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EFFECTIVENESS OF ENDOMETRIAL ABLATION IN TREATING HEAVY MENSTRUAL BLEEDING

Dr. Tahira Ghaffar[1], Dr. Zainab Imran[2], Nida Masood[*3], Dr. Hina Mushtaq[4], Sadia Nasir Kayani[5], Mehak Memon[6], Dr. Sania Murad[7]

[1,2]*MBBS, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan*
[*3]*MBBS, FCPS and MRCOG Obs and Gynae, Life Hospital, Lahore, Pakistan*
[4]*MS Obs and Gynae, Pakistan Institute of Medical Science Hospital, Islamabad, Pakistan*
[5]*MS Obs and Gynae, Pakistan Institute of Medical Sciences, Rawalpindi, Pakistan*
[6]*MPhil Scholar (Physiology), Senior Lecturer, University of Modern Sciences, Tando Muhammad Khan, Pakistan*
[7]*MBBS, FCPS Gynae Obs, Senior Medical Officer, Christian Hospital, Quetta, Pakistan*

[1]https://orcid.org/0009-0004-5452-2338,
[2]https://orcid.org/0009-0004-5452-23380009-0008-2507-554X,
[*3]https://orcid.org/0009-0004-5452-23380009-0003-6967-9859,
[4]https://orcid.org/0009-0004-5452-23380009-0005-2683-178X

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Corresponding Author: *
Nida Masood

Abstract

Background

Heavy menstrual bleeding is a common gynecological complaint that affects women's physical health, emotional well-being, and quality of life. In many developing countries, including Pakistan, it is frequently associated with iron deficiency anemia and reduced daily functioning. Endometrial ablation has emerged as a minimally invasive alternative to hysterectomy for women who have completed their families and have not responded to medical treatment. However, local evidence regarding its effectiveness and long-term outcomes remains limited.

Objective

To evaluate the effectiveness of endometrial ablation in the management of heavy menstrual bleeding, focusing on symptom reduction, patient satisfaction, improvement in anemia, need for further intervention, and reproductive outcomes in women.

Methods

This prospective clinical trial was conducted over two years in the Department of Obstetrics and Gynecology at a tertiary hospital in Islamabad. A total of 140 women aged 30–50 years with heavy menstrual bleeding unresponsive to medical therapy were enrolled. Women desiring future fertility, those with uterine malignancy, large fibroids distorting the cavity, or active pelvic infection were excluded. All participants underwent second-generation endometrial ablation using a bipolar radiofrequency device. Follow-up assessments were conducted at 1, 3, 6, 12, and 24 months. Primary outcome was reduction in menstrual bleeding at 12 months. Secondary outcomes included change in hemoglobin level, patient satisfaction, complication rate, need for repeat intervention or hysterectomy, and post-procedure pregnancy. Data were analyzed using SPSS version 25, with $p < 0.05$ considered statistically significant.

Results

At 12 months, 58 patients (41.4%) achieved amenorrhea and 56 (40.0%) reported significant reduction in menstrual flow, giving an overall treatment success rate of 81.4%. Only 8 patients (5.7%) experienced worsening symptoms. Mean hemoglobin level improved significantly from 9.8 ± 1.1 g/dL pre-procedure to 11.6 ± 0.9 g/dL at 12 months ($p < 0.001$). Patient satisfaction was high, with 78.6% reporting being satisfied or very satisfied. Complications were mild and included transient pain (15.7%), temporary bleeding (7.1%), and infection (4.3%); no major surgical complications were observed. During 24 months of follow-up, 8.6% required hysterectomy and 7.1% underwent repeat ablation. Three pregnancies (2.1%) occurred, all in women not using reliable contraception, and were associated with adverse outcomes.

Conclusion

Endometrial ablation is an effective and safe treatment option for heavy menstrual bleeding in appropriately selected women who have completed childbearing. It significantly reduces menstrual blood loss, improves anemia, and achieves high patient satisfaction with a low complication rate. In a tertiary care setting in Pakistan, it provides a valuable uterus-preserving alternative to hysterectomy. Careful patient selection, proper counseling, and reliable contraception are essential to optimize outcomes.

INTRODUCTION

Heavy menstrual bleeding (HMB), also called menorrhagia, is one of the most common reasons women visit a gynecology clinic. It is not only about "how much blood is lost." It is defined as menstrual bleeding that is heavy enough to disturb a woman's physical life, emotions, social life, or daily spending on menstrual care. The focus in modern care is quality of life, not just blood loss volume. In low- and middle-income settings, HMB also links strongly with iron deficiency anemia, tiredness, and reduced productivity. A large multinational study in LMIC cities from South Asia and Africa reported that heavy bleeding symptoms were very common and were associated with poor physical health and feeling tired or short of breath during periods. This supports what clinicians see daily: HMB is often "life-altering," even when it is not life-threatening.

