Sonographic features and clinical correlates of correctly positioned and malpositioned intrauterine device in women examined at a tertiary hospital: A five year review

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ABSTRACT

Background: Transvaginal ultrasound prior to IUD insertion may be helpful in appropriate patient selection and optimal patient conditions in preventing IUD malpositions and complications.

Objective: To describe the sonographic features of correctly positioned and malpositioned intrauterine device (IUD) in women and correlate with associated symptoms and concurrent cervical, uterine and ovarian pathology

Methodology: This is a 5-year retrospective cross-sectional study. Patients in a tertiary hospital with sonographically detected correctly positioned and malpositioned IUDs were selected from the Obstetrics and Gynecology Ultrasound Database from January 1, 2014 to December 31, 2018. The patient's name and case number were used to review the patient's charts for the demographic profile and other necessary data. Intrauterine device sonographic features were recorded, correlated clinically and analyzed statistically.

Results: Three hundred two patients were eligible for the study with ages between 41 to 50 years old and with an average of 1 to 3 pregnancies and livebirths. Almost half of the women with malpositioned IUDs complained of missing IUD string. Sonographically, the IUD appeared echogenic with more than half demonstrating a linear echogenic stripe. The most common type of malpositioned IUD was partial or fully embedding the myometrium (45.2 %), followed by those located in the cervix or in the lower uterine segment (35.7%), partially expelled with IUD segment extending through the external cervical os (11.9%), and fragmented (4.7%). The least common malpositioning was malrotation of the IUD (2.3%). There were significantly more women with cervical disease among those who had correctly placed IUDs. Thirteen women were pregnant, 9 of whom had intrauterine pregnancies. 3 had ectopic pregnancies and 1 had an abortion. Eight of the 9 intrauterine pregnancies had malpositioned IUD and only 1 had correctly positioned IUD which was statistically significant.

Conclusion: Women with IUD who became pregnant and with missing IUD strings are important predictors to re-assess IUD placement. Uterine pathologies such as myomas and adenomyomas do not affect placement of intrauterine devices. IUDs remain in place in the presence of cervical diseases such as cervical malignancies.

Keywords: Two dimensional (2D) ultrasound, intrauterine device, correctly positioned IUD, malpositioned/displaced IUD.

INTRODUCTION

For more than 30 years, women throughout the world have been using the intrauterine device (IUD) as their method of contraception. It is one of the most reliable and cheapest contraceptive methods and in fact, the most commonly used reversible method among women of reproductive age worldwide[1]. In 2017, 2.6 % of Filipino women used intrauterine device as their contraceptive method[2].

Despite its almost 99% effectivity, a small risk of pregnancy remains beyond the first year of use and with a cumulative pregnancy risk of 2% over 10 years of IUD use.[3-5] Ectopic pregnancy is one of the most reported complications of contraceptive failure with an IUD[6].

Other issues associated with intrauterine device use include missing IUD strings and malpositioning of the device. Malposition occurs if the IUD is not positioned in the uterine fundus and can result to contraceptive failure. This can be due to anatomical causes such as a small uterine cavity, congenital or acquired malformations or distortion of uterine cavity.[7] Changes of uterine forms and position, and presence of uterine or cervical masses may also impair the correct placement of the intrauterine device. Malposition may also be iatrogenic due to wrong insertion technique. Ultrasonography and hysteroscopy are the best and the most practical imaging techniques to diagnose intrauterine device malposition.[7] However, a transvaginal ultrasound is usually the first line imaging requested to determine if the device is correctly positioned. Although

an ultrasound scan is not required after uncomplicated placement of an IUD or during routine management of asymptomatic women with an IUD, it is invaluable in the evaluation of patients who present with pain or other symptoms suggestive of malpositioning.[8]

During the postpartum period, many women are at increased risk for a new pregnancy. In order to address the unmet need for postpartum contraception, many countries, including the Philippines, have initiated postpartum intrauterine device insertion in recent years. This initiative aims to improve pregnancy spacing for better maternal and child health. Locally, postpartum IUD insertion involves insertion of Copper T380 A in the first 48 hours of delivery of the fetus. The commonly reported side effects are increase in menstrual bleeding, abdominal cramps and expulsion of the device[9]. Malpositioning may occur due to the large uterine cavity of the postpartum uterus which is subjected to uterine contractions during the involution and lactation process. This study may therefore provide necessary correlation between interval and immediate postpartum IUD insertion in terms of IUD malposition.

