

Migration of an intrauterine device causing severe hydronephrosis progressing to renal failure

A case report

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Abstract

Rationale: Intrauterine device (IUD) is commonly used in China. Its complications include uterine perforation, IUD ectopic migration, etc. However, a migrated IUD rarely leads to renal failure.

Patient concerns: IUD insertion in the patient was followed by unexplained pain in the left renal area, without bladder irritation or dysuria.

Diagnoses: Hydronephrosis, renal failure, migrated IUD.

Interventions: The patient underwent laparoscopic and retroperitoneoscopic left nephrectomy, partial ureterectomy, and migrated IUD extraction.

Outcomes: No complications were found after 1 year of follow-up.

Lesson: An IUD should be placed by an experienced doctor. If conditions permit, it is best to perform the procedure under the guidance of ultrasound. The patients should be advised to undergo regular check-ups after the procedure. If necessary, abdominal color Doppler examination should be performed. Importantly, patients with IUD pregnancy must be reviewed.

Abbreviation: IUD = intrauterine device.

Keywords: abdominal cavity, ectopic ring of uterine cavity, loss of kidney function, ureter

1. Introduction

Intrauterine device (IUD) is a commonly used contraceptive in clinical practice. Its complications include hemorrhage, uterine perforation, infection, ectopic migration, rupture, deformation, dislocation, and downward movement. Harrison-Woolrych et al^[1] reported that the incidence of uterine perforation caused by IUDs is

about 1.6%, of which 15% may cause perforation of hollow organs. About 1% to 3% of patients with IUD have uterine perforation,^[2] which remains the most serious complication of IUDs which was 1st described in 1933 by Murphy.^[3]

However, migration of IUD to the ureter leading to severe hydronephrosis progressing to renal failure is extremely rare.

2. Case report

A 30-year-old woman had an IUD inserted 3 months after her vaginal delivery 5 years ago. She had an unintended pregnancy 3 years later, and an ultrasonography in the 1st trimester failed to detect the IUD. She did not undergo any further examinations to locate the misplaced IUD. She delivered a full-term healthy baby boy. Fifteen days ago, the patient experienced left side lumbago with no predisposing cause, and without concomitant bladder irritation or difficulty in urination. An ultrasonography at the local hospital revealed: left kidney hydronephrosis, and dilatation of left ureter (no evidence of an IUD within the abdominal cavity). The patient was referred to the department of urology of our hospital for further treatment. External inspection showed no swelling. Palpation showed tenderness of the renal and urethral regions. Gynecologic examination revealed a normal, nontender uterus, and bilateral adnexa. Contrast-enhanced computed tomography showed severe hydronephrosis and ureterectasis on the left side; and a foreign body was identified near the left lower ureter, which was suspected to be a migrated IUD. Renal dynamic imaging revealed that the left renal blood perfusion was poor and nearly nonfunctional; the right renal blood perfusion and filtration function were normal but associated with slow excretion of contrast agents. We consulted experts from multiple

Editor: N/A.

XL, HL, and CL contributed equally to this work.

The study protocol was approved by the Medical Ethics Committees of the Henan Provincial People's Hospital, and all participants provided written informed consent.

Informed consent was obtained from all individual participants included in the study.

The authors have no funding and conflicts of interest to disclose.

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Medicine (2019) 98:3(e13872)