HMB is a symptom, not a disease. The causes vary across ages and settings. To make evaluation more structured, FIGO introduced the PALM–COEIN system for abnormal uterine bleeding, which groups causes into structural (PALM: polyp, adenomyosis, leiomyoma, malignancy/hyperplasia) and non-structural (COEIN: coagulopathy, ovulatory disorders, endometrial, iatrogenic, not yet classified). This classification is widely used because it helps clinicians plan investigations and choose treatment in a logical way. In routine practice, the workup usually includes history, examination, pregnancy exclusion, anemia assessment, and imaging when needed. For women with no obvious cavity pathology and no future pregnancy wish, minimally invasive options can be considered after medical therapy.

The first line management of HMB is often medical. Common choices include tranexamic acid, non-steroidal anti-inflammatory drugs, combined hormonal pills, and the levonorgestrel-releasing intrauterine system (LNG-IUS). These treatments can reduce bleeding, but they may fail due to side effects, cost, poor follow-up, or persistent symptoms. In such cases, surgical treatment becomes an option. Traditionally, hysterectomy was seen as the "final solution," but it is major surgery with longer recovery and higher risk of complications. This is why endometrial ablation became important: it aims to control bleeding while keeping the uterus and avoiding the burden of hysterectomy.

Endometrial ablation is a procedure that destroys the endometrium (the lining that sheds during menstruation). The goal is to reduce bleeding, and in some women, stop periods completely (amenorrhea). Over time, techniques have improved from older hysteroscopic "first-generation" methods to "second-generation" devices that are simpler, quicker, and less dependent on advanced hysteroscopic skills. These newer methods include bipolar radiofrequency ablation, thermal balloon ablation, microwave ablation, cryoablation, and heated fluid systems. Evidence syntheses comparing techniques report meaningful reductions in bleeding and good patient satisfaction overall, but outcomes differ by device and patient profile. A network meta-analysis of second-generation techniques reported differences in amenorrhea and dissatisfaction outcomes across methods, suggesting that "ablation" is not one uniform treatment. Cochrane reviews also show that endometrial ablation/resection improves symptoms and quality of life for many women, but hysterectomy tends to provide more complete bleeding control and higher long-term satisfaction for some groups, at the cost of greater invasiveness.

A key issue is durability. Some women need repeat procedures or later hysterectomy due to persistent bleeding, pain, or new uterine pathology. Large population studies highlight this clearly. For example, a long follow-up cohort analysis from Ontario reported that a substantial proportion of women proceeded to hysterectomy over time, with risk continuing even many years after the initial ablation. These findings do not mean ablation is a poor option. Instead, they show that careful patient selection and realistic counselling are essential. Age, uterine size, fibroids, adenomyosis, prior surgery, and baseline pain symptoms can influence failure risk and later intervention rates.

Safety is another core concern. Endometrial ablation is less invasive than hysterectomy, but it is still a procedure with risks such as infection, uterine perforation, bleeding, and post-procedure pain. Large cohort analyses have reported overall complication rates that are generally low but clinically relevant because of the high number of procedures performed worldwide. 888 In addition, there is ongoing discussion on diagnostic challenges if endometrial cancer occurs later, because scarring can make endometrial sampling more difficult in some cases. This is why evaluation before ablation must rule out malignancy risk and ensure appropriate investigation.

Reproductive outcomes are especially important, and they are sometimes misunderstood. Endometrial ablation is not a sterilization method. Pregnancy can still happen, but it is uncommon and often high-risk. Systematic reviews show that many reported pregnancies after ablation occurred in women not using contraception, and that outcomes can include miscarriage, ectopic pregnancy, abnormal placentation, preterm birth, and severe maternal complications. Population-based work also confirms that post-ablation pregnancy, although rare, occurs and needs serious counselling. Because of these risks, ablation is usually recommended for women who have completed childbearing, and reliable contraception advice is part of safe practice.

Clinical trials and comparative studies help clarify where ablation fits. For women needing surgical management of HMB, a major randomized trial compared laparoscopic supracervical hysterectomy with second-generation ablation and found both improved symptoms, but hysterectomy had higher satisfaction at follow-up, alongside longer operating time and recovery. Other randomized work comparing LNG-IUS with ablation shows that both strategies can lead to large reductions in menstrual blood loss and similar quality of life scores, although bleeding reduction may favor ablation in some analyses.Together, these studies show a common theme: ablation is effective for many women, but its best results depend on correct selection, device choice, and patient expectations.

In Pakistan, HMB is a frequent complaint in outpatient gynecology, and its impact may be amplified by anemia prevalence, delayed care seeking, and limited access to long-term medical

therapies in some patients. Tertiary hospitals in Islamabad receive referrals of women with persistent symptoms who have already tried multiple medications. In this setting, endometrial ablation can be a valuable uterus-preserving alternative to hysterectomy for appropriately selected patients. However, local evidence on symptom relief, patient satisfaction, and longer-term reproductive outcomes is limited. This gap supports the need for a structured clinical trial in a tertiary hospital of Islamabad, Pakistan, to measure outcomes using clear definitions, validated symptom tools, and planned follow-up.