Based on collected data, appropriate patient selection and optimal patient conditions for IUD insertion can be recommended. This will also give us informative data if transvaginal ultrasound prior to IUD insertion is helpful in preventing IUD malpositions and complications or not.

OBJECTIVES

General objective:

To describe the sonographic features of correctly positioned and intrauterine device in women consulting at a tertiary hospital

Specific objectives:

1. To identify the demographic profile of women with intrauterine device in terms of age, gravidity and parity.
2. To describe the sonographic features of intrauterine device appearance in utero
3. To identify the sonographic findings of malpositioned intrauterine device in women
   a. Located in cervix or lower uterine segment,
   b. Partially expelled with part of the IUD extending through the external cervical os,
   c. Malrotated
   d. Partially or fully embedded in the myometrium
   e. Extending beyond the uterine serosa or within the pelvic or abdominal cavity
   f. Fragmented
4. To identify the corresponding uterine size and position of both the correctly positioned and malpositioned IUD
5. To identify uterine, cervical, ovarian and other pathologies in women with intrauterine device.
6. To correlate the sonographic features of correctly positioned and malpositioned intrauterine devices with associated symptoms.
7. To correlate the sonographic fetaures of correctly positioned and malpositioned intrauterine devices with (a) manner or route of insertion (b) period of insertion and (c) number of years from IUD insertion.

METHODOLOGY

Study Design: Retrospective cross-sectional study

Inclusion Criteria:

1. Patients with intrauterine device on 2D ultrasound and scanned in the study institution
2. The transvaginal or transabdominal ultrasound should have been done by a fellow in training or a consultant at the same institution

Exclusion Criteria:

1. Ultrasound performed in other institutions.
2. Intrauterine device that was not diagnosed by ultrasound

All patients with sonographically detected intrauterine device were selected from the Obstetrics and Gynecology Ultrasound Database from January 1, 2014 until December 31, 2018. The name and case number of these patients were used to retrieve the patient's charts from the hospital's medical records systems (MRS) to review the necessary study data.

Demographic data collected included age, gravidity and parity. The patient's chief complaint, manner of IUD insertion (vaginal or abdominal approach), timing of insertion (interval-more than 6 weeks postpartum, postpartum insertion-within 48 hours postpartum) and the years of IUD from the insertion (less than 1 year, 1-5 years, 5-10 years and more than 10 years) were also collected from the patient's chart.

Two dimensional (2D) ultrasound findings were retrieved and recorded in terms of the intrauterine device's sonographic appearance (linear, echogenic, s-shaped, presence or absence of acoustic shadowing) and type of IUD displacement/malpositioning (located in cervix or lower uterine segment, partially expelled with part of the IUD extending through the external cervical os, malrotated, partially or fully embedded in the myometrium or extending beyond the uterine serosa or within the pelvic or abdominal cavity, fragmented IUD). The uterine position (anteverted, retroverted, retroflexed, anteflexed, midpositioned)

and uterine size (length x width x height in centimeters) as well as presence of uterine, cervical, and ovarian pathology in women with intrauterine device and its associated symptoms (abnormal uterine bleeding, pelvic pain, dysmenorrheal, intrauterine pregnancy, ectopic pregnancy, and pelvic inflammatory disease) were also collected.

Patients with more than 1 ultrasound report with less than 3 months interval from the previous ultrasound findings were excluded in the study to avoid duplication of patients especially if the sonographic findings were the same. The ultrasound machines that were used in this retrospective study were the following: a.) GE Voluson, P8,3D/4D/Doppler ultrasound b.) Samsung UGEO H60, 3D/4D/Doppler ultrasound, c.) Samsung Accuvix A30, 3D/4D/Doppler ultrasound d.) Samsung UGEO H60, 3D/4D/Doppler ultrasound and e.) Aloka- prosound SSD-4000SV.

