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**Perforation of levonorgestrel-releasing intrauterine system found at one month after Insertion: A case report**

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3

**Abstract**

**BACKGROUND**

The levonorgestrel-releasing intrauterine system (LNG-IUS) is widely used in contraception, menorrhagia, dysmenorrhea and to prevent endometrial hyperplasia during estrogen supplementation. Perforation is more often seen after early postpartum placement. Perforation of the LNG-IUS occurring one month after placement is rare.

**CASE SUMMARY**

A 42-year-old female complained of progressive dysmenorrhea and increased menstrual volume. She was diagnosed with adenomyosis and the LNG-IUS was inserted in her uterine cavity. Routine ultrasound examination one month later revealed that the intra-uterine device (IUD) was not found in the uterine cavity, and further X-ray and pelvic magnetic resonance imaging (MRI) showed an abnormal signal area in the left posterior region of the uterus. Laparoscopic exploratory surgery was performed and the LNG-IUS was found in the left uterosacral ligament.

**CONCLUSION**

Perforation of a LNG-IUS occurring one month after placement is rare, and is more common in inexperienced operators and after early postpartum placement. When the operation is difficult, ultrasound monitoring is recommended to reduce the risk of IUD

perforation. For patients with inadequate surgery, postoperative imaging is recommended to detect potential risks as soon as possible.

## **INTRODUCTION**

The levonorgestrel-releasing intrauterine system (LNG-IUS) is a widely used effective intrauterine progesterone release system. The most common adverse effects of the LNG-IUS include pelvic pain, dysmenorrhea, heavy menstrual bleeding, infection and malposition<sup>[1-2]</sup>. Perforation of the LNG-IUS is rare. We report a case of LNG-IUS perforation found one month after insertion.

## **CASE PRESENTATION**

### ***Chief complaints***

A 42-year-old female patient complained of intermittent lower abdominal pain, with a visual analogue score of 2 points, and anal distension.

### ***History of present illness***

The patient had progressive dysmenorrhea and increased menstrual volume over the past years. She was diagnosed with adenomyosis and the LNG-IUS was placed in her uterine cavity by a certified doctor in November, 2021. Routine ultrasound examination in December, 2021 showed a strong echo area 0.6×0.2 cm in size in the uterine cavity, and no echo due to the IUD was detected in the uterine cavity. The patient denied a history of vaginal exclusion of contraceptives. Hysteroscopy was performed in December 2021, and no IUD was found in the uterine cavity.

### ***History of previous disease***

The patient had no previous disease history.

### ***Personal history and family history***

Gravidity 7 and parity 2 were noted. Menstrual history was 4-5 d/28 d. Her previous contraceptive method was the use of condoms. The patient had no history of family or genetic diseases.

### ***Physical examination***

Gynecological examination showed that the uterus was posterior, tough and flexible. Bimanual examination showed that a tough cord was felt in the left side of the uterus, with positive tenderness.

### ***Laboratory examinations***

Laboratory examinations showed that the total number of white blood cells was  $4.65 \times 10^9/L$ , and the proportion of neutrophils was 51.6%.

### ***Imaging examinations***

X-ray showed that a radiopaque T-shaped device was visible in the pelvis. Transvaginal ultrasonography revealed that the uterus was  $5.9 \times 7.5 \times 5.2$  cm in size; the endometrium was 0.4 cm thick; the muscular layer showed uneven echo patterns, with a thickness of 2.2 cm in the anterior muscular layer and 2.7 cm in the posterior; no echo area was detected in the left ovary, which was  $3.5 \times 2.3$  cm in size, with a clear boundary and no blood flow signal. Pelvic magnetic resonance imaging (MRI) presented abnormal signal in the left posterior area of the uterus (Figure 1).

## **FINAL DIAGNOSIS**

Extrauterine device malposition.

## **TREATMENT**

Given the possibility of IUD malposition, the patient underwent emergency laparoscopic exploratory surgery. During the operation, an intact LNG-IUS with a tail wire was found near the left uterosacral ligament (Figure 2), without adhesion to the surrounding tissues.

After thorough examination, no rupture was found in the uterus. A 3 cm diameter cyst with clear fluid inside was found in the left ovary and was removed. A new LNG-IUS was inserted in the uterine cavity.

### **OUTCOME AND FOLLOW-UP**

The patient was discharged after recovery. Postoperative pathology showed that the left ovarian cyst was a follicular cyst.

### **DISCUSSION**

The LNG-IUS is an effective intrauterine progesterone release system, which is widely used in contraception, menorrhagia, dysmenorrhea and to prevent endometrial hyperplasia during estrogen supplementation<sup>[2]</sup>. The LNG-IUS is also a radiopaque T-shaped device, approved for up to 5 years of use.

The adverse effects of IUDs include pelvic pain, heavy menstrual bleeding, dysmenorrhea, infection and malposition. IUD malposition, with a rate ranging from 10.4% to 25%, is described as expulsion, embedding, displacement and perforation<sup>[2]</sup>. Malposition often occurs with abnormal bleeding and pain, but may also be asymptomatic. Perforation is an IUD that penetrates through both the myometrium and the serosa.

The overall perforation rate is <sup>2</sup>2.1 per 1000 insertions for LNG-IUS users and 1.6 per 1000 insertions for copper-IUD users<sup>[3]</sup>. Perforation is more often seen in inexperienced operators and after early postpartum placement<sup>[4]</sup>. Malposition is more common in the condition of retroflexed uterine positions (7.6% *vs* 1.8%). Multivariable logistic regression has revealed that the anterior midline position and absence of uterine anomalies are factors associated with a lower incidence of IUD malposition<sup>[5]</sup>. The repositioned uterus may be a potential cause of uterine perforation upon insertion of the device. Therefore, doctors should take care in these cases.

Ultrasonography serves as the first-line imaging method to evaluate position of IUD in patients presenting with abnormal bleeding, pelvic pain, or absent retrieval strings<sup>[6]</sup>.

If an IUD is not detected on initial ultrasonography, further abdominal radiographs are recommended to locate the IUD<sup>[7]</sup>. Cross-sectional imaging can provide clues and strategies for surgical planning, as well as to evaluate potential complications such as abscess formation or bowel injury.

Surgical removal of IUDs is the main treatment strategy. In a previous report, laparoscopic surgeries to remove perforated IUDs were successfully achieved in 64.2% of cases (115/179)<sup>[8]</sup>. However 22.5% (27/120) of laparoscopic surgeries were converted to trans-abdominal operations in another report, and an overall rate of open surgery was 27.9%<sup>[9]</sup>. The most common location of malpositioned IUDs include the omentum and around the uterus<sup>[8]</sup>. <sup>1</sup> Intra-abdominal adhesions are more common in the copper-IUD group than LNG-IUS group (58% vs 20%)<sup>[8]</sup>.

## **CONCLUSION**

This case report shows that during placement of an IUD, uterine position should be confirmed by gynecological examination before surgery, and the operation should be performed with care. When the operation is difficult, ultrasound monitoring is recommended to reduce the risk of IUD perforation. Postoperative imaging is recommended to detect potential risks as soon as possible.

## **ACKNOWLEDGEMENTS**

We thank the patient for the consent to publish this case report.

## ORIGINALITY REPORT

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## PRIMARY SOURCES

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