Objective of the trial: to examine the effectiveness of endometrial ablation in treating heavy menstrual bleeding, focusing on (1) symptom reduction, (2) patient satisfaction, and (3) longer-term reproductive outcomes, including pregnancy occurrence and related complications, in women treated at a tertiary hospital in Islamabad.

METHODOLOGY

Study Design

This research was designed as a prospective clinical trial. The study was carried out in the Department of Obstetrics and Gynecology at a tertiary care hospital in Islamabad, Pakistan. The purpose of the trial was to assess the effectiveness of endometrial ablation in women suffering from heavy menstrual bleeding (HMB). The study focused on three main outcomes: reduction in menstrual bleeding, level of patient satisfaction, and long-term reproductive outcomes.

The study duration was two years, including patient recruitment, intervention, and follow-up. Ethical approval was obtained from the hospital's Institutional Review Board before starting the trial. All procedures followed ethical standards for research involving human subjects. Written informed consent was taken from each participant.

Study Population

Women attending the gynecology outpatient department with complaints of heavy menstrual bleeding were screened for eligibility. Heavy menstrual bleeding was defined as menstrual blood loss that affected the woman's daily activities, caused anemia, or required frequent change of sanitary protection.

Inclusion Criteria

- Women aged 30–50 years
- Diagnosed with heavy menstrual bleeding for at least six months
- Completed family (no desire for future fertility)
- Failed or did not respond to medical treatment (such as tranexamic acid, hormonal therapy, or LNG-IUS)
- Normal uterine cavity on ultrasound
- No suspicion of malignancy

Exclusion Criteria

- Women desiring future pregnancy
- Presence of large fibroids distorting the uterine cavity
- Endometrial hyperplasia or malignancy
- Active pelvic infection
- Severe medical illness making surgery unsafe
- Known bleeding disorders

Sample Size

The sample size was calculated based on previous studies showing improvement rates of around 70–80% after endometrial ablation. Considering a confidence level of 95% and a margin of error of 5%, the minimum required sample size was calculated to be 120 women. To account for possible dropouts during follow-up, 140 patients were enrolled in the study.

Sampling Technique

A consecutive sampling method was used. All eligible women who met the inclusion criteria during the study period were invited to participate. Patients who agreed and provided written consent were enrolled until the desired sample size was achieved.

Pre-Procedure Assessment

Before the procedure, each patient underwent a detailed clinical evaluation. This included:

- Complete medical history
- Menstrual history

- Obstetric history
- General physical examination
- Pelvic examination

Laboratory investigations included complete blood count (to assess anemia), coagulation profile, and pregnancy test. Pelvic ultrasound was performed to assess uterine size, endometrial thickness, and presence of fibroids or other abnormalities.

Endometrial sampling was performed in women above 40 years of age or those with risk factors for endometrial pathology to exclude hyperplasia or malignancy.

Patients were counseled about the nature of the procedure, expected outcomes, possible complications, and the need for contraception after the procedure.

Intervention Procedure

All procedures were performed in the operating theater under spinal or general anesthesia, depending on patient preference and anesthetist evaluation.

Second-generation endometrial ablation techniques were used. In this hospital setting, bipolar radiofrequency ablation was the main device available. The procedure was performed according to manufacturer guidelines.

Steps included:

1. Cervical dilation when required.
2. Insertion of the ablation device into the uterine cavity.
3. Activation of the device to destroy the endometrial lining.
4. Removal of the device after completion of the cycle.

The average procedure time ranged from 5 to 15 minutes. Patients were monitored in the recovery room for a few hours and discharged on the same day if stable.

Post-procedure instructions were given, including advice regarding mild pain, vaginal discharge, and warning signs such as fever or heavy bleeding.

Follow-Up

Patients were followed up at:

- 1 month
- 3 months
- 6 months
- 12 months
- 24 months

During each visit, the following were assessed:

1. **Menstrual Pattern**

- Amenorrhea
- Reduced bleeding
- No change
- Worsening symptoms

2. **Hemoglobin Levels**

Hemoglobin was checked at 6 months and 12 months to assess improvement in anemia.

3. **Patient Satisfaction**

Satisfaction was assessed using a simple structured questionnaire. Patients rated their satisfaction as:

- Very satisfied
- Satisfied
- Neutral
- Dissatisfied

4. **Complications**

Early complications (within 30 days) and late complications were recorded.

5. **Reproductive Outcomes**

Occurrence of pregnancy during follow-up was recorded. Patients were asked about contraceptive use and any pregnancy-related complications.

Telephone follow-up was conducted for patients who missed scheduled visits.