Sonographic findings of correctly positioned and malpositioned intrauterine device were correlated to the gravidity and parity of the patients, uterine position and uterine size; time and manner of IUD insertion, duration of IUD use as well as associated symptoms such as vaginal bleeding, pain and missing IUD string. The correlation of intrauterine malpositioning with pelvic masses such as uterine, cervical and ovarian diseases was also noted. Other conditions such as intrauterine pregnancy, ectopic pregnancy, abortion, and pelvic inflammatory diseases were also correlated.

Data collected were recorded in the Data Collection Sheet and sent for statistical analysis.

Sample size

The study population included ALL women diagnosed with intrauterine device on ultrasound at the tertiary hospital from January 1, 2014 to December 31, 2018- which was around 44 women [per year] based on the 2017 census suggesting that a minimum of 160 women for the past five years were included in the current study. This sampling design was utilized due to lack of available local literature regarding sonographic features, common risks of intrauterine device and its correlation to the position and size of uterus despite the number of its cases in our country.

STATISTICAL ANALYSIS

After the data were extracted by the investigators from the patient charts, all the information was manually entered into an electronic spreadsheet file. Subsequent data processing and analysis was then be carried out using the software Stata 13.

Descriptive statistics such as the mean and standard deviation were used to describe the dimensions of uterine size among the study population; and frequency and percentage for the remaining categorical data variables – to provide an overview of the study population. A series of chi-square tests of association were performed to determine if there is a significant difference in the selected clinico-sonographic variables between the study groups. Fisher's exact test for variables who do not satisfy the assumptions for a parametric test was used such as the case of gravidity, manner of insertion, and the presence of associated conditions.

Proportion per categories of the presence of a malpositioned intrauterine device was also computed, with the point and interval estimates as well. The level of significance for all sets of analysis was set at a p-value less than 0.05 using two-tailed comparisons.

RESULTS

A total of 302 women were included in the study. There were 218 women (72.2 %) with correctly positioned intrauterine device and 84 women (27.8%) with malpositioned intrauterine device.

Table 1 shows the baseline characteristics of the study subjects. Most of the women in the study were between 41 - 50 years old with an average of 1 to 3 pregnancies and livebirths, Most of them had anteverted uterine position and normal uterine size. The most common route of IUD insertion was vaginal at an interval timing and has been inserted for more than 10 years from the last pregnancy. There was no significant difference between women who had correctly positioned or misplaced IUDs in terms of these variables.

In terms of IUD sonographic features, there was no difference between those with correctly placed IUD and malposition ones. The intrauterine device is seen as an echogenicity in almost all of the women included in the study followed by more than half demonstrating an echogenic linear stripe. (Table 2, Figures 1-2)

The most common type of malpositioned IUDs seen among women was partially or fully embedding the myometrium (n:38, 45.23%) followed by those inappropriately located in the cervix or in the lower uterine segment (n:30, 35.71%), partially expelled with part of the IUD extending through the external cervical os (11.90 %), fragmented (4.76 %) and least common type were malrotated IUD (2.38%). (Table 3, Figures 3-5)

Almost half of the women who had malpositioned IUDs complained of missing IUD string or consulted for localization of IUD as compared to women who had correctly placed IUDs and this was statistically significant (Fisher's exact test: $\chi^{2,7}$: 16.49, p: 0.01). (Table 1)