Received: 29 August 2018 / Accepted: 5 December 2018

<http://dx.doi.org/10.1097/MD.0000000000013872>

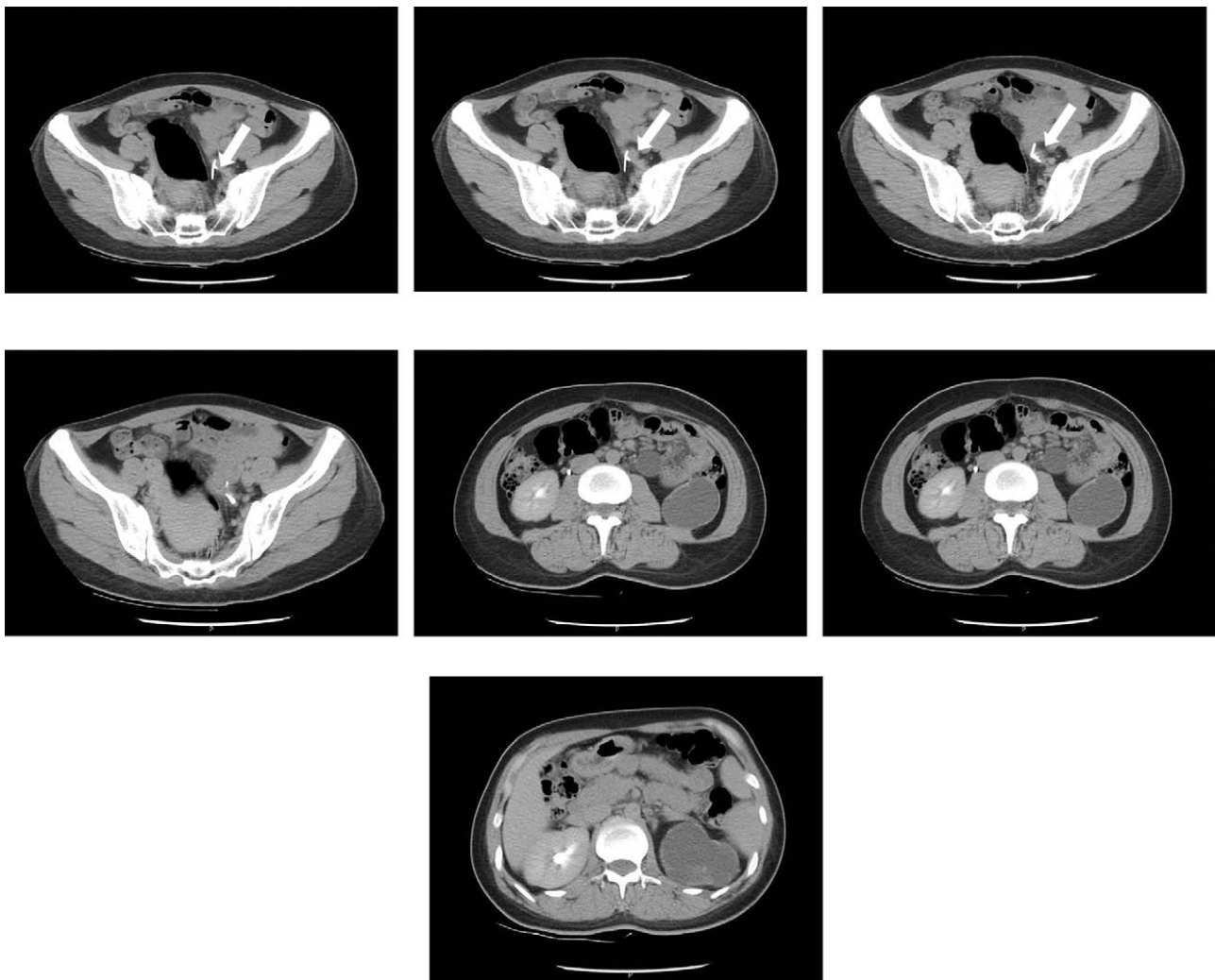


Figure 1. Contrast-enhanced computed tomography showed severe hydronephrosis and ureterectasis on the left side; and a foreign body was identified near the left lower ureter, which was a migrated (indicated by the arrow) intrauterine device.

departments to further clarify the diagnosis as follows: severe hydronephrosis, which led to nonfunction of left kidney; left hydroureter; and IUD transmigration. The preoperative planning of laparoscopy combined with retroperitoneoscopy surgery was conducted. After general anesthesia, left nephrectomy and integrant ureterectomy by retroperitoneoscopy combined with IUD removal under laparoscopy were performed on June 4, 2018. During the operation, no organ damage or scar was seen on the uterine surface. There was active bleeding on the left upper side of the left ovary, which was repaired by intraoperative coagulation. Based on preoperative imaging, the IUD was located close to the lower ureter about 5 cm from the bladder junction, and was isolated along with the ureter and removed. At the 1-year follow-up, the patient had no complication or evidence of recurrence.

