

Multisystem injury by Intrauterine Device: a report of five cases and literature review

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Case Report

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Abstract

Background

IUD placement is a widely used method of contraception in China and is currently recommended by the World Health Organization as a first-line contraceptive program. Intrauterine Device Migration can cause multiple system damage. Experts other than urologists and gynecologists often ignore this trigger. We aim to summarize cases and provide clinicians with more appropriate treatment options.

Case presentation

We reported five cases of ectopic IUDs and its effect on multiple systems, 2 cases underwent laparoscopic treatment, 2 cases underwent hysteroscopy, and one case underwent laparoscopic free ectopic contraceptive ring removal and ureter-bladder replantation, with no surgery post-complication difference. **Combining the five cases in our hospital, researchers searched PubMed, and other databases in the last 10 years to determine similar studies.** A total of 48 cases were ectopic to the urinary system, including ectopic to bladder (42 cases 87.5%), ureter (5 cases 10.4%), urethra (1 case 2.0%); ectopic to digestive system, 41 cases; 20 cases from ectopic to reproductive system, 65 cases underwent laparoscopic technology (50.7%), endoscopy (15.6%), and open surgery accounted for only 9%.

Discussion and Conclusions

Specialists other than urologists and gynecologists should not ignore injuries caused by Intrauterine Device Migration. Clinicians should choose the appropriate surgical plan according to the position of the ectopic to relieve the complications.

Highlights

- Intrauterine Device Migration can cause multiple system damage.
- In addition to urologists and gynecologists, other specialists tend to overlook this trigger.
- Summarize cases and provide clinicians with more appropriate treatment options.

Background

The intrauterine device (IUD), or ring for short, is one of the most widely used contraceptive methods in the world[1]. Due to its stable efficacy, safe operation and cost advantages, about 14% of women use this method for contraception[2]. Uterine perforation is a serious complication of IUD, with an average incidence of about 1.6%[3]. After uterine perforation, the IUD can be moved to other parts of the abdomen, common ones include omentum, rectum, sigmoid colon, peritoneum and bladder[4]. When transferred to the urinary system, digestive system, etc., it can cause varying degrees of damage.

This article collects 5 cases of abnormal displacement of the IUD into the bladder and ureter in our hospital (see Table 1) and analyzes the related literature about the abnormal position of the IUD that has

been reported in the past 10 years. Additionally, we used a list of keywords including “intrauterine device migration”, “intrauterine device ectopic treatment strategy,” “case reports”, and “Complications” to perform an extensive Medline search and summarize the collected data and literature. Among them, the data includes age, symptoms, length of time to implant the IUD, diagnosis mode, intervention and treatment methods. Written informed consent was obtained from the couples before the procedure and manuscript publication. The treatment procedure followed ethical principles, and all data was collected from chart reviews. This study was approved by the ethical committees at Xiangya Hospital, Central South University.

Case Presentation

Case 1

The patient was 35 years old and had an intrauterine device implanted for 10 years. She had intermittent irritation and gross hematuria for 3 years. CT of the pelvis showed that the intrauterine device had stones in the bladder (Figure 1a). Cystoscopy showed that the IUD penetrated the back wall of the bladder and formed stones. The ectopic IUD and stones were removed by laparoscopy, and the catheter was indwelled for 2 weeks after the operation. There were no postoperative complications during follow-up. This case was published in the *Int Urogynecology J* journal[5].

Case 2

The patient was 33 years old, who had been implanted with an intrauterine device for more than 2 years. The patient had no urinary system symptoms, had regular menstruation, and had a normal physical examination. The previous patient had an intrauterine device implanted, X-ray and transvaginal ultrasonography (TVS) showed that the IUD (copper-t) was outside the uterus, and the cystoscopy showed that a foreign body was embedded in the lateral wall of the right bladder. The patient underwent laparoscopic removal of the ectopic birth control ring. During the operation, the IUD was found to closely adhere to the bladder wall. The adjacent bladder wall was removed, and the IUD was treated. A drainage tube was placed after bladder repair. Follow-up showed no postoperative complications.

