IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Endometrial Thermal Balloon Ablation For Abnormal Uterine Bleeding: A Case Report With *Ayurvedic* Interpretation

[1]Dr. Jigisha H. Tanna, [2]Dr. Manda S. Ghorpade, [3]Dr. Kalpana B. Ayare

[1]B.A.M.S., M.S. Scholar (*Prasutitantra evum Striroga*), [2]B.A.M.S., M.S. (*Prasutitantra evum Striroga),* [3]B.A.M.S., M.S., PhD (*Prasutitantra evum Striroga*), Professor and Head of Department of *Prasutitantra evum Striroga*

[1]Department of *Prasutitantra evum Striroga*,

[1]MAM's Sumatibhai Shah Ayurved Mahavidyalaya, Hadapsar, Pune, India

Abstract: Endometrial ablation is a minimally invasive treatment aimed at destroying or removing the inner lining of the Uterus – Endometrium, to reduce or stop menstrual flow altogether in patients with Abnormal Uterine Bleeding.

Endometrial ablation is typically recommended for women who experience menorrhagia, for whom medication has not been effective, and for those who do not wish to undergo a Hysterectomy.

Endometrial Thermal Balloon Ablation (ETBA) may be conceptually equated with *Agnikarma*, as both utilize controlled thermal energy to ablate diseased tissue and induce *Rakta-stambhana*.

A 45-year-old female with Abnormal Uterine Bleeding came to our department with

C/O – Intermittent PV bleeding for the past 2 months with UPT Negative.

O/E - Patient's vitals were stable.

Per Abdominal examination – Soft and Non-tender.

Per vaginal examination revealed a bulky Uterus, corresponding to 8 weeks.

Surgical H/O – Diagnostic D&C done and HPE reports suggestive of Cystic Glandular Hyperplasia without atypia.

USG suggestive of Bulky Uterus with Thick Cystic Endometrium with Bilateral ovarian cyst.

The patient consented to Endometrial Thermal Balloon Ablation under Spinal Anaesthesia. Initially, dilatation and curettage was done, followed by Endometrial Thermal Balloon Ablation, and Endometrial fire (smoke) was achieved as the endpoint. The patient was vitally stable and discharged without complication.

KEYWORDS: Endometrial ablation, Endometrium, Abnormal Uterine bleeding, Bulky Uterus, Thermal balloon, Menorrhagia, *Agnikarma*.

I. INTRODUCTION:

The stratum basalis is the deep, permanent layer of the endometrium that does not shed during menstruation. It remains thin and relatively constant (2–4 mm) and serves as the regenerative layer from which the functional layer is rebuilt, while the functional layer shows marked cyclical thickness changes ranging from 2-16mm.

Abnormal uterine bleeding (AUB) refers to uterine bleeding that differs from normal menstruation in frequency, duration, or amount. Normal menses occur every 21–35 days and last for 3–7 days; any deviation is considered abnormal.

Dysfunctional uterine bleeding (DUB) is a subtype of AUB diagnosed after excluding all organic, systemic, and iatrogenic causes. That means:

- There are no fibroids, polyps, infections, cancers, hormonal disorders, pregnancy problems, or bleeding diseases, and
- The uterus looks normal, but the bleeding is still abnormal.
- So, DUB is basically abnormal bleeding with no obvious cause — a **"Diagnosis of exclusion."**

In DUB, bleeding problems are usually due to hormone imbalances, and may be associated with or without ovulation and accordingly grouped into:

1. Anovulatory DUB (most common)

- Anovulatory bleeding is commonly excessive and prolonged. Due to the absence of ovulation, progesterone is not produced, and the endometrium remains under the continuous influence of estrogen throughout the cycle. Because progesterone normally provides structural stability, its absence results in poor stromal support, making the endometrium fragile and unstable.
- When estrogen levels eventually fall due to hypothalamic–pituitary feedback, the endometrium sheds irregularly and asynchronously due to anoxia caused by congestion of endometrial capillaries themselves. Eventually leading to prolonged bleeding rather than normal menstruation.
- This is very common in teens and women of peri-menopausal age.