3. Discussion

The IUD is an accepted and popular contraceptive in China. Uterine perforation and migration of the IUD into abdominal

or pelvic organs are major complications of IUD insertion. Most patients with ectopic IUD may be asymptomatic. Some patients suffer from chronic pelvic pain, lower abdominal bulge, irregular vaginal bleeding, or other discomforts. Migration of IUD to abdominal organs may cause corresponding discomfort. A migrated IUD is not difficult to confirm based on the symptoms, signs, and imaging examination. Several mechanisms can explain the spontaneous migration of IUDs as follows:

1. Iatrogenic uterine perforation. A large-scale study found higher incidence of uterine perforation by physicians who had placed <10 IUDs as compared to those who had conducted ≥ 10 IUD procedures.^[1]
2. The procedure of IUD placement is invasive and may cause damage to the uterus, induce IUD embedment in the myometrium followed by invasion outside of the uterus.
3. It may also be related to factors such as the position and size of the uterus, uterine malformation, and duration of IUD placement.^[4]

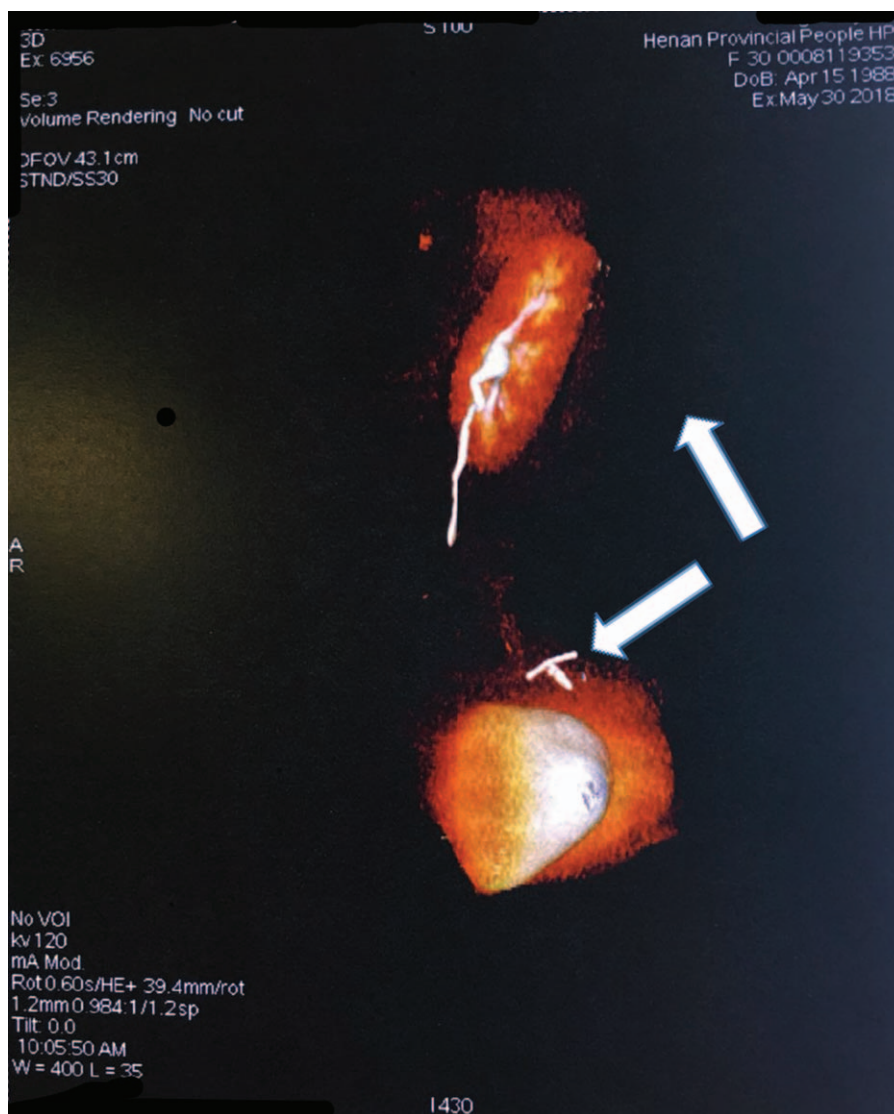


Figure 2. Renal dynamic imaging revealed that the left renal blood perfusion was poor and approximately nonfunctional; the right renal blood perfusion and filtration function were normal (arrow pointing to left kidney dysfunction + intrauterine device).