Case 3

The patient was 35 years old and had an intrauterine device implanted for 7 years. The patient was admitted to the hospital with recurrent frequent urination, urgency, and painful urination. Cystoscopy showed glandular cystitis. I was planning to perform a resection of bladder lesions under general anaesthesia in our hospital. The operation went smoothly. He continued to have frequent urination and hematuria one month after discharge. After a detailed medical history and cystoscopic re-examination, it was found that an IUD was inserted into the bladder at the original operation site, and the IUD that was ectopic to the bladder was removed by hysteroscopy. There were no postoperative complications during follow-up.

Case 4

The 33-year-old patient was implanted with an intrauterine device for 4 years. He was admitted to the hospital due to lower abdominal pain, bloating, hematuria, and frequent urination. Cystoscopy and pathological biopsy revealed glandular cystitis. A CT examination revealed that a foreign body on the right side of the uterus did not penetrate the bladder, but it had invaded the bladder wall, which thickened the bladder wall and formed a perforation of the uterus. The ectopic IUD was removed under hysteroscopy under general anaesthesia in our hospital, and no postoperative complications were found during follow-up.

Case 5

The patient was 42 years old with an intrauterine device implanted for 2 years. The patient was admitted to the hospital due to increased night urination at a local hospital 10 days ago, showing that right hydronephrosis with dilatation of the upper right ureter was suspected to be caused by a foreign body in the lower ureter (Figure 1b). After the medical history was asked, there was 2 history of birth control ring implantation and 1 history of ring removal (Figure 1 c/d), which may due to an ectopic uterine birth control ring to the right side of the uterus. Laparoscopic free ectopic contraceptive ring removal and ureter-bladder replantation were performed in the hospital on December 4, 2020. There were no postoperative complications during follow-up.

Table 1 Characteristics of the patients in our group

Age	Presenting symptom	Diagnostic modality	Complication of IUCD	Time since insertion of IUCD	Treatment	Postoperative complications
42	Abdominal pain	Abdominal ultrasound	Bladder calculus on migrated IUCD	10 years	Cystoscopy and Lithotripsy	None
33	asymptomatic	Cystoscope examination	Migration into bladder wall	>2 years	Laparoscopic	None
35	LUTS	After glandular cystitis	Migration into bladder wall	7 years	Laparoscopic	None
33	Hematuria and frequency of urination	After glandular cystitis CT	Migration into bladder wall and uterus perforation	4 years	Laparoscopic	None
42	hydronephrosis with distention of the upper ureter	CT	Extrauterine right side	2 years	Replantation of ureteral bladder and Laparoscopic	None

A total of 129 related studies were included through the search (see Table 2), divided from ectopic to each system, 48 cases from ectopic to urinary system: ectopic to bladder (42 cases 87.5%), ureter (5 cases 10.4%), urethra (2.0% in 1 case); 41 cases of ectopic to digestive system, ectopic to large intestine (33 cases 80.4%), small intestine (5 cases 12.1%), stomach (2 cases 4.8%) and liver (1 case 2.4%); ectopic to reproductive system in 20 cases, ectopic to uterus (17 cases 85%), ureter (1 case 5.0%), ovary (2 cases 10%); ectopic to greater omentum (7 cases 43%), retroperitoneum (50% in 8 cases). Clinical manifestations include lower abdominal pain (70, 54%), hematuria and dysuria 10%, vaginal bleeding [6] and urgency [7] 18%, and 14% of asymptomatic patients. The diagnosis can be confirmed by ultrasound examination (51 cases 34.9%) and CT (44 cases 30.1%), and sometimes X-ray or special examinations are needed to determine the ectopic position of the IUD.

