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Original Research Article

The role of levonorgestrel intrauterine device in managing abnormal uterine bleeding

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) is a prevalent gynecological condition affecting menstrual regularity and quality of life, with causes ranging from structural abnormalities to hormonal imbalances. Conventional treatments, including hormonal therapy and surgery, pose challenges such as side effects, non-compliance, and fertility loss. The levonorgestrel-releasing intrauterine device (LNG-IUD) offers a minimally invasive alternative, targeting the endometrium to reduce menstrual blood loss while minimizing systemic effects.
Methods: This study evaluated the efficacy, safety, and acceptability of LNG-IUD in 52 women with AUB over 24 months. Clinical outcomes, including bleeding patterns, USG findings, complications, and satisfaction, were assessed at baseline and follow-ups (1 week, 1 month, and 6 months). Statistical analysis was conducted using SPSS v25.0.
Results: The mean age was 42.8 years, with menorrhagia (55.8%) being the most common complaint. Adenomyosis (38.5%) and thickened endometrium (30.8%) were frequent sonographic findings. At 6 months, 48% achieved amenorrhea, and spotting decreased to 36.5%. LNG-IUD retention was 88.4%, with removal in 7.6% and expulsion in 3.8%. Treatment failures led to hysterectomy (7.6%) and hormonal therapy (3.8%). Patient satisfaction was high, with 63.5% reporting being satisfied.
Conclusions: LNG-IUD proved highly effective, safe, and well-accepted for AUB management, significantly reducing menstrual blood loss and improving patient outcomes. Its high retention and satisfaction rates make it a viable alternative to systemic hormonal therapy and surgery, particularly for those seeking uterine preservation. Further studies should explore its long-term efficacy across AUB subtypes.

Keywords: Abnormal uterine bleeding, LNG-IUD, Levonorgestrel intrauterine device, Amenorrhea, Patient satisfaction, Adenomyosis, Non-invasive treatment

INTRODUCTION

Abnormal uterine bleeding (AUB) is a prevalent gynaecological condition affecting women of all reproductive ages, characterized by deviations in the regularity, volume, frequency, or duration of menstrual flow. It significantly impacts the quality of life, physical health, and psychosocial well-being of affected individuals, making its management a critical concern in clinical practice. AUB may arise from a range of etiologies, including structural abnormalities (e.g., polyps or fibroids), systemic diseases, or hormonal imbalances, as outlined in the PALM-COEIN classification proposed by the international federation of gynaecology and obstetrics (FIGO).[1]

Among the therapeutic options, the LNG-IUD has gained widespread acceptance as a safe and effective intervention. Originally developed as a contraceptive, the LNG-IUD has demonstrated substantial efficacy in managing various forms of AUB, particularly in cases related to ovulatory dysfunction and endometrial pathology.[2] By delivering a consistent, localized release of levonorgestrel, it induces

endometrial atrophy, reduces menstrual blood loss, and alleviates symptoms associated with AUB while minimizing systemic hormonal side effects.[3] This has made the LNG-IUD a valuable alternative to systemic treatments and surgical interventions, such as hysterectomy, especially for women seeking uterine preservation. The prevalence of AUB underscores the need for effective, minimally invasive, and cost-efficient management strategies. Traditional treatments, including oral hormonal therapies and surgical options, often come with significant limitations such as patient non-compliance, systemic side effects, or permanent loss of fertility.[4] In contrast, the LNG-IUD represents a paradigm shift in AUB management due to its dual functionality as a contraceptive and therapeutic agent. Numerous clinical studies have demonstrated that the LNG-IUD not only reduces menstrual bleeding but also improves patient satisfaction and quality of life, particularly in women with heavy menstrual bleeding (HMB).[5]

The rationale for employing the LNG-IUD in AUB management lies in its targeted action on the endometrium. Unlike systemic treatments, the LNG-IUD delivers a high concentration of levonorgestrel directly to the uterine cavity, ensuring localized efficacy with minimal systemic absorption. This mechanism reduces menstrual blood loss by up to 80-90% over time, with some patients achieving complete amenorrhea.[6] Additionally, the LNG-IUD has been associated with a significant reduction in surgical interventions, thereby lowering healthcare costs and preserving fertility in women desiring future pregnancies.[7]

Despite its established efficacy, the utilization of the LNG-IUD in AUB management remains inconsistent across healthcare settings, influenced by factors such as patient preferences, provider knowledge, and access to care. Furthermore, while existing evidence supports its use in AUB due to ovulatory dysfunction and idiopathic causes, further research is required to clarify its role in specific subtypes of AUB, including those arising from structural abnormalities or systemic conditions. By exploring the benefits and limitations of the LNG-IUD in a diverse population, this study aims to bridge gaps in clinical practice and contribute to the optimization of AUB management strategies.

Objective

Objectives were to evaluate the efficacy of LNG-IUDs in treating AUB and women's degree of satisfaction.

METHODS

Study design

This study was a prospective descriptive observational study conducted in the department of obstetrics and gynaecology at Chettinad hospital and research institute. The study spanned 24 months, from January 2022 to December 2023.

