Early pregnancy likely caused by an intravesical intrauterine device

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A 42-year-old female with remote history of intrauterine device (IUD) placement presented with gross hematuria, urinary urgency, and dyspareunia. Cystoscopy showed an encrusted, free-floating intravesical foreign body consistent with a heavily calcified IUD. It was removed endoscopically using holmium laser cystolitholapaxy. The patient remained symptom free postoperatively. While most intravesical IUDs are thought to be the result of migration after several months, this patient became pregnant within 4 weeks after initial insertion. Therefore this may represent a case either of early intravesical migration or of accidental IUD placement into the bladder at the time of initial insertion.

Key Words: bladder stones, device removal, endoscopy, intrauterine device, lithotripsy

Introduction

Intravesical migration of an intrauterine device (IUD) represents a rare complication of a commonly used method of contraception. Multiple cases managed with methods ranging in invasiveness from simple cystoscopic retrieval to laparoscopic or open surgery have been reported on in the literature.[1-4] Here, we report on our recent experience treating a patient who presented with a free-floating encrusted IUD. Based on this patient's history and short time interval between IUD placement and subsequent pregnancy, one may speculate that the IUD was placed transurethrally into the bladder at the time of original insertion. A literature review was conducted to compare this patient's clinical presentation with those of previously reported cases and investigate the possibility of an IUD accidentally placed into the bladder.

Case report

A 42-year-old female was referred to our tertiary referral center with complaints of gross hematuria, urinary urgency, and dyspareunia. Per patient's history, she underwent an IUD placement by an outside provider after the birth of her fourth child 14 years prior to initial presentation. The patient was gravida 5 para 5, with all vaginal deliveries. Despite the presence of the IUD, the patient became pregnant just 4 weeks later. She eventually underwent bilateral tubal ligation 4 years after the birth of her fifth and final child.

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Figure 1. Large bladder calculus identified on dependent portion of bladder.

On physical examination, no abnormalities were identified. The pelvic exam was negative for urethral hypermobility, urine leakage with Valsalva or coughing, pelvic pain, and pelvic organ prolapse. Urinalysis was not suspicious for urinary tract infection.

As part of the hematuria work up, a CT urogram was performed, which demonstrated multiple bladder calculi, Figure 1. Outpatient cystoscopy demonstrated an encrusted free-floating foreign body with strings protruding from it. There were multiple small neighboring bladder calculi as well as erythematous patches on the mucosa of the posterior bladder wall and bladder base consistent with chronic irritation from the foreign body. An attempt was made to remove the foreign body using flexible graspers in clinic. The foreign body was too large to grasp effectively and the encrustations were too hard to break into smaller retrievable pieces. At this point, it was not clear whether or not the IUD was attached to the bladder wall nor if there was any associated scar on the bladder wall, which could imply intravesical migration of the IUD. A KUB was obtained and showed a T-shape intravesical structure, Figure 2.

The decision was made to take the patient to the operating room to remove the foreign body from the bladder. She was consented for an endoscopic and open approach. Rigid cystoscopy was performed initially, demonstrating a free-floating T-shaped heavily encrusted foreign body consistent with suspected IUD. It measured 4 cm in the largest dimension. Rigid graspers were used to attempt to extract the IUD but only small pieces of stone could be removed. A small portion of the IUD and an attached string were successfully removed using the graspers. The remainder of the encrusted IUD was too large to be removed with the graspers. A 24.5 Fr offset nephroscope (Richard Wolf Medical Instruments Corporation, Vernon Hills, IL, USA) was inserted through the urethra and a 600-micron Holmium laser fiber was used to fragment the calculus into small pieces. The stone fragments and remaining pieces of the IUD were removed with the graspers and with irrigation of the bladder , Figure 3. After the bladder was completely evacuated of any stone or foreign body material, it was carefully inspected. There was no scar tissue, lesion, or thickening of the bladder wall found, implying that the IUD may have migrated into the bladder in a very short timeframe or may have been accidentally placed into the bladder at the time of initial insertion. An intraoperative cystogram was performed in order to rule out bladder injury or

Figure 2. The outline of the IUD is easily seen on this abdomino-pelvic radiograph. The KUB is better able to demonstrate the outline of the IUD than the CT scan.