2. Ovulatory DUB

- **Polymenorrhea** is characterized by frequent menstrual cycles, with or without heavy bleeding, due to shortening of the follicular phase from accelerated follicular development caused by increased FSH stimulation; rarely, it results from premature luteal phase regression.
- **Oligomenorrhea** – Menstrual cycles longer than 35 days. This disturbance results from reduced ovarian responsiveness to FSH or pituitary dysfunction. There is a prolongation of the proliferative phase, while the secretory phase remains normal. But Oligomenorrhea is not an indication for Endometrial Thermal Balloon Ablation.
- **Ovulatory menorrhagia** is relatively rare and occurs in two forms:

○ Irregular Shedding of the Endometrium:

Prolonged endometrial shedding with delayed regeneration due to persistent progesterone, LH-mediated FSH suppression, and low estrogen results in prolonged/irregular bleeding.

○ Irregular Ripening of the Endometrium:

Due to defective corpus luteum with inadequate estrogen and progesterone, resulting in pre-menstrual spotting before normal flow.

The features of DUB include heavy or prolonged menstruation (>7 days), irregular, frequent (<21 days) or infrequent (>35 days) cycles, and intermenstrual bleeding or spotting. Menorrhagia is the most frequent form of DUB in women of reproductive age.

Menorrhagia means very heavy or prolonged menstrual flow, defined as:

- Blood loss during menses or in the intermenstrual period is more than normal (clinically >80 mL),
- or bleeding for more than 7 days.

Even though the bleeding is uterine in origin, bleeding can cause anaemia and fatigue, impair daily activities and quality of life, and may indicate an underlying hormonal imbalance.

Thermal ablation is a minimally invasive medical procedure that uses extreme temperatures (either heat or cold) to induce coagulation necrosis (cell death) to destroy or remove damaged or diseased tissue.
Endometrial Thermal Ablation is a medical procedure used to treat heavy menstrual bleeding by destroying the lining of the Uterus (Endometrium). It can reduce or stop menstrual bleeding by removing or destroying the tissue responsible for the bleeding. This procedure is an alternative to a Hysterectomy for women who do not respond to medical treatment.
There are four main types of thermal ablation: radiofrequency, microwave, laser, and cryoablation. The thermal ablation method used in this study relies on heat.
Mechanism of Action of Thermal Ablation:
1) Energy delivery: Probe delivers heat to destroy unwanted cells.
2) Tissue destruction: High temperatures damage the targeted cells, leading to their destruction. This tissue damage is irreversible. At 46°C, damage to targeted cells begins, and at temperatures above 60°C, cell death is nearly instantaneous due to rapid protein denaturation and melting of the cell membrane.
3) Scar tissue formation: Destroyed cells are gradually replaced by scar tissue, which may shrink over time.

Techniques of Endometrial Thermal Ablation are:
1) Hydrothermal ablation, where heated saline circulates within the uterine cavity to destroy the endometrium but carries a risk of thermal injury.
2) Heated balloon ablation, in which a fluid-filled balloon is placed in the uterus to safely and uniformly ablate the endometrial lining.
Purpose:
• To reduce or stop heavy menstrual bleeding.
• To improve the quality of life.
• As an alternative to a Hysterectomy.
Risks & Complications:
• Pain, cramping & nausea during or immediately after the procedure.
• Vaginal spotting or bleeding.
• Thermal burns, Infection and Perforation of the uterus.
Endometrial Thermal Balloon Ablation (ETBA) is preferred in women who have met their desired parity, as it may affect fertility. Endometrial hyperplasia is to be ruled out for malignancy by HPE before ablation.