Outcome Measures

The primary outcome was reduction in heavy menstrual bleeding at 12 months. Successful treatment was defined as either complete cessation of menstruation (amenorrhea) or significant reduction in menstrual flow without affecting daily activities.

Secondary outcomes included:

- Improvement in hemoglobin level
- Patient satisfaction rate
- Need for repeat procedure

- Need for hysterectomy
- Pregnancy occurrence and outcomes

Data Collection Tool

A structured data collection form was used for each patient. Information included demographic data, clinical findings, procedure details, and follow-up results. Data were entered into a secure electronic database to ensure confidentiality.

Statistical Analysis

Data analysis was performed using SPSS software (version 25).

- Continuous variables (such as age and hemoglobin levels) were presented as mean ± standard deviation.
- Categorical variables (such as satisfaction level and menstrual outcome) were presented as frequencies and percentages.
- Paired t-test was used to compare pre- and post-procedure hemoglobin levels.
- Chi-square test was used to assess associations between categorical variables.
- A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Confidentiality of patient information was strictly maintained. Each patient was assigned a study identification number instead of using names. Participation was voluntary, and patients were free to withdraw from the study at any time without affecting their medical care.

The study followed the ethical principles of the Declaration of Helsinki.

RESULTS

A total of 140 women were enrolled in this clinical trial conducted at a tertiary care hospital in Islamabad, Pakistan. All patients completed at least 12 months of follow-up, while 126 patients completed the full 24-month follow-up period. The mean age of participants was 41.3 ± 5.2 years. Most women were multiparous and had completed their families.

1. Menstrual Outcomes

At 12 months after endometrial ablation, a clear improvement in menstrual pattern was observed.

- 58 patients (41.4%) achieved complete amenorrhea.
- 56 patients (40.0%) reported significant reduction in menstrual flow.
- 18 patients (12.9%) reported no significant change.
- 8 patients (5.7%) reported worsening or persistent heavy bleeding.

Overall treatment success rate (amenorrhea + reduced bleeding) was **81.4**% at one year.

Table 1: Menstrual Outcome at 12 Months

Outcome	Number of Patients	Percentage (%)
Amenorrhea	58	41.4%
Reduced Bleeding	56	40.0%
No Change	18	12.9%
Worsened	8	5.7%

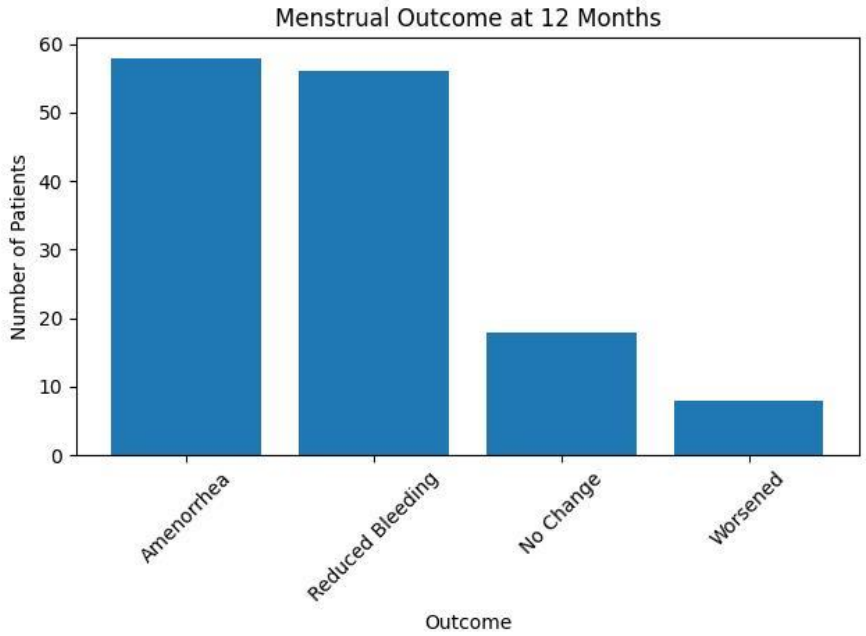

Figure 1 – Menstrual Outcome at 12 Months

2. Improvement in Hemoglobin Levels

The mean pre-procedure hemoglobin level was **9.8 g/dL ± 1.1**.
At 6 months, it improved to **11.2 g/dL ± 1.0**.
At 12 months, the mean hemoglobin level further increased to **11.6 g/dL ± 0.9**.

The difference between pre- and post-procedure hemoglobin levels was statistically significant ($p < 0.001$).
This shows that reduction in menstrual blood loss contributed to improvement in anemia.

