CHAPTER 8

Abnormal Uterine Bleeding

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Overview

Abnormal uterine bleeding (AUB), especially heavy menstrual bleeding (HMB) is a major health concern for women of reproductive age, affecting her physical, social, emotional and economic quality of life. Work up for diagnosis for AUB should exclude pregnancy states and malignancy. With proper evaluation, majority of these patients can be managed by medical treatment and can avoid major surgical intervention like hysterectomy. The new classification system introduced by FIGO-the PALM-COIN system, will help to standardize the outcome of management of AUB.

INTRODUCTION

Abnormal uterine bleeding (AUB) is a deviation from normal menstrual parameters, deviation in frequency, regularity, duration and volume. AUB is the new internationally agreed terminology for abnormal menstrual pattern. Nearly one–third of the gynecology outpatient visits of women of reproductive age will be for seeking medical advice for abnormal uterine bleeding.[1] Abnormal uterine bleeding can result from a wide veriety of systemic and local causes or may be due to medications. The common etiologies in nonpregnant women are structural uterine pathology (e.g. fibroids, endometrial polyps, and adenomyosis), anovulation, disorders of hemostasis, or neoplasia. The importance of AUB relates to its major impact on women's quality of life, productivity, and utilization of healthcare services. Till recently many women had undergone hysterectomy for AUB without any organic pathology and by proper evaluation many such cases could be treated by medical management.

NORMAL MENSTRUAL BLEEDING

Menstruation should be described in terms of frequency, regularity, duration and amount of flow. The frequency of menstruation is measured by the number of days from the first day of one menstrual period to the first day of the next, and the normal range is 24–38 days and >38 days is considered as infrequent. The regularity of menses quantifies the cycle to cycle variation in frequency over a 12-month time frame. Duration of menstrual flow is 4–8 days and more than 8 days is considered as prolonged periods. Normal menstrual loss is based on the Scandinavian study,[2] a population-based study wherein the menstrual, blood loss was objectively measured using the alkaline-hematin technique. Average blood loss is 40 mL, with 90% of women having a blood loss less than 80 mL. Therefore, heavy menstrual bleeding is objectively defined as a loss of more than 80 mL per cycle. In the clinical setting, where a woman's perception of heaviness and its impact on her social, physical, and economic quality of life are of much greater importance, and is important in defining the amount of menstrual bleeding. The term menorrhagia to denote excess menstrual blood loss is replaced by heavy menstrual bleeding (HMB).

THE NEW CLASSIFICATION OF AUB

A woman of reproductive age presenting with abnormal uterine bleeding may be having many disorders or pathologic entities, as structural anomalies, ovulatory disorders, coagulopathies and even malignancy. In order to have uniformity in diagnosis and management of abnormal uterine bleeding in non-pregnant women of reproductive

age, the International Federation of Gynecology and Obstetrics (FIGO) Menstrual Disorder Group introduced the PALM-COEIN system of classification.[3-7]

FIGO Classification of AUB

The FIGO classification system is divided into nine categories, denoted by the easy to remember acronym PALM-COEIN. The PALM component represents structural entities that can be visualized by ultrasound, hysteroscopy, or histology, and includes **P**olyps, **A**denomyosis, **L**eiomyomas (fibroids) and **M**alignancy and pre-malignant conditions. COEIN represents non-structural abnormalities, comprising **C**oagulopathies, **O**vulatory disorders, **E**ndometrial causes, **I**atrogenic causes and those that are **N**ot-otherwise classified.

PALM-COEIN CLASSIFICATION-FIGO

POLYP	**C**OAGULOPATHY
ADENOMYOSIS	**O**VULATORY DYSFUNCTION
LEIOMYOMA	**E**NDOMETRIAL
MALIGNANCY & HYPERPLASIA	**I**ATROGENIC
	NOT YET CLASSIFIED

*PALM—**Structural***

1. Polyps (AUB-P): An abnormal protrusion of the endometrium, polyps may be endometrial or cervical. Polyps may be diagnosed using ultrasound saline sonohysterography and/or hysteroscopy but may require histological assessment to confirm they are benign.
2. Adenomyosis (AUB-A): Adenomyosis is the presence of endometrial tissue within the myometrium and traditionally necessitates a histological diagnosis from hysterectomy specimens. Ultrasonography/MRI may be used for diagnosis.
3. Leiomyoma (AUB-L): By ultrasound, leiomyoma are grouped according to whether they are submucus, intramural or subserus.
4. Malignancy and pre-malignant conditions (AUB-M): Consequences of a diagnosis of malignancy or atypical hyperplasia necessitate their consideration in each patient, particularly if there are predisposing risk factors such as obesity or chronic anovulation (e.g. polycystic ovarian syndrome).

