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Research Article

The Effectiveness of Levonorgestrel Releasing Intrauterine System in The Treatment in Premenopausal Age with Heavy Menstrual Bleeding

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Abstract:

Background: Endometrial hyperplasia is the abnormal proliferation of endometrial glands due to unopposed estrogen stimulation, often leading to an increased risk of endometrial cancer. The condition is more common than endometrial cancer, particularly in women aged 40-45 for hyperplasia without atypia and 45- 55 for atypical hyperplasia. LNG-IUS reduces hyperplasia risk by differentiating epithelial cells and preventing estrogen-induced proliferation.

Aims of the study: To estimate the effectiveness of LNG-IUS in treating heavy menstrual bleeding in premenopausal women.

Subjects and Methods: A prospective observational study was conducted at Basrah Maternity and Children Hospital and the private clinic of my supervisor during the period from 1st of June 2023 to 1st of September 2024. It involved 69 premenopausal women with heavy menstrual bleeding (HMB) treated with the LNG-IUS. Participants were screened for eligibility, underwent assessments, and were monitored for menstrual blood loss, side effects, and haemoglobin levels at 4, 12, and 24 weeks post-insertion.

Results: The study involved 66 premenopausal women using LNG-IUS, 83.0% of the studied patients with HMB who inserted mirena have marked improvement at the end of the study of 24 weeks post insertion. Median Pictorial blood assessment score chart (PBAC) scores significantly reduced from a pre-insertion score of 290 to 160 at 4 weeks, 85 after 12 weeks and 22 after 24 weeks ($p < 0.001$). Haemoglobin levels improved from 8.6 ± 0.4 to 10.9 ± 1.2 mg/dl, and serum ferritin rose from 23 ± 16.3 to 65 ± 20.3 ng/ml (both $p < 0.001$). Common side effects included withdrawal bleeding (31.8%) and vaginal discharge (25.7%).

Conclusion: The LNG-IUS significantly reduced menstrual blood loss, improved symptoms in 83% of women, and had a low expulsion rate of the device, and significant increase in haemoglobin and serum ferritin levels following LNG-IUS insertion, indicating effective treatment for HMB.

1. Introduction

1.1. Endometrial hyperplasia (EH)

Endometrial hyperplasia refers to the abnormal and excessive growth of endometrial glands. It is the result of unopposed estrogenic stimulation of endometrial tissue in the relative absence of progesterone's counterbalancing effects. This hormonal imbalance may be seen in several scenarios when there is an excessive amount of oestrogen, either due to endogenous or exogenous factors.(1)

The endometrium's irregular growth leads to an aberrant ratio of glands to stroma and is seen as a range of changes in the endometrium. The condition encompasses several levels of histopathological complexity and abnormal characteristics in the cells and nucleus. Untreated endometrial hyperplasia has the potential to progress into endometrial cancer. (1, 2)

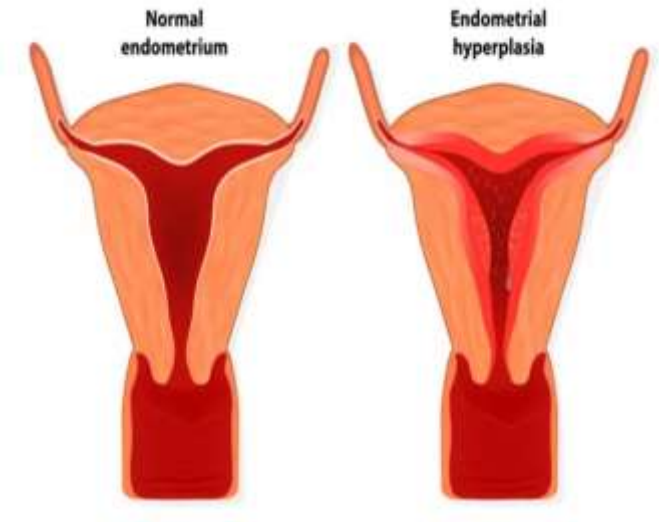

Table (1.1): Endometrial hyperplasia (thick endometrium). (3)