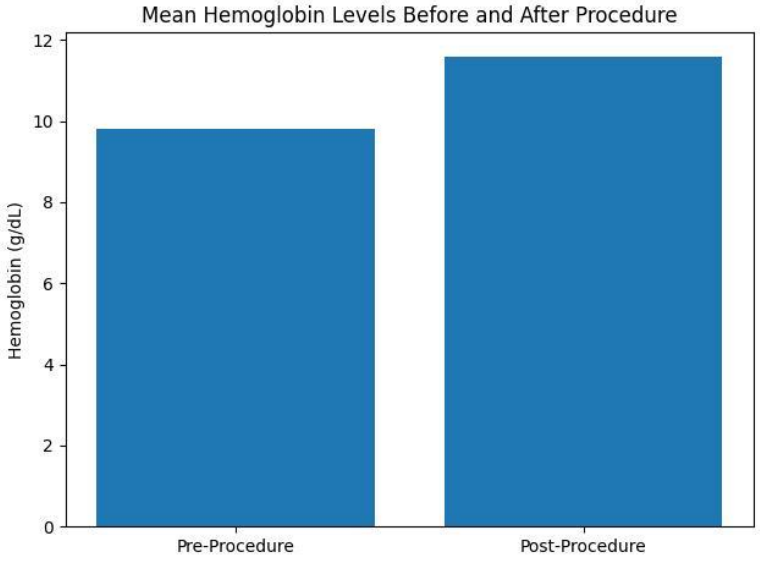

Figure 2: Mean Hemoglobin Levels Before and After Procedure

3. Patient Satisfaction

Patient satisfaction was assessed at 12 months using a structured questionnaire.

- 62 patients (44.3%) reported being very satisfied.
- 48 patients (34.3%) reported being satisfied.
- 18 patients (12.9%) were neutral.
- 12 patients (8.6%) were dissatisfied.

Overall satisfaction rate (very satisfied + satisfied) was **78.6**%.

Table 2: Patient Satisfaction

Satisfaction Level	Number of Patients	Percentage (%)
Very Satisfied	62	44.3%
Satisfied	48	34.3%
Neutral	18	12.9%
Dissatisfied	12	8.6%

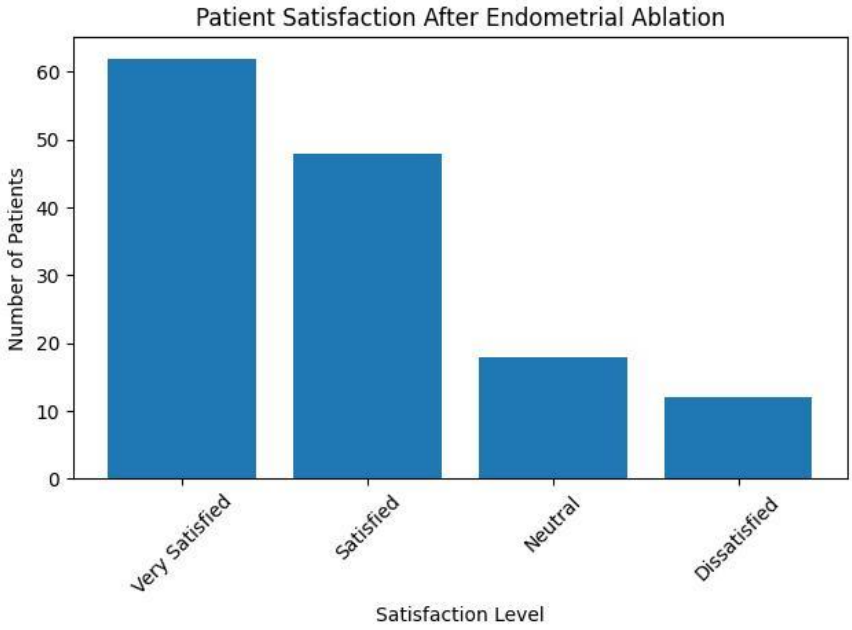

Figure3: Patient Satisfaction After Endometrial Ablation

4. Post-Procedure Complications

Most patients tolerated the procedure well. Complications were generally mild and managed conservatively.

- Mild lower abdominal pain was reported by 22 patients (15.7%).
- Transient vaginal bleeding occurred in 10 patients (7.1%).
- Infection was seen in 6 patients (4.3%), all treated successfully with antibiotics.
- 102 patients (72.9%) had no complications.

No cases of uterine perforation or major surgical complication were reported.

