

Bladder Calculus Resulting from the Migration of an Intrauterine Contraceptive Device: A Report of Ten Cases

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Abstract

Background and Aims: Although perforation of the uterus by an intrauterine contraceptive device is not uncommon, intravesical migration and secondary stone formation is a very rare complication. We report a series of 10 women in whom an intrauterine contraceptive Copper-T device migrated from the uterus to the bladder and resulted in formation of a stone.

Methods: Between May 1995 and January 2009, ten women were treated for bladder stones because of migrated intrauterine contraceptive device. Diagnosis was established after performing pelvic ultrasonography and/or intravenous urogram. We describe history, clinical course, diagnostic workup and treatment data obtained from the hospital charts.

Results: The mean age was 42.6 yrs (33-59). Persistent lower urinary tract symptoms were the main complaint in almost all the cases, while four patients presented with macroscopic hematuria. The interval between insertion of intrauterine contraceptive device and onset of symptoms ranged from 2 to 12 yrs. Cystoscopy revealed partial intravesical position of the intrauterine contraceptive device in 9 cases and an entire intravesical intrauterine contraceptive device in one case with calculus formation in all the cases. All patients underwent endoscopic lithotripsy of the stone with extraction of intrauterine contraceptive device. Procedures went well with no complications. Patients received urinary drainage for 10 days. Postoperative course was uneventful with a 2 years follow-up.

Conclusions: Intrauterine contraceptive device perforation to the bladder with stone formation is a rare event. Persistent lower urinary tract symptoms in women with intrauterine contraceptive device should raise the suspicion of intravesical migration. Ultrasonography permits excellent depiction of intravesical migrated intrauterine contraceptive device. Endoscopic retrieval is a feasible and safe procedure.

Keywords: Intrauterine Devices, Uterine Perforation, Urinary Bladder Calculi, Endoscopy.

Introduction

Currently, IUD is the most widely used method of reversible contraception and worldwide, over 100 million women use it (1). It is a widely accepted contraception method among women because of its

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low-complication rates.

There has been concomitant large number of reported complications (2), the spectrum of which varies greatly from slight discomfort at time of insertion to death (3).

Perforation of the uterus by an IUD with migration into the bladder is very uncommon. Most of these cases have only been published as abstracts and case reports.

Stones can form as a result of complete migration of the IUD. To date, approximately 70 cases of IUD migration to the bladder have been reported in the scientific literature, and about half of them resulted in stone formation, with established stone sizes varying from 1 cm to 8 cm (4, 5). To the best of our knowledge no large series of intravesical IUD resulting in stone formation have been reported.

On review of reported cases, there was no general consensus about the diagnostic tools and proper management. In this study, we report ten cases of IUD type copper-T migrating to the bladder complicated by bladder stone formation. Our aim is to define the proper investigations as well as management.

Materials and Methods

Between May 1995 and January 2008, ten women

were endoscopically treated for bladder stones resulting from migration of IUD to the bladder. The mean age at the time of diagnosis was 42.6 years (range 33–59). Only 3 of these patients have had ultrasonography immediately after the insertion of IUD to verify the device location.

Medical history of recurrent urinary infections was reported by three patients. Almost all patients (n=9) reported that gynecologist or the nurse was unable to locate the device and assumed that it had fallen out. Additionally, all of the patients failed to have their device medically controlled on regular basis.

Urine analysis and culture were performed for all the cases. Initial radiological investigations were requested by the treating doctor before referral to us. They included US and/or plain KUB film in all the cases. In three cases, IVU was carried out for evaluation of the upper urinary tract. Cystoscopy was performed at the time of surgical intervention in all the cases.

Results

In our department, over the last 14 years, there have been 56 female patients with the diagnosis of primary bladder lithiasis. Ten of them had an intravesical IUD complicated by bladder stone (17.8 %). The summary of the ten cases is presented in Table 1.