Sample size

The study included a total of 52 women aged 35 to 50 years who attended the gynaecology outpatient department (OPD) and had been using the LNG-IUD for management of AUB.

Methodology

Institutional ethics committee (IEC) approval was obtained before initiating the study. Written informed consent was taken from all participants prior to data collection. Women included in the study were assessed at baseline and followed up at specified intervals: one week, one month, and six months after LNG-IUD insertion. A structured questionnaire was used to collect information, including: Onset, duration, and progression of AUB, pre-treatment ultrasonographic findings of the uterus and clinical outcomes, such as spotting, amenorrhea, HMB, irregular cycles, expulsion, and removal of the LNG-IUD.

Satisfaction levels were evaluated through telephonic interviews using a 0 to 100-point Likert scale. Data were also collected on adverse events and treatment-related complications. Statistical analysis was conducted using paired t tests and chi-square tests to assess changes in bleeding patterns, patient satisfaction, and occurrence of side effects over time.

Statistical analysis

The data collected during the study were analysed using descriptive and inferential statistical methods. The primary outcomes included satisfaction scores, and device-related complications, which were evaluated at baseline, one month, and six months after LNG-IUD insertion. The statistical software SPSS version 25.0 was used for data analysis. A significance level of $p<0.05$ was considered statistically significant.

RESULTS

The mean age of participants was 42.8 years (SD: 4.59). Most of the participants (65.4%) reported no comorbidities. Among those with comorbid conditions, hypothyroidism was the most common, affecting 17.3% of participants, followed by systemic hypertension (11.5%) and diabetes (5.8%).

Table 1: Baseline characteristics.

Parameters	Counts	Total (%)
Age (in years)	42.8 (4.59)	
Comorbidities		
Hypothyroid	9	17.3
Nil	34	65.4
Systemic hypertension	6	11.5
Diabetes	3	5.8

Menorrhagia (HMB) was the most frequent presenting complaint, reported by 29 participants. Polymenorrhea (frequent menstrual bleeding) was observed in 10 participants, followed by dysmenorrhea (painful menstruation) in 7 participants. Menometrorrhagia (irregular heavy bleeding) was the least common, reported by 6 participants.

Table 2: Presenting complaints.

Presenting complaints	N
Menorrhagia (HMB)	29
Dysmenorrhea	7
Menometrorrhagia (Irregular heavy bleeding)	6
Polymenorrhea (Frequent menstrual bleeding)	10

The sonographic evaluation revealed adenomyosis as the most prevalent finding, identified in 20 participants (14 under 45 years, 6 aged 45 and above). Thickened endometrium was the next most common finding (16 participants), followed by bulky uterus in 11 participants and fibroids in 5 participants. The distribution of findings was slightly more frequent among younger participants (<45 years), suggesting a higher prevalence of adenomyosis and endometrial abnormalities in this age group.

Table 3: Sonography findings.

Sonography findings	Group A (below 45)	Group B (45 and above)	N
Adenomyosis	14	6	20
Bulky uterus	7	4	11
Thickened endometrium	10	6	16
Fibroids	1	4	5

At one-week follow-up, spotting was the most common symptom, reported by 63.4% of participants, while 21.1% experienced moderate bleeding, and 15.3% had heavy bleeding. By one month, 44% of participants achieved amenorrhea, which increased to 48% at six months. Spotting decreased over time, affecting 38.4% at one month and 36.5% at six months. Heavy bleeding remained stable in 5.7% of participants at one and six months. These results demonstrate a progressive improvement in bleeding patterns with LNG-IUD usage, with a significant proportion of participants achieving amenorrhea by six months.

Table 4: Follow-up data.

Follow-up	1 week, (n=52)		1 month, (n=52)		6 months, (n=52)	
	N	%	N	%	N	%
Heavy bleeding	8	15.30	3	57.00	3	57.00
Moderate bleeding	11	21.10	6	11.50	5	9.60
Spotting	33	63.40	20	38.40	19	36.50
Amenorrhea	0	0	23	44	25	48

Most LNG-IUDs remained in situ (88.4%), while 3.8% were expelled, and 7.6% were removed. Among participants where LNG-IUD treatment failed, 7.6% underwent hysterectomy, and 3.8% required additional hormonal therapy. However, 88.4% of participants did not require further interventions, indicating a high success rate and device retention for AUB management.

Table 5: Status of LNG-IUDs and treatment modalities in failure cases.

LNG-IUD		N	Percent (%)
Status of levonorgestrel IUDs	Expelled	2	3.8
	Removed	4	7.6
	At place	46	88.4
Treatment modalities in patients in whom LNG-IUD failed	Hysterectomy	4	7.6
	Hormonal therapy	2	3.8
	Not required	46	88.4

Satisfaction was assessed using a Likert scale. A majority of participants (63.5%) reported being satisfied, while 25% remained neutral. Only a small fraction expressed dissatisfaction, with 7.7% being very unsatisfied and 3.8% unsatisfied. These results highlight overall positive satisfaction with the LNG-IUD for AUB treatment, reinforcing its efficacy and acceptability.