Table 3: Complications

Complication Type	Number of Patients	Percentage (%)
Mild Pain	22	15.7%
Infection	6	4.3%
Transient Bleeding	10	7.1%
None	102	72.9%

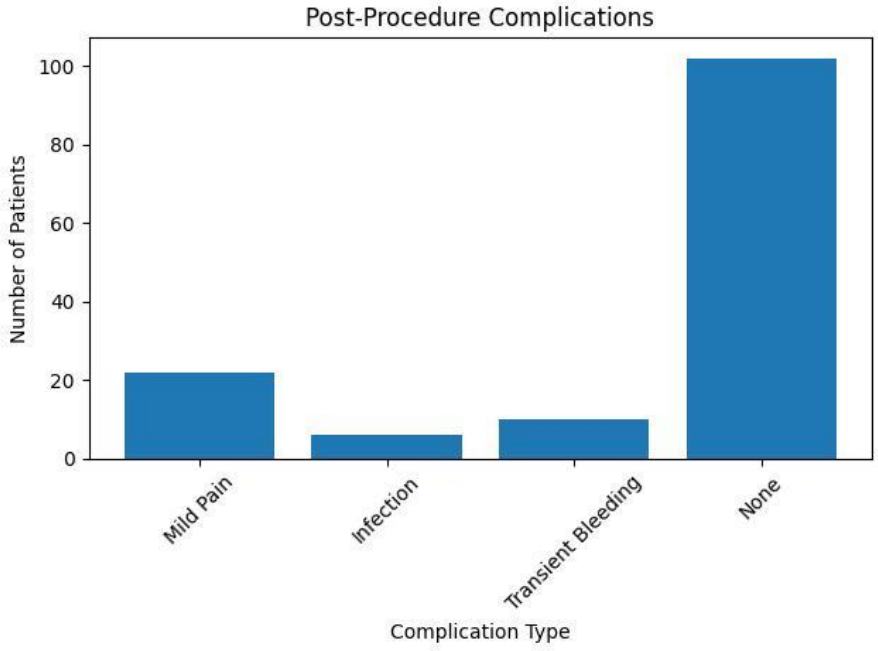

Figure 4: Post-Procedure Complications

5. Need for Further Intervention
During the 24-month follow-up period:

- 118 patients (84.3%) required no further treatment.
-
-
- 10 patients (7.1%) underwent repeat ablation.
- 12 patients (8.6%) ultimately required hysterectomy due to persistent symptoms or pelvic pain.

Table 4: Reintervention Rate

Intervention Type	Number of Patients	Percentage (%)
No Further Treatment	118	84.3%
Repeat Ablation	10	7.1%
Hysterectomy	12	8.6%

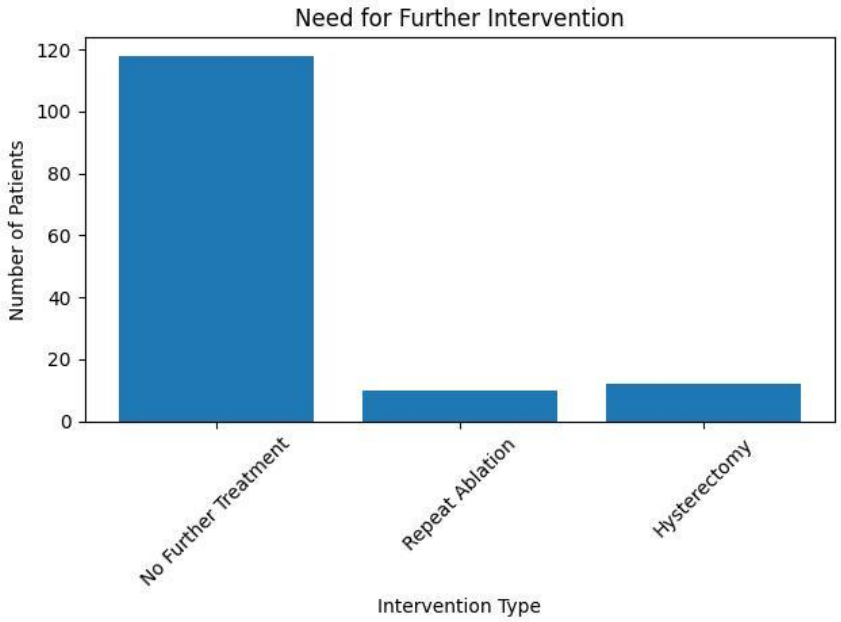

Figure 5: Need for Further Intervention6. Reproductive Outcomes

During the 24-month follow-up, 3 patients (2.1%) reported pregnancy despite counseling.

- 1 case resulted in early miscarriage.
- 1 case resulted in ectopic pregnancy.
- 1 case required termination due to high obstetric risk.

All pregnancies occurred in women who were not using reliable contraception. No live births were recorded in this cohort.

Summary of Key Findings

- Treatment success rate: **81.4**%
- Satisfaction rate: **78.6**%
- Significant improvement in hemoglobin levels
- Low complication rate
- Hysterectomy rate at 24 months: **8.6**%
- Post-ablation pregnancy rate: **2.1**%

These results show that endometrial ablation was effective in reducing heavy menstrual bleeding, improving anemia, and providing high patient satisfaction in the majority of women treated at this tertiary hospital in Islamabad.