***Ayurvedic* Concepts:**
Ayurveda describes four treatment modalities—*Bheshaja* (medicinal therapy), *Shastra* (surgical procedures), *Kshara* (alkaline therapy), and *Agni* (*Agnikarma*/thermal cauterization) as described by *Acharya Sushruta*. Among them, *Agnikarma* is considered superior due to its ability to prevent recurrence of disease (*Apurnarbhava*), also diseases that are incurable by medicines or *Kshara* become curable by *Agnikarma*.
Agnikarma is a para-surgical procedure extensively described by *Acharya Sushruta*. It is also described in *Charak Samhita*, *Ashtang Hridaya* and *Harita Samhita*. It involves the application of controlled therapeutic heat using heated instruments (*Agnishalaka*) to eradicate diseased tissue and arrest bleeding.
Agnikarma is classified into two types, i.e.
1. *Tvak Dagdha* – burning of the skin and
2. *Mamsa Dagdha* – burning of the muscles

तत्र द्विविधाग्निकर्माहुरेके त्वक् दग्धं, मांसदग्धं च इह तु
सिरास्नायुसन्ध्यास्थिष्वपि न प्रतिषिद्धोऽग्नि ॥
त्वक् मांस संश्रितो वायु त्वग्दाहेनैव शाम्यति। मांसदग्धेहि शाम्यन्ति सिरास्नाय्वस्थि सन्धिजाः।

- टीका सु. सू. १२/७

According to the *Dhanwantari* school of surgery, conducting *agnikarma* on *sira* (veins), *snayu* – ligaments, *sandhi* – joints, *asthi* (bones) is also not prohibited. *Agnikarma* performed at the level of the skin (*Tvak Dagdha*) alleviates diseases located at skin and muscle tissue and pacifies the local *Vata*.

Agnikarma carried out up to the level of the muscle tissue, or deeper (*Mamsa dagdha)*, pacifies *Vata* situated in the muscle, vessels (*sira*), ligaments (*snayu*), bones (*asthi*), and joints (*sandhi*), thereby curing the diseases of those structures. So, it establishes a functional correlation between *Mamsa Dagdha* and Endometrial Thermal Balloon Ablation (ETBA).

Acharya Charaka defines Menorrhagia as -

रजः प्रदीर्यते यस्मात् प्रदरस्तेन स स्मृतः ।

- च. चि. ३०/२०९

It implies that when *raja* (menstrual blood) undergoes *pradirana,* that is, excessive flow, overextension, or increased quantity, then it is called *Pradara*. Likewise, when *asruka* is discharged in an excessive or abnormal amount, the condition is known as *Asrugdara*. Thus, *Asrugdara* or *Pradara* represents a pathological state characterized by abnormal uterine bleeding.

Acharya Sushruta has indicated *Agnikarma* for *Shonita atipravritti*

त्वक् मांससिरास्नायुसन्ध्यस्थिस्थितेऽत्युग्ररुजे**…….**नाडीशोणितातिप्रवृत्तिषु चाग्निकर्म कुर्यात् ॥

- सु. सू. १२/१०

Acharya Charak has also mentioned *Agnikarma* for *Rudhir atipravritti*

रुधिरेऽतिप्रवृत्ते तु छिन्ने छेदयेऽधिमांसके। **…….**कर्माग्नेः सम्प्रशस्यते ॥

- च. चि. २५/१०१-१०२

Acharya Sushruta describes four fundamental mechanisms of hemostasis used in the management of bleeding and wounds namely *Sandhana*, *Skandana*, *Pachana* and *Dahana*.

चतुर्विधं यदेतद्धि रुधिरस्य निवारणम् । सन्धानं स्कन्दनं चैव पाचनं दहनं तथा ॥

व्रणं कषायः सन्धत्ते रक्तं स्कन्दयते हिमम् । तथा सम्पाचयेद्भस्म दाहः सङ्कोचयेत् सिराः॥

- सु. सू. १४/४०-४१

Kashaya (astringent drugs) help in *Sandhana*, i.e., they unite the wound edges and promote healing. *Hima* (cold substances) cause *skandana*, i.e., they coagulate blood and arrest bleeding. *Bhasma* (alkaline/caustic preparations) brings about *Sampachana*, i.e., they help in the proper processing and drying of vitiated blood. *Dahana* (cauterization) causes *sankocha* of *sira*, i.e., constriction of blood vessels, thereby stopping bleeding.

