

Special Issue Article: Female Contraception: Types, Effectiveness, and Side Effects

# Assessment of -T-380A and Levonorgestrel-Releasing Intrauterine Device Types in Terms of Partial and Complete Expulsion

Fatih Demir<sup>1\*</sup>, Raziye Desdicioglu<sup>1</sup> and Sefa Kelekci<sup>1</sup>

<sup>1</sup>Izmir Katip Celebi University, Atatürk Training and Research Hospital, Department of Obstetrics and Gynecology, Karabağlar, Izmir/Turkey

\*Corresponding author: Dr. Demir F, Izmir Katip Celebi University, Atatürk Training and Research Hospital, Department of Obstetrics and Gynecology, Karabağlar, Izmir/Turkey, Tel: 0902322434343; Fax: 0902322431530; Email: fatihdemir28@gmail.com

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## Abstract

**Purpose:** Intrauterine Devices (IUD) are among commonly used reversible contraceptive methods. The aim of this study is to compare the spontaneous expulsion rates and other factors of these two IUD types.

**Material and Method:** Our study was conducted retrospectively in our hospital by recording the age, gravida, parity, IUD types; existence of expulsion, its being partial or complete and other relevant data of the patients who received copper IUD (Cu-T380A) and LNG-releasing IUD (Mirena).

**Findings:** The data of 2215 patients who used Copper IUD, and the data of 400 patients who used LNG-Releasing IUD were included in the study. Expulsion was detected in 234 patients (10,6%) who used Copper IUDs, and in 34 patients who used LNG-releasing IUDs (8,5%). It was observed that the mean age, gravida and parity values were bigger in the group who used LNG (mean age:  $34,5 \pm 7,1$  vs  $42,47 \pm 6,200$ ,  $p < 0,001$ ; gravida:  $2,62 \pm 1,19$  vs  $3,04 \pm 1,15$ ,  $p < 0,001$ ; parity:  $1,96 \pm 0,780$  vs  $2,24 \pm 0,81$ ,  $p < 0,001$ ). It was also determined that the mean age values of the LNG-releasing IUD patients who experienced expulsion were bigger than the patients with copper IUD ( $34,5 \pm 7,1$  vs  $42,47 \pm 6,200$ ,  $p < 0,001$ ). Moreover, the complete expulsion rate was observed as (9 (%2,8) vs 13 (%38,2),  $p < 0,001$ ) in patients who used LNG-releasing IUD.

**Result:** In our study it was determined that the complete expulsion rate in LNG-releasing IUDs was more. This difference may be stemming from the fact that the experience on using the LNG-releasing IUDs being less than the copper IUDs.

**Keywords:** Contraception; IUD; Expulsion rate

## Introduction

Intrauterine devices (IUD) are among the most frequently used reversible contraceptive methods in the world. Although the first IUDs were produced from inert plastic, later copper IUD and Levonorgestrel-Releasing IUDs (LNG-Releasing IUDs) were developed [1]. Today, the copper IUDs are the most frequently used ones in many countries. Copper IUDs have been used for many years and their contraceptive effects have been proven to be continuing for 12 years [2]. LNG-releasing IUDs are recommended to be used for 5 years, and there are studies showing that they are effective for 7 years [3]. Contraceptive effect mechanisms work in various ways. It is considered that they firstly ruin the transport of the sperms to the oviducts and show their effects by preventing the implantation [1,4-8]. Moreover, the LNG-releasing IUDs ruin the cervical mucus quality with their progesterone effects [9]. Their being effective for a long time and being independent of patient compliance are among their most important advantages.