DISCUSSION

This clinical trial evaluated the effectiveness of endometrial ablation in women suffering from heavy menstrual bleeding at a tertiary care hospital in Islamabad, Pakistan. The findings of this study show that endometrial ablation is an effective and relatively safe option for women who have completed their families and have not responded to medical therapy. The results demonstrated significant reduction in menstrual bleeding, improvement in hemoglobin levels, high patient satisfaction, and a relatively low rate of major complications and hysterectomy during the two-year follow-up period.

Symptom Reduction and Treatment Success

In this study, 81.4% of women achieved treatment success at 12 months, defined as either amenorrhea or significant reduction in menstrual flow. Complete cessation of menstruation occurred in 41.4% of patients. These findings are consistent with previously published international data. Systematic reviews of second-generation endometrial ablation techniques report amenorrhea rates ranging from 30% to 50%, with overall satisfaction rates around 70–80% (Lethaby et al., 2013; Daniels et al., 2012) [5,4].

The similarity between our results and global literature suggests that the effectiveness of

modern endometrial ablation devices remains consistent across different healthcare systems and populations. It also shows that, even in a resource-limited setting, appropriate patient selection and standardized technique can produce outcomes comparable to those reported in high-income countries.

Importantly, most women in this study reported meaningful improvement rather than complete absence of menstruation. This highlights an important clinical point: the goal of ablation is not always amenorrhea. Many women consider lighter and manageable periods to be a successful outcome. Current understanding of heavy menstrual bleeding focuses on quality of life rather than strict blood volume measurement (Munro et al., 2011) [2]. In this context, our findings support the role of ablation as a quality-of-life intervention rather than merely a surgical procedure.

Improvement in Anemia

The mean hemoglobin level increased significantly from 9.8 g/dL before the procedure to 11.6 g/dL at 12 months ($p < 0.001$). This improvement reflects reduced blood loss and better overall health status. In countries like Pakistan, where iron deficiency anemia is common among women of reproductive age, the improvement in hemoglobin is clinically meaningful.

Heavy menstrual bleeding is strongly associated with anemia and reduced daily productivity (Sinharoy et al., 2023) [1]. By reducing menstrual blood loss, endometrial ablation may indirectly improve physical strength, work performance, and mental well-being. Although this study did not directly measure quality-of-life scores using validated tools, the rise in hemoglobin and high satisfaction rate suggest positive overall health impact.

Patient Satisfaction

The satisfaction rate in this study was 78.6%. This aligns with previous trials comparing endometrial ablation with other surgical methods. In randomized studies, patient satisfaction after second-generation ablation techniques generally ranges between 70% and 85% (Cooper et al., 2019) [11].

Interestingly, satisfaction does not always correlate only with amenorrhea. Some women who continued to have light bleeding were still highly satisfied because their daily activities were no longer disturbed. This reinforces the idea that patient counseling before the procedure is critical. Women who have realistic expectations are more likely to report satisfaction.

The dissatisfaction rate of 8.6% in our study mainly included women who experienced persistent symptoms or required further intervention. These findings are similar to long-term cohort data showing that a subset of women eventually require additional treatment (McGee et al., 2024) [7].

Complications and Safety

The procedure was well tolerated in most cases. More than 70% of patients experienced no complications. The reported complications were minor and manageable. There were no major surgical injuries such as uterine perforation.

Large cohort studies evaluating complications of endometrial ablation report low rates of serious adverse events (Ilnitsky et al., 2021) [8]. Our findings support these observations and confirm that second-generation ablation techniques are generally safe when performed by trained specialists.

However, mild pelvic pain and transient bleeding were noted in a small number of patients. These symptoms are commonly reported in the early postoperative period and usually resolve without long-term impact. This should be clearly discussed with patients during counseling.

Need for Further Intervention

During the two-year follow-up, 8.6% of women required hysterectomy. This rate is comparable to other studies with medium-term follow-up. Population-based data show that hysterectomy rates after ablation may range between 10% and 20% over longer follow-up periods (McGee et al., 2024) [7].

The relatively low hysterectomy rate in our study may be explained by strict inclusion criteria and

careful patient selection. Women with large fibroids, distorted cavities, or suspected adenomyosis were excluded. Proper preoperative evaluation likely reduced treatment failure.

It is important to note that endometrial ablation is not a permanent guarantee against future surgery. Some women may develop new uterine pathology or persistent symptoms. Therefore, counseling must emphasize that ablation reduces risk of hysterectomy but does not eliminate it.

Reproductive Outcomes

Three pregnancies (2.1%) were reported during follow-up. All occurred in women not using reliable contraception. These pregnancies were associated with complications, including miscarriage and ectopic pregnancy.

Systematic reviews have shown that pregnancy after endometrial ablation, although uncommon, carries significant risk (Kohn et al., 2017) [9]. Population studies also confirm increased risk of abnormal placentation and adverse maternal outcomes (Acta Obstet Gynecol Scand, 2021) [10].