*COEIN—**Non-Structural***

1. Coagulopathies (AUB-C): Disorders that interfere with coagulation will lead to AUB in about 10% of patients with heavy menstrual bleeding and may due to Von Willebrand disease. History of heavy menstrual bleeding since menarche, easy bruising, excess bleeding during dental extraction and history of post-partum hemorrhage are suggestive of coagulation disorders.
2. Ovulatory dysfunction (AUB-O): More common at extremes of reproductive age. Higher incidence in obese women and patients with hypothyroidism and polycystic ovarian syndrome.
3. Endometrial causes (AUB-E): Women with regular cycles having heavy menstrual bleeding without any structural abnormality and coagulation disorders are likely to be having local endometrial factors leading to defective hemostasis, delayed endometrial repair or impaired local vasoconstriction. There is no definitive diagnostic testing for AUB-E, but one by exclusion.
4. Iatrogenic causes (AUB-I): When AUB develops during the use of Intrauterine Systems, contraceptive pills, injections, implants, gonadotropin-releasing hormone therapy, aromatase inhibitors, selective estrogen receptor modulators, or progesterone receptor modulators, the woman is categorized as having AUB-I. By convention, when HMB occurs after the use of anticoagulants (e.g. warfarin, heparin), the woman is categorized as having AUB-C.
5. Not-otherwise classified (AUB-N): To allow for undiscovered, poorly defined, inadequately researched and/or extremely rare causes of AUB, the FIGO classification system includes a 'not-otherwise classified' category.

Classification of Leiomyoma (Fig. 8.1)

- Those that are intracavity with no myometrial involvement and attached to the endometrium by a narrow stalk are designated as type 0.
- If the tumor is within the endometrial cavity, with less than half of the largest diameter within the myometrium, it is categorized as type 1.
- If the tumor is visible in the endometrial cavity but half or greater of the largest diameter is in the myometrium, it is called type 2.
- Fibroids that abut the endometrium but do not distort the cavity are categorized as type 3.
- Those that are completely within the myometrium—meaning that there is myometrium interposed between both the serosa and the endometrium—are categorized as type 4 (or intramural).
- Types 5–7 are categorized by their relationship with the uterine serosa with type 5 lesions distorting the serosa but with half or more than of their largest diameter being within the myometrium, while type 6 lesions have less than half of the diameter within the myometrium.
- Type 7 lesions are attached to the uterus by a stalk.
- Type 8 includes 'others' such as cervical and parasitic leiomyomas.

SM—Submucosal	0	Pedunculated intracavitary
	1	<50% intramural
	2	>50% intramural
O—Other	3	Contacts endometrium; 100% intramural
	4	Intramural
	5	Subserosal ≥ 50% intramural
	6	Subserosal <50% intramural
	7	Subserosal pedunculated
	8	Other (specify, e.g. cervical, parasitic)
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 subserosal, each with less than half the diameter in the endometrial and peritoneal cavities, respectively.

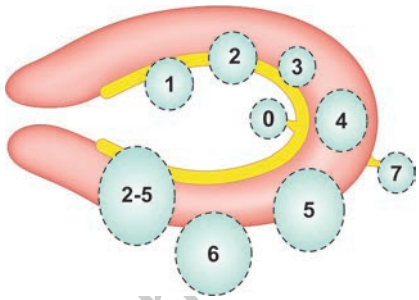

Fig. 8.1: Classification of leiomyoma.

Source: Malcolm GM, Critchleyc HOD, Michael, Fraser IS. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in non-gravid women of reproductive age. Int J Gynaecol Obstet. 2011;113:3–13.

Submucus: (0) Pedunculated intracavitary, (1) ≤ Submucus, (2) ≥ 50% Intramural.