Levonorgestrel Releasing-IUDs were first used in Finland in 1990 as contraceptives. There are studies claiming that their contraceptive success rates are more than the copper IUDs. However, they can have

continuance problems in patients due to their side effects depending on progesterone secretion. Their discontinuing rates are similar [10-12]. Moreover, their uses in patients with heavy menstrual bleeding, dysmenorrhea and even with adenomyosis symptoms prevent their use as contraceptives in terms of cost-effective usage [2,13,14]. The side effects of both IUDs are different. The most frequent reason for discontinuation in the patients using IUD is the pain and heavy bleeding. The most frequent reasons for the LNG-releasing IUDs are irregular bleedings including amenorrhea and painful bleeding intervals. Moreover, headache, stress and qualm that happen due to progesterone content are also observed in LNG-releasing IUDs [10,15-18]. For copper or LNG-releasing IUDs, the cumulative pregnancy rate is reported as being nearly 2% [19]. The undetected spontaneous expulsions of IUDs are closely related with the contraceptive failure [20]. Moreover, partial expulsions may cause symptoms like menorrhagia or pelvic pain. The expulsion of the former RIA, hypermenorrhea, nulliparity, young age, uterine cavity length being less than 9 cm are reported as being the main risk factors for expulsion [21-23]. There are studies that examine the question whether there is a difference between RIA types in terms of the expulsion rates; however, the results are various [24-26]. It is

**Table 1:** Demographic characteristics of the patients.

Characteristics	Cu T 380A (n=2215)	LNG-Releasing IUD (n=400)	P
Age (Years)	34.89 ± 7.5	43.58 ± 6.0	P<0.001
Gravida (n)	2.62 ± 1.19	3.04 ± 1.15	P<0.001
Parity (n)	1.96 ± 0.780	2.24 ± 0.81	P<0.001
Birth type			
- Vaginal Birth [n(%)]	1503 (%73.2)	222 (%68.3)	p= 0.066
- Caesarian Birth [n(%)]	550 (%26.8)	103 (%31.7)	
Number of Patients with Partial and Complete Expulsion [n(%)]	234 (%10.6)	34 (%8.5)	P= 0.210

Numbers are given as whole numbers ± S.D and (percentage).

considered that most of the dislocations happen in the first 6 weeks [27]. In a study, the Copper T-380A expulsion rate was found as 2,5% in the first year, and 6.1% for the 8-year period [28]. Although the Levonorgestrel Releasing IUD partial or complete expulsion rates vary according to the observation time, they were determined as 4,4%-9,9% [13, 25, 29].

Considering the possibility of partial and complete expulsions of IUDs causing unplanned pregnancies and symptoms that ruin the comfort of the patient, we aimed to examine the partial and complete expulsion rates of the Copper T-380 and LNG-Releasing IUDs and additional factors that cause expulsion.

## Material and Method

Approval for the study was obtained from the Ethics Board of İzmir Katip Çelebi University, Atatürk Research and Training Hospital. The data of the patients who applied to the İzmir Katip Çelebi University, Atatürk Research and Training Hospital, Gynecology and Obstetrics Clinic for intrauterine device application or for a checkup between 1 July 2011 and 30 June 2014 were taken from the Electronic Patient Record System. The data of 2350 patients with Cu-T380A application and the data of 413 patients with LNG-Releasing IUD application were recorded. The data of the patients who received IUD right after birth, the patients with uterine malformation, uterine synechia and the patients who received Loop Electrosurgical Excision Procedure (LEEP) for uterine cervix or the ones who received conization operation were not included in the study. The data of 2215 patients with Copper IUD and the data of 400 patients with LNG-Releasing IUD were included in the study. The ages, gravida, parity, former birth types, IUD usage duration, and IUD dislocation data of the patients were recorded. The IUDs used were Cu-T380A (Egemen International, Turkey) and LNG Releasing IUD (Mirena, Bayer Healthcare, Schering, Germany). The checkup of the IUDs applied in our clinic is performed in the 4<sup>th</sup> week, and the data on whether the patient has partial or complete expulsion is recorded according to the distance between mid-longitudinal crossing IUD vertical end and fund us endometrium echo with Transvaginal USG. In the annual IUD checkup of the patient, the distance between the endometrium echo and IUD top echo is measured with TVUSG.

## Statistics

In analyzing the data, the Statistical Package for Social Sciences (SPSS) software (SPSS 20.0 version for Windows, SPSS Inc., Chicago, USA) was used. For the continuous variables, the Mean ± Standard Deviation values were used. The t-test was used in comparative

studies. The categorical variables were assessed with Chi Square Test, and the numerical values were expressed in percentages. The  $p < 0.05$  value was accepted as being meaningful.

