Words matter: perforation… or transmural migration?

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Received 5 November 2022
Accepted 29 November 2022
Published Online First 23 December 2022

The intrauterine device (IUD) is a safe and highly effective form of reversible contraception, and IUD use is increasing globally.[1] The paper published in this edition is a credible and comprehensive review of early postpartum IUD (PPIUD) experiences.[2] In summary, the authors show that PPIUDs decrease unintended pregnancy rates and short-interval pregnancies, lessen economic burden, and are safe for most people seeking contraception. Despite the safety and benefits of IUDs, the authors state that PPIUD insertion is underutilised, and they call for further studies to understand better such low utilisation.

Despite the generally positive findings of this paper and the abundance of evidence indicating IUD benefit, it remains important to consider risks and complications around IUD use when discussing potential reasons and solutions for underutilization of PPIUDs. Certainly patients who receive counselling on IUD use are more often counselled about its potential adverse effects than about its benefits.[3] As such, it is important to note that misperceptions or misclassifications of complications can impact IUD use. This is particularly true for PPIUD use since this approach is relatively new in the spectrum of IUD initiatives.

In reviewing complications, especially perforations—occurring in about one in 1000 IUD insertions[4 5]—a gap has evolved in perception and terminology. Conventionally, all IUDs found outside the uterus are termed 'perforations'. This systematic review by Bolling *et al* and others document multiple reports in which an IUD is noted to be in the uterus for some time after insertion but is later found in the abdomen, suggesting that not all extrauterine IUDs are the result of an initial clinician perforation during insertion. While management is ultimately the same regardless of how an IUD becomes extrauterine, it is important to define this complication during patient counselling properly to inform patient and provider of the perceptions of safety.

The fact that not all extrauterine IUDs result from insertion-related uterine perforation is not a novel concept in the literature. Multiple case reports demonstrate instances where an IUD was known to be in the endometrial cavity and, years later, found in the abdomen. For example, Ferguson *et al* describe a case where a 52 mg levonorgestrel IUD was inserted and confirmed in the 'upper uterine cavity' on transvaginal ultrasound 6 days after insertion.[6] However, multiple follow-up images performed over 2 years (completed for non-gynaecologic reasons) demonstrated gradual migration of the IUD. The IUD was eventually removed laparoscopically, where it was found protruding through the myometrium. A second case report by Atileh *et al* describes a copper T 380A IUD shown to be intrauterine on abdominal ultrasound at 1 month follow-up.[7] Nine months later, the ultrasound was repeated due to menstrual irregularity; the IUD remained intrauterine along with a 7-week intrauterine gestation. The patient elected to keep the IUD in place and continue the pregnancy. Following the birth, the IUD was noted to be extrauterine on imaging. Soon thereafter, the IUD was laparoscopically removed where one arm was found within the cecum. Both these cases demonstrate compelling evidence of IUD migration unrelated to perforation at the time of insertion.

Multiple ex vivo studies support the physics and mechanism behind the concept of transmural migration, whereby embedment of the IUD into the uterine myometrium may over time lead to translocation into the abdomen. It turns out that it is hard to perforate the uterus with modern IUD insertion systems. Ex vivo testing using fresh hysterectomy specimens showed the force required for perforation depended on anatomical site and thickness of the myometrium; a metal

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To cite: Amaya SI, Henkel A, Blumenthal PD. *BMJ Sex Reprod Health* 2023;**49**:74–75.

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sound could perforate a uterus by applying forces of 20.7–28.4 Newtons (N).[8 9] To put this in context, it takes about 5 N to break a pencil. Another study of fresh hysterectomy samples similarly found that the plastic intrauterine device placement rod bowed and could not perforate the uterine serosa at the fundus, whereas a metal sound was universally able to perforate the uterine fundus with an average force of 17.9 N.[10] Goldstuck and Wildemeersch describe the concept of 'secondary perforation' where the uterus alone may be responsible for 'perforation' after demonstrating through uterine force, pressure, and surface area measurement that the uterus can generate a force of about 50 N during cramping or contractions. Compared with the 17–28 N of force required for perforation, the uterus alone being able to produce 50 N of force would be sufficient to produce transmural uterine migration even after the IUD is confirmed to be correctly placed.[9]

The biologic plausibility of this theory is further supported by data suggesting the risk of extrauterine IUD is highest when an IUD is placed when the uterus is cramping and contracting during the postpartum period and breastfeeding. In a large prospective longitudinal study of IUD users, the risk of uterine perforation increased most significantly for those 0–3 months postpartum followed by those 3–6 months postpartum.[11] Notably, this risk did not increase for immediate post placental insertion, likely because perforation in the setting of postpartum insertion would require an excessive amount of force given the increased thickness of the myometrium right after placental expulsion. Similarly, in a large population-level study with 370 identified perforations over a 13-year period, more than half of all the patients had given birth within the previous 6 months and at least one-third were breastfeeding and amenorrhoeic at the time of insertion.[12]

The problem with the word 'perforation' is that it almost always impugns the clinician and damages the IUD's reputation. It suggests that the IUD became extrauterine at the time of placement, even if the IUD was previously confirmed to be intrauterine. We advocate updating the lexicon and encourage the use of 'transmural migration' to describe select cases of extrauterine IUDs—acknowledging that migration likely plays a role in some proportion of such occurrences. This captures prior terminology such as 'secondary perforation' or 'translocation' that allude to asymmetric uterine forces leading to an extrauterine IUD. This change in nomenclature will better account for events that are the result of physiological processes rather than clinician-related causation. With the advent of three-dimensional ultrasound and identification of risk factors that may lead to transmural migration, we may better risk-stratify and counsel patients on IUD benefits and limitations. Words matter.

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Contributors SA and AH performed the literature review and co-authored the editorial. PB generated the concept, outlined the initial draft, and provided subsequent edits.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; internally peer reviewed.

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