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Intrauterine device extrauterine dislocation in women with previous caesarean section: two case reports and literature review

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ABSTRACT

Background. Intrauterine contraceptive devices (IUCDs) are one of the most frequently chosen methods by patients after counselling, especially following a delivery (vaginal or caesarean) or a voluntary abortion. Although displacement of the IUCD into the lower uterine segment or cervix is common (approximately 10.4%), uterine perforation occurs in about 0.1% of cases. Meanwhile, the rate of caesarean sections (CS) has been steadily increasing, and literature reports a higher risk of uterine perforation when the device is placed within the first 4-8 weeks after surgical delivery, with perforation rates plateauing around 22-23 weeks after postpartum insertion.

Case presentation. We describe two similar cases of extrauterine dislocated copper IUCDs in patients with a single previous pregnancy, which ended in a CS more than two years earlier. In both cases, ultrasound examination clearly revealed IUCD displacement. Both patients underwent uncomplicated laparoscopic removal of the device.

Conclusions. Persistent pelvic pain in IUCD users should be thoroughly investigated through clinical and imaging analysis. Diagnosis of IUCD displacement may require urgent or emergent management.

INTRODUCTION

Intrauterine contraceptive device (IUCD) is one of the most commonly used methods of long-acting reversible contraception (LARC) due to its high efficacy, safety [1], user-friendliness, and patient satisfaction [2]. An increasing trend in LARC use has been reported compared to other contraceptive methods in recent years [3]. Comprehensive and transparent information about this method appears to improve compliance and consideration [4].
Major complications associated with IUCD use include extrauterine dislocation, perforation, expulsion, and ectopic pregnancy [5]. Although IUCD expulsion within an intact uterus (cervix or lower uterine segment) is common (approximately 10%),

uterine perforation is rare, with a reported incidence of 1.6 cases per 1,000 insertions [6]. Perforation may be diagnosed early or remain asymptomatic and undetected for several years. The risk of perforation is higher when the IUCD is positioned within 4-8 weeks after delivery or elective abortion [7]. Similarly, there is an increased risk of uterine perforation during the first years after insertion, with a plateau around 22-24 weeks [8].
There are very few studies on the risk of uterine perforation after IUCD placement in women who had a caesarean sections (CS) more than 24 months earlier and this is a major research gap. An epidemiological analysis indicates a significant increase in risk associated with CS and multiple uterine surgeries [9-10]. This is relevant for the large number of women worldwide who have undergone a caesarean section, as well as for the numerous studies exploring the necessity of placing an IUCD at the time of caesarean delivery or LARCs in the post-partum period to prevent unintended pregnancies [11].
Diagnosis and localization of an extrauterine dislocated IUCD are performed using ultrasound, plain abdominal X-ray, or both. Levonorgestrel-releasing IUCDs are more likely than copper IUCDs to show discrepancies between presurgical evaluation and actual position after extraction [12].

CASE PRESENTATION

Here, we present two similar cases of copper IUCD displacement, combining them with a comprehensive literature review. Both patients chose non-hormonal reversible contraception with a copper IUCD, without any apparent difficulty. An intravaginal ultrasound examination confirmed the device's proper placement.
Neither patient had any comorbidities. However, they shared a history of a single previous pregnancy that ended in a CS more than two years earlier. Both presented to our emergency room about two months after IUCD insertion, complaining of abnormal uterine bleeding and vague pelvic pain.
The clinical exam began with a speculum examination, which showed no signs of atypical cervicovaginal discharge or IUCD strings visible outside the external cervical os. A subsequent bimanual examination revealed an anteflexed uterus, regular in shape and freely movable, with mild parametrial tenderness but no palpable masses.
Routine blood tests were within normal limits. Ultrasound examination clearly showed IUCD displacement: in the first case, the device was embedded in the right parametrium (**Figure 1**); in the second case, the device was lodged in the Douglas pouch [3]. No free fluid or haematoma was detected. Both patients were afebrile and asymptomatic for urinary or intestinal disorders. A plain abdominal X-ray confirmed IUCD displacement.
Both patients underwent laparoscopic removal of the device. In both cases, a 12 mm optic trocar was placed, and pneumoperitoneum was achieved using the open approach. Subsequently, two 5 mm ancillary trocars were placed in the iliac fossae. No intra-abdominal adhesions or visceral lesions were found during surgery, and the uterus appeared intact. The device was removed with an atraumatic grasper. The postoperative course was uneventful, and both patients were discharged the following day.
At follow-up, both patients requested oral contraception.

