

How common is IUD perforation, expulsion, and malposition?

IUD perforation of the uterus is uncommon, occurring in 0.1% of low-risk patients. IUD expulsion is common, with a rate of approximately 3% to 11%. IUD malposition is very common, occurring in 10% to 20% of patients. The management of IUD malposition is evolving.



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The medicated intrauterine devices (IUDs), including the levonorgestrel-releasing IUD (LNG-IUD) (Mirena, Kyleena, Skyla, and Liletta) and the copper IUD (Cu-IUD; Paragard), are remarkably effective contraceptives. For the 52-mg LNG-IUD (Mirena, Liletta) the pregnancy rate over 6 years of use averaged less than 0.2% per year.^{1,2} For the Cu-IUD, the pregnancy rate over 10 years of use averaged 0.5% per year for the first 3 years of use and 0.2% per year over the following 7 years of use.³ IUD perforation of the uterus, expulsion, and malposition are recognized complications of IUD use. Our understanding of the prevalence and management of malpositioned IUDs is evolving and the main focus of this editorial.

Complete and partial uterus perforation

A complete uterine perforation occurs when the entire IUD is outside the walls of the uterus. A partial

uterine perforation occurs when the IUD is outside the uterine cavity, but a portion of the IUD remains in the myometrium. When uterine perforation is suspected, ultrasound can determine if the IUD is properly sited within the uterus. If ultrasonography does not detect the IUD within the uterus, an x-ray of the pelvis and abdomen should be obtained to determine if the IUD is in the peritoneal cavity. If both an ultrasound and a pelvic-abdominal x-ray do not detect the IUD, the IUD was probably expelled from the patient.

Uterine perforation is uncommon and occurs once in every 500 to 1,000 insertions in non-breastfeeding women.⁴⁻⁸ The most common symptoms reported by patients with a perforated IUD are pain and/or bleeding.⁸ Investigators in the European Active Surveillance Study on Intrauterine Devices (EURAS) enrolled more than 60,000 patients who had an IUD insertion and followed them for 12 months with more than 39,000 followed for up to 60 months.^{7,8} The uterine perforation

rate per 1,000 IUD insertions in non-breastfeeding women with 60 months of follow-up was 1.6 for the LNG-IUD and 0.8 for the Cu-IUD.⁸ The rate of uterine perforation was much higher in women who are breastfeeding or recently postpartum. In the EURAS study after 60 months of follow-up, the perforation rate per 1,000 insertions among breastfeeding women was 7.9 for the LNG-IUS and 4.7 for the Cu-IUD.⁸

Remarkably very few IUD perforations were detected at the time of insertion, including only 2% of the LNG-IUD insertions and 17% of the Cu-IUD insertions.⁸ Many perforations were not detected until more than 12 months following insertion, including 32% of the LNG-IUD insertions and 22% of the Cu-IUD insertions.⁸ Obviously, an IUD that has completely perforated the uterus and resides in the peritoneal cavity is not an effective contraceptive. For some patients, the IUD perforation was initially diagnosed after they became pregnant, and imaging

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studies to locate the IUD and assess the pregnancy were initiated. Complete perforation is usually treated with laparoscopy to remove the IUD and reduce the risk of injury to intra-abdominal organs.

Patients with an IUD partial perforation may present with pelvic pain or abnormal uterine bleeding.⁹ An ultrasound study to explore the cause of the presenting symptom may detect the partial perforation. It is estimated that approximately 20% of cases of IUD perforation are partial perforation.⁹ Over time, a partial perforation may progress to a complete perforation. In some cases of partial perforation, the IUD string may still be visible in the cervix, and the IUD may be removed by pulling on the strings.⁸ Hysteroscopy and/or laparoscopy may be needed to remove a partially perforated IUD. Following a partial or complete IUD perforation, if the patient desires to continue with IUD contraception, it would be wise to insert a new IUD under ultrasound guidance or assess proper placement with a postplacement ultrasound.

Expulsion

IUD expulsion occurs in approximately 3% to 11% of patients.¹⁰⁻¹³ The age of the patient influences the rate of expulsion. In a study of 2,748 patients with a Cu-IUD, the rate of expulsion by age for patients <20 years, 20-24 years, 25-29 years, 30-34 years, and ≥35 years was 8.2%, 3.2%, 3.0%, 2.3%, and 1.8%, respectively.¹⁰ In this study, age did not influence the rate of IUD removal for pelvic pain or abnormal bleeding, which was 4% to 5% across all age groups.¹⁰ In a study of 5,403 patients with an IUD, the rate of IUD expulsion by age for patients <20 years, 20-29 years, and 30-45 years was 14.6%, 7.3%, and 7.2%, respectively.¹²

In this study, the 3-year cumulative rate of expulsion was 10.2%.¹² There was no statistically significant difference in the 3-year cumulative rate of expulsion for the 52-mg LNG-IUD (10.1%) and Cu-IUD (10.7%).¹²

The majority of patients who have an IUD expulsion recognize the event and seek additional contraception care. A few patients first recognize the IUD expulsion when they become pregnant, and imaging studies detect no IUD in the uterus or the peritoneal cavity. In a study of more than 17,000 patients using an LNG-IUD, 108 pregnancies were reported. Seven pregnancies occurred in patients who did not realize their IUD was expelled.¹⁴ Patients who have had an IUD expulsion and receive a new IUD are at increased risk for re-expulsion. For these patients, reinsertion of an IUD could be performed under ultrasound guidance to ensure and document optimal initial IUD position within the uterus, or ultrasound can be obtained postinsertion to document appropriate IUD position.

Malposition—prevalence and management

Our understanding of the prevalence and management of a malpositioned IUD is evolving. For the purposes of this discussion a malpositioned IUD is defined as being in the uterus, but not properly positioned within the uterine cavity. Perforation into the peritoneal cavity and complete expulsion of an IUD are considered separate entities. However, a malpositioned IUD within the uterus may eventually perforate the uterus or be expelled from the body. For example, an IUD embedded in the uterine wall may eventually work its way through the wall and become perforated, residing in the peritoneal cavity.

An IUD with the stem in the cervix below the internal os may eventually be expelled from the uterus and leave the body through the vagina.

High-quality ultrasonography, including 2-dimensional (2-D) ultrasound with videoclips or 3-dimensional (3-D) ultrasound with coronal views, has greatly advanced our understanding of the prevalence and characteristics of a malpositioned IUD.¹⁵⁻¹⁸ Ultrasound features of an IUD correctly placed within the uterus include:

- the IUD is in the uterus
- the shaft is in the midline of the uterine cavity
- the shaft of the IUD is not in the endocervix
- the IUD arms are at a 90-degree angle from the shaft
- the top of the IUD is within 2 cm of the fundus
- the IUD is not rotated outside of the cornual plane, inverted or transverse.

Ultrasound imaging has identified multiple types of malpositioned IUDs, including:

- IUD embedded in the myometrium—a portion of the IUD is embedded in the uterine wall
- low-lying IUD—the IUD is low in the uterine cavity but not in the endocervix
- IUD in the endocervix—the stem is in the endocervical canal
- rotated—the IUD is rotated outside the cornual plane
- malpositioned arms—the arms are not at a 90-degree angle to the stem
- the IUD is inverted, transverse, or laterally displaced.

IUD malposition is highly prevalent and has been identified in 10% to 20% of convenience cohorts in which an ultrasound study was performed.¹⁵⁻¹⁸

Benacerraf, Shipp, and Bromley were among the first experts to use

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ultrasound to detect the high prevalence of malpositioned IUDs among a convenience sample of 167 patients with an IUD undergoing ultrasound for a variety of indications. Using 3-D ultrasound, including reconstructed coronal views, they identified 28 patients (17%) with a malpositioned IUD based on the detection of the IUD “poking into the substance of the uterus or cervix.” Among the patients with a malpositioned IUD, the principal indication for the ultrasound study was pelvic pain (39%) or abnormal uterine bleeding (36%). Among women with a normally sited IUD, pelvic pain (19%) or abnormal uterine bleeding (15%) were less often the principal indication for the ultrasound.¹⁵ The malpositioned IUD was removed in 21 of the 28 cases and the symptoms of pelvic pain or abnormal bleeding resolved in 20 of the 21 patients.¹⁵

Other investigators have confirmed the observation that IUD malposition is common.¹⁶⁻¹⁸ In a retrospective study of 1,748 pelvic ultrasounds performed for any indication where an IUD was present, after excluding 13 patients who were determined to have expelled their IUD (13) and 13 patients with a perforated IUD, 156 patients (8.9%) were diagnosed as having a malpositioned IUD.¹⁶ IUD malposition was diagnosed when the IUD was in the uterus but positioned in the lower uterine segment, cervix, rotated or embedded in the uterus. An IUD in the lower uterine segment or cervix was detected in 133 patients, representing 85% of cases. Among these cases, 29 IUDs were also embedded and/or rotated, indicating that some IUDs have multiple causes of the malposition. Twenty-one IUDs were near the fundus but embedded and/or rotated. Controls with a normally-sited IUD were selected for compari-

son to the case group. Among IUD users, the identification of suspected adenomyosis on the ultrasound was associated with an increased risk of IUD malposition (odds ratio [OR], 3.04; 95% confidence interval [CI], 1.08-8.52).¹⁶ **In this study, removal of a malpositioned LNG-IUD, without initiating a highly reliable contraceptive was associated with an increased risk of pregnancy.** It is important to initiate a highly reliable form of contraception if the plan is to remove a malpositioned IUD.^{16,19}

In a study of 1,253 pelvic ultrasounds performed for any indication where an IUD was identified in the uterus, 263 IUDs (19%) were determined to be malpositioned.¹⁷ In this study the location of the malpositioned IUDs included¹⁷:

- the lower uterine segment not extending into the cervix (38%)
- in the lower uterine segment extending into the cervix (22%)
- in the cervix (26%)
- rotated axis of the IUD (12%)
- other (2%).

Among the 236 malpositioned IUDs, 24% appeared to be embedded in the uterine wall.¹⁷ Compared with patients with a normally-sited IUD on ultrasound, patients with a malpositioned IUD more frequently reported vaginal bleeding (30% vs 19%; $P < .005$) and pelvic pain (43% vs 30%; $P < .002$), similar to the findings in the Benacerraf et al. study.¹⁴

Connolly and Fox¹⁸ designed an innovative study to determine the rate of malpositioned IUDs using 2-D ultrasound to ensure proper IUD placement at the time of insertion with a follow-up 3-D ultrasound 8 weeks after insertion to assess IUD position within the uterus. At the 8-week 3-D ultrasound, among 763 women, 16.6% of the IUDs were malpositioned.¹⁸ In this study, IUD position was determined to be correct if all

the following features were identified:

- the IUD shaft was in the midline of the uterine cavity
- the IUD arms were at 90 degrees from the stem
- the top of the IUD was within 3 to 4 mm of the fundus
- the IUD was not rotated, inverted or transverse.

IUD malpositions were categorized as:

- embedded in the uterine wall
- low in the uterine cavity
- in the endocervical canal
- misaligned
- perforated
- expelled.

At the 8-week follow-up, 636 patients (83.4%) had an IUD that was correctly positioned.¹⁸ In 127 patients (16.6%) IUD malposition was identified, with some patients having more than one type of malposition. The types of malposition identified were:

- embedded in the myometrium (54%)
- misaligned, including rotated, laterally displaced, inverted, transverse or arms not deployed (47%)
- low in the uterine cavity (39%)
- in the endocervical canal (14%)
- perforated (3%)
- expulsion (0%).

Recall that all of these patients had a 2-D ultrasound at the time of insertion that identified the IUD as correctly placed. This suggests that during the 8 weeks following IUD placement there were changes in the location of the IUD or that 2-D ultrasound has lower sensitivity than 3-D ultrasound to detect malposition. Of note, at the 8-week follow-up, bleeding or pain was reported by 36% of the patients with a malpositioned IUD and 20% of patients with a correctly positioned IUD.¹⁷ Sixty-seven of the 127 malpositioned IUDs “required” removal, but the precise reasons for

the removals were not delineated. The investigators concluded that 3-D ultrasonography is useful for the detection of IUD malposition and could be considered as part of ongoing IUD care, if symptoms of pain or bleeding occur.¹⁸

IUD malposition following postplacental insertion

IUD malposition is common in patients who have had a postplacental insertion. Ultrasound imaging plays an important role in detecting IUD expulsion and malposition in these cases. Postplacental IUD insertion is defined as the placement of an IUD within 10 minutes following delivery of the placenta. Postplacental IUD insertion can be performed following a vaginal or cesarean birth and with a Cu-IUD or LNG-IUD. The good news is that postplacental IUD insertion reduces the risk of unplanned pregnancy in the years following birth. However, postplacental IUD insertion is associated with a high rate of IUD malposition.

In a study of 162 patients who had postplacental insertion of a Cu-IUD following a vaginal birth, ultrasound and physical examination at 6 months demonstrated complete IUD expulsion in 8%, partial expulsion in 16%, and malposition in 15%.²⁰ The IUD was correctly sited in 56% of patients. Seven patients (4%) had the IUD removed, and 1 patient had a perforated IUD. Among the 25 malpositioned IUDs, 14 were not within 1 cm of the fundus, and 11 were rotated outside of the axis of the cornuas. In this study partial expulsion was defined as an IUD protruding from the external cervical os on physical exam or demonstration of the distal tip of the IUD below the internal os of the cervix on ultrasound. Malposition was defined

as an IUD that was >1 cm from the fundus or in an abnormal location or axis, but not partially expelled.

In a study of 69 patients who had postplacental insertion of a Cu-IUD following a cesarean birth, ultrasound and physical examination at 6 months demonstrated complete IUD expulsion in 3%, partial expulsion (stem in the cervix below the internal os) in 4% and malposition in 30%.²⁰ The IUD was correctly positioned in 59% of the patients.²¹ The IUD had been electively removed in 3%. Among the 21 patients with a malpositioned IUD, 10 were rotated within the uterine cavity, 6 were inverted (upside down), 3 were low-lying, and 2 were transverse.²¹ Given the relatively high rate of IUD malposition following postplacental insertion, it may be useful to perform a pelvic ultrasound at a postpartum visit to assess the location of the IUD, if ultrasonography is available.

Management of the malpositioned IUD

There are no consensus guidelines on how to care for a patient with a malpositioned IUD. Clinicians need to use their best judgment and engage the patient in joint decision making when managing a malpositioned IUD. When an IUD is malpositioned and the patient has bothersome symptoms of pelvic pain or abnormal bleeding that have not responded to standard interventions, consideration may be given to a remove and replace strategy. When the stem of the IUD is below the level of the internal os on ultrasound or visible at the external os on physical examination, consideration should be given to removing and replacing the IUD. However, if the IUD is removed without replacement or the initiation of a highly reliable contra-

ceptive, the risk of unplanned pregnancy is considerable.^{16,19}

IUD totally or partially within the cervix or low-lying. When an IUD is in the cervix, the contraceptive efficacy of the IUD may be diminished, especially with a Cu-IUD.²² In these cases, removing and replacing the IUD is an option. In a survey of 20 expert clinicians, >80% recommended replacing an IUD that was totally or partially in the cervical canal.²³ But most of the experts would not replace an IUD that was incidentally noted on ultrasound to be low-lying, being positioned more than 2 cm below the fundus, with no portion of the IUD in the cervical canal. In the same survey, for patients with a low-lying IUD and pelvic pain or bleeding, the majority of experts reported that they would explore other causes of bleeding and pelvic pain not related to the IUD itself and not replace the IUD, but 30% of the experts reported that they would remove and replace the device.²³

IUD embedded in the myometrium with pelvic pain. Based on my clinical experience, when a patient has persistent pelvic pain following the insertion of an IUD and the pain does not resolve with standard measures including medication, an ultrasound study is warranted to assess the position of the IUD. If the ultrasound demonstrates that an arm of the IUD is embedded in the myometrium, removal of the IUD may be associated with resolution of the pain. Reinsertion of an IUD under ultrasound guidance may result in a correctly-sited IUD with no recurrence of pelvic pain.

IUD rotated within the uterus with no pain or abnormal bleeding. For an IUD that is near the fundus and rotated on its axis within the uterus, if the patient has no symptoms of pain or abnormal bleeding, my

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recommendation to the patient would be to leave the device in situ.

Without available guidelines, engage in clinician-patient discussion

It is clear that IUD malposition is common, occurring in 10% to 20%

of patients with an IUD. High-quality ultrasound imaging is helpful in detecting IUD malposition, including 2-D ultrasound with videoclips and/or 3-D ultrasound with coronal reconstruction. More data are needed to identify the best options for managing various types of malpositioned IUDs in patients with and without bothersome symptoms such

as pain and bleeding. Until consensus guidelines are developed, clinicians need to engage the patient in a discussion of how to best manage the malpositioned IUD. Medicated IUDs and progestin subdermal implants are our two most effective reversible contraceptives. They are among the most important advances in health care over the past half-century. ●

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