Table 2 Literature review of IUCD migration into various systems

IUD ectopic system	IUD migration	Presenting complaint (Number, %) a	Diagnostic modality
Urinary system (48)	Ureteral (5) Bladder (42) Urethra (1)	Asymptomatic (18.14%)	CT (44)
Digestive system (41)	Stomach (2) Small intestine (5) Large intestine (33) Liver (1)	Urinary tract pain (70, 54%)	Ultrasound (51)
Reproductive system (20)	Ureter (1), Uterus (17), Ovary (2)	Hematuria and dysuria (13.10%)	X-ray (26)
Other (16)	Greater omentum(7) Retroperitoneal (8) Pelvic (1)	Other (24, 18%)	Special inspection (21)
Not specified (4)	Not specified (4)	Not specified (4.3%)	Not specified (4)

Abbreviations: CT, computed tomography; X-ray: X-ray computed

Special inspection: Electronic colonoscopy Cystoscopy, etc

Different ectopic parts of the IUD can have different effects (see Table 3). Complications from ectopic to the urinary system include obstructive hydronephrosis and ureteral hydrops[8, 9]bladder stones[10] (urethral stones)[11], exogenous bladder masses[12]and secondary failure Pregnancy[13]. Complications from ectopic to digestive system include strangulated infarction[14], acute cholecystitis[15], ileocecal fistula[16], pelvic abscess[17], hyperkalemia[18] and Neisseria mucosal Peritonitis[19]. Complications from ectopic to reproductive system include uterine perforation[20], vesicovaginal fistula and vaginal stones[21]. Complications of ectopic to pelvic organs include dilatation of the ureter and renal pelvis and calyces, ureteral erosion and obstruction[9], peritonitis [22]and so on.

Table 3 The impact of IUCD migration to different systems

IUD ectopic system	Complication of IUCD	Treatment
Urinary system	Hydronephrosis/Obstructive	A (13)
	hydronephrosis and Hydronureter	B 10
	Bladder calculi	C 2
	Exogenous mass	D 7
	Secondary infertility	E 2
	Urinary calculi	F 13
	Dilatation of ureteral pelvis and calyces	
Digestive system	Small bowel perforation strangulation and infarction	A 7
	Intracecal perforation and lleocecal fistula	B 25
	Acute kidney injury and hyperkalemia	C 1
	uterine perforated	D 5
	Pelvic cyst	G 3
	utero-sigmoid fistula	
	Neisseria mucosal peritonitis	
Reproductive system	uterine perforated	B 14
		H 4
		G 2
Other	Ureterectasis	B (16)
	Ureteral erosion and obstruction	
	Peritonitis	
	Ureteronephrosis	
Not specified	Not specified	Other (4)

A: Endoscopes B: Laparoscopy C: Hysteroscopy D: Open surgery E: Transurethral-nephroscopy F: Cystoscopy and lithotripsy G: Colonoscopy H: Laparotomy

Discussion And Conclusions

IUD placement is a widely used method of contraception in China and is currently recommended by the World Health Organization as a first-line contraceptive program[23], mainly with "T-shaped" or "round-shaped" IUDs. Compared with other methods, This method is relatively convenient, safe and effective, and highly compliant. It is easy to insert, and fertility can be restored by removing the IUD[24].

The scope of IUD perforation is variable, from the insertion of IUD to complete uterine perforation, destruction of the three uterine layers (endometrium, myometrium, and serous membrane), and migration of IUD to the peritoneal cavity[25] Therefore, the perforation of the IUD is divided into four types: the first is when it is confined to the uterine cavity, the second is when the IUD is confined to the myometrium, and the third is when the peritoneal cavity is ruptured. Time. The fourth is when the IUD penetrates the surrounding organs[26].

An ectopic IUD often causes gynaecological symptoms such as abdominal pain, severe menstrual bleeding, prolonged menstruation, and unwanted pregnancy[26] but its impact on other systems is often ignored. On the contrary, when other systems produce corresponding symptoms, the factor of ectopic IUD is often ignored.

☒ Complications caused by ectopic IUD to the urinary system: Malik, T et al. have reported that the IUD ectopic to the right ureter, leading to hydronephrosis and ureteral hydrops, Priyadarshi et al. reported that the IUD was transferred to the peritoneum. The lower part of the left ureter is stenosis, which blocks the left ureter, resulting in severe ureter and hydronephrosis. Omar S. Akhtar et al. reported 2 cases of bladder stones formed from ectopic to the bladder. Vahdat, M et al. reported that a scar defect caused by cesarean section caused the intrauterine device to migrate into the bladder cavity and bladder wall, resulting in secondary Cases of infertility.