DISCUSSION

In today's healthcare landscape, the proliferation of innovative contraceptive methods and devices provides a wide range of options for patients and gynaecologists. Unfortunately, the introduction of these new instruments may lead to uncommon complications, some of which have already been described in the literature [13].
The IUCD is an increasingly popular and highly effective contraceptive method, with an efficacy rate exceeding 99% [14]. The primary complications

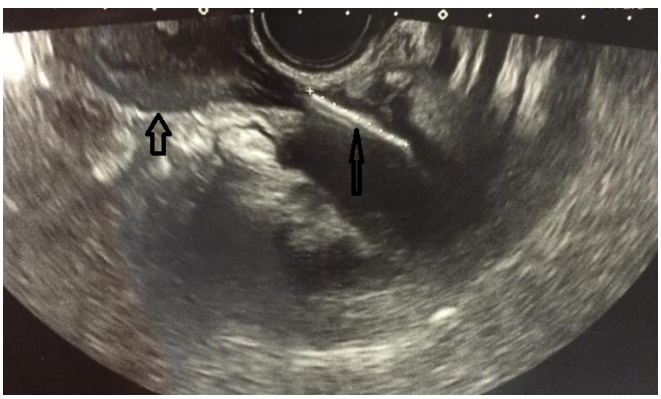

Figure 1. *Transvaginal ultrasound in transverse section showing IUCD embedded in the right parametrium.*

The two arrows indicate the uterus and the IUCD. Notice the typical hyperechoic profile of the device.

associated with these devices include intrauterine and extrauterine displacement. The latter is associated with uterine perforation. Uterine perforation events involving these devices are rare but may be more frequent in the postpartum period and during lactation.

The role of previous CS in increasing the risk of uterine perforation needs further investigation, especially given the rising CS rates. It is well known that the process of cicatrization of the myometrial wall after a caesarean is problematic, with well-known complications such as uterine wall defects, which can lead to perforation or uterine rupture in some cases [15]. Few studies have examined the risk of perforation beyond 24 months after CS, and the rarity of this event limits the available data to determine whether a previous CS constitutes a significant risk factor for complications.

The sequence of events leading to uterine perforation and IUCD migration may be influenced by uterine malposition, malformations, previous CS, multiparity, postpartum period, lactation and the operator's experience, potentially resulting in primary perforation. Regarding timing of insertion World health organization is very clear stating that IUCDs can be inserted within 48 hours after delivery [16] However, a previous CS may predispose to secondary perforation due to the increased susceptibility of the uterine wall to gradual pressure and subsequent necrosis caused by the IUCD [17].

Non-specific and vague symptoms should never be underestimated in patients with an IUCD, and prompt clinical evaluation is essential.

A plain X-ray is unsuitable for precise localization of the device, as it cannot reliably differentiate between an IUCD correctly positioned within the uterine cavity and a case of partial or complete uterine perforation. Therefore, intracavitary radiopaque contrast is required for an accurate differential diagnosis. However, in our cases, the IUCDs were unequivocally dislocated to extrauterine sites.

The diagnosis of IUCD perforation necessitates an urgent minimally invasive surgical approach, particularly in symptomatic patients. The choice of technique – hysteroscopy, cystoscopy, colonoscopy, or laparoscopy – depends on the IUCD's abnormal location [18], considering the potential risks of pathological adhesion formation, intestinal or urinary tract injury, and medico-legal implications.

Uterine perforations rarely result in severe complications such as bowel or bladder injury, sepsis, or peritonitis. For extrauterine IUCDs, laparoscopic surgery is the preferred approach; however, laparotomy is warranted in cases of bowel perforation or severe sepsis. Electrocautery should be avoided due to concerns about thermal energy transmission by the copper IUCD during surgical removal [19]. An ultrasonic scalpel (*e.g.*, Harmonic) is recommended for adhesion removal to minimize thermal energy dispersion.

Patients with IUCDs perforation exhibited a higher incidence of retroflexed uterine positions and various uterine anomalies – including septate and bicornuate uteri and fibroids – compared to controls [20]. Notably, submucosal fibroids were more prevalent among women with extrauterine dislocated IUCDs [20].

No significant difference in uterine perforation rates was observed when comparing the Levonorgestrel intrauterine system (LNG-IUS) with the copper IUCD. Most early perforations were detected due to symptoms of pain and/or bleeding. However, perforation was asymptomatic in 29% of LNG-IUS cases and 17% of copper IUCD cases.

