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Is there a difference in the clinical profile and outcome of women using levonorgestrel IUD for abnormal uterine bleeding and those using it for contraception?: A comparative cross-sectional study

Anormal uterin kanama için levonorgestrelli RİA kullanan kadınlar ile bunu kontrasepsiyon amacıyla kullanan kadınların klinik profili ve sonlanımları arasında fark var mı?: Karşılaştırmalı kesitsel bir çalışma

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Abstract

Objective: The most common indications for Levonorgestrel intrauterine device (LNG-IUD) are contraception and management of abnormal uterine bleeding (AUB). This study was conducted with the aim of exploring the differences in the clinical profile and outcome of women using LNG-IUD for contraception and AUB.

Materials and Methods: This was a retrospective comparative cross-sectional study of women who underwent LNG-IUD (52 mg) between 2012 and 2017. Their electronic health records were reviewed until the last documented follow-up or until December 2021.

Results: A total of 235 women had LNG-IUD with an age range of 21 to 62 years and a mean of (37.98 years±6.76). Of these women, 153/235 (65.1%) had it for contraception and 82/235 (34.89%) had it for AUB. The follow-up was 1-94 months with (mean ± SEM) follow-up for the AUB group of (21.48±2.31) months and for contraception group was (20.74±1.76) months (p-value of 0.80). There was a significant difference between the two groups in the age and body mass index (BMI), where women who had LNG-IUD for AUB were older (mean of 42.54±6.49 years, p-value <0.001) and had higher BMI (31.88±7.52 kg/m^2, p-value =0.011). All LNG-IUDs that were indicated for contraception were inserted in an outpatient setting. However, 68.3% in the AUB, the insertion was in the operating theater in conjunction with hysteroscopy. After combining both expulsion and removal of LNG-IUD during the follow-up period, there was no significant difference between the 2 groups in the overall retention rate during the follow-up (p-value =0.998).

Conclusion: this study shows that women using LNG-IUD for the management of AUB are older and have a higher BMI compared with those using it for contraception. AUB women experienced more expulsion compared with the contraception group, but there was no difference between the 2 groups in the overall survival/retention of LNG-IUD.

Keywords: Levonorgestrel intrauterine device, abnormal uterine bleeding, contraception, expulsion, medicated intrauterine device

PRECIS: In this study women using LNG-IUD for abnormal uterine bleeding or for contraception had similar long-term retention rate when followed for up to 94 months.

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Öz

Amaç: Levonorgestrelli rahim içi cihazın (LNG-RİA) en sık endikasyonu kontrasepsiyon ve anormal uterin kanamanın (AUK) tedavisidir. Bu çalışma, kontrasepsiyon ve AUK için LNG-RİA kullanan kadınların klinik profili ve sonlanımlarındaki farklılıkları araştırmak amacıyla yapılmıştır.

Gereç ve Yöntemler: Bu çalışma 2012 ve 2017 yılları arasında LNG-RİA (52 mg) uygulanan kadınlar üzerinde yapılan retrospektif, karşılaştırmalı, kesitsel bir çalışma idi. Elektronik sağlık kayıtları, belgelenen son takiplere veya Aralık 2021'e kadar incelenmiştir.

Bulgular: Yaşları 21 ile 62 arasında değişen ve ortalama yaşı 37,98±6,76 yıl olan toplam 235 LNG-RİA takılmış kadın hasta dahil edildi. Bu kadınların 153/235'inde (%65,1) doğum kontrolü için, 82/235'inde (%34,89) AUK için LNG-RİA takılmıştı. Takip süresi 1-94 ay olup, (ortalama ± SEM) AUK grubu için 21,48±2,31 ay, kontrasepsiyon grubu için 20,74±1,76 ay (p-değeri 0,80) idi. Her iki grup arasında yaş ve vücut kitle indeksi (VKİ) açısından anlamlı fark vardı; AUK grubundaki LNG-RİA takılan kadınların daha yaşlı (ortalama 42,54±6,49 yıl, p-değeri <0,001) ve daha yüksek VKİ'ye sahip oldukları görüldü (31,88±7,52 kg/m², p-değeri=0,011). Doğum kontrolü için kullanılan tüm LNG-RİA'lar ayakta tedavi ortamında yerleştirildi. Ancak AUK endikasyonu ile yerleştirilen LNG-RİA'ların %68,3'ü histeroskopi ile birlikte ameliyathanede yerleştirildi. Takip süresi boyunca LNG-RİA'nın düşmesi ve çıkarılması durumları birleştirildikten sonra, takip sırasında genel olarak RİA'nın yerinde kalması oranında 2 grup arasında anlamlı bir fark yoktu (p-değeri =0,998).

Sonuç: Bu çalışma, AUK tedavisi için LNG-RİA takılan kadınların kontrasepsiyon amacıyla kullananlara göre daha yaşlı ve VKİ'lerinin daha yüksek olduğunu göstermektedir. AUK grubu kontrasepsiyon grubuyla karşılaştırıldığında daha fazla RİA'nın düşmesi deneyimi yaşadı, ancak LNG-RİA'nın genel olarak yerinde kalması oranı açısından 2 grup arasında fark yoktu.

Anahtar Kelimeler: Levonorgestrelli rahim içi araç, anormal rahim kanaması, doğum kontrolü, RİA'nın düşmesi, ilaçlı rahim içi araç

Introduction

The Levonorgestrel intrauterine device (LNG-IUD) consists of a T-shaped body that has a reservoir for the synthetic progestinlevonorgestrel. It was first introduced in 1990 as a contraceptive method as Mirena® Bayer Schering Pharma, AG, Berlin, Germany, containing 52 mg and releasing 20 mcg per day[1]. Initially, it was approved for 5 years. Soon, it was introduced for the management of heavy menstrual bleeding. It was approved for this indication by the US Food and Drug Administration (FDA) in 2015. In 2020, the FDA approved it for 6 years of use[1], and in August 2021, it was approved for 7 years of use[2]. Although there are other versions of the device that contain lower doses of levonorgestrel and for shorter durations, Mirena® LNG-IUD remains the most widely used version of medicated IUDs[1]. In Oman; Mirena® is the only available version of a medicated IUD.

Besides these two common indications, LNG-IUD is also used to decrease dysmenorrhea in all age groups, including teenage girls. Moreover, it is used for endometrial protection in women on postmenopausal estrogen therapy and for the treatment of endometrial hyperplasia[3]. There might be other evolving uses in any condition that might benefit from thickened cervical mucus, induced morphological changes of decidualization of the stroma, and atrophy of the endometrial glandular epithelium[4]. Most studies reporting on LNG-IUD abbreviate it as LNG-IUS, intrauterine system[5]. In our experience in Oman and other countries, hardly any gynecologist uses IUS as an abbreviation, so we opted to use what is commonly and practically used LNG-IUD rather than LNG-IUS. This choice does not compromise the literature search as almost all search engines provide options for searching for both abbreviations.

Although there is a plethora of literature on LNG-IUD evaluating each of its indications on its own, there are not many studies on comparing the demographic and clinical outcomes between different indications, especially in a population similar to ours in Oman. Awareness and understanding of the differences in women using LNG-IUD for different indications is important for gynecologists to best select the appropriate patients, modify the counseling, the insertion process, and the post-insertion management and follow-up to optimize the outcomes.

Some studies focused on comparing women with heavy menstrual bleeding and contraception in terms of the expulsion rate of LNG-IUD and clinical characteristics that might be related[6]. Considering that abnormal uterine bleeding (AUB) and contraception are the most common indications for LNG-IUD and understanding the impact of cultural factors on women's lives, we conducted this retrospective comparative study with the aim of exploring the differences in the clinical profile and outcome of women using LNG-IUD for contraception and for AUB.