☒The ectopic IUD to the digestive system can cause intestinal strangulation, acute calculous cholecystitis, fistula and other emergencies. Mellow, S et al. once reported a case of severe abdominal pain and vomiting in a patient who went to the doctor with a history of severe abdominal pain and vomiting. A later detailed follow-up of the medical history revealed that IUCD was wrapped in the small intestine loop Its supporting mesenteric causes strangulation of the small intestine. Santos, A.P., etc. once reported a case of acute calculous cholecystitis caused by ectopic IUD, which reminds us that women of childbearing age should ask for detailed medical history when they develop digestive system diseases.

☒The most common complication caused by ectopic IUD to the reproductive system is uterine perforation. Davoodabadi, A. once reported a case of invasion of the sigmoid colon through uterine perforation, which is likely to be missed. Yan, D. et al. once reported a rare case of vesicovaginal fistula and vaginal stones. Risk factors for perforation of the IUD include inexperienced doctors inserting the IUD, incorrect positioning of the IUD, abnormal uterus, multiple pregnancies, and recent miscarriage or pregnancy.

☒The most common complications caused by ectopic IUD to pelvic organs are ureterorenal pelvis and calyx expansion, ureteral erosion and obstruction, and peritonitis. Therefore, the impact of ectopic IUD should be understood by more people.

Among the 5 cases reported by our hospital, 4 cases of IUD were ectopic to the bladder. Case 1 of this group went to the doctor due to symptoms of intermittent irritating urination and gross hematuria. After cystoscopy, the bladder was found to be ectopic to the bladder and bladder stones were formed. The intrauterine device and stones were successfully removed by laparoscopy. Case 2 in this group was

asymptomatic and found ectopic to the bladder wall through cystoscopy. Laparoscopy was used to remove the ectopic IUD. Omar S. Akhtar et al. reported 2 cases[26]. The IUD was removed by partial cystectomy via the abdomen. Case 3 in this group was found to be ectopic to the bladder after the removal of the vesicle tissue in the triangle area during the operation. Case 4 of this group was admitted to the hospital due to lower urinary tract symptoms. The cystoscope indicated cystitis glandularis, but CT found an ectopic IUD to the bladder. Hysteroscopy was used to remove the ectopic IUD in both cases. Case 5 of this group is the ectopic of the IUD to the right side ureter outside the uterus. CT examination showed that the right hydronephrosis with dilatation of the upper part of the right ureter was suspected to be caused by the obstruction of the lower part of the ureter. Researchers used laparoscopic ureteral replantation. And laparoscopic removal of the free ectopic contraceptive ring. Xuesong Yang et al. reported 1 case[27]. Ultrasound examination showed severe hydronephrosis and upper ureteral dilatation on the left side, abdominal X-ray (KUB) showed a left pelvic intrauterine device, pelvic computed tomography (CT) found The IUD is located very close to the lower part of the ureter. Researchers used a double J-shaped stent to be placed in the left ureter before the operation, and the IUD was taken out through laparoscopy for the first time. When the left side hydronephrosis worsened after 2 months, the second ureteroneocystostomy was performed.

Different surgical methods are selected for different ectopic positions and their effects. In the treatment methods reported in the literature review, all cases underwent surgical treatment (129/129, 100%), of which 65 cases underwent laparoscopic techniques (50.7%) and endoscopy (15.6%). Open surgery accounted for only 9%, intraoperative And there were no major complications after surgery. It can be seen that the use of laparoscopy to treat ectopic IUD is the choice of most doctors, but experienced clinicians should choose a suitable surgical method according to the different position of the ectopic and use minimally invasive techniques to remove the IUD as much as possible to relieve the ectopic IUD. Complications produced.