Table 1. Baseline Characteristics of the Population

Characteristics	Correctly Placed (n=218)	Mal-positioned IUD (n=84)	p-value
Age in years			
21 to 30	56 (25.69%)	23 (27.38%)	0.51
31 to 40	58 (26.61%)	27 (32.53%)	
41 to 50	104 (47.71%)	34 (40.96%)	
Number of pregnancies			
Zero	2 (1.01%)	1 (1.35%)	
1 to 3	121 (61.11%)	46 (62.16%)	0.81
4 to 5	48 (24.24%)	20 (27.03%)	
6 or more	27 (13.64%)	7 (9.46%)	
Number of live births			
Zero	1 (0.51%)	-	
1 to 3	133 (67.86%)	53 (72.60%)	0.87
4 to 5	43 (21.94%)	14 (19.18%)	
6 or more	19 (9.69%)	6 (8.22%)	
Uterine Size			
Length	8.06 ± 2.22	8.35 ± 2.28	0.33
Width	4.66 ± 1.59	4.99 ± 1.98	0.18
Height	5.67 ± 1.74	5.74 ± 1.91	0.76
Uterine Position			
Anteverted	157 (72.02%)	56 (66.67%)	0.23
Retroverted	57 (26.15%)	23 (27.38%)	
Anteflexed	-	1 (1.19%)	
Retroflexed	2 (0.92%)	2 (2.38%)	
Midpositioned	2 (0.92%)	2 (2.38%)	
Manner of IUD Insertion			
Abdominal	1 (2.63%)	-	0.69
Vaginal	37 (97.37%)	17 (100%)	
Timing of Insertion			
Interval	24 (85.71%)	11 (91.67%)	0.52
Post-partum	4 (14.29%)	1 (8.33%)	
Period of IUD Insertion			
Less than a year	13 (20.63%)	2 (9.09%)	0.39
1 to 5 years	23 (36.51%)	6 (27.27%)	
5 to 10 years	7 (11.11%)	4 (18.18%)	
More than 10 years	20 (31.75%)	10 (45.45%)	
Chief Complaint			
Vaginal bleeding	64 (29.36%)	15 (17.86%)	0.01*
Foul-smelling discharge	1 (0.46%)	1 (1.19%)	
Pubo-abdominal pain	26 (11.93%)	11 (13.10%)	
Irregular menstruation	8 (3.67%)	-	
Presence of a mass	50 (22.94%)	13 (15.48%)	
Localization or Lack of String	62 (28.44%)	38 (45.24%)	
Pregnancy with IUD	1 (0.46%)	2 (2.38%)	
Gynecologic Considerations	6 (2.75%)	4 (4.76%)	

Level of significance: p value < 0.05

Table 2. Sonographic Features of the IUD

Features	Overall	Malpositioned
Linear (echogenic stripe)	187 (61.92%)	57 (67.86%)
S-shaped (five echogenic points)	27 (8.94%)	6 (7.14%)
Acoustic shadowing	72 (23.84%)	17 (20.24%)
Echogenic	269 (89.07%)	73 (86.90%)

Table 3. Sonographic Characteristics and /or location of a Malpositioned IUD

Features	Frequency (Percentage) n=84
Located in the cervix or lower uterine segment	30 (35.7 %)
Partially expelled with part of the IUD extending through the external cervical os	10 (11.90%)
Mal-rotated	2 (2.38%)
Partially or fully embedded in the myometrium	38 (45.23%)
Extending beyond the uterine serosa or within the pelvic or abdominal cavity	-
Fragmented	4 (4.76%)

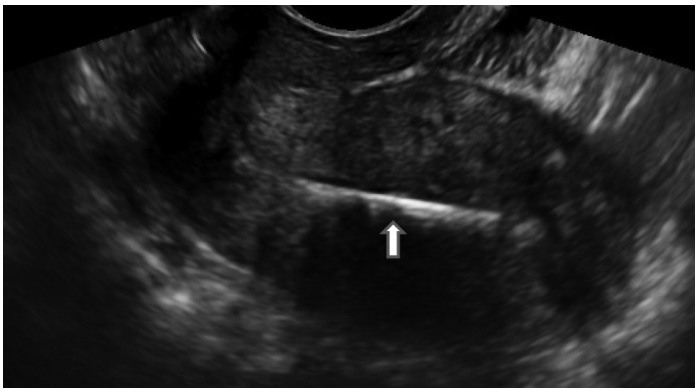
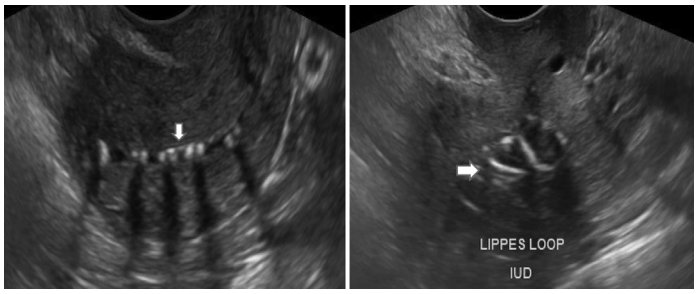


Figure 1. Correctly positioned intrauterine device. Within the endometrium is a brightly echogenic linear structure (arrow) corresponding to the long arm of a copper intrauterine device.