Table 6: Likert scale.

Likert scale	N
Very unsatisfied	4
Unsatisfied	2
Neutral	13
Satisfied	33

DISCUSSION

The findings of this study prove the efficacy, safety, and acceptability of the LNG-IUD in the management of AUB,

consistent with findings in comparative studies. The baseline characteristics revealed a mean age of 42.8 years, with most participants (65.4%) reporting no comorbidities. Among those with comorbid conditions, hypothyroidism (17.3%) was most prevalent, followed by systemic hypertension (11.5%) and diabetes (5.8%). This aligns with other studies that suggest hypothyroidism may exacerbate AUB due to its impact on menstrual regularity and endometrial function.[8]

HMB was the most common presenting complaint in this study, affecting 55.8% of participants, followed by polymenorrhea (19.2%) and dysmenorrhea (13.5%). Comparative studies have consistently highlighted menorrhagia as a predominant symptom managed effectively by LNG-IUD. For instance, a randomized trial by Hurskainen et al. demonstrated a significant reduction in menstrual blood loss (MBL) among LNG-IUD users, with an 80% reduction in MBL over six months, compared to 49% in those using oral cyclic medroxyprogesterone acetate.[5] This highlights the superior efficacy of LNG-IUD in reducing HMB.

Sonographic findings in this study identified adenomyosis (38.5%) as the most common abnormality, followed by thickened endometrium (30.8%) and bulky uterus (6-8 weeks size) (21.2%). The higher prevalence of adenomyosis among younger participants (<45 years) aligns with other reports suggesting that adenomyosis is a frequent underlying cause of AUB, particularly in premenopausal women.[9] LNG-IUD has been shown to be particularly effective in managing adenomyosis-related bleeding. Research by Ozdegirmenci et al reported significant symptom relief and reduced bleeding in women with adenomyosis after LNG-IUD insertion.[10]

Follow-up data demonstrated progressive improvement in bleeding patterns, with amenorrhea rates increasing from 44% at one month to 48% at six months, while spotting decreased from 63.4% at one week to 36.5% at six months. Similar trends have been reported in other studies. Gupta et al. found that 50% of women using LNG-IUD for AUB achieved amenorrhea by six months, and the majority experienced substantial reductions in bleeding.[7] These findings suggest that LNG-IUD provides consistent long-term benefits in controlling AUB.

The high retention rate of LNG-IUD in this study (88.4%) is comparable to findings in other cohorts. Mansour et al reported a retention rate of 85-90%, emphasizing the device's acceptability and safety.[6] Device expulsion (3.8%) and removal rates (7.6%) were low, further affirming its effectiveness as a non-invasive treatment. Among those in whom LNG-IUD failed, the need for surgical interventions such as hysterectomy (7.6%) was comparable to similar studies, indicating that the device successfully reduces the overall need for invasive treatments in most cases.[11]

Patient satisfaction levels in this study were high, with 63.5% of participants reporting being satisfied and only 11.5% expressing dissatisfaction or neutrality. Comparative research also highlights high satisfaction rates among LNG-IUD users due to improved quality of life and reduced bleeding symptoms. A systematic review by Kaunitz et al. found that over 80% of LNG-IUD users were satisfied with their treatment for AUB, further reinforcing its role as a first-line therapy.[3]

A Likert scale is a rating scale used to measure survey participants' opinions, attitudes, motivations, and more. It uses a range of answer options ranging from one extreme attitude to another, sometimes including a moderate or neutral option.

This study supports the LNG-IUD as a highly effective and well-tolerated treatment for AUB, consistent with findings from comparative research. It offers significant improvements in bleeding patterns, high patient satisfaction, and a reduced need for invasive interventions, making it a valuable option in AUB management. Future studies could explore its efficacy in different subtypes of AUB and assess its long-term outcomes.

CONCLUSION

The findings of this study highlight the LNG-IUD as a highly effective, safe, and patient-acceptable option for managing AUB in women aged 35 to 50 years. LNG-IUD use resulted in a significant reduction in menstrual blood loss, with nearly half of the participants achieving amenorrhea by six months. The device demonstrated a high retention rate (88.4%) with minimal complications, reducing the need for additional interventions such as hysterectomy or hormonal therapy. Patient satisfaction levels were high, reflecting the positive impact of LNG-IUD on quality of life. These outcomes align with existing evidence supporting LNG-IUD as a first-line treatment for AUB, offering a minimally invasive alternative to systemic hormonal therapy and surgical interventions. Additionally, the findings emphasize its effectiveness in addressing bleeding associated with conditions such as adenomyosis and thickened endometrium. Given the high efficacy, safety, and patient satisfaction, LNG-IUD remains a cornerstone in the management of AUB. Future research could further elucidate its long-term effects and explore its role in specific AUB subtypes, such as fibroid-related bleeding. Moreover, strategies to improve device acceptability and accessibility across diverse populations should be prioritized to maximize its benefits.

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