Table 1: Clinical summary of patients with IUD migrating to the bladder and complicated by bladder stone formation

	Age (ys)	Symptoms interval	Irritative symptoms	UTI	Pelvic Pain	Hematuria	Bladder stone size (cm)	Pregnancy with IUD	Time interval (ys)
Case 1	42	5 ys	+	+	+	0	2.5	2	10
Case 2	38	3 ys	+	0	+	+	2	2	5
Case 3	42	2 ys	+	0	+	0	1	2	4
Case 4	33	2 ys	+	0	+	0	4	1	14
Case 5	45	3 ys	+	0	0	0	3	0	3
Case 6	59	3 mo	+	0	+	+	2.5	0	7
Case 7	41	3 mo	+	0	+	+	3.3	0	7
Case 8	42	3 ys	+	+	+	+	3	0	11
Case 9	40	3 mo	+	+	+	0	1.7	1	7
Case 10	44	2 mo	+	0	0	0	2	0	2

In spite of the presence of the IUD, five patients became pregnant within 5 months to 2 yrs. Persistent LUTS (such as dysuria, frequency, and suprapubic pain) were the main complaint in all cases, while 4 had microscopic hematuria of variable duration, one patient suffered from urinary pseudo-incontinence and another one had acute urinary retention. The time interval between insertion of the IUD and appearance of urinary tract symptoms is variable and ranges between 2 to 12 yrs. Clinical examination was unremarkable in all the patients. Positive urine cultures were present in three cases; they were treated with proper antibiotics and a sterile culture was obtained before intervention.

KUB plain radiographs showed bladder stone on IUD in all the cases with variable sizes (1-4 cm) (Fig. 1). The stone size was greater than 2 cm in 7 patients. The US revealed normal upper tracts. IVU confirmed the diagnosis of intravesical IUD (Fig. 2).

Figure 1. KUB x-ray. A stone forming on the long arm of the copper-T IUD is observed in the bladder area.



Figure 2. Post void x-ray during IV pyelogram: bladder stone (arrowheads) formed on a partially intravesical migrating contraceptive device and adhered to the blood wall



The migrated IUD was partially inside the vesical lumen with calculus formation on top in nine cases (Fig. 3). One patient was found to have a bladder stone mobile in the bladder with intact bladder mucosa.

The stone was fragmented endoscopically using a ballistic lithotripter (Swiss Lithoclast, Le Sentier, Switzerland). Both fragmented calculus and IUD were removed cystoscopically by a grasping forceps without any complication (Fig. 4). A Foley catheter was left for 10 days.

All patients did well and were discharged to their homes with no complications. Recovery was uneventful. Four weeks after, patients remained clinically asymptomatic. Follow-up ultrasound and urine culture performed at 6 months were normal. Later on, 2 patients became pregnant and they had delivered their babies without

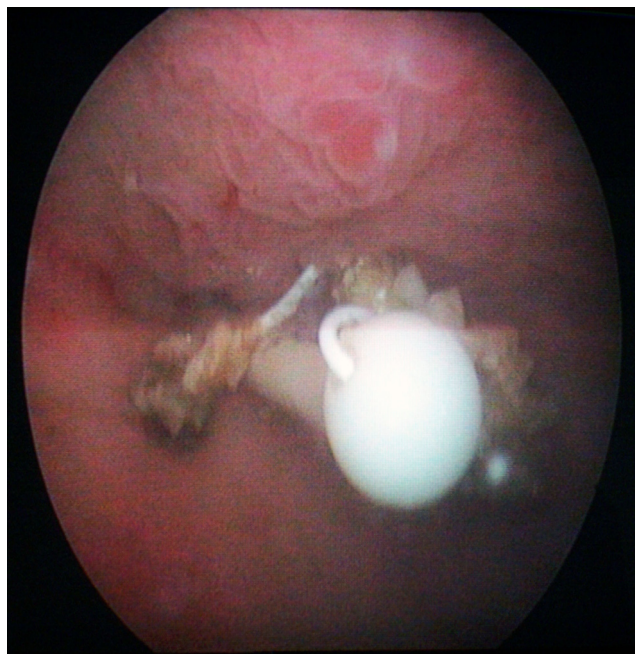
any problem. After a mean follow-up of 3.5 years (2-7 years) none of our patients have presented new recurrences of lithiasis or urinary tract infections and all of them were sexually active.

recurrences of bladder lithiasis or urinary tract infections and all of them were sexually active.

Figure 3. Cystoscopy: Intravesical calcified IUD. Note the thread of the IUD (arrow)



Figure 4. Cystoscopy: Endoscopic view after stone fragmentation



Discussion

IUD is the most popular method of reversible contraception (6) due to its high efficacy for fertility regulation, low risk and low-cost (7). It has been used for over 30 years and is a widely accepted worldwide contraceptive instrument especially in the developing countries (8).

However, its use has been associated with some complications, e.g. pelvic inflammatory disease, infertility due to upper genital infections, spontaneous and septic abortion, bowel perforation and vesicouterine fistula and endometrial adenocarcinoma. Other reported complications include dysmenorrhea, hypermenorrhea, pain, pelvic infections, ectopic pregnancy, uterine rupture and migration into adjacent organs (2, 3, 9-12).