1.2. Epidemiology

The incidence of endometrial hyperplasia is three times higher than the number of cases of endometrial cancer. Endometrial hyperplasia is considered to be a precursor to endometrial

cancer, and if detected early, preventive measures may be taken to halt the development of cancer. To reduce the incidence of endometrial cancer, it is necessary to accurately detect and treat endometrial hyperplasia. According to comprehensive research on the epidemiology of endometrial hyperplasia, women between the ages of 40 and 45 were diagnosed with hyperplasia without atypia. Hyperplasia with atypia was mostly seen in those aged 45–55, whereas it was rarely found in the age group under 30 years old. [4]

1.3. Pathophysiology

Endometrial hyperplasia occurs due to an excess of oestrogen and a lack of sufficient progesterone. Common factors leading to excessive endogenous oestrogen levels include anovulatory cycles (such as those occurring during perimenopause or in individuals with polycystic ovarian syndrome), obesity, and the presence of ovarian tumours that produce oestrogen. The exogenous reasons include unopposed oestrogen therapy, hormone replacement therapy (HRT), and tamoxifen (used in breast cancer treatment). [5]

The Postmenopausal Estrogen/Progestin Interventions Trial (PEPI) demonstrated that administering 0.625 mg of conjugated equine oestrogen as unopposed oestrogen therapy to women for a duration of three years resulted in a higher occurrence of endometrial hyperplasia. The risk of complicated hyperplasia increased by 22.7%, whereas the risk of atypical hyperplasia increased by 11.8%. Nevertheless, the Women's Health Initiative (WHI) research demonstrated that the inclusion of 2.5mg of medroxyprogesterone acetate with 0.625 mg of conjugated equine oestrogen did not elevate the likelihood of developing endometrial cancer. [4]

1.4. Types of endometrial hyperplasia

Types of endometrial hyperplasia include the following: [6]

- **Simple or complex endometrial hyperplasia (without atypia):** This type of endometrial hyperplasia is characterised by the presence of cells that seem normal and are unlikely to undergo malignant transformation. The term "without atypia" indicates a lower likelihood of developing cancer. This issue may spontaneously improve, and healthcare professionals may advise hormone therapy as a therapeutic option.
- **Simple or complex atypical endometrial hyperplasia (with atypia):** Endometrial hyperplasia that is classified as "atypical" or "with atypia" has an increased likelihood of developing into cancer. If left untreated, the likelihood of developing endometrial or uterine cancer rises.

1.5. Aetiology

The causes of oestrogen excess may be caused by either internal factors (endogenous) or external factors (exogenous). The risk factors linked to endometrial hyperplasia are as follows: [1, 2]

- Age
- Nulliparity
- Obesity
- Genetic
- Diabetes Mellitus
- Anovulatory cycles- PCOS, perimenopause
- Ovarian tumors- granulosa cell tumors
- Endometrial hyperplasia may also be caused by immunosuppression in renal transplant recipients and infection.
- Hormone replacement treatment, namely oestrogen-only therapy, may cause endometrial hyperplasia even at low doses. Over-the-counter or herbal remedies may contain a significant concentration of oestrogen. [7]
- Women with hereditary nonpolyposis colorectal cancer, often known as Lynch syndrome, have a much higher chance of developing endometrial hyperplasia. [8, 9]

1.6. Clinical presentation

The majority of individuals' first exhibit symptoms of unusual uterine bleeding. The change in the monthly bleeding pattern prompts the woman to seek medical assistance as soon as possible. The primary explanation for the early diagnosis of endometrial cancer in over 70% of cases is the absence of prolonged symptom manifestation, which often occurs in other types of cancer and allows for the spread of disease to nearby and distant areas. An exhaustive medical history and a thorough physical examination are crucial in the evaluation process.[4]