II. MATERIALS & METHODS:

Balloon Material:

In Endometrial Thermal Balloon Ablation (ETBA), a catheter-mounted balloon is inserted into the uterus and filled with hot liquid to ablate the endometrium. The balloon is made of silicone or latex-coated material, and most commercial devices (e.g., ThermaChoice, Cavaterm) use silicone balloons.

Balloon Size and Dimensions:

In ETBA, the catheter is thin (4–8 mm in diameter) and about 16 cm long. The balloon is designed to conform to the uterine cavity with a maximum capacity of 30–50 mL, while the working inflation volume usually ranges from 2–30 mL using heated liquid (5% dextrose or sterile water). Latest systems include automatic safety controls that monitor pressure and leaks and shut down the device if abnormalities are detected, minimizing the risk of balloon rupture and thermal injury.

Working of the Thermal Balloon Ablation Machine:

The Endometrial Thermal Balloon Ablation System destroys the endometrial lining of the uterus using heat delivered through a fluid-filled balloon. Once the endometrium is ablated(destroyed), it reduces or stops abnormal uterine bleeding.

How it works:

1) Insertion – A thin, soft balloon catheter is inserted into the uterus through the cervix.
2) Inflation – The balloon is inflated with a sterile fluid (usually saline or a glycol-based fluid).
3) Heating – The fluid is heated to approximately 85-90℃ and maintained for several minutes(10-12minutes).
4) Thermal ablation – The heated fluid transfers energy to the uterine lining, destroying the endometrial tissue.
5) Completion – The balloon is deflated and removed.

The endpoint of endometrial thermal balloon ablation is the destruction of the uterine lining (endometrium) to a depth of roughly 4–6 mm, targeting the basal layer to prevent regeneration. Appearance of smoke or burning smell during endometrial thermal balloon ablation is generally considered a sign of successful extensive tissue destruction.

Target Depth: The procedure aims to ablate the endometrial lining along with a limited depth of the superficial myometrium, thereby preventing endometrial regrowth.

Success Metrics: Clinical success is primarily assessed by a marked reduction in menstrual blood loss, with many patients achieving amenorrhea or minimal menstrual flow.

Post-Procedure Assessment: It is commonly verified through follow-up ultrasonography, demonstrating a uniformly thinned endometrium, generally measuring less than 5 mm.

Indications:

(a) Failure or intolerance of medical therapy.
(b) Women who do not wish to preserve menstrual or reproductive function. (c) Uterus - normal size or not bigger than 10 weeks of pregnancy size.
(d) Small uterine fibroids (<3 cm).
(e) This approach is suitable for a woman under 40 who wishes to avoid extensive surgery, or one for whom surgery is not advised due to conditions such as uncontrolled diabetes, thalassemia, or idiopathic thrombocytopenic purpura (ITP).
(f) Woman who prefers to preserve her uterus.

Contraindications:

(a) Pregnancy
(b) Women who desire future fertility
(c) Active pelvic infection
(d) Uterine anomalies (e.g., small, large, or distorted cavities)
(e) Known/suspected endometrial hyperplasia or cancer.
(f) Uterine cavity length >10cm or <4cm.
(g) Post menopausal women.

Complications:

Specific late complications include Hematometra, continued bleeding or pain. PATSS (Post Ablation Tubal Sterilization Syndrome) is seen in women with a previous history of tubal ligation, where menstrual fluid becomes trapped in the fallopian tube, causing pain.

Immediate/Perioperative Complications:

- ❖ Uterine perforation - accidental puncture of the uterine wall.
- ❖ Thermal injury to adjacent organs - such as the bowel or bladder.
- ❖ Haemorrhage - rare but possible.
- ❖ Infection - including endometritis or pelvic inflammatory disease (PID).
- ❖ Anaesthesia-related complications - depending on the method of sedation or anaesthesia.