The ectopic IUD can cause a serious impact on multiple systems of the human body. Therefore, it is recommended that experienced gynaecologists use the correct intrauterine device implantation technology, but the spontaneous ectopic IUD cannot be controlled. Use imaging techniques such as ultrasound, Techniques such as CT scan and cystoscopy can determine the position of the intrauterine device. According to the location of the ectopic, select the appropriate surgical plan to remove the ectopic IUD and relieve the complications caused by the ectopic IUD. Our report aims to remind people that researchers must be alert to the loss of an ectopic intrauterine device that may cause serious damage to nearby organs.

Abbreviations

IUD: Intrauterine devices. **CT:** Computed tomography **X-ray:** X-ray computed .

KUB: plain radiograph .**TVS:** transvaginal ultrasound.

Declarations

Ethical approval and consent to participate

This study was approved by the ethics committees at at Xiangya Hospital, Central South University.

Consent for publication

Written informed consent was obtained from the parents of the patients for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors report no conflict of interest regarding this paper.

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Author Contributions

J Sun: Project development, data analysis and manuscript writing, Q Tang: Data collection, X Zhang: Project development. Final approval of manuscript: All authors.

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References

1. Gunbey, H.P., et al., Migration of intrauterine devices with radiological findings: report on two cases. *BMJ Case Rep*, 2014. 2014.DOI: 10.1136/bcr-2013-202522

2. Paré, A.K., et al., Management of Intrauterine Device Migrated into the Bladder: A Case Report and Literature Review. *Case Rep Urol*, 2020. 2020: p. 8850087.DOI: 10.1155/2020
3. Zakin, D., W.Z. Stern, and R. Rosenblatt, Complete and partial uterine perforation and embedding following insertion of intrauterine devices. II. Diagnostic methods, prevention, and management. *Obstet Gynecol Surv*, 1981. 36(8): p. 401–17.DOI: 10.1097/00006254-198108000-00001
4. Nouioui, M.A., et al., A Mislocated Intrauterine Device Migrating to the Urinary Bladder: An Uncommon Complication Leading to Stone Formation. *Case Rep Urol*, 2020. 2020: p. 2091915.DOI: 10.1155/2020/2091915
5. Liu, L., H. Liu, and X. Zhang, Intravesical migration of a Chinese intrauterine device and secondary stone formation: diagnostic investigation and laparoscopic management. *Int Urogynecol J*, 2015. 26(11): p. 1715–6.DOI: 10.1007/s00192-015-2735-4
6. An, Y., et al., Intrauterine device found in an ovarian tumor: A case report. *Medicine (Baltimore)*, 2020. 99(42): p. e22825. DOI: 10.1097/MD.00000000000022825
7. Zhang, N.N., et al., An Effective Method Combining Various Endoscopes in the Treatment of Intravesical Migrated Intrauterine Device. *J Minim Invasive Gynecol*, 2020. 27(3): p. 582.DOI: 10.1016/j.jmig.2019.07.024
8. Malik, T. and S. Khan, An unusual cause of hydronephroureter. *J Coll Physicians Surg Pak*, 2014. 24(10): p. 766–7.DOI: 10.2014/JCPSP.766767
9. Priyadarshi, V., N. Sehgal, and D. Sen, Ureteric erosion and obstruction: A rare but dreaded complication of intrauterine contraceptive device. *Urol Ann*, 2017. 9(1): p. 103–106.DOI: 10.4103/0974-7796.198839
10. Shin, D.G., T.N. Kim, and W. Lee, Intrauterine device embedded into the bladder wall with stone formation: laparoscopic removal is a minimally invasive alternative to open surgery. *Int Urogynecol J*, 2012. 23(8): p. 1129–31.DOI: 10.1007/s00192-011-1632-8
11. Ko, P.C., Y.H. Lin, and T.S. Lo, Intrauterine contraceptive device migration to the lower urinary tract: report of 2 cases. *J Minim Invasive Gynecol*, 2011. 18(5): p. 668–70.DOI: 10.1016/j.jmig.2011.05.010
12. Torres-Cepeda, D. and E. Reyna-Villasmil, Small bowel perforation by an intrauterine device. *Gastroenterología y Hepatología (English Edition)*, 2016. 39(7): p. 495–496.DOI: 10.1016/j.gastrohep.2015.12.007
13. Vahdat, M., et al., Cystoscopic removal of a migrated intrauterine device to the bladder; a case report. *Contracept Reprod Med*, 2019. 4: p. 7.DOI: 10.1186/s40834-019-0089-x
14. Mellow, S., et al., Ischaemic bowel due to migrated intra-uterine contraceptive device: a rare, delayed complication of intra-uterine contraceptive devices. *ANZ J Surg*, 2018. 88(12): p. 1349–1350.DOI: 10.1111/ans.13910
15. Santos, A.P., et al., Laparoscopic removal of migrated intrauterine device. *BMJ Case Rep*, 2017. 2017.DOI: 10.1136/bcr-2017-221342
16. Almarhabi, Y., Asymptomatic cecal perforation and ileocecal fistula after intrauterine device migration: a case report. *J Surg Case Rep*, 2020. 2020(4): p. rjaa015.DOI: 10.1093/jscr/rjaa015