Other: (3) Intramural but contacts endometrium, (4) Intramural, (5) Subserous ≥ 50% intramural (6) Subserous <50% intramural, (7) Subserous pedunculated, (8) Other (e.g. cervical).

SALIENT FEATURES OF PALM-COEIN CLASSIFICATION

- The PALM-COEIN classification for AUB does not include abnormal bleeding related to pathologic conditions of the lower genital tract
- The term dysfunctional uterine Bleeding used as diagnosis when there was no systemic or locally discernible structural cause is abandoned. Such patients generally will have one or a combination of coagulopathy, disorder of ovulation, or primary endometrial disorder, may be a primary or secondary disturbance in local endometrial hemostasis
- The term menorrhagia used in excess menstrual bleeding is replaced by heavy menstrual bleeding (HMB)
- As per NICE guidelines[8] -"Heavy menstrual bleeding (HMB) is defined as excessive menstrual blood loss which interferes with a woman's physical, social, emotional and/or economic quality of life. It can occur alone or in combination with other symptoms". This definition is accepted as it is not easy to measure the actual menstrual blood loss. It is the woman's perception that what she considers as heavy bleeding.
- Metrorrhagia uterine bleeding at irregular intervals, particularly between the expected menstrual periods is replaced by intermenstrual bleeding.
- Chronic AUB is defined as bleeding from the uterine corpus that is abnormal in volume, regularity, or timing; is present for most of the prior 6 months; and may not require immediate intervention.
- Acute AUB is defined as an episode of heavy bleeding requiring immediate intervention
- Not yet classified causes include rare or ill-defined conditions: chronic endometritis, arteriovenous malformations, and myometrial hypertrophy.
- The full notation of classification would include the entire acronym AUB PALM-COEIN with the abnormalities noted, whereas the abbreviated notation would include only the abnormalities. As an example, if the patient on investigation found to have a submucus fibroid as a cause for abnormal bleeding—classification will be AUB—$P_0A_0L_1smM_0$ –$C_0O_0E_0I_0N_0$. An abbreviation is also accepted like—AUB-L_{1SM}.

Acute AUB is 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. By comparison, chronic AUB is defined as bleeding from the uterus that is abnormal in frequency, duration and/or volume and has been present for the majority of the previous 6 months. Intermenstrual bleeding is defined as bleeding between clearly defined cyclic and predictable menses, and includes random episodes as well as predictable episodes occurring at the same time each month.

EVALUATION OF ABNORMAL UTERINE BLEEDING

Although, the patient's perception of the bleeding is not quantifiable, it is important for the management of the

problem. Ultimately, the woman's experience and the impact on her quality of life determine the intervention which may be required. Heavy menstrual bleeding is the most common complaint of AUB. It has been defined as "excessive menstrual blood loss which interferes with the woman's physical, social, emotional, and/or economical quality of life. It can occur alone or in combination with other symptoms."[8]

History and Physical Examination

A detailed history and physical examination will help to establish the cause of the abnormal bleeding, to direct further investigations and to decide on the management. Menstrual history as regards to regularity, amount, duration of flow, intermenstrual bleeding, postcoital bleeding, and premenstrual symptoms and pain may give the clue regarding anovulatory bleeding or ovulatory bleeding, cervical lesions and polyps. Regular heavy menstrual bleeding with pelvic pain can be due to adenomyosis or submucus fibroids. Anovulatory bleeding is characterized by heavy bleeding following a short period of amenorrhea and is seen among patients at adolescent age or at perimenopausal age or in patients with PCOS. There is risk of endometrial hyperplasia and endometrial cancer.

Further details regarding sexual life, contraception, use of intrauterine devices, chance of being pregnant, symptoms suggestive of thyroid disorders and hyperprolactinemia, history of other drug intake, use anticoagulants, and history of systemic diseases and its treatment should also be elicited. History of heavy menstrual bleeding with menarche and personal or family history of abnormal bleeding indicates testing for coagulation disorders.

Physical Examination

A thorough physical examination including the general examination, examination of the abdomen with bimanual pelvic examination should be carried out. Per vaginal examination may be avoided in unmarried girls instead a per rectal examination may help to find out any organic condition.

Investigations

- Complete blood count.
- Pregnancy should be excluded in suspected cases by urine pregnancy test/serum βhCG.
- TSH, T3, and T4 with suspicion of thyroid dysfunction.
- Testing for coagulation disorders is done in women with human menopausal gonadotropin (HMG) since menarche and history of excess bleeding with minor surgical procedures.

