. Ablation techniques are quite safe but require repeat definitive surgery in 6-20% of women. It always must be remembered that women who are pregnant or wish to be pregnant or gone through menopause should not have this procedure. ACOG suggests that Resectoscopic endometrial ablation provides high degree of patient satisfaction but not as high as hysterectomy. Endometrial resection may be best considered if other medical treatment have been contraindicated or ineffective, especially for women who have completed family and possibility of endometrial malignancy as been ruled out as a cause of AUB.

FUTURE PERSPECTIVE

Number of surgical and medical strategies are increasing and it is not easy to choose both for the patient and for the doctor.

In the future all the minimally invasive procedures will replace the actual common definitive approach. New technologies, robotics or new targeted drug development will get evoluted in treating AUB. This could minimize operative time and cost and will increase patient's satisfaction.

SUMMARY

AUB is the most common gynecological disease and its etiology is
classified by the 2011's PALM-COEIN system.

After the complete workup the first line of management should always be medical treatment, if not controlled then instead of directly going for hysterectomy now with advanced technology we have multiple of minimal invasive procedures. This procedure requires proper selection of cases to be highly effective. No one procedure is said to be best each has its pros & cons but proper selection of case, handling of instrument and skillful procedure can avert lots of hysterectomies & its related complications.

The best treatment for endometrial polyps is hysteroscopic resection and D & C should be avoided.

The gold standard for the treatment of adenomyosis is hysterectomy, but local resection and removal have good results with minimally invasive surgeries.

Leiomyomatosis is symptomatic due to submucous myomas which can be removed with hysteroscopic resection if < 5-6 cm in diameter.

Hysterectomy is the definitive treatment of AUB and should be performed by vaginal or laparoscopic route.

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CASE SERIES

ABNORMAL UTERINE BLEEDING - A CASE REPORT

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AUTHORS CONTRIBUTION

- Dr. Sonia R. Chandnani conducted the treatment and suggested for case to be published.
- Dr.Chaitali G. Viras wrote the manuscript and Dr.Kajal Tejani provided data for the same.
- All authors reviewed the final manuscript

ACKNOWLEDGEMENT

We take this opportunity to express our gratitude to everyone who supported us for the case. We are thankful for their aspiring guidance, invaluably constructive criticism and friendly advice. We are sincerely grateful to all for sharing their truthful and illuminating views on a number of issues related to this case report.

ABSTRACT

Abnormal uterine bleeding (AUB) is the most common gynaecologic complaint of adolescents admitted to hospital. Heavy menstrual bleeding (HMB) is the most frequent clinical presentation of AUB. Anovulatory cycles, owing to immature hypothalamic-pituitary-ovarian axis, is the leading etiology of HMB and there is an accompanying bleeding disorder in almost 20% of patients with HMB. Additionally, endocrine disorders such as hypothyroidism, hyperprolactinemia and polycystic ovary syndrome are possible causes of AUB. Management of HMB is based on the underlying etiology and severity of the bleeding. After other causes are excluded, anovulatory heavy bleeding can be treated successfully with combined oral contraceptives and iron supplementation depending on the clinical findings and level of anaemia. The epidemiology, clinical presentation, diagnostic approach and treatment of HMB is discussed and our clinical experience in this field is presented in this review.

Keywords: Abnormal uterine bleeding, heavy menstrual bleeding, Anovulatory cycles, PCOS.

INTRODUCTION

Abnormal uterine bleeding associated with ovulatory dysfunction (AUB-O) or anovulatory bleeding, is non-cyclic uterine bleeding characterized by irregular, prolonged, and often heavy menstruation. It represents one of the identified causes of abnormal uterine bleeding (AUB), a frequently encountered chief complaint in the primary care setting affecting up to one-third of women of child-bearing age. Though commonly observed during menarche and perimenopause, it can present at any stage of reproductive life.

AUB accounts for half of the gynaecologic problems among adolescents. Also, some adolescents maybe unaware that their bleedings patterns are abnormal, as menstrual cycles are known to often be irregular during adolescence. The underlying factors that cause AUB have potential for long term health consequences & often decrease quality of life.

The etiology of AUB-O is believed to be rooted in a disturbance in the hypothalamicpituitary-ovarian axis. Physiologic anovulation is common at the beginning of reproductive life when the hypothalamic-pituitary-ovarian axis is not yet mature. Pathologic anovulation often occurs secondary to an endocrine dyscrasia with polycystic ovarian syndrome (PCOS) being the most commonly implicated process. AUB-O can also be related to weight loss or weight gain, psychological stress, excessive exercise, or medications that affect dopamine metabolism.

Menarche usually occurs between the ages of 12-13 years. The normal cycle of an adolescent female occurs every 21-45 days with bleeding lasting between two and seven days.

The frequency of cycles decreases at higher postmenarchal ages. Menstrual cycles are 21-34 days, similar to adults, in 60-80% of adolescents by the third year after menarche. The average blood loss during a normal menstrual cycle is 30-40 mL, requiring the use of 3-6 pads or tampons per day or 10-15 soaked pads or tampons per cycle. More than 50% of the total menstrual loss is an endometrial transudate and 30-50% consists of whole blood components Chronic loss of ≥80 mL blood is associated with anaemia . AUB-O is a diagnosis of exclusion; other structural and physiologic etiologies of AUB should be ruled out by history, physical exam, or with laboratory analysis and imaging as appropriate.