Short-Term/Postoperative Complications:

- ❖ Cramping and pelvic pain - common in the first few days.
- ❖ Vaginal discharge - watery, sometimes mixed with blood, lasting days to weeks.
- ❖ Infection - delayed endometritis or other pelvic infections.
- ❖ Urinary tract symptoms - dysuria, frequency, or urgency.

Long-Term Complications:

- ❖ Post-ablation syndrome (late-onset endometrial ablation failure)

Characterized by cyclic pelvic pain and/or hematometra (blood trapped in the uterus due to scarring). It can require further intervention or hysterectomy.

- ❖ Hematometra - accumulation of blood in the uterus due to scarring.
- ❖ Cervical stenosis - narrowing or closure of the cervix, due to scarring.
- ❖ Failure of symptom control - continued or recurrent abnormal bleeding.
- ❖ Difficulty in future endometrial assessment - Endometrial sampling or biopsy may be challenging or impossible.
- ❖ Risk of delayed diagnosis of endometrial hyperplasia or cancer.
- ❖ Need for hysterectomy - up to 20-25% of women may eventually require hysterectomy due to persistent symptoms or complications.

III. CASE REPORT:

A 45-year-old non-tubectomized female came to the *Prasutitantra evum Striroga* department with Abnormal Uterine Bleeding.

Obstetric History – G5 P1 L1 A4 D0 with previous LSCS

Patient was a known case of Schizophrenia for 25 years and was on medications –

a) Tb. Trihexyphenidyl 2mg 1BD
b) Tb. Clozapine 100mg 1 HS
c) Tb. Clomipramine 25mg 1HS
d) Tb. Ziproj 40mg 1 HS
e) Tb. Aripiprazole 30mg 1 HS

The menstrual history of the patient was regular earlier, but had been irregular for the last 6 months. Patient had 1st episode of Menorrhagia with USG suggestive of endometrial thickness 15.7mm and a bulky uterus with Bilateral ovarian cysts. The right ovary showed a small simple follicular cyst of size 26x18mm, and the left ovary showed a small simple follicular cyst of size 36x27mm. CA-125 value was 29.4 U/ml (Normal).

Patient was posted for Diagnostic Dilatation & Curettage under General anaesthesia & Histopathological Examination (HPE) reports were suggestive of Cystic Glandular Hyperplasia without Atypia. Post Diagnostic D&C, the patient had Intermittent PV bleeding and was prescribed Progesterone only pills (Tb. Loette 1 OD). Even with ongoing hormonal treatment with a proper regimen, the patient had PV bleeding on & off. So,

all anticipated treatment regimens and plans were explained to the patient and her family. As the patient desires to preserve her uterus, the Endometrial Thermal Balloon Ablation plan of treatment was accepted. Hence, the patient consented to Endometrial Thermal Balloon Ablation under Spinal Anaesthesia.

Physical examination - Vitals stable

P/A – soft & non-tender,

P/S – Cervix healthy,

P/V – Uterus bulky and corresponding to 8 weeks, with minimal PV bleeding noted on gloved finger

Laboratory Investigations-

Haemogram - Hb-13 gm%; WBC-9490/cmm; Plt-1,73,000/cmm

Blood Group = 'B' Rh Positive.

Her Coagulation test, Kidney & Liver Function test & Urine Routine test appeared Normal.

Surgical Intervention:

Under Spinal Anaesthesia initially, Cervical Dilatation & Curettage was done. Then, a Deflated Thermal Balloon was inserted into the uterine cavity. The balloon was connected to the Thermal Ablation machine, which controlled pressure, temperature and time of treatment.

The thermal balloon was inflated automatically by the Thermal ablation machine, containing 12ml of hot water circulating inside the balloon at a temperature of 91℃ for 12 minutes.