17. Ye, H., et al., Migration of a foreign body to the rectum: A case report and literature review. *Medicine (Baltimore)*, 2018. 97(28): p. e11512. DOI: 10.1097/MD.00000000000011512
18. Nair, K.V., Image of the Month: Endoscopic Removal of an IUCD Migrated Into the Rectum. *Am J Gastroenterol*, 2016. 111(3): p. 309. DOI: 10.1038/ajg.2015.265
19. Khan, K.N., et al., Neisseria mucosa Peritonitis in the Setting of a Migrated Intrauterine Device. *Adv Perit Dial*, 2018. 34(2018): p. 47–49. PMID:30480537
20. Davoodabadi, A., et al., Invading of intrauterine contraceptive device into the sigmoid colon through uterine perforation caused by a blunt trauma. *Chin J Traumatol*, 2015. 18(4): p. 235–7. DOI: 10.1016/j.cjtee.2015.09.006
21. Yan, D., et al., Migration of a fractured ring IUD resulting in vesicovaginal fistula and vaginal calculus. *Eur J Contracept Reprod Health Care*, 2018. 23(5): p. 387–389. DOI: 10.1080/13625187.2018.1517409
22. Altun, E., et al., Comamonas testosteroni peritonitis secondary to dislocated intrauterine device and laparoscopic intervention in a continuous ambulatory peritoneal dialysis patient. *Perit Dial Int*, 2013. 33(5): p. 576–8. DOI: 10.3747/pdi.2013.00007
23. Curtis, K.M., et al., Adaptation of the World Health Organization's Selected Practice Recommendations for Contraceptive Use for the United States. *Contraception*, 2013. 87(5): p. 513-6. DOI: 10.1016/j.contraception.2012.08.024
24. Waqar, M., et al., Erosion of an intrauterine contraceptive device into the urinary bladder: A case report. *Case Rep Womens Health*, 2021. 29: p. e00274. DOI: 10.1016/j.crwh.2020.e00274
25. Dappa, E., et al., Intrauterine device migration into the bladder with stone formation after radiochemotherapy for cervical cancer: a case report. *J Obstet Gynaecol*, 2020. 40(8): p. 1166–1168. DOI: 10.1080/01443615.2019.1693524
26. Akhtar, O.S., S. Rasool, and S.S. Nazir, Migrated Intravesical Intrauterine Contraceptive Devices: A Case Series and a Suggested Algorithm for Management. *Cureus*, 2021. 13(1): p. e12987. DOI: 10.7759/cureus.12987
27. Yang, X., X. Duan, and T. Wu, Ureteric Obstruction Caused by a Migrated Intrauterine Device. *Urol Case Rep*, 2017. 10: p. 33–35. DOI: 10.1016/j.eucr.2016.11.011