Figures 2a and 2b. Sagittal and transverse view of Lippes Loop intrauterine device. Within the endometrial cavity is an interrupted, echogenic, spiral-shaped structure (arrow) casting posterior acoustic shadows.

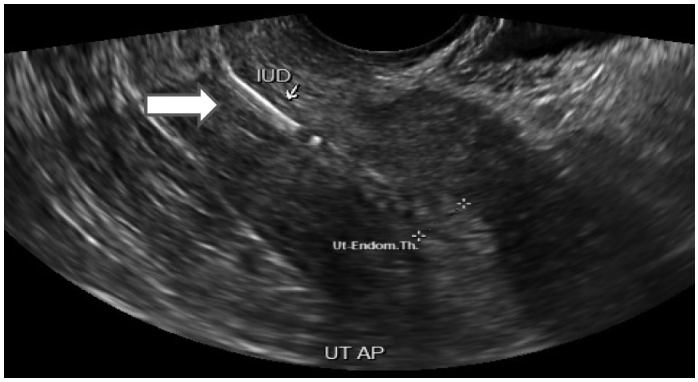


Figure 3. Malpositioned intrauterine device located in the lower uterine segment. The long arm of the intrauterine device is located within the upper part of the endocervical canal (arrow)

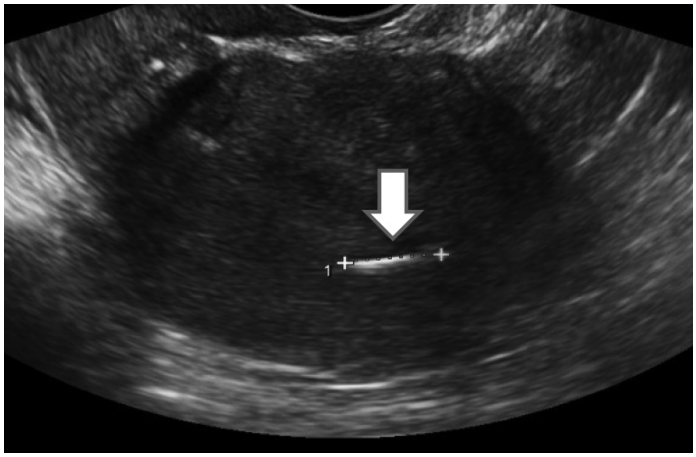


Figure 4. Malpositioned intrauterine device which is partially embedded in the myometrium. (arrow)

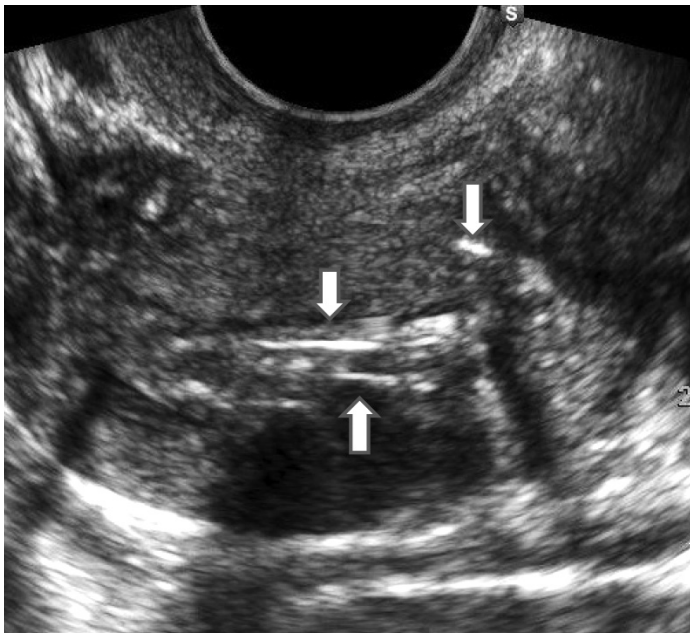


Figure 5. Fragmented intrauterine device. There are several brightly echogenic linear structures (arrows) casting posterior shadows within the endometrial cavity and some at the isthmus and embedding at the anterior myometrium suggestive of fragmented IUD