The mechanism of uterine perforation by IUD may be primarily at the time of insertion (13). It is closely related to the time and technique of insertion, the type of IUD, the skill of the physician, and the anatomy of the cervix and uterus (3). Undetected extreme posterior uterine position is the most common reason for perforation at the time of insertion. This risk increases especially during the puerperium or out of the menstruation, when the uterus is small and its wall is thin predisposing to IUD migration.

Inept insertion and position, fragile uterine wall, multiparity, recent abortion or pregnancy, following cesarean section and sepsis are some of the factors associated with uterine perforation and subsequent transvesical migration (14, 15). Patients may be asymptomatic or may present with abdominal or pelvic pain and lower urinary tract voiding symptoms like recurrent urinary tract infection. These cases underline the need for a closer meticulous post-insertion follow up and a high index of suspicion (15).

Secondary perforation can occur by slow migration through the muscular wall of the uterus which can be augmented by spontaneous uterine contractions,

urinary bladder contractions (14). Maskey et al (13) reported a case of intravesical migration of an IUD one month after its insertion. Dietrick et al (11) reported a case in which the device migrated into the pelvis 3 years after its placement, and remained there for an additional 13 years before migrating into the bladder. In our series, the bladder perforations presented long time after IUD insertion, suggesting slow migration.

It has been suggested that pregnancy helps in erosion of the uterine wall with IUD and therefore, secondary perforation is considered to be the most likelihood mechanism (2). Our data support this hypothesis because pregnancy had occurred in four cases (about half of patients) after IUD insertion. Upon reviewing the literature, there were no reported cases of pregnancy except 1 report from Turkey with the IUD perforating into the bladder (1).

Experience of the practitioner is a crucial element in determining the risk of uterine perforation. It was shown in a large-scale study that doctors who reported inserting less than ten devices (in a study period of 7 years) reported significantly more perforations than those who reported inserting between 10 and 100 devices (15). These findings stress the fact that placing an IUD is an invasive procedure and should be performed by experienced doctors. In developing countries, the device is often inserted by paramedics with variable skills (in family planning facilities, and in rural areas), and follow-up evaluations are irregular or absent that explain the importance of our series.

An IUD in the bladder can also be the consequence of inserting it erroneously in the bladder through the urethra (16). In our tenth case, cystoscopy showed a totally mobile T-shaped bladder stone covering the IUD with no mucosal lesions. These findings can be consistent either with an early bladder perforation during insertion of the device or an erroneous placement of the IUD directly in the bladder by an inexperienced paramedic lacking basic anatomical knowledge.

In a literature review by Kassab and Audra (17), a total of 165 cases of migrating IUDs were collected, and only 23 were in the bladder (14%). The incidence of uterine perforation was reported to be 1.6 for 1,000 insertions (18). The true incidence of perforation is most likely higher because of the frequently asymptomatic nature of perforation (3). Migration into the bladder and secondary bladder stone formation is very uncommon (2, 3, 9, 16, 18).

It has been reported in fewer than 70 cases in the literature. However, less than half of these cases have resulted in bladder calculus formation (4). Only 31 cases of complete or incomplete migration of IUD into the bladder and calculus formation have been reported in the literature by 2006 (8).

From a review of the literature, it appears that most cases of intravesical migration of IUDs have been associated with the Copper T. However, we did not find any scientific evidence to suggest that Copper T IUD is more prone to such complications. It seems that hormone releasing IUDs may also cause bladder perforation (19).

To reduce the incidence of such complications of IUD use, new improved devices have become available during the past few years. However, in many parts of the world like Tunisia, Copper T devices are still frequently used. They result in more severe inflammatory reaction and adhesion (20).

From a review of the literature it appears that any foreign body placed in the proximity of the bladder has the potential to migrate into bladder, e.g. vaginal diaphragm (21), cerclages (22), surgical clips used in hernia repair (23), prosthetic slings (24) etc.

Once an IUD has eroded in to the bladder, it plays the role of matrix (24) and the deposition of urinary sediments leads to calculus formation on the device. However, the degree of encrustation is variable and independent of the duration of the device in the bladder (11). Thus, the device can either be partially or completely encrusted with calculi. In only one patient, there was complete encrustation of the device

and the stone measured 4 cm.

The migrated IUD may remain silent for a long period (25) and not be discovered until it is found to be missing. Nine of our patients were noted to have lost their IUD years before the development of urinary tract symptomatology and, instead of carrying out radiological investigations, they were told that the IUD must have fallen out.