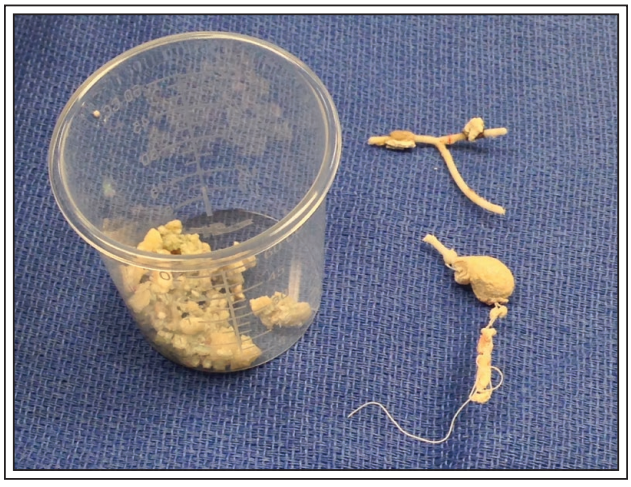

Figure 3. Fragmented bladder calculi and encrusted IUD.

fistula. Filling images demonstrated no extravasation of contrast. A post-drainage film was also negative for contrast extravasation and there was no retained contrast within the bladder. Efflux from both ureteral orifices was visualized with indigo carmine. A 22 Fr Foley catheter was left in place postoperatively.

The patient's postoperative course was uncomplicated. On postoperative day one, she passed a voiding trial and was discharged home. The patient was seen in follow up 1 week after surgery and she reported resolution of her lower urinary tract symptoms, dyspareunia, and hematuria. She was experiencing no pain. The patient underwent pelvic ultrasound at 2 months postoperatively and repeat cystoscopy at 3 months postoperatively, both of which demonstrated no abnormalities.

Discussion

There have been at least 90 reports of calculus formation around an intravesical IUD in the English language scientific literature reported in PubMed over the last 30 years.[5] Common presenting symptoms include hematuria, recurrent urinary tract infections, dysuria, dyspareunia, and chronic pelvic pain. The IUD string may be absent on pelvic exam and the patient may become pregnant unexpectedly. In one case series, the time of onset of symptoms ranged from 1 week to 2 years after the original IUD insertion.[3] Others have described an even longer duration between IUD insertion and diagnosis. One case report described a patient who had an IUD placed 10 years prior and subsequently presented with dysuria, lower abdominal pain, and irritative lower urinary tract symptoms of a year's duration. Four weeks prior to presentation, she also began to have hematuria. In this case, the IUD was felt to have migrated into the bladder.[6] Pregnancy in cases of IUD migration has previously been reported to occur as early as 2 months after the IUD insertion.[4] Most cases are felt to be due to uterine perforation with subsequent intravesical migration of the IUD. Accordingly, multiparity and recent pregnancy, which predispose the uterus to perforation, have both been reported as possible risk factors for intravesical migration of an IUD.[2]

Some investigators believe that this migration can occur either early after initial insertion or later, in a delayed fashion. Early migrations are felt to be the result of uterine perforation at the time of initial placement. The overall incidence of uterine perforation has been estimated at 0.87 per 1000 insertions.[2] These perforations can be completely asymptomatic and the patient may present in a delayed fashion with symptoms attributed to the encrusted IUD, with the original perforation having long since healed. While delayed migration may possibly be caused by iatrogenic damage to the uterus during IUD placement, it may also be caused by delayed perforation.[4] Delayed perforation may occur in a spontaneous fashion, without any iatrogenic cause.[4,5] Hypothesized causes include uterine perforation caused by infection, uterine or bladder contraction, and peristalsis of nearby intestine.[2,4]