Imaging Studies

Ultrasound scanning is indicated when there is suspicion of structural abnormalities, failure of conservative management, suspicion of malignancy and in patients older than 45 years.

Transvaginal Sonography

After a transabdominal survey scan, all patients with AUB should have a detailed Transvaginal sonography. It allows detailed assessment of anatomical abnormalities of the uterus and endometrium.[9] In addition, pathologies of the myometrium, cervix, tubes, and ovaries may be assessed. This investigative modality may assist in the diagnosis of endometrial polyps, adenomyosis, leiomyoma, uterine anomalies, and generalized endometrial thickening associated with hyperplasia and malignancy.

Saline Infusion Sonohysterography

In saline infusion sonohysterography (SIS) 5 to 15 mL of saline is instilled into the uterine cavity during transvaginal sonography which improves the diagnosis of intrauterine pathology. In cases of uterine polyps and fibroids, SIS allows for greater discrimination of location and relationship to the uterine cavity.[10-12] As a result, SIS can also obviate the need for MRI in the diagnosis and management of uterine anomalies.[13]

Hysteroscopy

Hysteroscopy done in cases of abnormal uterine bleeding will help to visualize the cavity pathology like endometrial thickening or polyps, submucus fibroids, müllerian anomalies like septate and bicornuate uterus, retained intrauterine devices and retained products of conception. It can be used simultaneously for directed biopsy of abnormal looking endometrium and removal of polyps.

MRI

MRI can assess the myometrial pathology better than ultrasonography and help to map the site of fibroids before planning myomectomy and embolization. Adenomyosis will be better evaluated by MRI than by ultrasonography. As per the NICE guidelines MRI should not be used as the first line diagnostic tool in abnormal uterine bleeding.[9]

Endometrial Sampling

Endometrial sampling is indicated in:

- Women over 40 years, who fail to respond to medical treatment
- Women with significant intermenstrual bleeding

- Suspicious of cavity pathology on imaging
- In patients with risk factors for endometrial cancer
- Endometrial study is also indicated in women with AUB with infrequent cycles with heavy bleeding as in anovulatory cycles and in obese patients with PCOS
- All women age 45 years or older with abnormal uterine bleeding to rule out endometrial cancer or a premalignant lesion.

Dilatation and curettage (DC) is still being used as a method of endometrial sampling though office procedures are available. Patients with prolonged bleeding can have temporary relief after dilatation and curettage. An endocervical sample may be taken before dilatation. The sample is blind and therefore will miss a focal lesion. Hysteroscopic directed sampling is recommended in the situation of a focal lesion found on ultrasound.[14]

The development of equipment for office-based endometrial sampling has mostly replaced the dilatation and curettage. Pipelle endometrial suction curette and Vabra aspirator can get adequate endometrial samples for evaluation. Continuation of bleeding with a normal report on such sample would necessitate the hysteroscopy directed biopsy.

MANAGEMENT

If history, examination and investigation suggest no evidence of any structural abnormality, pharmaceutical therapy using hormonal or nonhormonal agents could be started after discussing with the patient. Patients with acute HMB require agents that will control bleeding quickly. Although most women with acute AUB can be managed on an outpatient bases, acute bleeding occasionally will be severe enough to require hospitalization and emergency treatment. Some patients will require stabilization with IV fluids and blood transfusion. Acute anovulatory bleeding can be treated with estrogen, estrogen-progestin or progestin alone.

High Dose Progestin Therapy for Acute AUB

Acute severe anovulatory bleeding can be effectively treated with high dose progestin alone using medroxyprogesterone acetate 10–20 mg twice daily, megesterol acetate 20–40 mg twice daily, norethindrone 5 mg twice daily. Treatment should be continued for one with the high dose followed by one daily dose for three weeks. High dose progestin treatment induces stabilizing predecidual changes in a thickened, vascular and fragile endometrium. Progestin withdrawal will result in the so-called "medical curettage". Thereafter cyclic progesterone treatment or an estrogen-progesterone COC pill can be given for long-term management.