Materials and Methods

This is a retrospective cross-sectional study to compare the clinical profile and outcome of women who had LNG-IUD for contraception and those who had it for the management of AUB with normal endometrial histopathology in a tertiary level hospital in Oman. Figure 1 shows the study flowchart. The included women were those who had LNG-IUD inserted in the period from January 2012 to December 2017 and were followed up in the same hospital until December 2021. The inclusion criteria were premenopausal women who opted for LNG-IUD as a management option for AUB or contraception. Those women who had a prescription for LNG-IUD in the electronic hospital information system were checked, and then the individual patient records were reviewed to solicit only those where the prescription was translated into actual insertion of the IUD. Exclusion criteria were women who had malignant and pre-malignant endometrial or cervical conditions on endometrial biopsy and women who had LNG-IUD for other indications, such as endometriosis, without AUB. Women who had LNG-IUD with a cavity distorted by submucous myomas or endometrial polyps were also excluded.

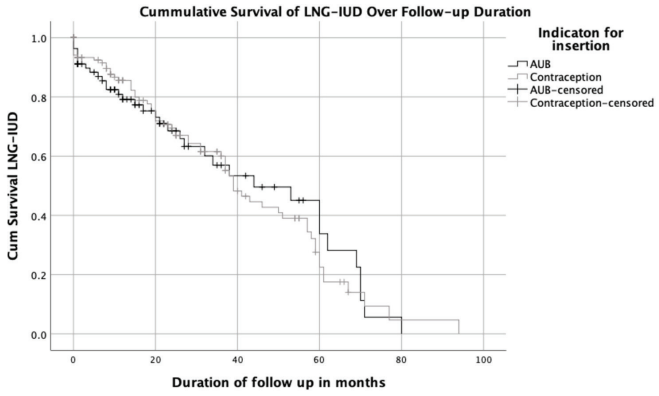

Figure 1. Study flowchart

LNG-IUD: Levonorgestrel intrauterine device, AUB: Abnormal uterine bleeding

The collected data include demographics such as age, number and type of deliveries, body mass index (BMI), and medical history. When the indication for LNG-IUD was not recorded as a diagnosis explicitly by the treating gynecologist, the clinical notes were reviewed for details. The presence or absence of significant medical disorders was recorded. The medical disorders were categorized into cardiovascular disorders, such as hypertension, valvular heart disease, coronary heart disease, and heart failure; metabolic and endocrine disorders, such as diabetes and thyroid disorders; neurological disorders, such as epilepsy, multiple sclerosis, and myasthenia gravis; and immunological and connective tissue disorders, such as systemic lupus erythematosus and Sjogren's syndrome.

Syndrome, rheumatoid arthritis, respiratory disorders such as asthma and bronchiectasis, hematologic disorders such as sickle cell disease, thalassemia, bleeding disorders, renal disorders including any cause of chronic kidney diseases, psychiatric disorders, and infective disorders such as retroviral infection or hepatitis B or C infections. The notes of the insertion procedure were reviewed for the facility where the insertion occurred in the outpatient department set-up (OPD) or in the operating theater in conjunction with hysteroscopy. The uterocervical length in centimeters with uterine sound was recorded. As internationally recommended, the department protocol for the management of AUB in pre-menopausal women mandates an endometrial histological evaluation with or without hysteroscopy if the woman is above 40 years of age or if she is younger than 40 years of age with risk factors of high BMI or chronic anovulation. Information was also collected on the occurrence of side effects, complications of expulsion, malposition, or uterine perforation, and contraception failure or failure to control bleeding. Expulsion was diagnosed by the absence of the IUD string on vaginal speculum examination. Pelvic ultrasound confirmed the absence of the IUD from the uterus, and abdominal X-ray confirmed its absence from the abdomen. If the LNG-IUD was removed, information was collected for the date of removal, did it require hysteroscopy for removal, and what was the reason for removal.

This study was approved by the Ethics and Research Committee of the College of Medicine and Health Sciences MERC#1731.

Statistical Analysis

Data were collected and analyzed using IBM-SPSS version 23 software. The two groups were compared for clinical features, duration of follow-up, and outcome.

