CASE REPORT

Pregnant with a perforated levonorgestrel intrauterine system and visible threads at the cervical os.

David L Howard,¹ Lauren M Beasley²

¹Las Vegas Minimally Invasive Surgery/Women's Pelvic Health Center, Las Vegas, Nevada, USA
²633d Medical Group, Langley AFB, Hampton, Virginia, USA

Correspondence to

Dr David L Howard,
 dhoward@wellhealthqc.com

Accepted 5 May 2017

SUMMARY

We present a case in which a patient presented with a pregnancy of unknown location and normally rising human chorionic gonadotropin (hCG) levels but with a levonorgestrel intrauterine device (LNG-IUD) present. The LNG-IUD had been placed 4.5 years ago. Although unintended, this pregnancy was desired. Strings were clearly visible and initial 2D ultrasound suggested intrauterine location of the LNG-IUD. The LNG-IUD could not be removed however. The patient was managed expectantly with close follow-up, serial beta-hCGs and serial ultrasounds until definitive diagnosis of the location of the pregnancy. The patient was diagnosed with an ectopic pregnancy and during laparoscopy the body of the IUD was noted in the posterior cul-de-sac. When patients present with multiple competing clinical problems it is important to look at the patient as a whole, taking into account their desires, in order to construct a cohesive management plan.

BACKGROUND

Pregnancies conceived with an intrauterine device (IUD) are associated with adverse pregnancy outcomes.¹ These pregnancies are at greater risk for spontaneous abortion, preterm delivery and chorioamnionitis compared with pregnancies conceived without an IUD.² Among pregnancies conceived with an IUD in place, those in which the IUD is left in place are at increased risk of spontaneous abortion, preterm delivery and septic abortion compared with those in which the IUD is removed early.^{3–5} Although current IUD use does not increase the risk of ectopic pregnancy, if a pregnancy does occur with an IUD in place, one study estimated an almost 10-fold higher risk of that pregnancy being an ectopic pregnancy.⁶

Although uncommon, uterine perforation is a potentially serious complication of IUD placement. Uterine perforation occurs in approximately 1 out of every 1000 insertions.^{7–8} Typically, the most common sign that prompts a provider to suspect perforation and migration is the absence of strings at the cervical os during a speculum examination. As long as the strings are visible or palpable, the IUD is likely still inside the uterus.

Here we present a case of a patient with a pregnancy of unknown location with a perforated levonorgestrel (LNG) IUD and visible threads at the cervical os.

CASE PRESENTATION

A 31-year-old gravida 4, para 2 woman with the LNG-IUD in place for 4.5 years started to experience symptoms concerning pregnancy. The LNG-IUD had been placed by a midwife 6 weeks after last vaginal delivery. Prior to that delivery she had a history of one other vaginal delivery and one elective termination by suction dilation and curettage. At the onset of her current symptoms she took a home pregnancy test and it was positive. Based on her last menstrual period she was 5 weeks and 2 days at this point. She had desired another child though was planning on waiting longer before trying again. She then went to a local urgent care in recognition of the fact that she had an LNG-IUD in place and she was now pregnant. The emergency room physician did a speculum examination and saw the strings but referred her to see an obstetrician/gynaecologist for removal rather than attempting removal in the emergency room. She presented to her primary care physician who then promptly referred her to the obstetrics and gynaecology department at our facility where she was seen the same day.

INVESTIGATIONS

During the initial visit the strings were visualised on examination and, after extensive counselling about the risks of removing the LNG-IUD and the risks of leaving the LNG-IUD in place, the patient consented to early removal. As stated above, although this pregnancy was unintended it was a desired pregnancy as the patient was planning on having one more child. Of note, her human chorionic gonadotropin (hCG) on this day was 307 mIU/mL and the rest of the pelvic examination was benign. The strings were grasped with a ring forceps and steady traction was applied but the LNG-IUD could not be removed. After two consecutive tries (in that initial visit) the removal attempt was aborted. That same day, the patient was taken immediately to the radiology department for a formal pelvic ultrasound to rule out ectopic pregnancy. The radiology report noted: "IUD is seen within lower uterine segment/endocervical canal. No intrauterine gestational sac is identified. No free fluid." The plan at the end of this visit was to follow patient closely with serial hCG levels and serial ultrasounds until the location of the pregnancy could be verified.