Munro et al. (2006)[15] reported the result of a randomized controlled trial with oral medroxyprogesterone acetate and combination of oral contraceptives for acute uterine bleeding. Medroxyprogesterone acetate was given in a dose of 20 mg three times a day for one week and then 20 mg daily for three weeks. OC containing 1 mg norethindrone and 35 µg ethinyl estradiol three times a day for week followed by 1 daily for three weeks was given to the control group. Cessation of bleeding had occurred in 88% of the OC group and 76% of those receiving medroxyprogesterone acetate, with a median time to bleeding cessation of 3 days for both groups.

Though depot-medroxyprogesterone acetate is less effective for management of acute bleeding, Ammerman et al. (2013)[16] in a pilot study has shown that depot-medroxyprogesterone acetate 150 mg IM combined with 3 days of oral medroxyprogesterone acetate 20 mg every 8 hours for 9 doses is an effective outpatient therapy for acute abnormal uterine bleeding.

Estrogen Therapy for Acute Heavy Bleeding

When acute heavy bleeding result in a thin denuded endometrium, high dose estrogen therapy is the initial treatment. Estrogen stimulates endometrial re-epithelialization and proliferation. There is only one randomized study by DeVore GR et al. (1982)[17] who reported the effectiveness of high dose estrogen for control of acute heavy bleeding. Bleeding stopped in 72% of patients who received intravenous Premarin and in 38% who received placebo. 25 mg conjugated equine estrogen (Premarin) is given intravenously every 4 hours up to 24 hours and bleeding will be controlled within 8 hours. Then oral premarin 2.5 mg is given 6th hourly and tapering to once daily for one week. Medroxyprogesterone acetate is added for two weeks to stabilize estrogen stimulated endometrial growth.

Other Treatments for Heavy Menstrual Bleeding

Pharmaceutical treatment should be considered where no structural or histological abnormality is present, or for fibroids less than 3 cm in diameter which are causing no distortion of the uterine cavity.

Nonsteroidal Anti-inflammatory Drugs (NSAIDs)

Elevated levels of prostaglandin E2 and prostaglandin F2–α have been demonstrated within the uterine tissues

of women with heavy menstrual bleeding.[18] There is further evidence of deranged hemostasis (abnormal clotting) as the ratio of prostaglandin E2 to F2 and the ratio of prostacyclin to thromboxane A2 are elevated. NSAID reduce prostaglandin levels by inhibiting the enzyme cyclo-oxygenase and reduces blood loss by 20–40% and to a greater extent in those with excessive bleeding. In a Cochrane review including 17 randomized trials, NSAIDs reduced menstrual blood loss by 33–55% when compared with placebo, without a significant difference in adverse effects.[19] Mefanamic acid was most commonly studied and the usual dosage was 500 mg three times a day from onset of menses for four or five days or until menstruation ceased. Naproxen was given 500 mg twice a day for three to five days to get the therapeutic effect while Ibuprufen was effective in controlling the bleeding at a dose of 200–400 mg three times a day. NSAIDs have the added advantage of giving relief from dysmenorrhea. Significant differences in efficacy between different NSAIDs have not been demonstrated but the risk of gastrointestinal side effects was significantly less in the mefanamic acid group when compared with the naproxen group. Treatment with NSAIDs may be considered as the first line treatment for ovulatory bleeding with heavy menstrual bleeding and no demonstrable pathology. Clinical trials comparing NSAIDs to other medical agents have found them to be less effective in objectively reducing menstrual blood loss than tranexamic acid, the combined oral contraceptive pill, danazol, or the LNG-IUS.[20,21]

Antifibrinolytic Agents

An increase in the levels of plasminogen activators has been found in the endometrium of women with heavy menstrual bleeding compared to those with normal menstrual loss.[22] Plasminogen activators are a group of enzymes that cause fibrinolysis. Plasminogen activator inhibitors have, therefore, been promoted as a treatment for heavy menstrual bleeding. Tranexamic acid is an antifibrinolytic agent (or plasminogen activator inhibitor) that reversibly binds to plasminogen to reduce local fibrin degradation without changing blood coagulation parameters.