Table 4. Distribution of Conditions across Placement of IUD

Conditions	Correctly Placed	Mal-positioned IUD	p-value
Associated Pathology			
Uterine Disease	56 (25.69%)	25 (29.76%)	0.47
Cervical Disease	15 (6.88%)	1 (1.19%)	0.05*
Ovarian Disease	68 (31.19%)	17 (20.24%)	0.06
Other Pelvic Disease/s	16 (7.37%)	6 (7.14%)	0.95
Associated Conditions			
Abnormal uterine bleeding	29 (13.30%)	10 (11.90%)	0.75
Intrauterine Pregnancy	1 (0.46%)	8 (9.52%)	<0.01**
Ectopic Pregnancy Pelvic	2 (0.92%)	1 (1.19%)	0.83
Inflammatory Disease	2 (0.92%)	-	0.99
Abortion	-	1 (1.19%)	0.10

Level of significance: p value <0.05

Table 4 shows that only few associated conditions are different between women who had correctly and mal-positioned intrauterine devices. There is no significant difference between correctly positioned and malpositioned intrauterine devices in the presence of uterine diseases such as myomas or adenomyomas (Figure 6). There were significantly more women with cervical disease among those had correctly placed IUDs (Figure 7). The opposite is observed in those women in the study with intrauterine pregnancy who mostly had malpositioned IUDs (Figure 8). Of the three women with ectopic pregnancies, two had correctly positioned IUDs.

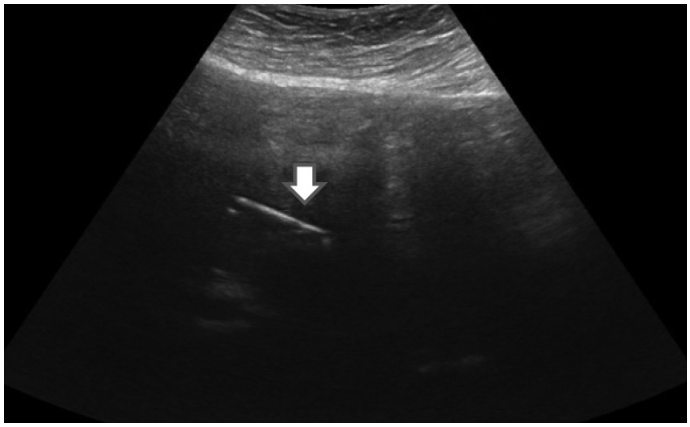


Figure 6. Multiple myoma uteri with intrauterine device. Transabdominal scan showing a brightly echogenic structure (arrow) - the long arm of an IUD correctly positioned within the endometrial cavity. There are multiple well-circumscribed heterogeneous uterine masses in the anterior myometrium.

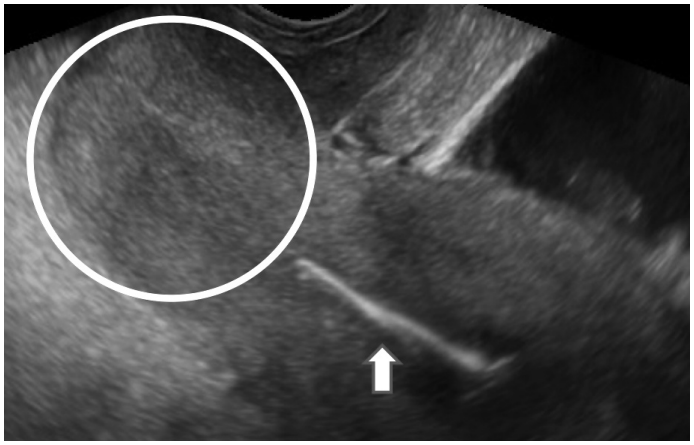


Figure 7. A case of squamous cell carcinoma of the cervix, stage IIB with intrauterine device. The cervix is converted into a heterogenous mass (ring). Within the endometrial cavity is a correctly positioned copper IUD. (arrow)