Six days after this first visit, and 1 day before her 1-week follow-up visit was scheduled, she presented

CrossMark

To cite: Howard DL, Beasley LM. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-220071

Figure 1 Transvaginal ultrasound image of the left adnexa in the sagittal plane performed on day 10 after presentation. Human chorionic gonadotropin level was 6188 mIU/mL. Note the presence of a complex mass separate from the ovary suggestive of left ectopic pregnancy.

to the emergency room at our institution with left lower quadrant pain. Her hCG level at this point was 2535 mIU/mL which was appropriate based on an expected rise of at least 53% every 48 hours.⁹ A repeat ultrasound done during this emergency room visit showed no visible intrauterine or ectopic pregnancy and again the report noted that ‘the intrauterine contraceptive device is in the lower uterine segment.’ At this point, the patient had a pregnancy of unknown location with appropriately rising hCG levels and an LNG-IUD noted to be in the lower uterine segment.

Seven days after her initial gynaecology consult, and the day after presentation to the emergency room, the patient was seen by another gynaecologist within our department. She requested another attempt at removal. Like the first attempt, the second attempt was unsuccessful. On day 8 her hCG level was 4736 mIU/mL, and appropriately risen from her hCG level on day 6 (2535 mIU/mL). On day 10, her hCG level was 6188 mIU/mL which represented only a 30% rise from her day 8 hCG level. On pelvic examination during her follow-up visit (on day 10) she was noted to have mild left adnexal tenderness. A bedside transvaginal ultrasound showed no intrauterine pregnancy and a moderate amount of free fluid. Patient was then taken immediately for formal ultrasound which showed a new complex left adnexal mass, separate from the ovary, and no intrauterine gestation, highly suggestive of ectopic pregnancy (see [figure 1](#)). Again, the LNG-IUD was reported as remaining in the lower uterine segment (see [figures 2 and 3](#)).

DIFFERENTIAL DIAGNOSIS

1. Early intrauterine pregnancy of uncertain viability versus ectopic pregnancy
2. Embedded intrauterine device versus perforated intrauterine device

TREATMENT

The patient was consented for both laparoscopic salpingectomy to remove the ectopic pregnancy and hysteroscopy to attempt removal of the LNG-IUD, which was still thought to be inside the uterus based on serial ultrasounds documenting this. During the laparoscopic portion of the surgery a left ectopic pregnancy was noted and more surprisingly the entire body of the LNG-IUD was outside the uterus with the strings still inside the

Figure 2 Transvaginal ultrasound image of the uterus in the midline sagittal plane performed on day 10 after presentation. Human chorionic gonadotropin level was 6188 mIU/mL. Note the linear echogenic shadowing in the lower uterine segment.

uterus. The LNG-IUD had perforated through the posterior wall of the uterus. None of the three formal ultrasounds performed had visualised any part of the LNG-IUD as being extrauterine. The LNG-IUD was removed laparoscopically without difficulty. Hysteroscopy was not performed since the LNG-IUD was removed intact laparoscopically.

OUTCOME AND FOLLOW-UP

Final pathology confirmed a left ectopic pregnancy. The patient had an uncomplicated postoperative course and hCG levels were followed until less than 5 mIU/mL.

DISCUSSION

At the heart of this challenging case were two competing clinical scenarios. On the one hand the patient had a pregnancy of unknown location, that was desired even if unintended, and on the other hand the patient had an LNG-IUD that could not be removed in the clinic despite attempts by two different physicians. Further, the first four serial hCG levels obtained rose appropriately suggesting an intrauterine pregnancy.

Figure 3 Transvaginal ultrasound image of the uterine fundus in the coronal plane performed on day 10 after presentation. Human chorionic gonadotropin level was 6188 mIU/mL. Note that the crossbars of the levonorgestrel intrauterine device cannot be clearly appreciated.

In a retrospective case series of 75 patients in Finland treated for uterine perforation, seven women (9%) were referred because of failure to remove their IUD by pulling visible threads and, separately, 11 (15%) were pregnant.⁹ What distinguishes this case is that the patient was both pregnant and had an LNG-IUD that could not be removed by pulling on the visible threads. In addition, she had a pregnancy of unknown location with hCG levels that rose appropriately for the first 8 days of follow-up. In this same case series, all seven cases with visible

threads but unsuccessful removal by pulling were diagnosed with partial perforation or myometrial embedding. In our case, there was complete perforation and the entire body of the LNG-IUS (intrauterine system) was inside the posterior cul-de-sac.