1.7. Diagnosis

The predominant manifestation is abnormal uterine bleeding, which may manifest as menorrhagia (excessive menstrual bleeding), metrorrhagia (irregular bleeding), unscheduled bleeding (in individuals receiving hormone replacement therapy), or postmenopausal haemorrhage. Certain women may exhibit aberrant discharge, characterised by an unpleasant odour or the presence of blood. The PAP smear may reveal glandular cells or endometrial cells that are atypical, indicating the need for further assessment. [10]

When patients have these symptoms and a supporting medical history, they raise a clinical suspicion of endometrial hyperplasia. However, to confirm this, a histological study of endometrial tissue is necessary. This may be done either by small outpatient surgery or an inpatient endometrial biopsy. The necessary investigations include routine blood tests, a PAP smear, and a transvaginal ultrasound to exclude specific abnormalities in the endometrium, such as a polyp, a tiny submucous myoma, and an ovarian problem. [11]

1.8. Treatment

The main guiding principles of management are as follows: [4]

1. To inhibit the development or progression of endometrial cancer.
2. To exclude the possibility of the presence of concurrent endometrial cancer.
3. To provide a treatment plan that optimally addresses the patient's requirements.

Treatment options for endometrial hyperplasia vary depending on the specific subtypes, including medical intervention with hormones or surgical intervention with hysterectomy. Oral

progestogens such as megestrol acetate and medroxyprogesterone are often used to treat endometrial hyperplasia without atypia. [12] The reason for this is that endometrial hyperplasia without atypia has a decreased likelihood of developing atypia or cancer in comparison to other forms of endometrial hyperplasia. Nevertheless, oral progestogens may not consistently induce regression of endometrial hyperplasia and may exhibit some adverse effects. [13] The Levonorgestrel-intrauterine device (LNG-IUD) has been presented as an alternate option for delivering progestogens in clinical practice to treat endometrial hyperplasia. [14]

1.8.1. The role of levonorgestrel intrauterine system (LNG-IUS) in EH

The levonorgestrel intrauterine system (LNG-IUS) may be used as an alternative therapy for women with endometrial hyperplasia (EH) who do not have atypia or atypical hyperplasia. The LNG-IUS is a small plastic device shaped like a T that is inserted into the uterus. The progestogen LNG is a chemical compound that is derived from 19-nortestosterone. The LNG-IUS is a slow-release contraceptive device that delivers a continuous flow of LNG directly to the endometrium at a rate of 20 mcg per 24 hours. It may be left in place for a period of five years or more. [13]

Progestogens can be directly delivered into the endometrial cavity with LNG-IUD without having the negative side effects of systemic progestogens. Unopposed oestrogen is the predominant risk factor for the development of endometrial hyperplasia and endometrial cancer since it stimulates the proliferation of all kinds of endometrial cells. [15] Progestogens are thought to cause the terminal differentiation of epithelium, trigger apoptosis, and inhibit the prolifration caused by oestrogen. [16]

An examination of 24 observational studies conducted a systematic review and meta-analysis, which found that oral progestogens had a lower rate of disease regression compared to LNG-IUD in the treatment of endometrial hyperplasia. A recent meta-analysis, consisting of 7 randomised controlled trials (RCTs), found that the use of LNG-IUD resulted in a greater incidence of regression in the treatment of endometrial hyperplasia without atypia. [17] The findings of a recent Cochrane study, which included 11 randomised controlled trials (RCTs), indicate that the use of LNG-IUD treatment is effective in reducing endometrial hyperplasia in the short term (within 12 months). However, there is limited information available regarding the long-term effectiveness of LNG-IUD treatment for endometrial hyperplasia beyond 13 months. [13]

1.8.2. Side effects of LNG-IUS

LNG-IUS may also have crucial adverse effects and problems. The Canadian guidelines for LNG-IUS therapy for irregular uterine bleeding state that the dangers associated with the device, such as expulsion, perforation, and pelvic inflammatory disease, are uncommon. [4]