For continuous variables such as age and BMI, descriptive statistics were reported as mean, and standard deviations. An independent t-test was used to test the difference in the means. Leven's test was used for continuous variables to test the difference in the mean when there was a significant difference in the size of the groups and they did not have a normal distribution. A p-value of <0.5 was considered for significance.

Most of the categorical variables are dichotomous variables (yes/no) like the presence or absence of complications and side effects. Other categorical variables include grouping variables such as the order of parity (deliveries) and the number of cesarean section groups. Categorical variables were described by frequencies and percentages. Chi-square and Fisher's Exact tests were used to compare frequencies between the groups. The Mann-Whitney U test was used to assess the difference between the 2 groups when there was a continuous variable that was not normally distributed, such as BMI and duration of follow-up.

Results

In the period between January 2012 and December 2017, 235 women met the inclusion criteria having LNG-IUD with the age range of 21 to 62 years and a (mean of 37.98 years +/- 6.76). Of these women, 82/235 (34.89%) and 153/235 (65.1%) had it for contraception. The 2 groups were compared in terms of their demographics, as shown in Table 1.

There was a significant difference between the two groups in age and BMI, where women who had LNG-IUD for AUB were older (mean of 42.54±6.49 years, p-value <0.001) and had higher BMI (31.88±7.52 kg/m^2, 0.011). Women in the AUB group were less likely to have a medical condition compared with women in the contraception group, with 33 (14.0%) versus 54 (23.00%). There was a difference between the two groups in cesarean deliveries, where the AUB group had more cesareans in general, especially higher order cesareans of 3 or more.

All LNG-IUDs that were inserted for contraception were inserted in the OPD as expected. None of the patients required insertion in the operating theater or under anesthesia. However, 68.3% in the AUB, the IUD insertion was performed in the operating theater in conjunction with hysteroscopy. In the overall cohort, the complication rate was as follows: 16/235 (6.8%) experienced expulsion, malposition was detected by ultrasound in 1/235 (0.4%), and it occurred in the contraception group. There was one case of uterine perforation 1/235 (0.4%) and it was also in the contraception group. Other complications included pelvic infection (20/235;8.5%) and pregnancy (2/235;0.8%). When comparing the two groups in those complication rate per group

as shown in Table 2, expulsion occurred more in women with AUB compared to the contraception group 10 (12.20%) vs. (6, 3.9%) with of p-value 0.027). The difference between the 2 groups in pelvic infection and pregnancy was statistically not significant.

When comparing the reported side effects of LNG-IUD, women in the AUB group reported more AUB 33 (40.24%) as a side effect compared to women in the contraception group 31 (20.26%) with a p-value of 0.002. No women in the AUB group reported mood changes, as reported by one woman in the contraception group. Both groups reported weight gain while on the LNG-IUD, but it was not significantly different between both groups, as shown in Table 3. On follow-up ultrasound, bilateral simple ovarian cysts were found in similar proportions in both groups of 9/83 (11.0%) and 16/153 (10.5%) of the AUB group and the contraception group, respectively, with a p-value of 0.90. Amenorrhea occurred in 7.3% of the AUB group and in 9.8% of the contraception group, which was not statistically different with a p-value of 0.524.

Women were followed up for a range of 1-94 months. The mean (mean ± SEM) follow-up for the AUB group was (21.48±2.31) months and for the contraception group was (20.74±1.76) months p-value of 0.80. Cumulative Kaplan-Meier rates of LNG-IUD survival (for removal or expulsions) is used. No significant difference was observed between the 2 groups in the overall rate of removal or expulsion during the follow-up

Table 1. The demographic and clinical characteristics of the LNG-IUD in AUB group and contraception group, Oman, 2012-2021