CASE REPORT

A 20 years old unmarried female with BMI of 28.9 , presented with early cycles with heavy bleeding per vagina since 20 days, generalized weakness, occasional giddiness and low grade lower abdominal pain. No history of sexual activity, bleeding disorder, tuberculosis, anticoagulants administration, thyroid disorder, any medical disorder or other illness was elicited. No family history of bleeding disorder or Diabetes Mellitus, thyroid illness was observed. She had joined a near by gym for fitness for last few weeks & was given some vitamin tablets.Her mother gave history of similar episode one year before when she took two blood transfusions . On Examination she was found clinically stable with no evidence of goitre, lymphadenopathy, pelvic tenderness. Her blood profile was done and severe anemia was observed , her haemoglobin was very low (4 g/dL) and her sonographic reports were suggestive of bulky uterus with thick endometrium with bilateral PCOS with gall bladder Polyp as an incidental finding.Patient & relatives were explained about admission ,care and investigations.

Hb-4, WBC-4610, Platelet-268000 with INR-1.19, PT-15.5, TIBC-493, Iron-21.9, LDH-289, Creatinine-0.4, CRP-14.4, SGPT-28, K-4.4, RBS-89.05, HbA1c-4.73, TSH-1.9, B12-494, Vit D- 8 Iu, AMH- 8.9, Hb Electrophoresis- normal, with bilateral PCO on USG on admission. She was admitted in HDU, under gynec with physician & endocrinology specialist care in view of severe anemia with PCO.

DAY-1; P-112, BP-98\58, PALLOR +++, PA—SOFT, No hepatosplenomegaly or Lymhadenopathy, bleeding PV–heavy. Two units RCC, oral norehisterone tds, IV antifibrinolytics bd, oral vitamins were administered.

DAY-2: P-98, BP-104/64, INPUT –OUTPUT adequate, pt stable, except mild weakness, bleeding pv reduced significantly.

DAY-3: P-70, BP-116/74,Pt comfortable with no discomfort on all activities, no bleeding pv. Hb-12.9%, WBC-9730, Platelet-251000, Neutrophils-70% on discharge with complete Recovery IV fluids, 4 units of PCV, anti-fibrinolytic drugs, ferrous sulphate, multi vitamins and

oral norethisterone administered over three days and she responded well to conservative efforts with involvement of physician & endocrinologist in the management.

Fig. 1 Ultrasonographic presentation of Severe polycystic ovarian syndrome.