A meta-analysis of studies comparing the use of LNG-IUS and oral progestogens for EH treatment found that up to 35% of women suffered irregular bleeding or spotting during the first three months of management. This percentage decreased to 4% in the following months. [17] A Cochrane Review of studies comparing LNG-IUS to alternative therapies for heavy menstrual bleeding found that LNG-IUS was linked to adverse effects such as pelvic pain and cramping, as well as hormonal impacts including breast tenderness, ovarian cysts, weight gain, and acne. [18]

1.9. Complication

Hyperplasia of any type may cause atypical and excessive bleeding, which can lead to anaemia. Anaemia occurs when there are insufficient levels of red blood cells that contain enough iron. [6]

Endometrial hyperplasia may serve as a precursor to the development of endometrial cancer. If atypia or EIN is present, there is a significantly increased chance of progressing to invasive malignancy, with a risk as high as 27.5% if left untreated. Additionally, there is a 43% chance of coexisting endometrial cancer in this entity. [19]

Aims of the study

To estimate the effectiveness of LNG-IUS in treating premenopausal heavy menstrual bleeding.

2. Patients and Methods

The study was a prospective, observational clinical study conducted at Basrah Maternity and Child Hospital and the private clinic of my supervisor during the period from 1st of June 2023 to 1st of September 2024.

Sixty-nine Premenopausal women with HMB were included after the assignment of written informed consent and were screened for eligibility criteria.

HMB was known by a score of more than 100 points on the PBAC which corresponded to bleeding of more than 80 ml during each period.

- Inclusion criteria were premenopausal women aged between 40-50 years with severe and heavy mensal blood loss due to benign causes such as adenomyosis, small uterine fibroid less than 3 cm, endometrial hyperplasia without atypia and DUB. And those who were accepted to measure the monthly blood loss and report the side effects of mirena. All had been subjected to ultrasound examination before the device insertion and after the insertion at 4, 12, and 24 weeks following mirena insertion.
- While the exclusion criteria were multiple uterine fibroids with a size more than 5 cm, whose haemoglobin level is less than 7 mg/dl, those with disorders of the cervix and vagina and uterus, those with abnormal PAP smear, those with histological findings indicating simple endometrial hyperplasia with atypia, those with HMB due to systemic disorders or coagulopathy. So all the studied patients were subjected to dilatation and curettage, PAP smear, ultrasound and coagulation profile before enrolling in the study. Of the 66 patients, who fulfilled the inclusion criteria, a detailed menstrual and obstetrical history, and past medical, surgical and personal history were taken.

All the studied patients underwent the complete pelvic exam, ultrasound, and endometrial thickness assessment, and baseline

haemoglobin and serum ferritin levels were measured.
All the patients were informed of instrumental follow-up. Visits at 4 weeks, 12 weeks, and 24 weeks after insertion of LNG-IUS, with each interview visit, menstrual blood loss assessment subjectively by the patient, relief of the dysmenorrhea, any side effects and objectively by PBAC Score and TVS were taken to exclude expulsion and endometrial thickness measurement. Haemoglobin and serum ferritin were assessed at 4, 12, and 24 weeks post insertion.

- **Statistical Analysis of Data**

The data was completed and statically analysed using the Statistical Package for Social Sciences (IBM SPSS statistics 20.0; IBM SPSS Inc.). Paired t-tests for normally distributed data were used and p-value <0.05 were considered significant.

3. Results

3.1. The enrolled patients in this study

Figure (3.1) shows the enrolled patients in this study. Out of 66 women included and studied 3 had expulsion of the mirena and one was lost for follow-up. After 12 weeks two ended with TAH and one was lost for follow-up, so the outcome measures were analysed on 59 patients.