Variable	AUB group	Contraception group	p-value	95% CI
	n=82	n=153		
	Mean ± SD	Mean ± SD		
Age	42.54±6.49	35.54±5.54	<0.001	5.32-8.58
BMI	31.88±7.52	29.29±6.84	0.011	0.60-4.58
Parity no. (%)				
Nulliparous	5 (6.1%)	1 (0.7%)	0.012	
Parous	77 (93.0)	152 (99.3%)		
Parity categories	no. (%)	no. (%)		
0	5 (6.10)	1 (0.65)	0.017	
1-2	14 (17.07)	40 (26.14)		
3 or more	63 (76.83)	112 (73.20)		
Cesarean sections n (%)				
0	57 (69.51)	115 (75.16)	0.028	
1-2	16 (19.51)	34 (22.22)		
3 or more	9 (10.98)	4 (2.7%)		
Medical disorders no. (%)				
Yes	33 (14.00)	54 (23.00)	0.48	

AUB: Abnormal uterine bleeding, BMI: Body mass index, CI: Confidence interval, LNG-IUD: Levonorgestrel intrauterine device, SD: Standard deviation

Table 2. Complications of LNG-IUD in the AUB and contraception groups, Oman 2012-2021

Variable	AUB group	Contraception group	p-value
	n=82	n=153	
Pregnancy	1 (1.2%)	1 (0.70)	0.65
Expulsion	10 (12.20)	6 (3.9%)	0.027
Malposition	0	1 (0.7%)	0.49
Uterine perforation	0	1 (0.7%)	0.49
PID	7 (8.5%)	13 (8.5%)	0.99
Hysteroscopic removal	4 (4.9%)	1 (0.7%)	0.032

LNG-IUD: Levonorgestrel intrauterine device, AUB: Abnormal uterine bleeding

(p-value of 0.998) as shown in Table 4. At 36 months, AUB continuation was 0.53±0.077 and for contraception group 0.600±0.53. At 60 months, the continuation was 0.338±0.094, and 0.225±0.059 for the contraception group. During the follow-up period, the number of women retaining the LNG-IUD continued to decrease in both groups at similar rates. The decreased numbers during the follow-up occurred because the LNG-IUD was expelled or removed. Removal occurred at the elapse of 5 years or before. Removal before the end of the efficacy period was due to desire of pregnancy, occurrence of side effects such as AUB, or complications such as pregnancy or PID and these reasons with their frequency is shown in Table 5. Of the overall cohort of women with LNG-IUD, 28/235 had serial insertion of IUD to continue the primary indication. 16/82 and 12/153 had sequential immediate insertion of LNG-IUD when expelled or removed with a p-value of 0.346.

Discussion

This study was carried out in a tertiary hospital in Oman, a country that has contraception services provided by primary

Table 3. Side effects of LNG-IUD in the AUB and contraception groups in Oman 2012-2021

Variable	AUB group	Contraception group	p-value
	n=82	n=153	
AUB	33 (40.24)	31 (20.26)	0.002
Amenorrhea	6 (7.3)	15 (9.8)	0.524
Mood changes	0	1	
Weight gain	2 (0.90)	4 (1.7)	0.94
Ovarian cyst	9 (11.0)	16 (10.5)	0.90

LNG-IUD: Levonorgestrel intrauterine device, AUB: Abnormal uterine bleeding

Table 4. Expulsion rate of LNG-IUD in the AUB and contraception groups at different time intervals in Oman 2012-2021

Expulsion at	AUB group (n=82)	Contraception group (n=153)	p-value
3 months	4 (22.2)	1 (2.0)	0.016
6 months	2 (50.0)	0 (0)	0.429
12 months	1 (6.7)	1 (4.2)	1.000
36 months	2 (6.9)	3 (7.7)	1.000
60 months	0 (0)	1 (3.6)	1.000
72 months	1 (16.7)	0 (0)	0.400
Overall	10 (12.2)	6 (3.9)	0.027

LNG-IUD: Levonorgestrel intrauterine device, AUB: Abnormal uterine bleeding

Table 5. Comparison of reasons for removal of LNG-IUD between the AUB and contraception groups in Oman 2012-2021