In this way, thermal energy was used to destroy the endometrial lining. The endpoint of the procedure was achieved by observation of smoke (Endometrial fire) around the thermal balloon. The balloon was deflated automatically by the Thermal ablation machine, and the deflated balloon was removed.

Peri and postoperative complications were not observed. Antibiotic coverage and analgesics were given. The patient was vitally stable and hence discharged.

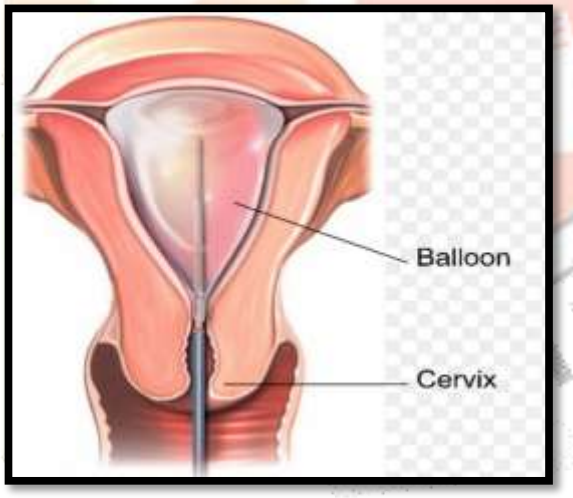

Fig. 1 Endometrial Thermal Balloon Ablation

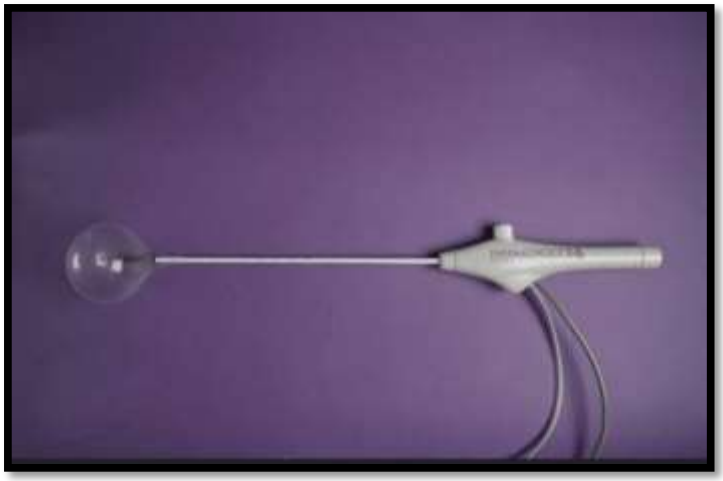

Fig. 2 Probe with a balloon of the Endometrial thermal ablation machine

Fig. 3 Endometrial Thermal Balloon Ablation Machine

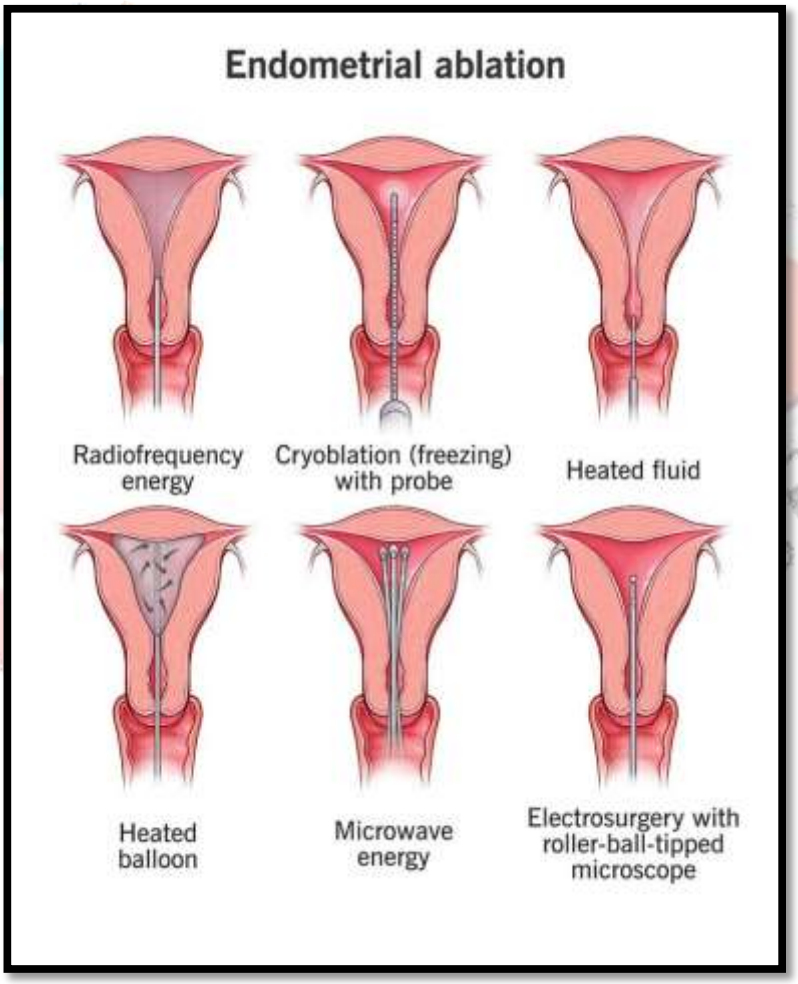

Fig. 4 Types of Endometrial Ablation

IV. DISCUSSION:

Endometrial thermal balloon ablation has emerged as a viable minimally invasive alternative to Hysterectomy for Abnormal uterine bleeding, particularly in women who have completed their family but still desire to preserve the uterus. It effectively controls menorrhagia, leading to reduced menstrual flow, improved quality of life, and minimal intra-operative complications, with amenorrhea achieved in around 30–55% of cases.

Compared to hysterectomy, it offers less invasiveness and faster recovery, though some patients may experience persistent or recurrent bleeding, requiring repeat ablation or hysterectomy. The presence of sub-mucosal fibroids, a distorted uterine cavity or adenomyosis may be associated with poorer outcomes, reaffirming the importance of careful patient selection, pre-procedural imaging and counselling especially regarding irreversibility and fertility concerns. Rare complications include uterine perforation, infection, and PATSS.