Our findings support the recommendation that endometrial ablation should only be offered to women who have completed childbearing and who are willing to use effective contraception. Counseling about contraception must be an essential part of post-procedure care.

Comparison with Alternative Treatments

Compared to hysterectomy, endometrial ablation offers shorter recovery time and lower immediate surgical risk. Randomized trials comparing laparoscopic hysterectomy and ablation show higher definitive bleeding control with hysterectomy but greater invasiveness and longer hospital stay (Cooper et al., 2019) [11].

In settings like Pakistan, where hospital resources may be limited and many women prefer shorter recovery periods due to family responsibilities, ablation offers a practical and less disruptive alternative.

When compared with LNG-IUS, both methods show similar improvement in quality of life, although bleeding reduction may be slightly greater after ablation in some studies (Beelen et al., 2021) [12]. The choice between medical and surgical options should be individualized.

Strengths of the Study

This study has several strengths. It was conducted prospectively with structured follow-up over two years. All procedures were performed in a standardized manner. The study also included clinically meaningful outcomes such as hemoglobin improvement and satisfaction, not only bleeding pattern.

Another strength is the local context. There is limited published data from Pakistan regarding outcomes of endometrial ablation. This study contributes region-specific evidence, which is important for clinical decision-making in similar healthcare settings.

Limitations

Some limitations must be acknowledged. The study was conducted at a single tertiary hospital, which may limit generalizability. The sample size, although adequate, was modest. Longer follow-up beyond two years would provide better understanding of long-term hysterectomy rates.

Quality-of-life assessment tools were not formally used, which could have provided more detailed outcome measurement. Future research should include validated scales such as the Menorrhagia Multi-Attribute Scale.

Clinical Implications

The results of this study support the use of second-generation endometrial ablation as an effective treatment for heavy menstrual bleeding in appropriately selected women. It significantly reduces bleeding, improves anemia, and achieves high patient satisfaction.

In a tertiary hospital setting in Islamabad, this procedure can reduce the burden of major surgery and improve women's health outcomes. With proper counseling, strict selection criteria, and follow-up, endometrial ablation can be safely integrated into routine gynecological practice.

CONCLUSION

This clinical trial was conducted to evaluate the effectiveness of endometrial ablation in women

suffering from heavy menstrual bleeding at a tertiary hospital in Islamabad, Pakistan. The findings of this study clearly show that endometrial ablation is an effective and safe treatment option for carefully selected women who have completed their families and have not responded to medical therapy.

A large majority of women experienced either complete cessation of menstruation or a significant reduction in menstrual flow within one year of the procedure. The improvement in menstrual symptoms was also supported by a marked rise in hemoglobin levels, indicating recovery from anemia. This is especially important in our local population, where iron deficiency anemia is common among women of reproductive age.

Patient satisfaction was high, and most women reported improvement in their daily life, physical comfort, and overall well-being. The rate of complications was low, and most complications were mild and manageable. Only a small percentage of women required further intervention, including repeat ablation or hysterectomy, during the two-year follow-up period.

Although a few pregnancies were reported after the procedure, these were associated with lack of proper contraception and resulted in complications. This finding reinforces the importance of thorough counseling regarding fertility expectations and the need for reliable contraception after endometrial ablation.

Overall, the results demonstrate that endometrial ablation provides a practical, minimally invasive alternative to hysterectomy for the management of heavy menstrual bleeding in a tertiary care setting in Pakistan. When performed with proper patient selection and follow-up, it offers meaningful symptom relief with a favorable safety profile.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. **Careful Patient Selection**

Endometrial ablation should be offered to women who have completed childbearing and have failed medical management. Pre-procedure evaluation must exclude malignancy, large fibroids, and uterine cavity distortion.

2. **Structured Counseling**

Patients should receive detailed counseling regarding expected outcomes. They should understand that the goal of treatment is reduction of bleeding, not always complete amenorrhea. The possibility of future hysterectomy should also be discussed.

3. **Contraception Advice**

Since pregnancy after endometrial ablation carries significant risks, reliable contraception must be strongly recommended. Counseling on long-term contraceptive methods should be part of routine post-procedure care.

4. **Standardized Follow-Up Protocols**

Regular follow-up visits should be encouraged to monitor menstrual pattern, anemia status, and possible late complications. A minimum follow-up of two years is recommended.

5. **Training and Skill Development**

Gynecologists working in tertiary and secondary hospitals should receive proper training in second-generation endometrial ablation techniques to ensure safe and consistent outcomes.

6. **Multicenter Research in Pakistan**

Larger multicenter studies with longer follow-up periods should be conducted to strengthen national data. Future research should also include validated quality-of-life assessment tools.

7. **Integration into National Guidelines**

Based on accumulating local evidence, endometrial ablation may be considered as a standard uterus-preserving option in national management guidelines for heavy menstrual bleeding.

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