Reason for removal	AUB group 25/82 (30.5%)	Contraception group 42/153 (27.5%)	p-value
AUB	13 (52.0%)	8 (19.0%)	1.00
Malposition	6 (24%)	7 (16.7)	0.462
Weight gain	1 (4.0%)	2 (4.8%)	-
Pelvic pain/cramping	0	6 (14.3%)	-
Pelvic Infection	1 (4.0%)	4 (9.5%)	-
Divorce	0	1 (2.4%)	-
Desire for pregnancy	1 (4.0%)	6 (14.3%)	-
Unexplained	3 (12%)	8 (19.0%)	
Total	25	42	

LNG-IUD: Levonorgestrel intrauterine device, AUB: Abnormal uterine bleeding

health care. Still, 65% of women who had LNG-IUD in this tertiary hospital used it for contraception. This can be explained by the fact that many of these women (23%) had a medical disorder for which they were already being followed up in the same hospital. This makes it logistically easier for women to attend for care. Also, the availability of medical records and multidisciplinary communication regarding what is suitable and what is not for the patient when all aspects of care are available in the same institution. A third reason is that these women might have been referred to the hospital specifically for LNG-IUD because it is not available in primary health care in Oman[7]. As we are aware, there are no studies comparing the insertion setup between different levels of health care institutions. Most studies compare the types of health care professionals inserting IUDs for contraception, including nursing staff, general practitioners/family physicians, and obstetricians[8,9].

There were 2 main significant differences between women who had LNG-IUD for the management of AUB and those who had it for contraception. These differences were in age and BMI. Women in the AUB group were older with a mean age of 42.54±6.49 years compared to 35.54±5.54 years in the contraception group. Women in the AUB group had a higher BMI mean of 31.88±7.52 kg/m^2. These findings are supported by the known pathophysiology of AUB. The relationship between age and AUB can be explained in relation to the different etiologies of AUB. A significant subset of AUB is caused by ovulatory ovarian dysfunction, which is more common in women aged 41-50 years[10,11]. Adenomyosis, another etiology of AUB, is more common in middle-aged parous women[12]. Leiomyoma of the uterus is also a cause of AUB, where the literature supports a relationship between the age of the women and delayed menopause as risk factors for the development of uterine leiomyomas[13,14]. Likewise, the finding that women with AUB have a higher BMI than those using LNG-IUD for contraception is not surprising. Women with high BMI have more than double the risk of AUB compared with those with normal BMI[15,16]. High BMI has been considered a significant risk factor for abnormal endometrial histology in women with AUB[17,18]. Also AUB is also more prevalent in women with high BMI, and high BMI is a stronger predictor of abnormal endometrial pathology in women with AUB[16,19]. This strong relationship between BMI and AUB has resulted in the debate of whether it should replace age as a stronger indication for endometrial biopsy[16,19]. This relationship between obesity and AUB can be explained by recent advances in the neuroendocrine physiology of the role of leptin and adiponectin from the adipose tissue in blunting the level of kisspeptin, which modulates GnRH and LH pulsatility, resulting in anovulation or oligo-ovulation[20,21].

Of the list of complications of LNG-IUD in Table 2, cumulative expulsion occurred in 6.8% of the total study group and more in women with AUB than in the contraception group with 12.2% and 3.9%, respectively, and a p-value of 0.027. Literature reported several expulsion rates in different groups of women between 3.7% and 22%[22,23]. Our overall expulsion rate and expulsion rate per group is less than that reported by Harris et al.[23], who reported an overall 22% cumulative expulsion rate in women using LNG-LUD for non-contraceptive purposes[6]. Our expulsion rate in women using LNG-IUD for contraception is similar to that reported by Gemzell-Danielsson et al.[22] in a similar group with a reported expulsion rate of 3.7%. The higher expulsion rate in women using LNG-IUD for AUB or non-contraceptive use compared with those using it for contraception could be explained by different reasons. Many women with AUB have a pathology causing an enlarged or distorted uterine cavity, such as adenomyosis and uterine leiomyomas. A second explanation possible is that heavy menstrual bleeding is accompanied by more uterine contractions, causing menstrual cramps and pushing the IUD toward the cervical canal. A third possibility is that the presence of menstrual blood and clots in the uterine cavity is likely to facilitate IUD malpositioning or expulsion[24]. Factors other than heavy menstrual bleeding increase the risk of expulsion, including multiparity, previous cesarean delivery, obesity, and the expertise of the health care provider inserting the IUD[6,25]. Our center is a tertiary care and training center, and many LNG-IUD insertions are performed by trainees.