Extremely retroverted uterus or uterine retroflexion has a higher incidence of IUD migration.^[5] IUD inserted in early postpartum period (within 12 weeks after delivery) and failure of IUD are well-recognized risk factors of perforation.^[6] The subinvolution of uterus and thinning of the uterine wall due to postnatal decline in estrogen levels could increase the risk of perforation.^[7] Actinomycotic infection is a precipitating factor of uterine perforation, and an IUD-associated actinomycotic infection should be carefully monitored.^[8] Uterine perforation results from the interaction of various factors. Endometritis and the expression of related enzymes induced by IUD may accelerate the development of uterine perforation. Many other mechanisms can explain the migration of IUDs including spontaneous uterine contraction, involuntary bladder contraction, and gut peristalsis.^[9] Our patient had a history of T-shaped IUD insertion 3 months after delivery, continued

breast-feeding after insertion, and had a subsequent unintended pregnancy to full-term delivery. Other factors that led to IUD migration in this case included intraoperative ectopy caused by improper insertion that led to myometrium damage causing the IUD to be embedded in the left horn of uterus, and eventually migrating to the left lower ureter. This migrated T-shaped IUD led to chronic inflammation and infiltration in the ureter causing left ureteral stricture, which developed into lower ureteral obstruction and upper dilatation associated with hydronephrosis, and further progressed into nonfunction of the thin renal cortex.

4. Conclusion

The IUD insertion should be performed by an experienced gynecologist. Women who opt for IUD should be regularly