While most cases are felt to be due to uterine perforation followed by migration into the bladder, the findings of an IUD entirely located within the bladder rather than partially embedded in the bladder wall have been thought by some to be indicative of an IUD that was inappropriately placed into the bladder to begin with.[7] The published cases of an intravesical IUD have in common an initial symptom-free period with delayed onset of lower urinary tract symptoms and/or hematuria and a free-floating encrusted intravesical IUD discovered at the time of diagnosis. Some patients report that the IUD insertion was difficult and/or painful. In our patient, only a short interval of 4 weeks passed between initial placement and pregnancy. To our knowledge, this represents the shortest interval reported in the literature between insertion and pregnancy. This short interval suggests that IUD migration can occur very quickly after initial insertion in some cases. Alternatively, the fact that the IUD was entirely free-floating within the bladder with no signs of bladder wall damage or fistula seen intraoperatively introduces the possibility that this case may represent an example of an IUD was accidentally placed into the bladder at the time of original insertion.

Diagnosing this rare process requires a high index of clinical suspicion. An office ultrasound may be of use in initial evaluation prior to committing to more invasive testing. This may show an echogenic structure within the bladder and/or uterus.[8] For more definitive diagnosis, we recommend thorough cystoscopy to evaluate for vesicouterine fistula, as there have been reports of a vesicouterine fistula discovered at the time of surgery.[3] In addition to evaluation of any possible fistulas, cystoscopy can be useful for evaluating for malignancy. There is at least one report of squamous cell carcinoma of the bladder attributed to chronic irritation from an intravesical IUD.[9] CT scan or intraoperative cystogram may be considered for further evaluation of a possible vesicouterine fistula. As shown in Figures 1 and 2, intravesical encrusted IUDs can sometimes mimic the appearance of bladder calculi on CT scan. For the patient presented in this case report, a KUB was

TABLE 1. **Methods of retrieval of an intravesical IUD**

Endoscopic[3,4,10]	IUD extraction Holmium laser lithotripsy Ultrasonic lithotripsy
Laparoscopic[1,2]	Cystotomy, IUD extraction
Open[3]	Cystotomy, IUD extraction

Additional procedures such as partial cystectomy or fistula closure may be necessary in select cases

able to differentiate between an encrusted IUD and a bladder calculus by demonstrating the structure of an IUD within the calculus.

There have been multiple reports of successful transurethral retrieval of encrusted IUDs, sometimes requiring lithotripsy, and sometimes requiring the use of a nephroscope placed transurethrally.[7,10] More complex cases involving very large stones or partial penetration of the bladder wall have been managed in the past with laparoscopic or open surgery Table 1.[1-3] We expect that IUDs that were inadvertently placed into the bladder at the time of insertion are likely to be free-floating and much less likely to be embedded within the bladder wall, making them amenable to transurethral extraction using lithotripsy if necessary. Prompt removal of these IUDs is necessary in order to relieve the patient's symptoms, prevent undesired pregnancy, lessen the risk of recurrent UTI, relieve bothersome lower urinary tract symptoms, prevent fistula formation, and decrease the risk of rare but serious long term complications such as malignancy.

Conclusion

The vast majority of the intravesical IUDs reported in the literature have been due to presumed migration with possible fistula formation, which may complicate attempts at extraction and necessitate cystostomy. We report an example of what to our knowledge represents the shortest published interval between IUD insertion and pregnancy, indicating that the IUD may have either been placed erroneously into the bladder initially or may have migrated within a very short period of time. These cases are amenable to endoscopic extraction as the IUD if free-floating within the bladder without being embedded within the bladder wall. Lithotripsy may be required if the IUD is encrusted. Following treatment and extraction, patients are expected to make a full recovery. □

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