The removal of LNG-IUD is another cause of its loss in survival. As shown in this study and as reported in the literature, AUB is the main reason women request removal of the LNG-IUD[26,27]. Women using LNG-IUD for the management of AUB might request removal because it fails to provide symptom control or develop a new pattern of bleeding that they donot like[24]. Many of these women who discontinue IUD revert to surgical options such as hysterectomy. In women using LNG-IUD for contraception, discontinuation due to AUB reached up to 27% of the overall discontinuation[28].

Although our overall LNG-IUD continuation in this study is similar to other studies, we did feel in clinical practice that women in our culture might be less tolerant to AUB patterns compared with women in other cultures. This study somehow supports that impression where more than 50% of the discontinuation in the AUB group is due to AUB where women are unsatisfied with the vaginal bleeding pattern they have. This proportion is higher than any reported proportion that we came across in the literature. The reason might be that prolonged and unpredictable vaginal bleeding, even if not heavy, causes inconvenience to women of Muslim faith as it is closely tied to some of the religious duties that Muslim women have to perform[29]. Another possible reason is that prolonged vaginal bleeding may cause husband dissatisfaction, as Muslims are advised to abstain from menstrual bleeding in women[30].

Most studies comparing LNG-IUD use for the treatment of AUB and contraception focused on the expulsion rate rather than reasons for removal and so not much reports on discontinuation due to cramping in comparative studies. In a

review by Kaunitz and Inki[24], discontinuation due to LNG-IUD-related cramping was reported to be around 18% in some of the studies he included in his review. In the population of women using LNG-IUD for contraception, discontinuation due to cramping and pain is reported to occur in 13% of those who discontinued[31]. In our study, no women in the AUB group reported cramping as a reason for discontinuation, whereas 14.3% in the contraception group requested removal due to cramping. This might be inaccurate due to recall bias, but in some women, more than one reason contributes to her dissatisfaction, resulting in her request for removal. However, gynecologists tend to minimize the documentation for only one reason.

Study Limitations

The limitations of this study include its retrospective nature, resulting in the loss of adequate information on accurate side effects and reasons for IUD removal. The strength of this study is that it includes women from the most 2 common indications for LNG-IUD, AUB, and contraception. It also provides long-term follow-up data up to 94 months. Also, because women in Oman share common cultural, social, and religious values with other women in the Arabian Peninsula and North Africa, we believe it is safe to assume that these findings are generalizable to the populations in those countries.

Conclusion

This study shows that women using LNG-IUD for the management of AUB are older and have a higher BMI than those using it for contraception. AUB women experienced more expulsion than the contraception group, but there was no difference between the 2 groups in the overall survival/retention of LNG-IUD or in the rate of reported complications. The AUB group reported more abnormal bleeding patterns after the insertion of the LNG-IUD, and this reason was the most common reason to request LNG-IUD removal.

Ethics

Ethics Committee Approval: This study was approved by the Ethics and Research Committee of the College of Medicine and Health Sciences MERC#1731 (Sultan Qaboos University Ethics Committee - date: 14.08.2018, approval number: SQU-EC/108/18).
Informed Consent: Retrospective study.

Authorship Contributions

Surgical and Medical Practices: M.A.S., M.M., V.G., Concept: M.A.S., Design: M.A.S., Data Collection or Processing: M.A.S., M.S., M.M., Analysis or Interpretation: M.A.S., M.S., A.N., V.G., Literature Search: M.A.S., Writing: M.A.S., V.G.
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