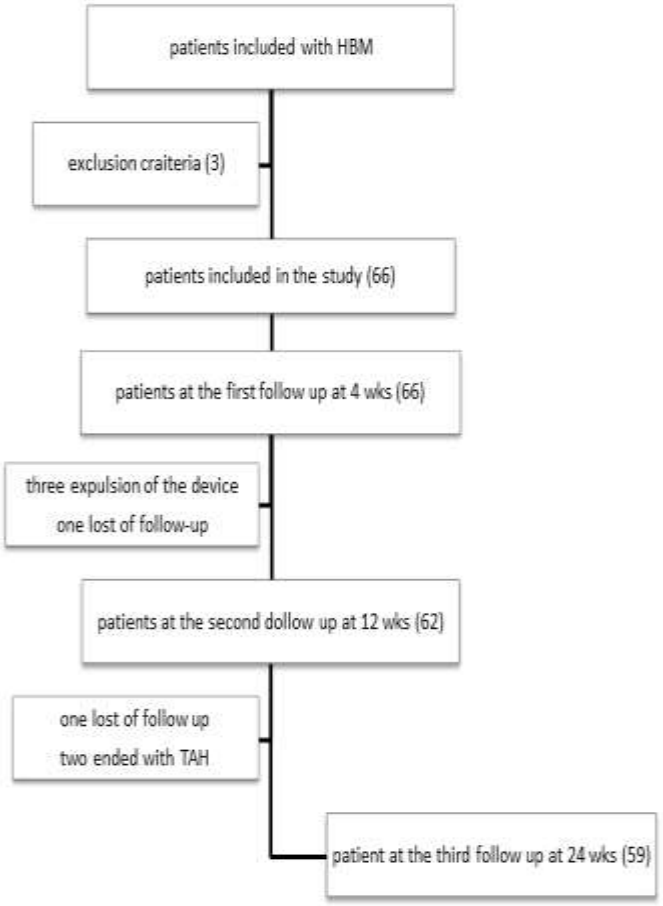

Figure (3.1) shows the studied patients

3.2. Demographic characteristics of the studied patients

Table (3.1) shows the mean age of 66 studied women with LNG-IUS was (43.8 ±3.6). The majority had 1-4 party (72.7%). Around 53.0% were of middle socioeconomic status. Around 81.8% were urban and 12.1 % had DM.

Table (3.1) Demographic characteristics of the studied patients

Variables	No (%)
Age (mean in years)	43.8 ± 3.6
Parity	
Nullipara	6 (9.1%)
1-4	48 (72.7%)
≥5	12 (18.2%)
BMI	33.2 ± 2.6
Socioeconomic status	
Low	18 (27.3)
Middle	35 (53.0)
High	13 (19.7)
Residence	
Rural	12 (18.2)
Urban	54 (81.8)
Medical diseases	
DM	8 (12.1)
Hypertension	5 (7.6)
Thyroid disease	4 (6.1)
Combined of others	6 (9.1)
No medical illness	43 (65.1)

3.3. The clinical characteristics of the studied patients

The baseline clinical characteristics of the studied patient are shown in Table (3.2) which found that the mean duration of HMB was 10.4± 6.8 months. Around 27.3 % had bulky uterus while only 4.5% had uterine size of 10 weeks.
And around 31.8% had previous tubal ligation. 43.9% had a previous caesarean section, 37.8% had adenomyosis 50% had simple cystic endometrial hyperplasia, with 62.1% had dysmenorrhea.

Table (3.2) the clinical characteristics of the studied patients

Variables	No (%)
Duration of HMB	10.4 ± 6.8
Size of uterus	
Normal	12 (18.2%)
Bulky	18 (27.3%)
6 wks	16 (24. 2 %)
8 wks	17 (25.8)
10 wks	3 (4.5)
Hx of tubal ligation	
Yes	21 (31.8)
No	45 (68.2)
Previous C.S	
Yes	29 (43.9)
No	37 (56.1)
Pre-treatment TVs findings	
Adenomyosis	25 (37.9)
Bulky uterus	18 (27.3)
Fibroid	11(16.7)

Normal	12 (18.2)
Histological findings	
Cystic glandular hyperplasia	14 (21.2)
Non-secretory	19 (28.8)
Simple hyperplasia without atypia	33 (50.0)
Dysmenorrhea	
Yes	41 (62.1)
No	25 (37.9)

3.4. Subjective assessment of the improvement and relief of symptoms

Table (3.3) shows that 83.0% of the studied patients with HMB who inserted mirena have marked improvement at the end of the study of 24 weeks post insertion.