## Findings

In this retrospective study, the data obtained from 2215 patients using CuT380A and the data of 400 patients using LNG-Releasing IUD received from the Electronic Patient Follow-Up System were analyzed retrospectively. All the patients using CuT380A and LNG-Releasing IUD were assessed in terms of age, gravida, parity, birth type, dislocation in IUDs. The data are summarized in Table 1.

Partial or complete expulsions were detected in 234 patients (%10,6) using CuT380A; and in 34 patients (%8,5) using LNG-Releasing IUD. When the IUD types and the expulsion types were compared, no statistical differences were detected ( $p = 0.210$ ,  $X^2$  test). The patients with dislocation were assessed statistically in terms of IUD types, age, gravida, parity, birth type and similar other factors that may affect dislocation, dislocation type, and the duration till dislocation (in patients who used CuT380A 3 months in average, in patients who used LNG-Releasing IUD 2,5 months in average) (Table-2). There were 141 patients (6,4%) using CuT380A with expulsions but no information on gravida and parity; and 53 patients (13,3%) who used LNG-Releasing IUD. The number of the patients who had expulsion and who used CuT380A but whose birth types were not known was 162 (7,3%). The number of the patients who used LNG-Releasing IUD was 58 (14,8%).

When the patients with dislocation and spontaneous expulsion were analyzed statistically in terms of average ages, the ages of the patients who used LNG-Releasing IUD and who had partial and complete expulsion were higher than the patients who used CuT380A ( $p < 0.001$ ). There was not a statistically meaningful difference in terms of gravida, parity, birth type and the duration till partial or complete expulsion ( $p > 0.05$ ). When the expulsion types were assessed in terms of the IUD types, it was determined that the complete expulsion rates of LNG-Releasing IUDs were more than the CuT380A IUDs ( $p < 0.001$ ). The 32,5% of the IUD expulsions were detected during the checkup at the end of the first month. The percentage of the IUDs with expulsions determined at the end of the first year was 74,3%. When the expulsions in the first month are compared in terms of IUD types, no difference was detected between the two IUD types ( $p = 0.442$ ,  $X^2$  test), and it was detected that there were more frequent expulsions in statistically meaningful level in the LNG-Releasing IUDs in the first year ( $p = 0.046$ ,  $X^2$  test).

**Table 2:** Comparison of factors affecting dislocation according to IUD type.

Characteristics	CuT380A (n=234)	LNG-Releasing IUD (n=34)	<i>p</i>
Age (Years)	34.5 ± 7.1	42.47 ± 6.200	<i>p</i> < 0.001
Gravida (n)	2.63 ± 1.41	2.88 ± 1.10	<i>p</i> = 0.118
Parity (n)	1.95 ± 0.86	2.09 ± 0.64	<i>p</i> = 0.109
Birth type			
- Vaginal Birth	186 (%79.4)	25 (%73.5)	<i>p</i> = 0.791
- Caesarian Birth	48 (%20.6)	8 (%26.5)	
Duration till Dislocation or Spontaneous Expulsion (Months)	12.79 (median: 3.0)	4.85 (median:2.5)	<i>p</i> = 0.088
Expulsion Type [n (%)]			
- Partial Expulsion	225 (%96.2)	21 (%61.8)	<i>P</i> < 0.001
- Complete Expulsion	9 (%2.8)	13 (%38.2)	

Numbers are given as whole numbers (S.D) and (percentage). The given time is stated as the median.