Total or partial migration into the bladder usually presents with LUTS as urinary frequency, tenesmus, suprapubic pain, dysuria, hematuria, urinary tract infection, urinary tract obstruction secondary to lithiasis, and urinary incontinence (2-4, 12). Persistent or recurrent urinary tract infections are the most frequent presentation, being the diagnosis of intravesical IUD a finding during diagnostic workup (4, 16).

Recurrent urinary tract infections after appropriate antibiotic therapy should also arouse suspicion of a foreign body in the urinary tract (18). Primary vesical calculi are very unusual in women and presence of intravesical stones should raise suspicion of the presence of a foreign body (11).

A careful search for the lost device must be performed with the hope of preventing dangerous sequelae. All IUDs are radio-opaque; therefore, plane pelvic radiography may be used for detection of the IUD (16) as well as US and Computed Tomography Scan.

The main function of the plain film is to show whether it is present within the patient (16).

The plain film diagnoses a bladder perforation by demonstrating a bladder stone with an attached IUD that has served as a nidus for the deposition of radiopaque urinary salts (26).

US is widely used for the evaluation of patients with a suspected ectopic IUD (2). However, according to some investigators, US may not accurately detect partial perforation (unless the device is unequivocally eccentric), complete perforation (unless the device is close to the uterus), or deep embedding (16).

Transvaginal US provides the best view for locating the IUD, but it restricts the space for its

simultaneous removal (20). From our experience, we found that US can be the investigation of choice for the diagnosis of intravesical migrated IUD. Moreover, the extent of myometrial and bladder wall perforation could be precisely depicted without the need for other invasive technique. For other authors (27), noncontrast Computed Tomography for detection of the site of the IUD and diagnosis of associated complications such as stone or fistula is mandatory.

Cystoscopy is another method to detect the intravesical IUD and can help in more effectively planning the optimal approach for removing the IUD. The adherence of the IUD to the bladder wall, as well as the degree of intravesical protrusion, can readily be identified (26)

Cystoscopy will confirm the presence of an IUD in the bladder and, it might be possible to retrieve the IUD endoscopically (28).

Although the management of the migrating IUD in asymptomatic patients remains controversial, no controversy exists about the management of the IUD that migrates into the bladder. All migrated IUDs in the bladder must be removed. Even if the IUD migration is asymptomatic, it should be removed for the prevention of complications such as pelvic abscess, bladder rupture, and adhesions.

A migrant IUD in the bladder can be removed by cystoscopy, as reported in some cases (2, 12, 16, 18). It can also be removed by suprapubic cystotomy such as was used in other reports (3, 9). Open surgery was generally used for the removal of the big stones around IUD (17). However, open surgery has definitive morbidity over the patient.

We opted for endoscopic management in all our patients. This was done because of minimal invasiveness concern and for the reason that the endoscopic management does not prevent conversion to open surgery should it be a failure. Endocorporeal lithoripsy and IUD extraction were easily performed in our cases. Because the partially migrating IUD was either under the bladder mucosa or within the bladder wall,

gentle traction on it allowed its complete extraction. The punctuate bladder perforation caused by pulling the IUD out of the bladder wall was insignificant and healed simply by prolonged urinary drainage.

The most effective treatment remains prevention. The IUD should be correctly inserted by an experienced person. A proper selection of patient and a thorough history and physical examination is crucial. If uterine rupture is suspected, US should be performed to determine the probable location of the rupture. Women should be informed of the potential complications and should be suggested to check the device string regularly. If the string is not found, abdominal radiography is required even in asymptomatic patients.

In any woman who has an IUD in situ and who presents with LUTS, with recurrent urinary tract infections in spite of appropriate antibiotic therapy, the possibility of intravesical migration of the device should be included in the differential diagnosis.

Conclusions

Migration of an IUD into the bladder is a low-frequency complication. Persistent LUTS, recurrent or persistent urinary tract infections, and moreover, bladder lithiasis, in women with IUD should raise the suspicion of intravesical migration. Ultrasonography is generally the first test in which suspicion is raised, and it should be confirmed by cystoscopy.

Endoscopic retrieval is a feasible and safe procedure to achieve complete extraction of the stone and IUD with very low morbidity for the patient. To the best of our knowledge, we have reported the largest series of bladder calculus resulting from the migration of an intrauterine contraceptive device managed endoscopically with excellent outcome.

Conflict of interest:

None declared.

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