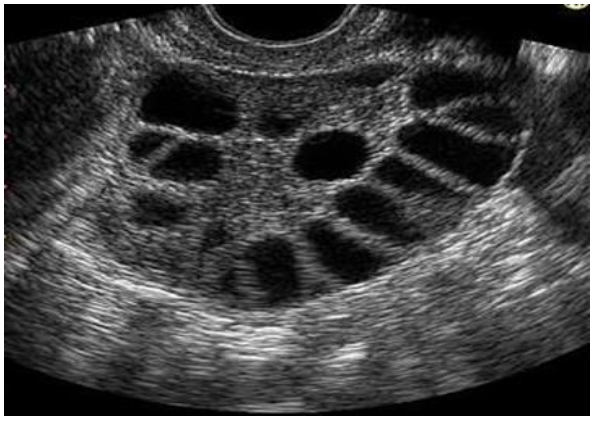


Fig. 2: Menstrual Cycle

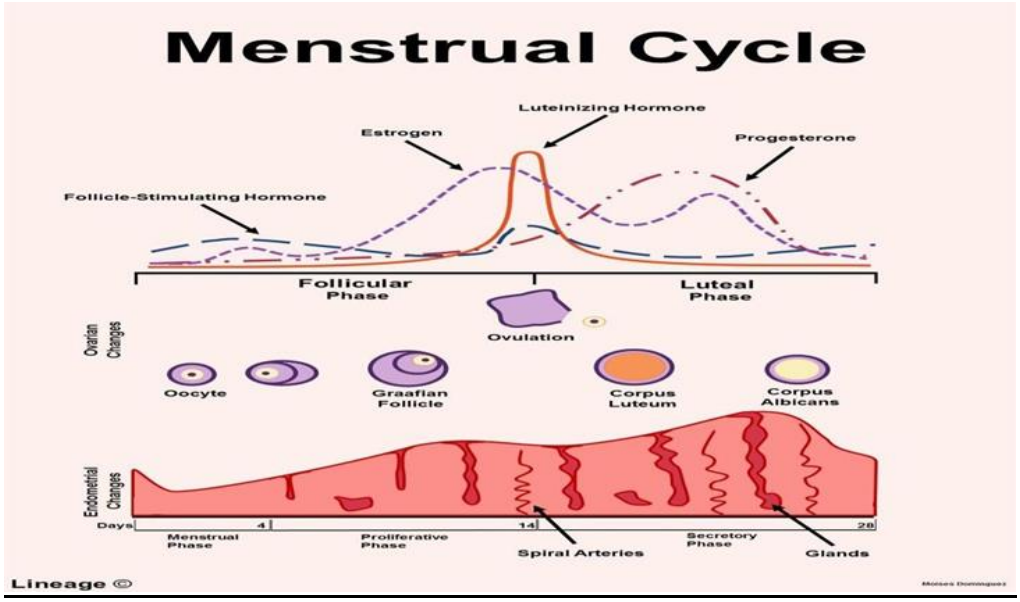
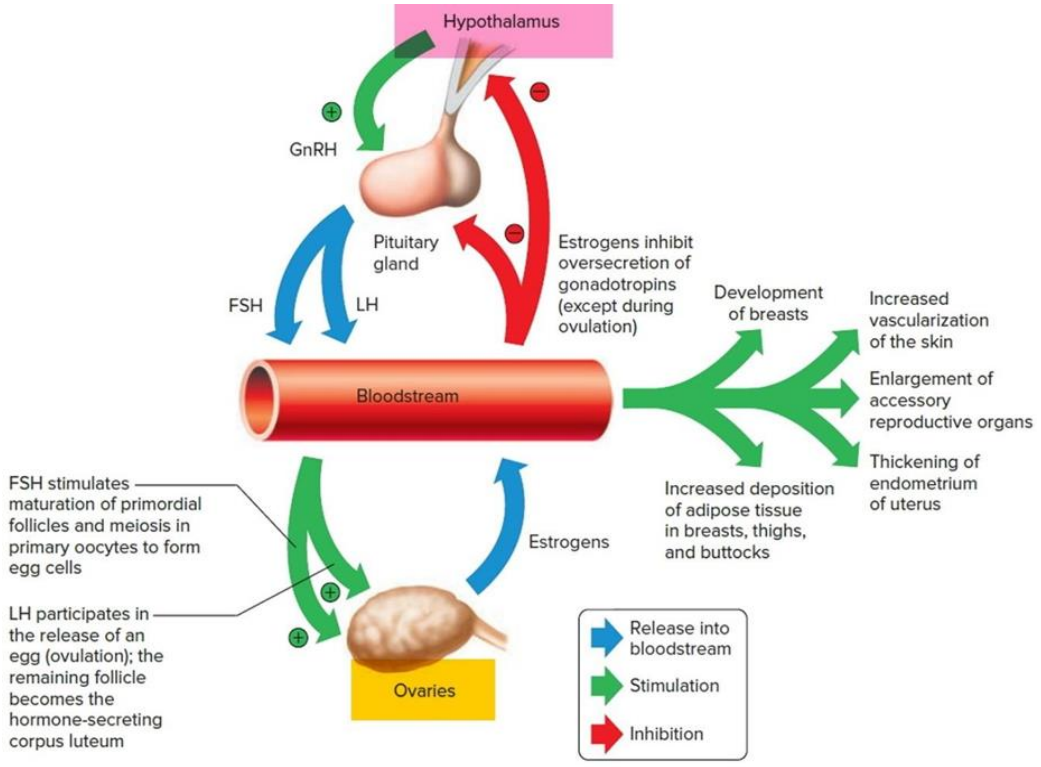


Fig. 3: Pituitary gland hormones under the influence of the hypothalamus



DISCUSSION

Polycystic ovary syndrome (PCOS) affects 8% to 13% of reproductive-aged women and is associated with reproductive and metabolic dysfunction. Obesity worsens the presentation of PCOS and weight management (weight loss, maintenance or prevention of excess weight gain) is proposed as an initial treatment strategy, best achieved through lifestyle changes incorporating diet, exercise and behavioural interventions.