Tranexamic acid was approved by FDA in 2009 for the treatment of HMB. The dose is 1–1.5 g 3–4 times daily during periods. In placebo-controlled trials, Tranexamic acid has been shown to be effective in AUB with an overall reduction in menstrual blood loss between 40% and 59%.[23]

Cochrane review has shown that antifibrinolytics are more effective than NSAIDs, oral luteal phase progestogens and ethamsylate in reducing heavy menstrual bleeding. There is a 25–50% reduction from baseline in menstrual blood loss for participants treated with tranexamic acid when compared to these medical therapies.[23]

Ethamsylate

This is hemostatic agent act by increasing the platelet adhesiveness and aggregation. Use of ethamsylate shows varying effect and may achieve up to 20% reduction in bleeding. Ethamsylate is less effective in controlling HMB and NICE guideline does not recommend its use in HMB.[8]

Combined Oral Contraceptive Pills

Combined oral contraceptive pill (OCP) is effective in controlling heavy menstrual bleeding in unexplained menorrhagia and in patients with adenomyosis and fibroid to a lesser extent. Long-term use can reduce the blood loss to 40–70%. Combined OCPs have the additional benefit of reducing dysmenorrhea and providing contraception. Combined OCPs can also be used in control of acute heavy bleeding as mentioned earlier (Munro 2006). NICE guideline 44(2007) states that it is appropriate to use combined OCPs for control of HMB if pharmacological therapy is appropriate. Cochrane review suggests that there is no difference in effectiveness between combined OCPs and NSAIDs.[24]

Oral Progestins

In patients with HMB due to anovulatory cycles with unopposed estrogen stimulation of endometrium, progestins, norethindrone 5 mg three times a day or medroxyprogesterone 10 mg daily for 10 days will result in controlled withdrawal bleeding. Ovulatory menorrhagia will not respond to luteal phase progesterone. They may respond to continued use of progestins from day 5 to 26, but with more side effects. NICE do not recommend luteal phase progestins for control of HMB.

Cochrane database review 2008 states that progestogens administered from day 15 or 19 to day 26 of the cycle offer no advantage over other medical therapies such as danazol, tranexamic acid, NSAIDs and the progesterone-releasing intrauterine system in the treatment of menorrhagia in women with ovulatory cycles. Progestogen therapy for 21 days of the cycle results in a significant reduction in menstrual blood loss, although women find the treatment less acceptable than using intrauterine levonorgestrel. This regimen of progestogen may have a role in the short-term treatment of menorrhagia.[25]

Gonadotropin-releasing Hormone Agonists (GnRHa)

Treatment with long-acting GnRHa can achieve short-term relief from HMB and can be used effectively as a preoperative adjunct in women waiting for myomectomy, endometrial ablation or hysterectomy. Due to the estrogen deficiency symptoms it can produce, the treatment is limited to 6 months. In severe anemia, GnRHa can be given

for 6 months at 3.75 mg dose monthly or 11.25 mg every three months. Due to the cost factor and the side effects, it is not recommended for long-term use.

Levonorgestrel-releasing Intrauterine System (LNG-IUS)

LNG-IUS (Mirena) has a reservoir with 52 mg levonorgestrel mixed with polydimethylsiloxane which control the rate of hormone release 20 μg per day. Menstrual blood loss in women with heavy menstrual bleeding can be reduced by 75 to 95% due to progesterone induced decidualization of the endometrium.

Cochrane Database of Systematic Reviews 2005[26] summarizes that the levonorgestrel-releasing intrauterine device (LNG-IUS) is more effective than cyclical norethisterone (for 21 days) as a treatment for heavy menstrual bleeding. Women with an LNG-IUS are more satisfied and willing to continue with treatment but experience more side effects, such as intermenstrual bleeding and breast tenderness. The LNG-IUS results in a smaller mean reduction in menstrual blood loss than endometrial ablation but there is no evidence of a difference in the rate of satisfaction with treatment. Women with an LNG-IUS experience more progestogenic side effects compared to women having TCRE for treatment of their heavy menstrual bleeding but there is no evidence of a difference in their perceived quality of life. The LNG-IUS treatment costs less than hysterectomy but there is no evidence of a difference in quality of life measures between these groups.

DANAZOL AND GESTRINONE

Use of danazol and gestrinone in control of HMB is limited because of its androgenic side effects.

Iron Therapy

Anemia due to HMB should be treated with oral iron therapy which will improve the sense of well-being.