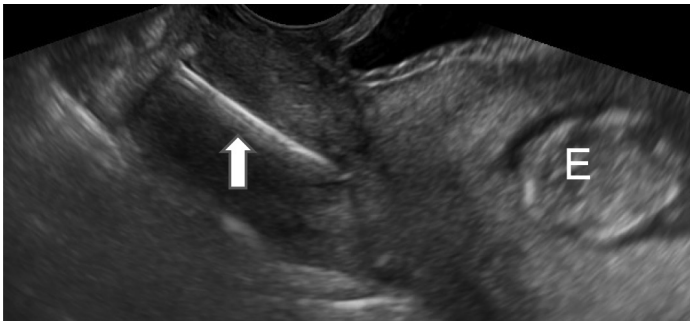


Figure 8. Intrauterine pregnancy with displaced intrauterine device. Within the endocervical canal is the long arm of the IUD (arrow). There is an intrauterine pregnancy seen with a single embryo (E)

DISCUSSION

Knowledge of the clinical presentation and sonographic findings of correctly positioned and malpositioned intrauterine device allow us to get informative data on how we can prevent or lessen IUD malposition's and complications. Sonographically, the IUD was seen as echogenic in almost all of the women followed by more than half demonstrating a linear echogenic stripe which is a common sonographic feature of a copper IUD. In the study of Nowitzki, the IUD stem is usually easily identified on standard 2D transvaginal ultrasonography as a linear echogenic structure. While the arms of the copper IUD are also fully echogenic, the arms of the levonorgestrel-

releasing IUD are only echogenic at the proximal and distal ends, with characteristic central posterior acoustic shadowing on transverse images10 while the lippes loop has an appearance of 5 echogenic foci aligned in the endometrial cavity with shadowing[11]

The prevalence of malpositioned IUD among patients seen at the Department of Obstetrics and Gynecology from year 2014 to 2018 was 27.81%. Almost half of women who had malpositioned IUDs complained of missing string as compared to women who had correctly placed IUDs. Ultrasound served as first-line imaging for evaluation of IUD for women complaining of abnormal bleeding, pelvic pain or non palpable retrieval strings. If a patient had lost IUD and the threads are not visible during pelvic exam, preoperative vigilance, including transvaginal or transabdominal ultrasound should be obtained to confirm the position of the IUD[12]. In this study, women complaining of missing IUD strings mostly had malpositioned IUD on ultrasound as expected. Women with malpositioned IUD however can also be asymptomatic[10]. Most common negative sequelae of women with a malpositioned IUD include an increase in bleeding or pain, compared with women with fundally positioned IUDs.[13] The presence of vaginal bleeding and pelvic pain were not significantly different between correctly positioned and malpositioned IUD in this study.

Goldstuck reported that the imbalance between the size of the IUD and that of the uterine cavity can result in the production of asymmetrical uterine forces[14]. Intrauterine devices that are too large for the small cavity, if not expelled, may embed resulting in patient discomfort, bleeding and may advance to perforations[15]. However, this study showed that there is no significant difference between correctly positioned and malpositioned IUDs with regards to uterine size and position.

With further reference to small uterine cavities predisposing to IUD displacement and expulsion, Hubacher's review of copper IUDs revealed that nulliparous women suffer higher rates of total expulsion compared with parous women[16]. Nulliparity was not seen as a risk factor for IUD malpositioning in this study.

Transmural migration and ultimate perforation may still happen even after a correct insertion technique and the embedment may occur at the time of insertion. A risk factor for IUD displacement and eventual uterine perforation includes IUD being placed less than 6 months post-partum[17]. The reasons for malpositioning in cases of intracesarean or postplacental IUD insertion, could be a large uterine cavity and contraction of the uterus during the process of involution causing the IUD direction to easily change[9]. There was no significant difference in the timing and manner of intrauterine device insertion in this study but it cannot be conclusive due to insufficient data collected. Out of 302 women with IUD, only 40 (13.2%) retrieved charts mentioned the timing of IUD insertion; only 55 (18.2%) where identified with regards to the manner of IUD insertion and only 85 (28.1%) women where identified with regards to length of period of IUD insertion or use.

Although the large majority of displacements are in the lower uterine segment of the uterus or in the cervix, migration upwards towards the fundus may occur particularly during the first few months after insertion[7]. The most common type of malpositioned IUDs seen in this study was partial or fully embedding the myometrium, and followed by those inappropriately located in the cervix or in the lower uterine segment. The timing of insertion may have contributed to the myometrial embedment in this study but we lacked the data to conclude on this.