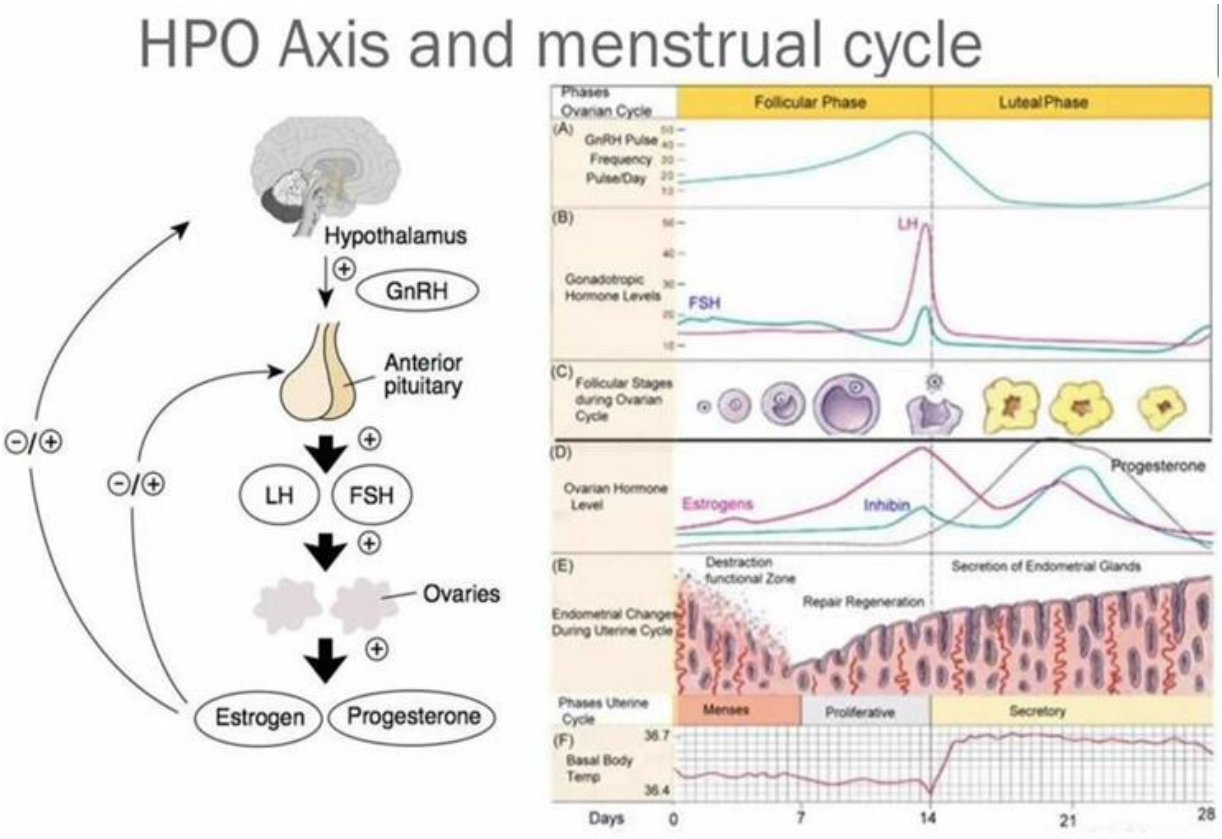
A confusing, inconsistent and overlapping array of terms has evolved to describe abnormal frequency, duration or volume of uterine bleeding. For this reason, the general term ‘abnormal uterine bleeding’ is often used instead of terms such as polymenorrhea, menorrhagia and oligomenorrhea. Dysfunctional uterine bleeding (DUB) is not a generic term for AUB, but is excessively heavy, prolonged or frequent bleeding of uterine origin that is not due to pregnancy or due to recognizable pelvic or systemic disease.

A common cause of chronic anovulation in adolescents is PCOS, as in our index case, which should be considered in any adolescent with menstrual irregularity, clinical hyperandrogenism (hirsutism or acne) or obesity. PCOS should also be considered in adolescents who continue to have menstrual irregularity 3–4 years after menarche, even in

the absence of hirsutism or acne. PCOS is diagnosed in the presence of two out of three of the following: polycystic ovary appearance on ultrasound, clinical or biochemical hyperandrogenism and anovulation. The diagnosis of PCOS in adolescence is problematic since many clinical features (e.g., menstrual irregularity and acne) are considered 'normal' in adolescents. It was previously considered that adolescent menstrual irregularity represents normal maturation of the HPO axis. However, there is increasing evidence that this is not the case and that persistent menstrual irregularity in adolescence may be an early presentation of PCOS. Menstrual irregularity associated with normal reproductive development is likely to resolve within the first 2 years following menarche. After this time, over 70% of adolescents with irregular menses have clinical and metabolic signs of PCOS. By contrast, adolescents aged 15 years with regular cycles rarely develop menstrual irregularity in adulthood.

We guided the patient about lifestyle related changes, diet, regular physical activity and regular follow up in view of PCO with high BMI and anaemia.

Fig. 4: HPO Axis and menstrual cycle



CONCLUSION

The underlying causes of AUB are poorly understood and this has considerably limited the development of medical treatment options. Further studies are needed in this area to investigate the underlying mechanisms so that the therapy can be more targeted to the cause. Diagnostic criteria for PCOS, particularly the clinical features (e.g., menstrual irregularity and acne) are considered 'normal' in adolescents and the multifollicular ovary of the normal adolescent also may be confused with the polycystic ovary of an adult women with PCOS. A diagnostic criteria for PCOS in adolescents is needed to correctly diagnose this disorder. In addition, further studies are needed to assess the safety of OCP in adolescents.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her clinical information and images to be reported in the journal the patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

FINANCIAL SUPPORT AND SPONSORSHIP: NIL

CONFLICTS OF INTEREST: THERE ARE NO CONFLICTS OF INTEREST.