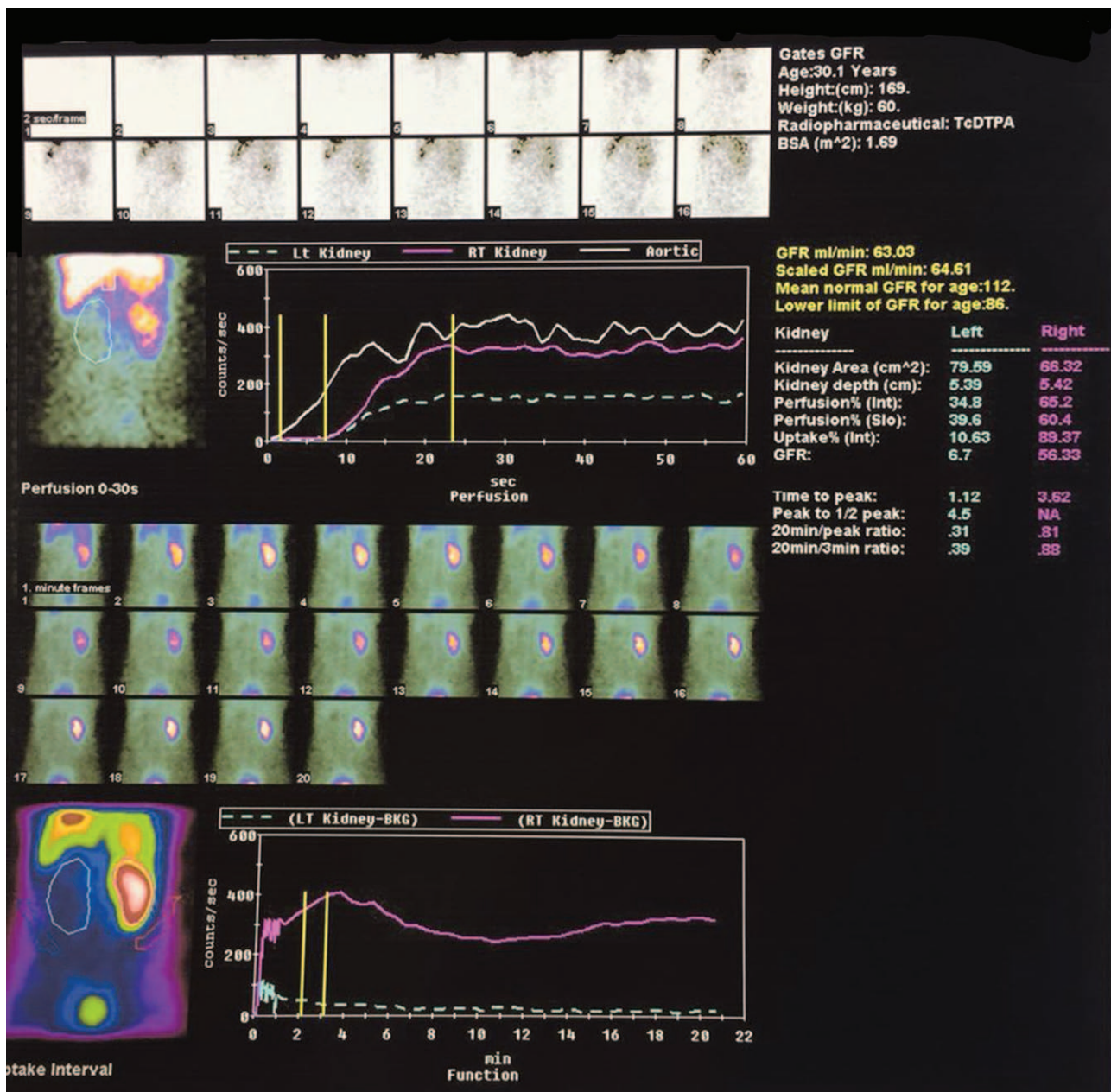


Figure 3. Single-photon-emission computed tomography (SPECT) image showing almost nonfunctional left kidney.

monitored by pelvic or abdominal cavity ultrasonography, if necessary. The patient in this report did not undergo regular check-ups after IUD insertion, and ultrasonography during a subsequent unintended pregnancy failed to detect the misplaced IUD. The patient assumed that the IUD was removed by physicians without informing her, which eventually led to a serious consequence. Women who nurse babies after IUD insertion should be recommended to stop breastfeeding 6 to 12 months after delivery, and undergo routine pelvic imaging examinations. This rare case report is intended to spread awareness about locating a missing IUD at the earliest to prevent it from causing severe injury to the nearby organs. A misplaced

IUD must be carefully monitored for possible perforation of the uterus and migration to the pelvic organs (Figs. 1–6).

Acknowledgment

The authors thank the patient for her participation in this study.

Author contributions

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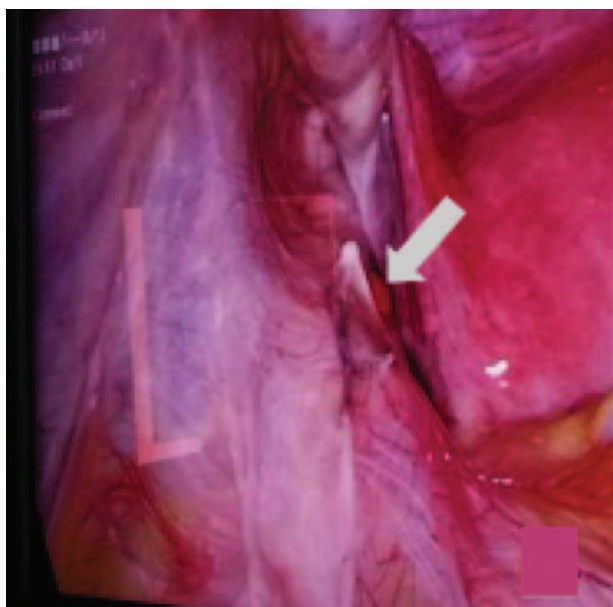


Figure 4. The intrauterine device (indicated by the arrow) was located close to the lower ureter around 5 cm from the bladder junction during the operation.



Figure 5. A dilated ureter with enlarged pelvis and calyces are seen with gross atrophy of the renal cortex (as shown by the arrow).

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Figure 6. Removed ectopic intrauterine device (IUD) step by step from the patient's abdominal cavity by laparoscopy, and pieced together complete IUD on disinfection cloth (as shown by the arrow).

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