Surgical Management of Heavy Menstrual Bleeding

Most women with heavy menstrual bleeding will have control of HMB with medical management. However, nearly 50% of women with HMB would have had hysterectomy within 5 years of their referral to a gynecologist, and at least 30% of the uterus removed will be anatomically normal.[27] Though hysterectomy ensures 100% effective treatment of HMB, it is a major operation with significant morbidity. As an alternative to hysterectomy, various endometrial ablative procedures were developed which gives satisfactory improvement, but later on many of them will require hysterectomy for a cure.

Endometrial Ablation/Resection

Endometrial ablation is used to control heavy menstrual bleeding when

- Bleeding has not responded to other treatments.
- Patient not desirous of further childbearing.
- Patient prefer not to have a hysterectomy to control bleeding.
- Other medical problems prevent a hysterectomy.

Endometrial destruction or ablation involves the removal of endometrial tissue. The endometrium has great powers of regeneration and to suppress menstruation successfully it is essential to remove the full thickness of this lining together with the superficial myometrium, including the deep basal glands. The deep basal glands are believed to be the primary foci for endometrial regrowth. This tissue may be removed under direct hysteroscopic view either by excision with an electrosurgical loop or by ablating the endometrium with some form of thermal energy of sufficient power to produce necrosis of the full thickness of the endometrium when applied to its surface.

The first generation endometrial ablation techniques require advanced hysteroscopic skills and longer operating times. These first generation techniques include Nd-YAG laser, Rollerball ablation and transcervical resection of the endometrium (TCRE). They all require direct hysteroscopic visualization. The expectation was that these first-generation ablation methods would become an alternative to hysterectomy but, analyses of recent hospital statistics in the UK suggest that first generation endometrial ablation has failed to have an impact on hysterectomy numbers.[28] The first generation ablation techniques require expertise and were associated with more complications.

Subsequently, second-generation non-hysteroscopic techniques have been developed, which are considered easier to perform, equally effective and safe. They can potentially be used in outpatient settings. The techniques use thermal energy, cryosurgery, electrosurgery and microwave energy.

Thermal Balloon Ablation

Several thermal balloon ablation systems are currently used worldwide. These are Cavaterm plus system, Thermablate Endometrial Ablation System and Thermachoice III Uterine Balloon Therapy System.

Thermachoice III Uterine Balloon System is a software-controlled devise to ablate endometrial tissue using thermal energy. After cervical dilatation of 5.5 mm, the Thermachoice device is introduced into the uterine cavity

and 5% dextrose water is instilled into the silicon bag at the tip. The fluid is heated to 87°C and circulated for 8 minutes.

All hot liquid balloon devices do not require hysteroscopy and complication rates are low. Thinning of the endometrium by pharmacological agents or dilatation and curettage prior to the procedure improves the success rate.

After resection or ablation 70–80% of women experience significantly decreased flow, and 15–35% of them will experience amenorrhea. As time passes on more and more failures occur due to regeneration of the endometrium. After 5 years, up to 15% may require hysterectomy for a cure.

Authors of Cochrane database of systematic reviews (2013) [29] on endometrial resection and ablation techniques for heavy menstrual bleeding concluded that:

- Endometrial destruction by first or second-generation techniques should be considered for all women with normal uteri who wish to reduce their heavy menstrual bleeding and wish to retain their uterus.
- The potential for second-generation methods to be performed under local anesthesia is a considerable advantage and should be considered in cases where general anesthetic may be having more risk.
- There is sufficient evidence to confirm that, on average, second generation techniques are technically more simple and quicker to perform than first-generation techniques, while satisfaction rates and reduction in heavy menstrual bleeding are similar. However, technical difficulties have not yet been completely resolved.

Hysterectomy

Hysterectomy gives 100% cure of abnormal uterine bleeding. Hysterectomy is not the first line management of HMB and is considered only when:

- Other treatment options have failed, are contraindicated or are declined by the woman
- The woman no longer wishes to retain her uterus and fertility
- The patient accepts amenorrhea and who has been fully informed requests for it
- The route of hysterectomy preferably be vaginal if possible or else laparoscopic or abdominal
- Healthy ovaries should not be removed at the time of hysterectomy especially in women under the age of 45 years
- Ovaries should only be removed only with the informed consent of the women having understood its impact on her future health including the need for hormone replacement therapy.

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