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ENDOMETRIAL POLYP: A CAUSE OF POSTMENOPAUSAL BLEEDING

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Introduction

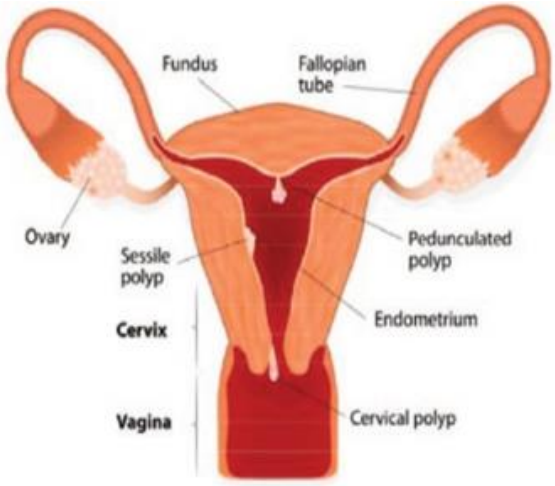
Postmenopausal bleeding (PMB) is defined as bleeding from the genital tract, more than 12 months after the last menstrual period in a woman not on hormone replacement (HRT).1Postmenopausal bleeding (PMB) can be due to various causes. The commonest cause is atrophy of the vagina or the endometrium. Endometrial cancer accounts for 10% cases of PMB, hence every postmenopausal bleed should be investigated to rule out this first. We present the case of endometrial polyp as a cause for PMB.

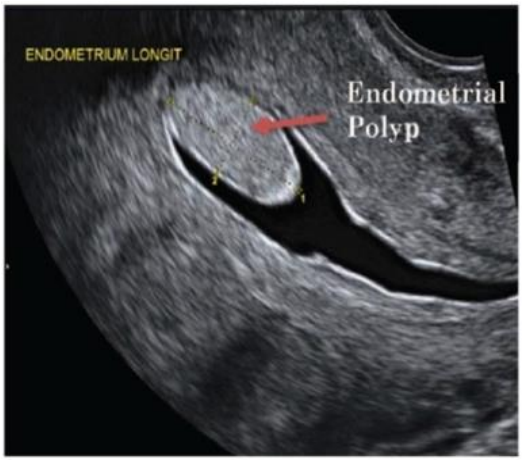
Keywords :- Endometrial Polyp, Postmenopausal Bleeding.

Case report

A 56-year-old Female P4L4 presented with a history of Postmenopausal bleeding(PMB) for 2 months. She was menopausal since 4 years. Patient is K/C/O cirrhosis of liver &oesophageal varices since 2004 & patient is on medication. On investigation, her Hb 12.6 gm%, WBC-4100/mm3, Platelet- 213000, coagulation profile normal, Liver function test and Renal function test normal. On examination her body mass Index was 20, P/A soft, P/S cervix normal, uterus and adnexa normal on bimanual examination. An Abdominal ultrasound demonstrated a 5.7×3.2×3.1 cm sized uterus with app. 2.0×1.3 cm2uterine polyp Present. All

Modality of management explained and opted for hysterectomy. TAH+BSO was performed. Postoperative period was uneventful and discharged from 4th postoperative day. HPE report was benign polyp.





Discussion

Endometrial polyps are benign, localized overgrowth of endometrial glands and stroma, covered by epithelium and project above the adjacent surface epithelium. Polyps arise as monoclonal overgrowths of genetically altered endometrial stromal cells, with secondary induction of polyclonal benign glands through as yet undefined' stromal – epithelial interactive mechanisms. Chromosomal analysis of polyp stroma shows in the majority of cases clonal translocations involving 6p21-22, 12q13-15 or 7q22 regions.

Morphological features of polyp:

Endometrial polyps' range in size from a slightly rounded to a large broad based or pedunculated, oval structure filling the uterine cavity. Many polyps are sessile and have a broad base of attachment. 20% polyps are multiple. The most common presentation is AUB in reproductive age group and postmenopausal bleeding in older patients.

The surface may be smooth and shiny, often, haemorrhagic particularly at the tip. The cut surface may be uniform or it may show cysts, haemorrhage and necrosis.

Microscopy: The diagnosis of a polyp in a curetting depends upon the finding of at least two, of three particular histologic features and exclusion of mimics.

These are:

(I) irregularly shaped and positioned glands

(ii) stroma altered by fibrosis or excessivecollagen

(iii) thick-walled bloodvessels

The mesenchymal component of polyps may consist of endometrial stroma, fibrous tissue, as smooth muscle, but generally the stroma appears more fibrous than normal endometrium. Polyps are morphologically diverse lesions that are difficult to sub classify; but most can be categorized as; hyperplastic, atrophic or functional.

Hyperplastic polyps contain proliferating, irregularly shaped glands, resembling diffuse, nonpolypoid endometrial hyperplasia probably etiologically related to hormone imbalances.

Atrophic polyps consist of low columnar or cuboidal cells lining cystically dilated glands. These polyps are typically found in postmenopausal patients and may represent regression of hyperplastic or functional polyps.

Functional polyps contain glands resembling normally cycling endometrium

TVS with the help of saline infusion sonography helps to confirm the diagnosis.

Endometrial polyps are usually removed by hysteroscopy. Sometimes, a D & C (Dilation and Curettage) can be done to biopsy the endometrium and remove the polyp.

Postmenopausal women who have polyps that are not causing symptoms may also consider watchful waiting. However, the polyp should be removed if it is causing vaginal bleeding.

Conclusion

Post menopausal bleeding needs thorough evaluation to rule out malignancy. Definitive treatment according to etiology is necessary.

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MCQ

1.AUB-M stands for_____

(a) Myoma

(b) Endometrial malignancy

(c) Myohyperplaisa

(d) All of above

2. Submucus fibroid with < 50% intramyometrial component is classified as:

(a) 2

(b) 3

(c) 4

(d) 1

3. Cervical fibroid is classified as type:

(a) 8

(b) 6

(c) 7

(d) None of above

4. Risk of endometrial malignancy in woman with endometrial hyperplasia without atypia is:

(a) < 1%

(b) 1-10%

(c) 10-15%

(d) 25-33%

5. An episode of postmenopausal bleeding needs evaluation within _____ weeks.

(a) 12

(b) 6

(c) 8

(d) 4

6. Cut off endometrial thickness in postmenopausal woman is less than _____ mm.

(a) 7

(b) 6

(c) 3

(d) 2

7. Which one of following is not 1st generation endometrial technique?

(a) Radiofrequency electricity (NovaSure)

(b) Cryoablation

(c) Microwave endometrial Ablation (MEA)

(d) Nd-Yag laser ablation

8. Endometrial malignancy is the commonest cause of postmenopausal bleeding.

(a) True

(b) False

9. Which is the most common cause of puberty menorrhagia?

(a) PCOD

(b) Pregnancy complications

(c) Immature HPO axis

(d) Coagulation disorders

10. Dose of ormeloxifene in AUB is _____ mg twice a week

(a) 60

(b) 30

(c) 20

(d) None of above

Answers :-

1 (b)

2 (d)

3 (a)

4 (a)

5 (d)

6 (c)

7 (b)

8 (b)

9 (c)

10 (a)

SPECIAL ARTICLE - LET FOOD BE OUR ONLY MEDICINE : PREVENTING CANCER THROUGH DIET

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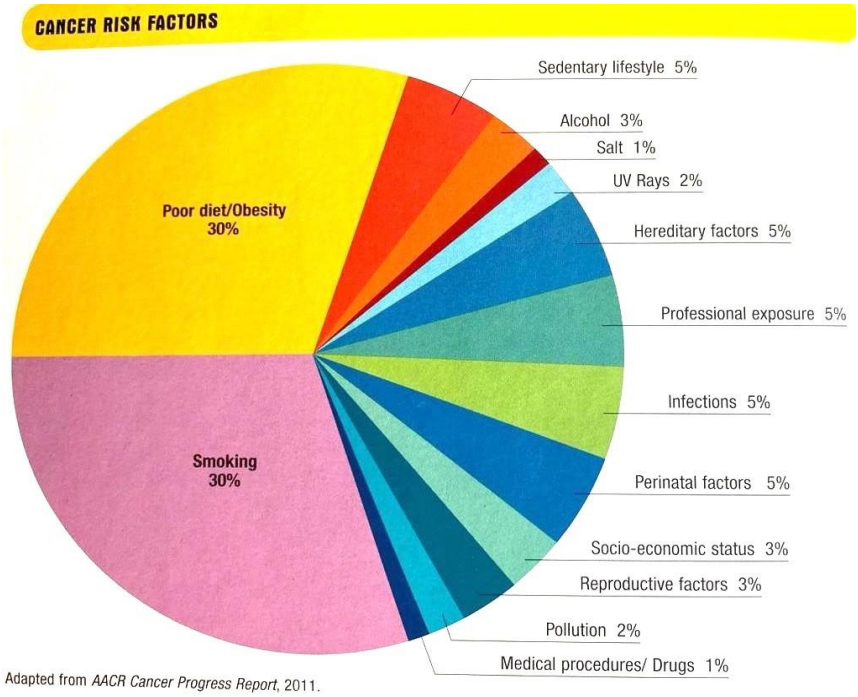
The fear of harmful consequences caused by events beyond our control is a characteristic unique to humans. The sound of cancer generates a sense of fear in our hearts. It is the fear of death, the fear of treatment, the fear of disfiguration of the body, the fear of a huge monetary loss due to the treatment and the fear of recurrence. Research shows that lowering our risk of developing the disease is by no means beyond our control.



Adapted from *AACR Cancer Progress Report*, 2011.

FIG - 30% of cancers can be prevented by maintaining a proper diet and optimum body weight.

A sedentary lifestyle, lack of plant-based foods, intake of processed and junk food, excessive intake of red and processed meat, tobacco in any form, too much salt, and being overweight are avoidable factors to prevent cancer.

Obesity-Fatty tissue in women who are overweight produces additional oestrogen- a sex hormone that can increase the risk of uterine cancer. The risk increases with an increase in Body Mass Index (BMI). About 70% of uterine cancer cases are linked to obesity, so right diet and control of weight can reduce the incidence of uterine as well breast cancer.

Avoid a diet containing a large amount of fat and sugar. Don't make up for a bad diet by taking supplements. The synergy provided by a combination of foods is by far more superior for lowering the risk of cancer. A diversified diet high in fruits and vegetables, combined with a calorie-controlled intake is a simple and effective way to reduce the risk of getting cancer.

Let food be your only medicine.

Chronic inflammation participates actively in cancer growth by encouraging the survival and growth of precancerous cells. Being overweight or obese encourages a pro-inflammatory environment to take hold and increases the risk of developing several types of cancer. Regularly eating plant-based foods and maintaining a normal body weight plays a crucial role in reducing inflammation. The best doctor is Nature, it cures three-quarters of illnesses. A healthy diet not only prevents cancer but it prevents Diabetes, Hypertension, Cardiovascular diseases and Obesity.

The nutrients we get from our food are generally categorized into two groups: Macronutrients (Carbohydrates, Proteins and Fats) and Micronutrients (vitamins and minerals). Apart from these, another compound exists - phytochemicals. The terms macronutrients and micronutrients give an incomplete description of what fruits and vegetables contain. This is because their composition is not limited to nutrients. Phytochemicals are another class of molecules found in significant amounts in them.

Common phytochemical compounds found in fruits, vegetables, spices and beverages:

- Curcumin - Turmeric
- Delphinidin - Blueberries
- Catechin - Green Tea
- Genistein - Soya Beans
- Resveratrol - Grapes

- Ellagic Acid - Strawberries
- Limonene - Citrus Fruits
- Diallyl sulphate (DAS) - Garlic
- Indole-3-carbinol - Cabbage
- Sulforaphane - Broccoli
- Lycopene – Tomatoes

Preventing cancer through diet can be linked to a kind of natural, non-toxic chemotherapy that uses anti- cancer molecules in food to fight cancer at the source before it reaches maturity and threatens the proper functioning of the body.

Cancer-fighting foods to include in your diet

Cruciferous Vegetables

Cruciferous vegetables such as green and black cabbage, cauliflower, broccoli and Brussels sprouts contain large quantities of several anti-cancer compounds that hinder the development of cancer by preventing carcinogenic substances from causing cell damage. Lightly cooking and then thoroughly chewing these vegetables is necessary to get the most benefit from their anti-cancer properties. The diligent efforts made by our far off ancestors to provide all these verities of cabbages were certainly worth the trouble. Phytochemicals of this group of vegetables show an impact on oestrogen and its ability to interfere with the oestrogen-dependent cancers like breast cancer, cervical and ovarian cancer and uterine cancer.

Garlic and Onions

Throughout the history of the greatest civilizations, garlic has always been prized as both: food and medicine. Allium family plants are used in traditional culinary and medical practices. Garlic, onions, shallots and leeks are vegetables from the Allium family. They slow down cancer development, both, through their protective action against damage caused by carcinogenic substances, and their ability to hinder the growth of cancer cells. The molecules responsible for the anti-cancer effects are released by the mechanical breakdown of these vegetables. Freshly crushed garlic is therefore by far the best source of anticancer compounds and should be chosen over supplements.

SOY

Soybeans are a source of anti-cancer phytoestrogens. Compounds found in soya beans and soy products are proving to be a powerful dietary tool in the fight against cancer. Isoflavone is a key component of soy's health-giving properties. Soybeans are not only a significant

source of nutrients that has a high level of proteins, essential fatty acids, vitamins, minerals and dietary fibres but are also an extremely important source of anticancer phytochemicals. The main food sources of Soy: Fresh soya beans, miso (fermented paste of soybeans), soy sauce, dry roasted soybeans, tofu, and soya milk.

Hormone dependent cancers like breast cancer and prostate cancer, are the main causes of death in western countries, yet these cancers are much rarer in Asian countries mainly Japan, China and Indonesia where soya bean is included in their daily diet. Research shows that consuming enough soybeans to generate 25 mg. of is Isoflavones is linked with a notable drop in breast cancer risk. The key to getting the most from soy's anticancer effects is to eat about 50 grams of whole foods, like fresh soybeans, tofu, soya milk daily. Isoflavone supplements must be avoided. In addition to soy, eating linseeds is a simple and economical way to increase phytoestrogen intake.

While the vast majority of researchers, doctors and nutritionists agree that including soy in the diet is good for health, there is still some controversy around its consumption by menopausal women and women who have had breast cancer. The controversy is based on the mildly estrogenic nature of Isoflavone. Still, recent results clearly show that this controversy is baseless as far as natural soy-based foods are concerned.

Spices and Herbs

The anticancer potential of certain common spices, which could reduce the incidence of several cancers makes them precious. No spice is as closely associated with cancer prevention as turmeric. It is of ginger family found mainly in India and Indonesia. Powder of dry turmeric root is widely used in culinary. It is anti-inflammatory, antiseptic and anticancer. Turmeric contains the phytochemical curcumin. There is some consensus in the scientific community to suggest that turmeric could be responsible for the huge differences in rates of Certain cancers in India and western countries. The bioavailability of curcumin (Turmeric) is enhanced greatly by combining it with black paper, root ginger and cumin.

Other herbs used in cooking like ginger, black paper, cumin, mint, thyme, oregano, basil, rosemary, parsley, coriander are also having phytochemicals. Eat more spices and herbs as these contain anti- inflammatory molecules that help hinder cancer development.

Green Tea

Drinking green tea has become an essential part of the social customs of Asian countries. Green tea remains less popular in the west than east. Tea is an exquisite medicine that prolongs the lives of human beings. The soil of the mountain and valleys where tea is grown is holy and powerful. If you pick its young shoots, make tea from them and drink it, you will enjoy a healthy long life. Green tea is an outstanding source of very powerful anticancer

molecules, making it one of the key elements of any diet designed to prevent the occurrence of cancer.

Tea is a complex beverage, made up of several hundred different molecules that give it its aroma, taste and astringency. One-third of the weight of tea leaves contains a class of polyphenols called flavones, or more commonly, Catechins, and these are the main source of green tea's anticancer potential. It is preferable to choose Japanese green tea which is richer in anticancer molecules. Let the tea brew for 8 to 10 minutes to extract the most molecules possible. Always drink freshly brewed tea and space your drinking out throughout the day.

Berries

Berries not only taste good but are also good for your health. These delicious fruits contain an arsenal of phytochemical compounds with the potential to combat cancer. It is good to know that freezing berries does not reduce their anticancer capabilities. Raspberries contain a large amount of anticancer molecule Ellagic acid. Raspberries have a truly delightful flavour and play an important role in the traditional medicine of many cultures, mainly China and Russia. Strawberries, Blueberries and Cranberries also have medicinal value since they are full of antioxidants and anticancer molecules. Cranberries are also effective in treating urinary infections.

Berries are seasonal fruit and therefore take up a relatively limited space in the routine diet, but it has been found that regularly eating strawberries, blueberries and mulberries is associated with a 30% decline in the risk of hormonal dependent breast cancer (ER +). With all the phytochemicals associated with berries, Ellagic acid is most likely to interfere in cancer development. Strawberries and raspberries are the main sources of Ellagic acid. It is preferable to consume dried cranberries rather than juice. Blueberries and other berries can be frozen and eaten round the year.

Omega-3s

Finally, fats that are good for you! While some fats like trans-fat, saturated fat and some animal fat are definitely harmful, there are some very good fats that actually play an essential role in the body's proper functioning. It is all about quality and not quantity.

Essential Fatty Acids - Polyunsaturated fatty acids (omega-3 and omega-6) are said to be essential because the human body cannot produce them on its own, so we must acquire them through food. Meeting our omega-6 fatty acids requirements is not a problem as these fats occur in large amounts in main components in our routine diets such as eggs, certain vegetables and various vegetable oils. Such foods provide a sufficient supply of Linoleic acid (LA), the most important fat in this category.

The situation with regards to omega-3 fatty acids is more complex since these fats are much less widely distributed in nature. In addition, omega-3s are by nature extremely unstable, so it is better to use whole foods as a source of these fats rather than supplements. The health benefits of omega-3s are not limited to heart diseases but also play role in preventing cancer.

There are two types of omega-3s. Linolenic acid (LNA) is a short-chain omega-3 fatty acid found in plants, mainly in linseeds and some nuts especially walnuts. Docosahexaenoic (DHA) and eicosapentaenoic (EPA) are long-chain omega-3s found exclusively in fatty fish. The importance of omega-3 fats stems from their many positive roles in ensuring our body functions properly. DHA and EPA are absolutely essential for the development of the brain and retinal cells during pregnancy. Some commonly found plant-based sources of omega-3s are walnuts, linseeds, olive oil, avocados, almonds, soya beans, and tofu. A few animal sources are sardines, herring and salmon fish. Eating fatty fish once or twice a week is a simple way to increase the amounts of omega-3s in the diet. Similarly, store linseeds in a sealed container in the refrigerator and grind only as many as you need to use.

Tomatoes

Tomatoes are the most used fruit in the kitchen. The bright red colour of a ripe tomato is derived from its content of the phytochemical lycopene, a potent weapon in the fight against cancer. Lycopene belongs to the carotenoid family, a highly varied class of phytochemical molecules that give many fruits and vegetables their yellow, orange and red colour. The human body cannot produce carotenoids, so this molecule must be obtained by including vegetables in the diet. Lycopene's anticancer characteristic is maximized and better absorbed when it is cooked with olive oil, such as in tomato sauce.

Citrus Fruits

Citrus fruits such as oranges, lemons, sweet lime, grapefruits and amala (Indian gooseberry) have long been known as rich sources of vitamin C. They also contain many phytochemicals. Citrus fruits are foods essential for cancer prevention, both because of their direct effect on cancer cells and their ability to enhance the anticancer potential of other phytochemical compound in the diet. To avoid gaining weight eat whole fruits and avoid juice as far as possible.

Red Wine

Red wine is an alcoholic drink. It contains many phytochemicals compounds beneficial to health. The resveratrol in red wine has a powerful anti-cancer effect. A little wine is an antidote to death. In large amounts, it is the poison of life. So consume it in recommended dose only.

Summary

A close link exists between eating plant-based foods and preventing cancer. We must take advantage of this relationship by changing our lifestyle. Changing our diet to incorporate certain foods that are exceptional sources of anticancer molecules is one of the best weapons for fighting cancer at our disposal.

- Include a wide range of plant-based cancer-fighting foods in your diet.
- Stop smoking and tobacco consumption in any form.
- Exercise regularly. Control your body weight.
- Limit alcohol intake.
- Avoid unnecessary sun exposure.
- Limit salt consumption.
- Do not rely on taking supplements to make up for a bad diet.
- Cut back on calorie intake.
- Reduce consumption of red meat and processed meat products.

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