Despite the high percentage of effectiveness of the IUD as a contraceptive device, pregnancy in the presence of an IUD can occur[18]. Early studies showed that the IUD was more likely to be found low-lying within the cavity than at the fundus in women who had become pregnant with an IUD in situ.[19] It was concluded that low-lying devices were more likely to fail. In this present study, those women discovered to be pregnant have expectedly malpositioned IUDs. There were 13 pregnant patients in the present study. Nine of these women had intrauterine pregnancies, three had ectopic pregnancies and one had an abortion. Out of 9 intrauterine pregnancies, 8 had malpositioned IUDs and only 1 had correctly positioned IUD which was statistically significant. Of the 8 malpositioned IUDs, 4 were located in the cervix or lower uterine segment which concurred with IUD location in previously reported studies of pregnancies in the presence of IUDs.[19]

Of the 3 women who had ectopic pregnancies, two had correctly positioned IUDs. In women who become pregnant with an IUD in place, ectopic pregnancy must be ruled out because pregnancies that occur with an IUD in place are more likely to be ectopic[5]. It may be surmised that the correctly placed IUD occupies the endometrial region where the embryo should implant in thus causing extrauterine pregnancy.

Women with uterine fibroids and on intrauterine device can have increased uterine bleeding or risk for device displacement or expulsion.[20] Severe uterine distortion due to a myoma or congenital deformity may preclude the proper postioning of an IUD and may cause displacement and migration of the IUD in and through the wall of the uterus[7]. A retroflexed uterine position

and increase in number of fibroids particularly the submucous type have been reported to have a higher incidence of IUD malposition[21]. Out of 302 women with IUD, 81 of them had uterine pathology. Almost 70% (n= 56) of those with uterine pathologies had correctly positioned IUDs inspite of the presence mostly of uterine fibroids (n=35), adenomyosis (n=6), adenomyomata (n=8) and endometrial pathology (n=8). The 25 women with malpositioned IUDs had almost similar concomitant uterine and endometrial pathology proportions as those with correctly positioned IUD. The presence of uterine pathology did not appear to contribute to the malpositioning of the IUDs. However, this may not be conclusive since the specific location of the leiomyomas were not collected in this study.

There are conflicting reports on the relationship between IUD and cervical neoplasia with a recent metaanalysis showing a decreased risk of cervical cancer with IUD use while an earlier study showed no significant association between IUD and cervical cancer.[22,23] Interestingly, there were 16 women in this study with cervical pathology. Among those 16 women, 15 had correctly positioned IUD and only 1 had malpositioned IUD. Out of 15 women with correctly positioned IUD, 12 of them had cervical malignancy and 3 had cervical polyp. This study shows that there were significantly more women with cervical disease such as cervical malignancy who had correctly placed IUDs. In these cases, the IUDs remained in place despite the presence of such conditions, with the cervical pathology probably preventing displacement of the intrauterine device.

CONCLUSION

Women with malpositioned IUDs mostly complained of missing string. An IUD that was partially or fully embedding the myometrium, was the most common malposition followed by inappropriate location in the cervix or in the lower uterine segment. Age, parity, uterine size, uterine position and presence of pelvic diseases did not contribute to the malpositioning of the intrauterine device. There is no adequate data with regards to the manner, timing and period of IUD insertion to conclude on its effect on the possibility of IUD malposition. Among those women with IUD who had associated pathology, cervical diseases had not contributed in the malpositioning of the IUD. Patients who become pregnant inspite of having an intrauterine device should be immediately checked for the possibility of a malpositioned IUD. In the presence of correctly positioned IUD, an ectopic pregnancy must be highly suspected.

LIMITATIONS and RECOMMENDATIONS

The study being retrospective is limited to what was written in the patient chart. There is limited data on timing and manner of insertion of the IUD and size and location of uterine pathologies - factors that may influence the malpositioning of the intrauterine devices. A prospective study that will follow up patients with IUD and possibly a three dimensional ultrasound visualization to correctly identify IUD placement is recommended. ■

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