Table (3.3) Subjective assessment of the improvement and relief of symptoms

Time of insertion	No response	Mild	Moderate	Marked
4 weeks (66)	12 (18.2)	24 (36.4)	29 (43.9)	1 (1.5)
12 weeks (62)	2 (3.2)	10 (16.1)	22 (35.5)	28 (45.2)
24 weeks (59)	1 (1.7)	3 (5.1)	6 (10.2)	49 (83.0)

3.5. Pictorial blood assessment score chart (PBAC) before and after LNG-IUS insertion

Table (3.4) shows the median PBAC score was reduced from a pre-insertion score of 290 to 160 at 4 weeks, 85 after 12 weeks and 22 after 24 weeks and the difference was statistically significant.

Table (3.4) Pictorial blood assessment score chart (PBAC) before and after LNG-IUS insertion

Time-related to LNG-IUS insertion	PBAC score	p-value
Preinsertion	290 (248-320)	
Postinsertion		
4 weeks (66)	160 (79-216)	<0.001
12 weeks (62)	85 (60-118)	< 0.001
24 weeks (59)	22 (8-30)	< 0.001

3.6. Complications and side effects of LNG-IUS

Table (3.5) shows that withdrawal bleeding 31.8% and vagina discharge 25.7% are the most important complications of LNG-IUS insertion.

Table (3.5) Complications and side effects of LNG-IUS

Variables	No.	%
Expulsion	3	4.55
Abdominal cramps	10	15.15
Withdrawal bleeding	21	31.81
Vaginal discharge	17	25.75
No complication	28	42.42

- The number does not include 66 patients because some patients had more than one complication

3.7. Haemoglobin, serum Ferritin, and endometrial thickness before and after LNG-IUS insertion at 12 and 24 weeks

Table no.6 shows significant improvement in haemoglobin level and ferritin following LNG-IUS insertion after 12 and 24 weeks after insertion of mirena and the statistical difference was significant <0.001

Table (3.6) Haemoglobin, serum Ferritin, and endometrial thickness before and after LNG-IUS insertion at 12 and 24 weeks (n=59)

Time-related to LNG-IUS insertion	Hb mg/dl	p-value	Serum ferritin	p-value	Endometrial thickness	p-value
Preinsertion	8.6± 0.4		23± 16.3		11.2 ± 3.2	
Postinsertion 12 weeks (62)	10.2± 0.93	<0.001	45 ± 18.6	<0.001	6.1± 2.3	<0.001
Postinsertion 24 weeks (59)	10.9± 1.2	<0.001	65± 20.3	<0.001	4.6 ± 1.3	<0.001

4.1. Discussion

Heavy menstrual bleeding (HMB) is a prevalent symptom among premenopausal women, often leading to a significant impact on their quality of life. The management of HMB secondary to benign uterine conditions typically involves prolonged medical therapy, which can include both non-hormonal and hormonal options. However, these treatment regimens are frequently associated with numerous adverse effects, leading to poor patient compliance. Many patients opt against these medications due to concerns about the potential side effects and the extended duration of therapy required for efficacy. [20, 21]

While surgical treatment such as hysterectomy or endometrial ablation requires hospitalisation and anaesthesia, the risk of surgical intervention, anaesthetic complication and surgical site infections are considerable.