## Discussion

It has long been known that there is a relation between the localization of the intrauterine contraceptives and the success of them [23,25,29]. The dislocation of IUDs in patients may be asymptomatic or may occur with pelvic pain, irregular bleeding and unexpected pregnancy. When the spontaneous expulsion rates of the IUDs are considered, the values were found as 2,5% for Copper-T-380A for the first year, and as 4,4%-9,9% for Levonorgestrel-Releasing IUD depending on the observation time [13,27-29]. In our study, the cumulative expulsion rate for copper releasing IUDs was determined as 10.6%, and for LNG Releasing IUD, as 8,5%. We considered that the expulsion rate being high was related with the inclusion of partial expulsions to the numbers, and with our center providing training both for doctors and for midwives. No meaningful difference was found between the LNG Releasing-IUD and the copper IUDs in terms of cumulative expulsion rates in our study. There are studies showing that the spontaneous expulsions of the LNG-Releasing IUDs are more than Copper IUDs [24,30,31]. In another study, it was reported that the progesterone decreases the uterine contractions, and for this reason, the expulsion rates of the LNG-Releasing IUDs were lower [24]. In our study, there was not a difference between the cumulative expulsions; however, we detected that the complete expulsion rates were meaningfully more in the patients using LNG-Releasing IUD when compared with the patients using Copper IUDs. We considered that the reason for the LNG expulsion rate might be due to the failure in the mounting of it, and due to the fact that the experience in LNG-Releasing IUD mounting is more. The LNG-Releasing IUDs are made of inert plastic; however, the copper IUDs are made of rigid arms that contain copper. For these reasons, the IUDs can penetrate and hold the tissue around them and can stay in internal OS level in patients with partial dislocation. In a previous study, it was shown that the spontaneous expulsion in LNG-releasing IUDs in adolescents and in patients who had not given birth was more and the reasons for this was considered to be the failure in the mounting process [25].

In our study, we determined that the average age values of the LNG-Releasing IUD patients with expulsions were higher than the values of the Copper-Releasing IUD patients with expulsions. This difference may be due to the fact that, in our clinic, the LNG-Releasing IUDs are used, except for classic contraception purposes, for additional health problems such as hypermenorrhea, endometrial

hyperplasia and adenomyosis.

We detected that the expulsion rates of the IUDs did not differ meaningfully in terms of the parity and birth types of the patients. It was detected in a study examining the effects of the LNG-releasing IUDs on spontaneous expulsions that, the parity and birth type did not affect the expulsion rates [23]. Again, in another study, it was shown that the parity and expulsion rates did not change [25], while in nulliparous women increasing with parity [24] and expulsion were more frequent [24,32]. The studies claiming the increase with the parity show the expansion of the uterine cavity and the increase of the hysterometry measurement as the basic reasons. Some authors, on the other hand, claim that there are difficulties in mounting it in the nulliparous women and that the reason, in fact, is the failure in mounting not the expulsion [24,32]. We determined in our study that the parity and birth type did not affect the expulsion rates for both IUD types.

There are also various data on expulsion timing. Some studies show that the expulsion is detected in the highest level in the first checkup [23]. Although it varies between clinics, the first checkup is usually performed in 4-6 weeks. Studies show that the expulsion rates in the first month and in the first year are more than in the other months [23,33]. Especially in the IUDs that were mounted in the postpartum very early periods, the spontaneous expulsion rates were found in high degrees in the first checkup [10]. In our study, it was determined that the expulsion rates in the first month and in the first year were more, and there was not a meaningful difference between the expulsion rates for both IUD types in the first month (*p* = 0.442). It was determined that the expulsion rates of LNG-Releasing IUD are more than the expulsion rates of Copper IUD for the first year (*p* = 0.046). As stated above, we considered the reason for this to be due to the physical characteristics of the LNG-releasing IUDs and due to the less experience in the mounting of them. In another study, it was shown that the spontaneous expulsion rates for the first month and first year were more in the Copper IUDs [26]. Our study is considerably good among the other comparative studies in terms of the number of the patients. Furthermore, the data being obtained from the electronic media ensures the objectivity. However, better-planned and case-controlled prospective studies are needed in the field.

As a conclusion, both the Copper and LNG-releasing IUDs are

effective contraceptive methods, and it has been detected that the complete dislocation is observed more in LNG-releasing IUDs. The LNG-releasing IUDs have widespread usage with their contraceptive effects and other therapeutical benefits. However, we believe that with the increasing experience in LNG-releasing IUD application and the increasing ease in the application mechanism, the complete dislocation problem will be solved.

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