Thermal Endometrial Ablation can be conceptually correlated with *Agnikarma* as both employ controlled thermal energy to destroy pathological tissue and achieve *Rakta-stambhana*. In *Ayurveda*, *Agni* is indeed *ushna*, representing the essential heat, intensity and transformative power (*paka*). Due to *Pachana*, there is disintegration (*vighatana)* of cells ultimately leading to cell death and loss of original function. This also supports the mechanism of action of ETBA, which is the destruction of the endometrial lining leading to Amenorrhea.

Classical references from *Sushruta Samhita* validate the principles of heat-induced hemostasis and non-recurrence, making Endometrial Thermal Balloon Ablation a modern technological adaptation of the *Agnikarma* concept in the management of Heavy bleeding.

Agnikarma when performed to the depth of muscle tissue or beyond is indicated for disorders involving deeper structural components, as it effectively pacifies aggravated *Vata* localized in muscular, vascular, and supportive tissues. Comparably, Endometrial Thermal Balloon Ablation applies controlled thermal energy to the endometrium and superficial myometrium, targeting the pathological tissue layer responsible for excessive bleeding. Thus, a functional correlation between *mamsa dagdha* and ETBA establishes integrative scope for further study.

V. SUMMARY:

Endometrial thermal balloon ablation (ETBA) is a minimally invasive and uterus-preserving alternative to hysterectomy for the management of abnormal uterine bleeding, particularly in women who have completed childbearing or those under 40 years of age. It effectively controls menorrhagia, resulting in reduced menstrual flow, improved quality of life, minimal peri-operative complications, and amenorrhea in approximately 30–55% of cases. Although recovery is faster and morbidity is lower than hysterectomy, a small proportion of patients may require repeat procedures or hysterectomy, especially in the presence of submucosal fibroids, distorted uterine cavity, or adenomyosis, highlighting the importance of careful patient selection, imaging, and counselling.