Recent studies have demonstrated that the mirena intrauterine system is an effective, non-surgical, minimally invasive, and long-term treatment option for managing heavy menstrual bleeding (HMB). [22] Unlike traditional pharmacological therapies, which can have significant side effects and require prolonged use, mirena offers a more targeted approach by locally releasing levonorgestrel, leading to endometrial suppression and a substantial reduction in menstrual blood loss. Its efficacy in controlling HMB has been well-documented, making it a preferred alternative for patients seeking to avoid surgery or long-term systemic hormonal therapy. Additionally, its convenience and high tolerability profile contribute to better adherence and patient satisfaction. [22]

In this study, Table 1 illustrates the demographic characteristics

of our patient cohort, revealing that the majority were premenopausal, with a mean age of 43.8 ± 3.6 years. The participants were predominantly multiparous, with 72.7% having 1 to 4 children. The average body mass index (BMI) was 33.2 ± 2.6, indicating a significant prevalence of obesity within the group. Additionally, 12.1% of the patients had a history of diabetes, while approximately 6.1% were diagnosed with thyroid disorders. Notably, 29 patients (43.9%) in the study had undergone previous caesarean sections (C.S.), and the insertion of the LNG-IUS was performed safely in these women. This finding aligns with the results presented by Zhang et al. (2023), which demonstrated the safety of the device in individuals with prior uterine scars. [23] Furthermore, a comparable study by Dhamangaonkar et al. [22] reported that among a series of 70 patients, 14.2% had a history of C.S. scars. In our cohort, ten patients with prior C.S. scars experienced no complications, such as uterine perforation or device expulsion, reinforcing the conclusion that mirena is a safe option for women with a history of uterine surgery. [22, 23]

In our study, most of our patients were (81.8%) from urban areas and (53.0%) belonged to the middle socioeconomic group. This observation has little effect on the aetiology of HMB, but the high education level in this group played a vital role in counselling for acceptance of LNG-IUS and compliance to follow-up visits.

Also, we used LNS-IUS in patients with comorbid conditions. Comorbidity was presented in (34.9%). 23 out of 66 patients were included in the study and these diseases include DM, hypertension, and thyroid disease.

Several other studies have also demonstrated mirena to be safe and effective in women with comorbid conditions, including valvular heart disease, human immunodeficiency virus infection, D.M., and haemostatic disorders. [24] Therefore, one advantage of mirena is its ability to be used in medical comorbid conditions where surgical treatment may be contraindicated.

Table No. 2 shows that uteri of more than 10 weeks size were excluded in our study, and the maximum size in which mirena was inserted is 10 weeks, but the effectiveness of the device in controlling HMB due to adenomyosis in women with uterine sizes greater than 10 weeks has been checked and demonstrated. [25]

In our study, we found that 16.7% of patients with uterine fibroids smaller than 3 cm experienced a significant reduction in menstrual blood loss with the use of the mirena intrauterine system. This finding is consistent with previous studies conducted by Kriplani et al. and Woranan et al. [26, 27], which also demonstrated the efficacy of mirena in managing heavy menstrual bleeding in patients with small fibroids. These results suggest that mirena can be an effective therapeutic option for women with small uterine fibroids who wish to avoid surgical intervention, providing substantial symptom relief while maintaining a minimally invasive approach.

In our study, a significant decrease in vaginal bleeding was observed at 4, 12, and 24 weeks post-intervention, as measured by the median PBAC values, with a p-value of <0.001, indicating strong statistical significance (Table 4). This outcome aligns with a pooled analysis of five randomised studies conducted by Endrikat et al. [28], which also reported a marked reduction in menstrual blood loss following the use of the levonorgestrel intrauterine system (LNG-IUS). Furthermore, our results are consistent with findings from a study by Nidhi et al. [29], which demonstrated a significant decrease in menstrual blood loss at 4, 12, and 24 weeks after the insertion of LNG-IUS, compared to pre-insertion levels. These findings further validate the effectiveness of LNG-IUS in managing heavy menstrual bleeding over both short and long-term periods, suggesting its utility as a reliable non-surgical treatment option.

Despite the observed reduction in blood loss following the insertion of mirena, our study also revealed a notable subjective improvement in symptoms, particularly dysmenorrhea, with 62.1% of participants reporting relief at the end of the 24-week follow-up period. This finding aligns with the results of a study conducted by Endrikat et al. [28], which similarly reported significant symptom improvement in patients receiving LNG-IUS. Such results underscore the multifaceted benefits of mirena beyond more blood loss reduction, highlighting its role in enhancing overall quality of life for women experiencing heavy menstrual bleeding and associated symptoms.