While some patients exhibit signs and symptoms suggestive of perforation (such as pain or bleeding), many remain asymptomatic at the time of diagnosis. Patients with IUCD migration are also at risk of unintended pregnancy [21]. Symptoms vary depending on the extrauterine location of the IUCD.

Perforated IUCDs have been found in various locations, including the omentum (26.7%), pouch of Douglas (21.5%), colonic lumen due to perforation (10.4%), myometrium (7.4%), broad ligament (6.7%), free within the abdominal cavity (5.2%), small bowel serosa (4.4%), colonic serosa (3.7%), and mesentery (3%). Rare locations include the bladder, appendix, abdominal wall, fallopian tube, ovary, retroperitoneum, and small bowel with perforation.

The World Health Organization recommends prompt removal of migrated IUCDs, as chronic cases may lead to granulation tissue formation, complicating retrieval and increasing the risk of adhesions [22, 23]. Symptoms of colorectal perforation can be nonspecific. Some authors report a case of a 77-year-old woman with a positive faecal occult blood test and no symptoms, in whom two IUCDs were found located in the transverse colon [24].

IUCD bladder perforation typically manifests as recurrent and refractory cystitis, with only temporary response to treatment. Patients generally present with pyuria and a positive urine culture [25]. In

most cases, the IUCD is freely floating in the abdominal or pelvic cavity, often encased in adhesions, which can lead to infertility, chronic pain, and intestinal obstruction. Rarely, an intraperitoneal IUCD may perforate adjacent structures, resulting in peritonitis, fistula formation, or haemorrhage [12].

First, the patient is assessed to rule out the possibility of spontaneous expulsion. A complete physical and gynaecological examination is then performed to assess abdominal pain, uterine tenderness, and abnormal cervicovaginal discharge. A subsequent ultrasound examination helps determine whether the IUCD is intrauterine or extrauterine, as observed in our two cases [26].

Three-dimensional ultrasound (3D US) is often useful in further characterizing displacement or myometrial perforation [25]. Standard two-dimensional ultrasound (2D US), whether vaginal or abdominal, typically provides an accurate visualization of the IUCD shaft but may not always clearly identify the location of its side arms. Copper IUCDs typically appear as highly echogenic and are easier to distinguish from a medicated device, which is smaller and tends to be iso to hyperechogenic. The 3D coronal view of the uterus is particularly effective in illustrating the spatial relationship between the IUCD shaft, arms, and the endometrial cavity. Thus, the IUCD location was misidentified in 12% of cases using transvaginal ultrasound. Additionally, IUCDs were not detected in 9% of patients undergoing office-based 2D ultrasound [26]. Embedment occurs when the IUCD penetrates the endometrium or myometrium without extending through the serosa. Ultrasound is the preferred initial imaging modality for suspected IUCD perforation. Complete perforation is a more severe complication, occurring when the IUCD penetrates all three layers of the uterus, extending partially or completely into the extraperitoneal tissues, as in our first case, or into the peritoneal cavity, as in our second case.

In cases of suspected major surgical complications related to intra-abdominal IUCDs, such as visceral perforation, abscess formation, or bowel obstruction, CT is considered the gold standard imaging modality [25, 27].

To prevent this complication, we propose a management strategy aimed at reducing the risk, particularly in cases of isthmocele (also referred to as caesarean scar defect, niche, or diverticulum), which is becoming increasingly prevalent in gynaecological practice (**Figure 2**). It is crucial to highlight the major