It is not a form of contraception, so reliable birth control is advised if the uterus is retained. Patients with a desire for future fertility are generally not good candidates for Endometrial Thermal Balloon Ablation.

Classical references from *Sushruta Samhita* support heat-induced hemostasis and non-recurrence, allowing ETBA to be viewed as a modern technological adaptation of *Agnikarma*.

Thus, Endometrial thermal balloon ablation is an effective first-line treatment in the management of abnormal uterine bleeding of benign origin.

VI. REFERENCES:

1) Amso NN, Fernandez H, Vilos GA. Uterine endometrial thermal balloon therapy for the treatment of menorrhagia: long-term multicentre follow-up study. Hum Reprod. 2003;18(5):1082-1087

2) American College of Obstetricians and Gynecologists (ACOG). (2017). Management of abnormal uterine bleeding in reproductive-aged women. Practice Bulletin No. 128. Obstet Gynecol, 120(1), 197-206. https://www.acog.org/clinical/clinical-guidance/practice-bulletin/articles/2017/08/management-of-abnormal-uterine bleeding.

3) Berek, Jonathan S.; Berek & Novak's Gynecology, 16th Edition; Philadelphia, PA: Wolters Kluwer; 2020; Chapter on Abnormal Uterine Bleeding and Endometrial Ablation.
4) Barbieri, Robert L.; Menopause and Medical Gynecology, 3rd Edition; Philadelphia, PA: Elsevier; 2014.
5) Cunningham, F. Gary, et al.; Williams Obstetrics, 25th Edition; New York, NY: McGraw Hill; 2018.
6) https://images.app.goo.gl/Umh7DKy2ejuZJgy99
7) https://share.google/A9xs4kg0PwcxZOTZb
8) https://images.app.goo.gl/snHAw3KJet5enwj1A
9) https://images.app.goo.gl/zxdvZU9MY8qG94GW7
10) https://pmc.ncbi.nlm.nih.gov/articles/PMC3387747/
11) Gogate R. Viddha and Agnikarma Chikitsa. Pune: Vaidyamitra Prakashan; 2006. Chapter 1. p. 5 -11.
12) Tiwari P. Part II Striroga. 2nd Edition. Varanasi: Chaukhamba Orientalia; 2018 reprint. Chapter 2. p. 172.
13) Konar H, Editor. DC Dutta's Textbook of Gynecology. 7th Edition. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.; 2016 reprint. Chapter 15. p. 154-155.
14) Konar H, Editor. DC Dutta's Textbook of Gynecology. 7th Edition. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.; 2016 reprint. Chapter 15. p. 158-159.
15) Sharma A, Editor. Sushruta Samhita. Hindi Commentary. Varanasi: Chaukhamba Surbharati Prakashan; 2022. Sutrasthana, Chapter 12, Verse 3. p. 85.
16) Sharma A, Editor. Sushruta Samhita. Hindi Commentary. Varanasi: Chaukhamba Surbharati Prakashan; 2022. Sutrasthana, Chapter 12, Verse 7. p. 86.
17) Sharma A, Editor. Sushruta Samhita. Hindi Commentary. Varanasi: Chaukhamba Surbharati Prakashan; 2022. Sutrasthana, Chapter 12, Verse 10. p. 87
18) Sharma A, Editor. Sushruta Samhita. Hindi Commentary. Varanasi: Chaukhamba Surbharati Prakashan; 2022. Sutrasthana, Chapter 14, Verse 40. p. 111.
19) Kale VS, Editor. Charak Samhita. Vaidyamanorama Marathi Commentary. Delhi: Chaukhamba Sanskrit Pratishthan; 2016 reprint. Chikitsasthana, Chapter 25, Verse 101-102. p. 604.