The fact that our patient did not get pregnant for over 4 years raises the question of exactly how efficacious is a misplaced LNG-IUD. A recent case report examined serum LNG levels in a patient with an intraperitoneal LNG-IUD and reported that the intraperitoneal dislocated LNG-IUD resulted in plasma LNG levels 10 times higher than the plasma level of LNG observed with LNG-IUD placed in utero.¹⁰ High levels of plasma LNG are effective at suppressing ovulation.

Contributors At the time of this work, DLH and LMB were military service members. They contributed equally to the conceptualisation of this report and both participated substantially in the writing and editing of the manuscript. This work was prepared as part of their official duties. Title 17, USC, 105 provides that 'Copyright protection under this title is not available for any work of the United States Government.' Title 17, USC, 101 defines a US Government work as a work prepared by a military service member or employee of the US Government as part of that person's official duties. The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Air Force, Department of the Navy, Department of Defense, nor the US Government.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

REFERENCES

- 1 Brahmi D, Steenland MW, Renner RM, *et al.* Pregnancy outcomes with an IUD in situ: a systematic review. *Contraception* 2012;85:131–9.
- 2 Kim SK, Romero R, Kusanovic JP, *et al.* The prognosis of pregnancy conceived despite the presence of an intrauterine device (IUD). *J Perinat Med* 2010;38:45–53.
- 3 Ganer H, Levy A, Ohel I, *et al.* Pregnancy outcome in women with an intrauterine contraceptive device. *Am J Obstet Gynecol* 2009;201:381.e1–381.e5.
- 4 Inal MM, Ertopçu K, Ozelmas I. The evaluation of 318 intrauterine pregnancy cases with an intrauterine device. *Eur J Contracept Reprod Health Care* 2005;10:266–71.
- 5 Deveer R, Engin-Ustun Y, Sarikaya E, *et al.* Comparison of C-reactive protein levels in pregnancies with retained and removed intrauterine device. *J Matern Fetal Neonatal Med* 2011;24:1152–4.
- 6 Xiong X, Buekens P, Wollast E. IUD use and the risk of ectopic pregnancy: a meta-analysis of case-control studies. *Contraception* 1995;52:23–34.
- 7 Harrison-Woolrych M, Zhou L, Coulter D. Insertion of intrauterine devices: a comparison of experience with Mirena and Multiload cu 375 during post-marketing monitoring in New Zealand. *N Z Med J* 2003;116:U538.
- 8 Heinemann K, Reed S, Moehner S, *et al.* Risk of uterine perforation with levonorgestrel-releasing and copper intrauterine devices in the European active Surveillance Study on Intrauterine Devices. *Contraception* 2015;91:274–9.
- 9 Kaislasuo J, Suhonen S, Gissler M, *et al.* Uterine perforation caused by intrauterine devices: clinical course and treatment. *Hum Reprod* 2013;28:1546–51.
- 10 Haimov-Kochman R, Amsalem H, Adoni A, *et al.* Management of a perforated levonorgestrel-medicated intrauterine device—a pharmacokinetic study: case report. *Hum Reprod* 2003;18:1231–3.

Patient's perspective

'I learned that a perfectly healthy woman with no abnormal health history can still have medical complications. I can't recall in the 5 years I had the IUD experiencing any symptoms that could have hinted that it had perforated. I didn't subject my body to any extremely physical demanding situations that could have caused it. I found the verification methods for the IUD were very frustrating because the only two ways to check were to see the string and use a transvaginal ultrasound. I was aware of the complications related to having the Mirena IUD and that there were extreme ones but, incredibly rare. I never thought one let alone two would happen to me. After discussions with my OB/GYN of the different scenarios that could happen, I had made the decision to have the IUD removed, but the doctors' attempts were unsuccessful and it was extremely painful. This entire event was a complete emotional rollercoaster. From unexpectedly finding out that I was pregnant, then to bear a pregnancy with possible complications, to accepting a completely failed pregnancy that resulted in limited ability for future pregnancies. I hope this case study will help other physicians to be aware of this unique situation and can better help other patients.'

Learning points

- ▶ When patients present with multiple competing clinical problems it is important to look at the patient as a whole, and consider their desires, in order to construct a cohesive management plan.
- ▶ Physicians should keep in mind that visualisation of intrauterine device (IUD) strings does not rule out perforation.
- ▶ Physicians should also keep in mind that even an initially correctly placed IUD can subsequently migrate over time and cause perforation.

Copyright 2017 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>. BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow