

Received: 2025.12.22

Accepted: 2026.03.19

Available online: 2026.04.25

Published: 2026.XX.XX

# Strangulated Small Bowel Obstruction Caused by a Migrated Ring-Shaped Intrauterine Device: Two Case Reports and a Literature Review


## Authors' Contribution:

Study Design A  
Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
Literature Search F  
Funds Collection G

BDEF **Yifan Lu**  
BD **Jiaxu Zhu**  
D **Ziwen Wang**  
BF **Xiangtian Shi**  
BF **Xingchi Jiang**  
AG **Dong Shang**  
AE **Qingkai Zhang**  
ABEG **Shuang Li**


Department of General Surgery, The First Affiliated Hospital of Dalian Medical University, Dalian, Liaoning, PR China

**Corresponding Authors:** Shuang Li, e-mail: [shuangli@dmu.edu.cn](mailto:shuangli@dmu.edu.cn), Qingkai Zhang, e-mail: [dlkaiyu@163.com](mailto:dlkaiyu@163.com)  
**Financial support:** Clinical Collaborative Project on Major Difficult and Intractable Diseases Integrating Traditional Chinese and Western Medicine (ZDYN-2024-A-086), Liaoning Provincial Science and Technology Joint Program (2024-MSLH-112), Dalian Dengfeng Plan Research Project (DF2024034)  
**Conflict of interest:** None declared

**Case series****Patients:** Female, 61-year-old • Female, 73-year-old**Final Diagnosis:** Strangulated small bowel obstruction caused by a migrated ring-shaped intrauterine device**Symptoms:** Acute abdomen caused by a migrated intrauterine device**Clinical Procedure:** —**Specialty:** Surgery**Objective:** Unusual clinical course**Background:** Small bowel obstruction (SBO) is a common surgical emergency, most frequently caused by postoperative adhesions or hernias. SBO resulting from migration of an intrauterine device (IUD) is exceedingly rare but can be life-threatening.**Case Reports:** We present 2 cases of postmenopausal women with long-term IUD retention (>30 years) who developed acute abdominal pain and clinical signs of intestinal obstruction. Preoperative abdominal CT revealed dilated small bowel loops with surrounding fluid and inflammatory changes, along with an ectopic ring-shaped IUD through which a segment of ileum herniated. Emergency laparotomy confirmed a strangulated obstruction and necrotic bowel in both cases, which required segmental bowel resection and primary anastomosis. Postoperative recovery was uneventful in both patients. A review of the literature indicates that such complications predominantly occur in postmenopausal women. Prolonged device retention, particularly with O-shaped IUDs, is associated with older age at presentation. Progressive uterine atrophy and myometrial thinning after menopause increase the risk of chronic erosion and eventual perforation with intraperitoneal migration. If the IUD is not encapsulated by the omentum, it provides an opportunity for small bowel loops to herniate through its central opening, ultimately resulting in strangulated intestinal obstruction.**Conclusions:** These cases highlight the importance of recognizing IUD migration as a rare cause of mechanical small bowel obstruction, especially in women with a remote history of IUD placement. Prompt imaging evaluation and timely surgical intervention are critical to prevent bowel ischemia and reduce morbidity.**Keywords:** Case Reports • Gastroenterology • Intestinal Obstruction • Intrauterine Devices • Literature Review • Strangulation**Full-text PDF:** <https://www.amjcaserep.com/abstract/index/idArt/952535>
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## Introduction

Small bowel obstruction is a common surgical emergency, and its mortality increases markedly when strangulation occurs. Although adhesions and hernias are the most frequent causes, SBO resulting from migration of an intrauterine device (IUD) is exceedingly rare. Intrauterine devices (IUDs) are widely used long-acting reversible contraceptives with a history of more than 5 decades. They are generally safe, effective, and well tolerated, and many women remain asymptomatic during long-term use. Despite clinical guidelines recommending removal of IUDs after menopause, non-removal remains common. As a result, some IUDs are not removed after menopause, particularly when patients are unaware of the need for removal or lack regular gynecologic follow-up. Long-term retention, however, can lead to complications such as embedment, migration, or perforation, which can present incidentally or with acute symptoms. Given that uterine perforation – the prerequisite for IUD migration – occurs in only 0.05 to 13 per 1000 insertions, subsequent progression to strangulated intestinal obstruction is even more uncommon. As a result, this etiology is often overlooked in clinical practice, particularly when the symptoms of obstruction are atypical, increasing the risk

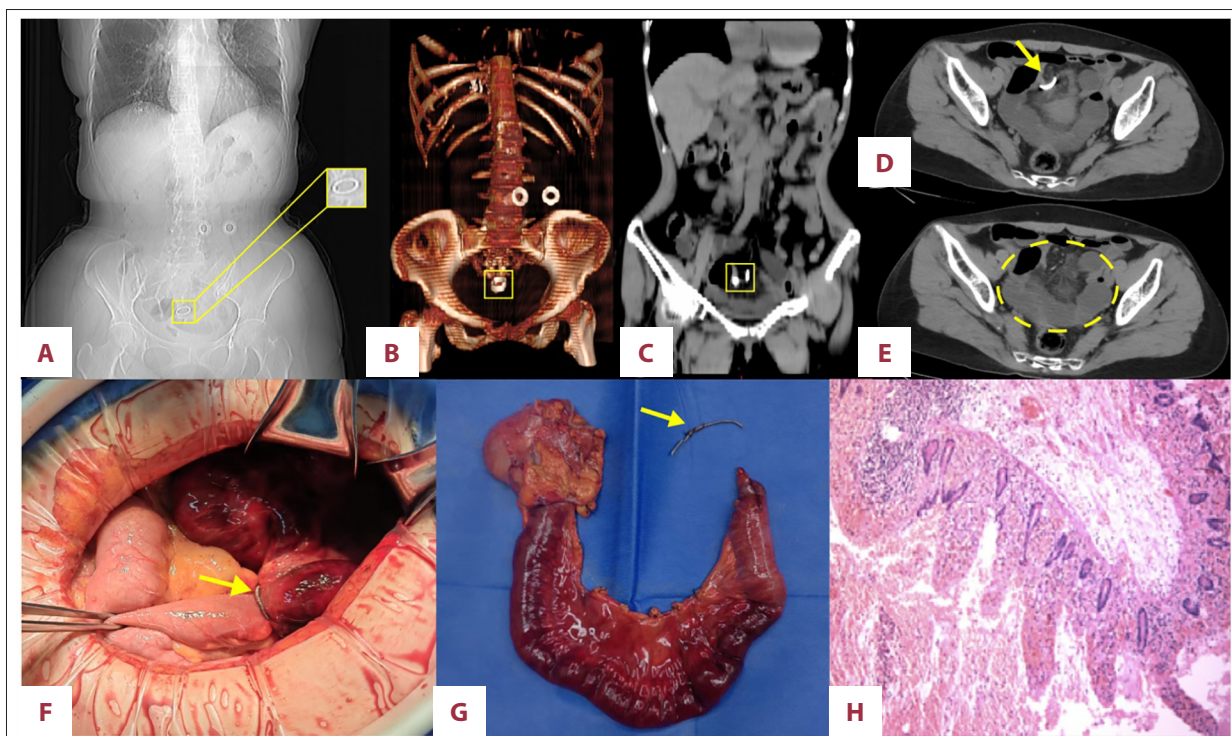
of missed diagnosis, bowel necrosis, and even life-threatening complications.

In this report, we describe 2 consecutive cases encountered within a 6-month period in postmenopausal women who had retained ring-shaped intrauterine devices (IUDs) for more than 30 years. Beyond highlighting the diagnostic challenges associated with this rare condition, this study aims to elucidate the novel “internal herniation” mechanism unique to ringshaped devices – distinct from direct bowel perforation – and to identify postmenopausal uterine atrophy as the key precipitating factor that transforms a long-dormant device into a surgical emergency. This case report is presented in accordance with the SCARE criteria [1].

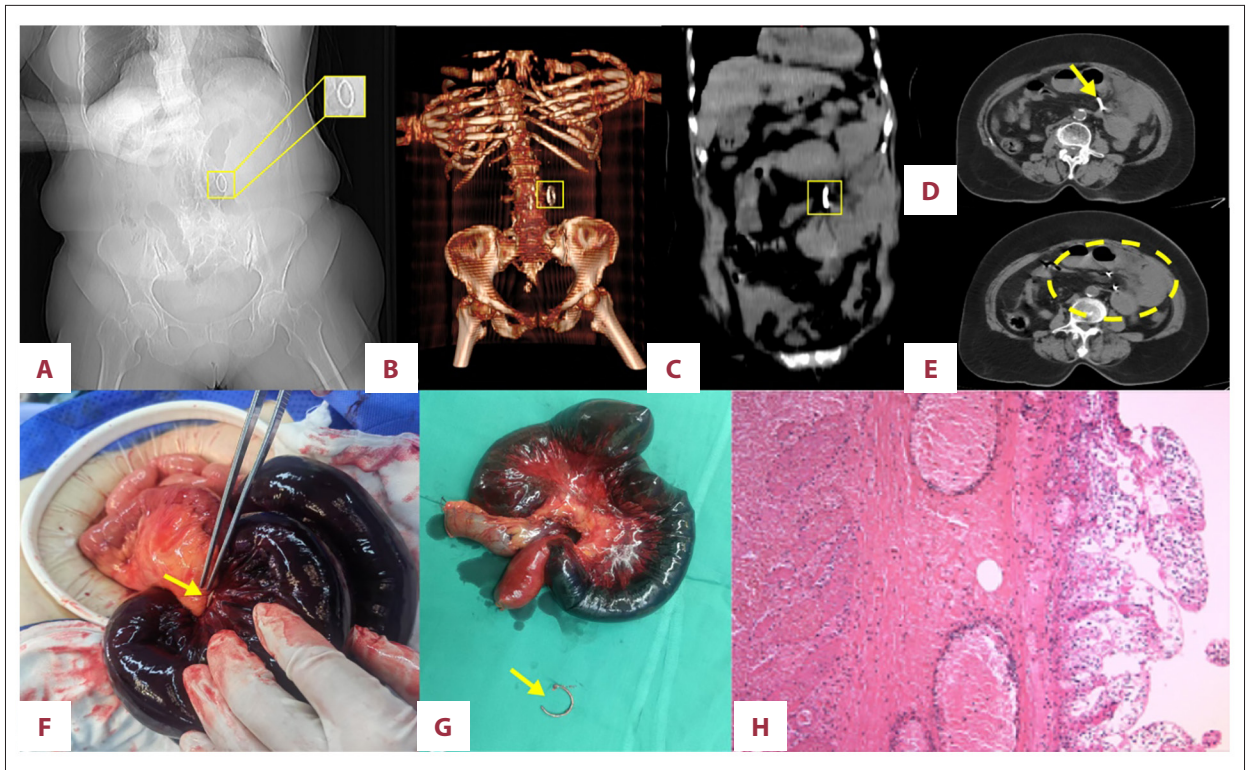
## Case Reports

### Case 1

A 61-year-old woman presented with a 1-day history of acute-onset abdominal pain, distension, nausea, and vomiting. Physical examination revealed lower abdominal tenderness



**Figure 1.** Imaging, intraoperative, and pathological findings in Case 1. (A) Abdominal film showing a metallic ring-shaped IUD located in the pelvic cavity. (B) 3D-reconstructed CT image demonstrating the position of the migrated IUD. (C) Coronal CT view of the IUD location. (D) Axial abdominal CT demonstrating migration of the IUD (yellow arrow). (E) CT image highlighting thickened intestinal wall and surrounding exudation (green circle). (F) Intraoperative view showing the IUD causing intestinal obstruction and necrosis; yellow arrow indicates the intraoperative position of the IUD. (G) Resected necrotic bowel segment and the retrieved IUD. (H) Histopathological examination of the resected bowel showing transmural necrosis.



**Figure 2.** Imaging, intraoperative, and pathological findings in Case 2. (A) Abdominal film showing a metallic ring-shaped IUD located in middle abdomen. (B) 3D-reconstructed CT image demonstrating the position of the migrated IUD. (C) Coronal CT view of the IUD location. (D) Axial abdominal CT demonstrating migration of the IUD (yellow arrow). (E) CT image highlighting thickened intestinal wall and surrounding exudation (yellow circle). (F) Intraoperative view showing the IUD causing intestinal obstruction and necrosis; yellow arrow indicates the intraoperative position of the IUD. (G) Resected necrotic bowel segment and the retrieved IUD. (H) Histopathological examination of the resected bowel showing transmural necrosis.

with rebound and guarding. Vital signs were stable except for tachycardia (102 bpm). Her medical history was notable for intrauterine device (IUD) placement over 30 years prior, with no history of abdominal surgery. Abdominal and pelvic computed tomography (CT) demonstrated segmental small bowel dilatation with air-fluid levels, localized bowel wall thickening with effusions, suggestive of mechanical small bowel obstruction with possible strangulation, and an ectopic ring-shaped IUD (Figure 1A-1E). Laboratory findings included leukocytosis ( $16.6 \times 10^9/L$ ; 90.3% neutrophils) and hypokalemia (3.21 mmol/L). Given the signs of peritonitis and suspected strangulated internal hernia, emergency laparoscopy was performed. Intraoperative findings included necrotic ileum and bloody ascites, prompting conversion to laparotomy. A segment of terminal ileum was found herniated through a metallic ring-shaped IUD, resulting in strangulation and necrosis (Figure 1F, 1G). Resection of the necrotic ileum and ileocecal region (total 30 cm) was followed by side-to-side ileo-ascending colon anastomosis. Gynecologic evaluation revealed an atrophic uterus without evidence of acute perforation. Histopathology confirmed transmural necrosis and mesenteric vascular congestion. The postoperative course was stable

and uneventful (Figure 1H), except for a wound infection; she was discharged on postoperative day (POD) 17 and remained well during follow-up.

### Case 2

A 73-year-old woman presented to the emergency department with a 2-day history of lower abdominal pain, exacerbated by physical activity, accompanied by nausea and vomiting. On examination, she was afebrile with stable vital signs except for localized tenderness, rebound, and mild guarding in the left lower quadrant. Her history included intrauterine device (IUD) placement over 40 years prior, with no prior abdominal surgeries. Urgent abdominopelvic CT revealed dilated small bowel loops with air-fluid levels in the left abdomen, localized exudative changes, a ring-shaped radiopaque structure in the abdominal cavity, and free intraperitoneal fluid – findings suggestive of small bowel obstruction with possible strangulation (Figure 2A-2E). Laboratory tests showed leukocytosis ( $10.89 \times 10^9/L$ ; 85.7% neutrophils). Emergency exploratory laparotomy revealed approximately 500 mL of hemorrhagic ascites and a migrated ring-shaped IUD in the mid-abdomen. A

segment of ileum had herniated through the IUD ring, resulting in strangulation and necrosis (Figure 2F, 2G). The affected bowel (total 50 cm) was resected, and a side-to-side anastomosis was performed using a linear stapler. Uterine exploration revealed no acute perforation, although a suspicious scar was noted. Histopathology confirmed transmural necrosis and hemorrhagic infarction (Figure 2H). The postoperative course was uneventful. The patient was discharged on postoperative day 8 and remained well during follow-up.

## Discussion

Strangulated intestinal obstruction is a common and potentially life-threatening surgical emergency characterized by high mortality and complex clinical manifestations. The underlying pathophysiology involves compromised mesenteric blood flow due to bowel strangulation, leading to ischemia and subsequent transmural necrosis if not promptly treated [2,3]. Early and accurate diagnosis, followed by timely surgical intervention, is critical to improving patient outcomes and reducing mortality [4]. While postoperative adhesions and mesenteric arterial stenosis or occlusion are well-established etiologies, strangulated obstruction secondary to IUD migration remains exceedingly rare [5]. To date, 36 cases of IUD-related intestinal obstruction have been reported in China, with only 10 cases documented in the English-language literature worldwide [6-14]. Based on previous case reports (Table 1), intestinal obstruction caused by IUD migration exhibits the following clinical characteristics: the mean age at onset was 56.2 years, whereas patients with ring-shaped IUDs had a higher mean age of 63.57 years. The IUDs had been retained within the pelvic or abdominal cavity for an extended period, averaging over 30 years. The average length of the resected affected bowel segment was approximately 78.3 cm. All cases were treated surgically, and all patients recovered postoperatively. Because most published reports are individual case descriptions, the age discrepancy observed in our cases is derived from limited case-based evidence and lacks support from large-scale datasets. In addition, unlike T shaped IUDs with sharp edges that can penetrate tissues more rapidly, the ring-shaped IUD has a blunt, closed-loop configuration, resulting in a slower and more prolonged transmural migration through the atrophied postmenopausal myometrium [15]. Even when perforation occurs, the device is often covered by the omentum, making small bowel herniation less likely. These factors may collectively contribute to the relatively higher age observed in our cases.

We report 2 cases of IUD-related strangulated small bowel obstruction, both occurring in postmenopausal women who had retained ring-shaped IUDs for several decades and presented to the emergency department with acute abdominal pain. Abdominopelvic CT revealed small bowel obstruction and

ectopic IUD in both cases. Intraoperative findings confirmed strangulated ileal herniation through the IUD rings, resulting in ischemic necrosis – 30 cm in Case 1 and 50 cm in Case 2. Both patients underwent successful segmental bowel resection and anastomosis. Histopathological examination showed transmural necrosis and mesenteric vascular congestion.

IUDs are widely used for contraception [15,16]; however, complications arising from device displacement are frequently underrecognized. Displacement refers to deviation from the intended intrauterine position, which can result in partial or complete penetration of the uterine wall [17,18]. Such migration can lead to serious complications, including hemorrhage, uterine perforation, pelvic inflammatory disease, and injury to adjacent organs [18-21]. The reported incidence of uterine perforation associated with IUDs ranges from 0.05 to 13 cases per 1000 insertions [22-24]. Common sites of migration include the bladder wall, intestines, peritoneal cavity, and retroperitoneal space [25-27]. However, migration into the peritoneal cavity resulting in strangulated intestinal obstruction remains poorly defined, with few case reports available. Previous studies suggest that ring-shaped IUDs are more prone to displacement due to their rigid structure and limited flexibility [6]. Despite this, their blunt configuration and small central aperture typically favor omental encapsulation following perforation, which rarely causes intestinal obstruction [28].

The 2 cases presented here offer meaningful clinical evidence that helps clarify this apparent contradiction. Both patients exhibited marked uterine atrophy, and intraoperative findings revealed no evidence of recent perforation, only suspected chronic scarring, indicating a low likelihood of acute perforation. Regarding the mechanism of uterine perforation, intrauterine device (IUD) perforation and subsequent displacement may begin as a chronic, occult process during the perimenopausal period, with the myometrium thinning as the uterus atrophies, but the rigid ring-shaped device retains its original size and shape. The uterus can generate forces up to 50 Newtons [29], sufficient to induce myometrial erosion and facilitate IUD migration into the peritoneal cavity [30,31]. It is plausible that the ring-shaped IUDs in these cases had partially embedded into the myometrium before menopause and gradually migrated into the peritoneal cavity as uterine atrophy progressed thereafter.

In contrast, the mechanism of intestinal strangulation differs substantially from that associated with sharp T-shaped devices. Rather than directly perforating the bowel, the ring-shaped IUD serves as a fixed hernia orifice. Chronic inflammation promotes adhesion formation [32], securing the device to the omentum or adjacent bowel loops. During intestinal peristalsis, bowel segments may become entrapped by these adhesive bands or by the ring itself, leading to mechanical obstruction

**Table 1.** Overview of documented cases.

References	Country	Age	Type of IUD	Symptoms	Herniated bowel segment	Treatment	Length of resected bowel	Outcome	Time between placement and diagnosis
Zheng K et al [4]	China	72	Ring-shaped IUD	Upper abdominal pain and severe vomiting	Ileocecal junction	Surgery	30 cm	Recovered	47 years
Song HX et al [5]	China	57	Ring-shaped IUD	Abdominal pain	Small intestine	Surgery	100 cm	Recovered	Over 30 years
Yang H-W et al [6]	China	77	Ring-shaped IUD	Diffuse lower abdominal pain and vomit and anus without exhaust and defecation	Mid-intestine	Surgery	N/A	Recovered	Over 30 years
Li Y et al [7]	China	59	Ring-shaped IUD	Umbilical and right-sided abdominal tenderness	Small intestine	Surgery	30 cm	Recovered	Over 20 years
Xu J et al [8]	Australia	79	Ring-shaped IUD	Severe epigastric pain	Small intestine	Surgery	60 cm	Recovered	Over 50 years
Brar R et al [9]	England	64	Saf-T-Coil IUD	Vomiting and severe right iliac fossa pain	Ileum	Surgery	14 cm	Recovered	Over 30 years
Mellow S et al [10]	New Zealand	63	Ring-shaped IUD	Abdominal pain and vomiting	Small intestine	Surgery	100 cm	Recovered	Over 30 years
Haspels AA [11]	USA	38	Ring-shaped IUD	Pain around the umbilicus	Ileum	Surgery	150 cm	Recovered	1 year
Loveless A et al [12]	USA	29	LNG-IUS	Abdominal pain, constipation, nausea, and vomiting	Small intestine and adhesive band	Surgery	N/A	Recovered	N/A
Jones D [13]	USA	24	T-shaped IUD	Abdominal pain, nausea, and vomiting	Not specified	Surgery	N/A	N/A	1.5 months

N/A – not available.

– an internal herniation process. As venous congestion causes the entrapped bowel loop to swell, it becomes irreducible, ultimately progressing to strangulation and the transmural necrosis observed in our patients.

For surgeons, determining the optimal timing for surgical intervention in cases of intestinal obstruction remains challenging,

particularly when the etiology of strangulation is unclear [33]. These 2 cases were consecutive patients treated within a 6-month period. In Case 1, the IUD remained confined to the pelvis, and an IUD-related internal herniation was not anticipated preoperatively. Given the patient's presentation with acute peritonitis, emergency laparoscopy was selected to establish the diagnosis while minimizing surgical trauma. However,

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the intraoperative discovery of extensive bowel necrosis and dense adhesions rendered laparoscopic manipulation unsafe, necessitating conversion to an open procedure. In Case 2, the surgical strategy was informed by the experience gained from the first case. The IUD was identified preoperatively in a supraumbilical position, and CT imaging demonstrated localized bowel dilatation, fluid accumulation, and clear signs of peritonitis. These findings raised a strong suspicion of bowel necrosis prior to surgery. Consequently, a primary laparotomy was performed to expedite decompression and relieve the obstruction, thereby shortening operative time and reducing the risks associated with prolonged anesthesia and toxin absorption in an older patient. This progression in operative decision making underscores an important principle: although laparoscopy is valuable for diagnostic clarification, primary laparotomy may offer a safer and more efficient approach when strangulation is strongly suspected or when marked bowel distension limits the feasibility of laparoscopic intervention.

While sporadic cases have been documented, the novelty of our report lies in 3 key contributions to the existing literature. First, we encountered 2 such rare cases consecutively within a short 6-month interval. This brief “cluster” suggests that, as China’s population continues to age and the number of women with long-term retained IUDs increases, the true incidence of this complication may be higher than previously estimated and warrants heightened clinical awareness. Second, we identify postmenopausal uterine atrophy not merely as a contributing risk factor but as the primary precipitating event capable of transforming a dormant, decades-old device into a surgical emergency. Third, we clearly delineate the unique “internal herniation” mechanism associated with ring-shaped IUDs, in which the device functions as a fixed hernia orifice rather than directly perforating the bowel, as is more typical with T-shaped devices. Preoperative imaging [34] played a pivotal role in diagnosis, revealing bowel dilation, fluid-filled loops, wall thickening, and IUD displacement. Correlating these radiologic findings with the patient’s clinical history, physical examination, and laboratory results enabled timely surgical intervention. Laparoscopic exploration proved essential in preventing misdiagnosis and guiding appropriate clinical decision-making. Furthermore, these cases highlight the critical

importance of patient education regarding the risks associated with long-term IUD retention [35]. To prevent serious and potentially life threatening complications, clinicians should emphasize the importance of timely IUD removal at the onset of menopause. In older women presenting with unexplained abdominal pain, a thorough inquiry into remote contraceptive history is essential. Moreover, for patients with retained IUDs who are poor surgical candidates, we recommend regular abdominal ultrasound surveillance to detect potential device displacement at an early stage.

## Conclusions

Although rare, IUD displacement leading to strangulated intestinal obstruction poses serious clinical risks. The pathological process typically begins with mechanical penetration, followed by local inflammation, adhesion formation, and damage to surrounding organs. In cases of intestinal obstruction with unclear etiology, especially in patients with long-term IUD retention, clinicians should maintain a high index of suspicion. A comprehensive evaluation, including imaging studies, is essential to ensure accurate diagnosis, avoid mismanagement, and facilitate timely surgical intervention.

## Institution Where Work Was Done

The First Affiliated Hospital of Dalian Medical University, Dalian, Liaoning, PR China.

## Patient Consent

Written informed consent was obtained from the patients’ next of kin for the publication of these case reports and any accompanying images. Copies of the written consents are available for review by the Editor-in-Chief of this journal.

## Declaration of Figures’ Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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