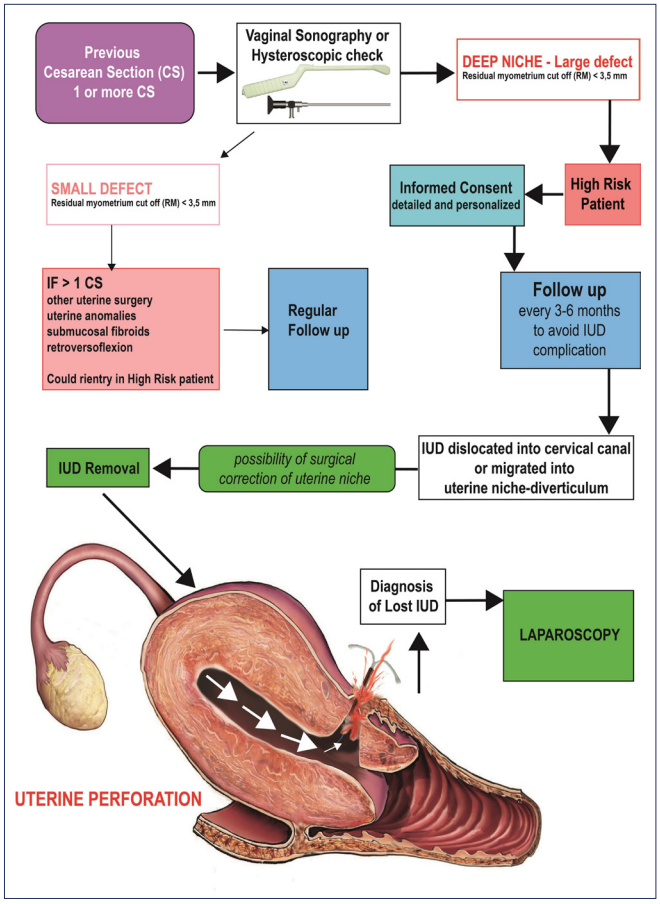

Figure 2. *Proposal management and mechanism of dislocated IUCD in women with previous cesarean section.*
CS: caesarean section.

technological advancements achieved in recent years, particularly in ultrasound and hysteroscopy.

In this context, an accurate assessment of the uterine niche is essential. An isthmocele is defined as a myometrial discontinuity or a triangular anechoic defect in the anterior uterine wall. It can be classified as a small or large defect based on the residual myometrial thickness at the site of the previous hysterotomy. Although often asymptomatic, its primary clinical manifestation is abnormal or postmenstrual bleeding, and some patients may report chronic pelvic pain.

Risk factors for uterine niche formation include a retroflexed uterus and multiple caesarean sections (CS). A residual myometrial thickness of < 3.5 mm is considered a large defect, whereas a thickness of ≥ 3.5 mm is classified as a small defect. These defects can be accurately evaluated using ultrasound and magnetic resonance imaging (MRI) [28].

In selected high-specialization centres, hysteroscopic evaluation may be performed to assess the presence of a uterine niche, providing a qualitative

measurement of the residual myometrial thickness and detecting possible perforations. Careful patient selection and strict evaluation criteria are essential, as the insertion of an intrauterine device (IUCD) in such cases may lead to severe complications that are sometimes difficult to diagnose.

Therefore, in women with a history of caesarean section, the procedure must be carefully tailored, taking into account previous uterine surgeries and any underlying anomalies. Even a seemingly simple procedure can sometimes trigger complications related to preexisting structural defects

A detailed and personalized informed consent with comprehensive counselling must be provided to women with a history of caesarean section (CS).

In the informed consent, according to recent literature, it is crucial to specify that a residual myometrial thickness of ≥ 3.5 mm is the cutoff to reduce the risk of uterine perforation or bladder injury.

A combined laparoscopic-hysteroscopic approach should be preferred in cases of significant defects. After dissecting the vesicouterine pouch, the surgeon incises the scar tissue of the niche, guided by transillumination from the hysteroscopic route, and sutures the uterine wall in multiple layers to reinforce the defect.

Due to the increasing number of CS procedures, the previously rare complications of IUCD perforation are becoming more common. There is a need for evidence-based, safe, and effective surgical strategies to manage these patients.

CONCLUSIONS

Pelvic symptoms in women using an IUCD should never be overlooked. Clinical and imaging evidence of IUCD extrauterine dislocation necessitates an urgent, minimally invasive surgical approach, particularly in symptomatic patients. This is a small case series, and further research is required to determine the safest interval after a previous CS for IUCD insertion, aiming to reduce the risk of secondary uterine perforation and subsequent device migration. Minimally invasive techniques remain the gold standard for retrieving extrauterine dislocated IUCDs. Informed consent should be thorough and tailored to the patient, ensuring the woman is informed of all potential risks. Moreover, a more rigorous follow-up schedule should be adopted to effectively monitor complications.

COMPLIANCE WITH ETHICAL STANDARDS

Authors' contribution

A.P., M.V., D.C.: Conceptualization, data curation, formal analysis, writing – original draft, writing – review & editing. A.D., A.M., M.C.: Validation, visualization, writing – original draft, writing – review & editing. G.R.D.: Methodology, project administration, supervision, writing – original draft, writing – review & editing. D.D.G.: Data curation, writing – review & editing.

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Disclosure of interests

The authors declare that they have no conflict of interests

Ethical approval

N/A.

Informed consent

Informed consent for data collection for research purpose and publication was retrieved by every patient included in the study. All personal data have been anonymized in the current publication.

Data sharing

All data are on the public online repository.

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