Table 5 indicates that the most common side effect experienced by patients was withdrawal bleeding, reported in 31.81% of cases, followed by vaginal discharge in 25.75% of cases. The withdrawal bleeding typically lasted for no more than 12 weeks and showed a gradual decrease and improvement over time. This reduction can be attributed to the alterations in the vascular pattern of the endometrium caused by exposure to the levonorgestrel intrauterine system. These vascular changes likely contribute to the stabilisation of the endometrium, thereby reducing bleeding over time. This observation is consistent with findings from a study conducted by Archer et al. [30], which also reported a decrease in withdrawal bleeding as patients continued using LNG-IUS.

Spontaneous expulsion of the LNG-IUS device was observed in only 4.55% of cases in our study. In contrast, other studies have reported higher expulsion rates, reaching up to 28%. [31] This lower expulsion rate in our cohort may be attributed to factors such as proper insertion technique, patient selection, or anatomical variations.

Table No. 5 demonstrates a significant increase in both haemoglobin levels and serum ferritin following LNG-IUS (mirena) insertion over a 24-week period. Haemoglobin increased from 8.6 ± 0.4 to 10.9 ± 1.2 g/dL, while serum ferritin rose from 23 ± 16.3 to 65 ± 20.3 ng/mL. Additionally, the endometrial thickness decreased from 11.2 ± 3.2 to 4.6 ± 1.3 mm within the same timeframe. These findings were statistically significant (p-value <0.001). This can be attributed to the localised release of progesterone by the LNG-IUS, which renders the endometrium non-proliferative, leading to a reduction in menstrual bleeding. Consequently, the decrease in blood loss helps correct anaemia and increase serum ferritin levels, making the LNG-IUS an effective non-surgical option for managing heavy menstrual bleeding. [22, 26]

The primary strength of this study lies in its prospective design,

which enhances the reliability of the findings. However, a notable limitation is the small sample size, along with a relatively short follow-up period of 24 weeks. To better understand the long-term effects of LNG-IUS, larger prospective studies with extended follow-up durations are necessary. Such studies would provide more comprehensive data on the efficacy and safety of LNG-IUS in managing heavy menstrual bleeding, thereby contributing valuable insights to clinical practice.

5.1. Conclusions

From the current study, we conclude the followings:

1. The insertion of the LNG-IUS resulted in a statistically significant reduction in menstrual blood loss, as evidenced by the decreasing Pictorial Blood Assessment Chart scores over the study period. This suggests that LNG-IUS is an effective treatment for HMB.
2. Subjective assessments indicated that a substantial percentage of women (83.0%) experienced marked improvement in their symptoms by the end of the 24-week follow-up, further supporting the efficacy of LNG-IUS.
3. Study demonstrated that the LNG-IUS had a favourable safety profile, with a low rate of device expulsion (4.55%) and manageable side effects such as withdrawal bleeding (31.8%) and vaginal discharge (25.75%).
4. There was a significant increase in haemoglobin and serum ferritin levels following LNG-IUS insertion, indicating correction of anaemia associated with HMB.

5.2. Recommendations

From the current study, we recommend the followings:

1. Given the efficacy and safety profile of LNG-IUS, it should be considered a first-line treatment option for premenopausal women with HMB, particularly those with underlying conditions like adenomyosis or endometrial hyperplasia.
2. Future studies should aim for longer follow-up periods to assess the sustained effects of LNG-IUS on menstrual bleeding, symptom relief, and quality of life.
3. To enhance the generalizability of findings, it is recommended that future studies include larger sample sizes to better assess the efficacy and safety of LNG-IUS across diverse populations.
4. Clinicians should provide comprehensive education to patients regarding the potential side effects of LNG-IUS, the expected timeline for symptom improvement, and the importance of follow-up appointments.
5. Regular monitoring of haemoglobin and ferritin levels in women undergoing LNG-IUS insertion is recommended to ensure timely intervention for anaemia correction.

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