Figures

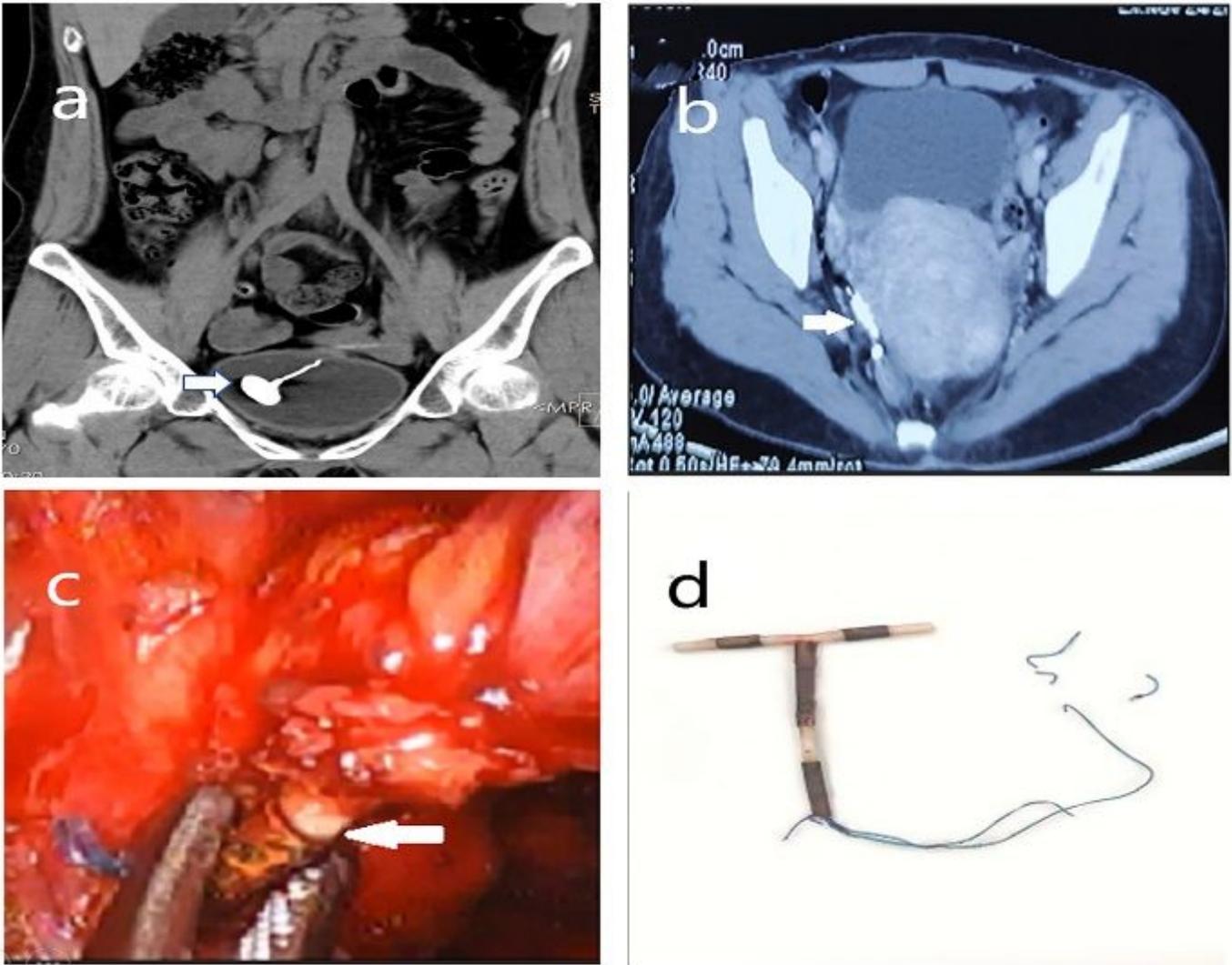


Figure 1

- a. Pelvic CT showed that the IUD was partly intrauterine and partly intravesical with stone formation (white arrowhead).
- b. Pelvic CT showed that the IUD was removed and ectopic to the right side of the uterus(white arrowhead).
- c. The IUD was found and separated during surgery.
- d. The IUD was isolated and 123 removed.