

# Removal of migrated intrauterine device embedded in the urinary bladder wall complicated with cystitis glandularis by a combination of laparoscopy and cystoscopic assistance and literature review.

Jincheng Hua, Hui Pan, Shaoping Cheng\*, Hao Deng, Zhenlei Shi, Jin Dai, Zhigang Huang, and Yu Sang

Department of Urology, First Affiliated Hospital of Yangtze University, Hubei 434000, China

\* Corresponding author: Shaoping Cheng (Email: 284422025@qq.com)

**Abstract:** Objective: To explore the mechanism and prevention measures of calculi and adenular cystitis because of IUCD bladder ectopic. Method: Clinical data of one patient with IUCD bladder ectopic cystitis were collected, and the main history, examination data, intraoperative surgical methods and postoperative follow-up were also retrospectively analyzed. Result: The patient recovered well after surgery, without recurrent urinary tract infection after 1 year of follow-up, and recovered from sexual life. Conclusion: IUD allotopic and adenandular cystitis requires complete resection of the lesion, and laparoscopic combination with cystoscopy has obvious results.

**Keywords:** Cystoscope; Laparoscope; Migrated intrauterine device, Cystitis glandularis.

## 1. Introduction

Intrauterine contraceptive device (IUCD) is a widely used reversible contraceptive measure because of its economical, effective and low complication rate. The incidence of IUCD ectopic was not high, with between 1.2-1.6/1000. But IUCD displacement can cause many complications such as uterine perforation and / or damage to the surrounding organs. The IUCD bladder ectopic position is very rare, which often leads to urinary bladder perforation and stone formation. This report of 1 case of IUCD bladder ectopic complicated with stone formation, cystoscopy combined with laparoscopic partial cystectomy, and postoperative examination was adenandular cystitis. The pathogenesis, clinical manifestations and current diagnosis and treatment of the disease are now analyzed based on the literature. The report is as follows:

## 2. 1 Case report

The patient, a 43-year-old female, was admitted with "repeated urination discomfort for 1 year". The patient developed lower abdominal swelling discomfort after urination 1 year ago, accompanied by pain in sexual intercourse, and repeatedly underwent anti-infection treatment with "urinary tract infection" outside the hospital, and the symptoms showed no significant improvement. One month ago, external ultrasound examination found "bladder occupation", in order to seek further diagnosis and treatment into our hospital. More than 10 years ago, after having the first child, the IUCD contraception was placed. 10 years ago, to have a second child, and the IUCD was removed. One year after having the second child, she was placed again into the IUCD, but the patient was pregnant after two months, and she was put into the third IUCD more than one month after the induced abortion. The second IUCD considered the possible shedding but without further examination. After admission,

the patient underwent urine routine: WBC 130 / HP, RBC 300 / HP, and urinary tract CT indicated: abnormal density shadow in the inner and external area of the anterior wall of the bladder, considering metal artifacts, and IUCD shadow in the uterine cavity (Figure 1).



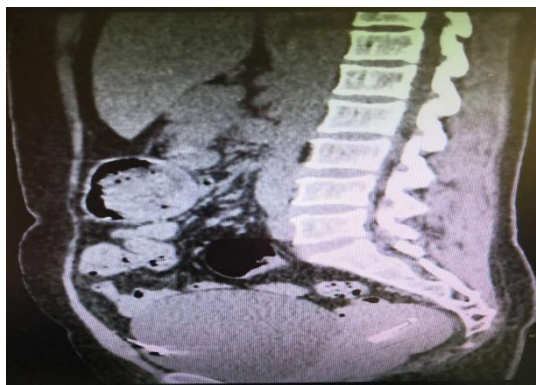
**Figure 1.** A high-density shadow is seen in both the bladder and in the uterus

Consideration: the bladder IUCD is ectopic and associated with stone formation. Patients with anti-infection treatment for 3 days, under general anesthesia, supine lithotomy, cystoscopy group cystoscopy, found a bladder wall IUCD, IUCD prominent in the bladder cavity, surface stone formed, connection embedded in the bladder wall, local mucosal congestion surface rough, embedded mucosa pale (figure 2), the rest of the bladder no abnormal new organisms.

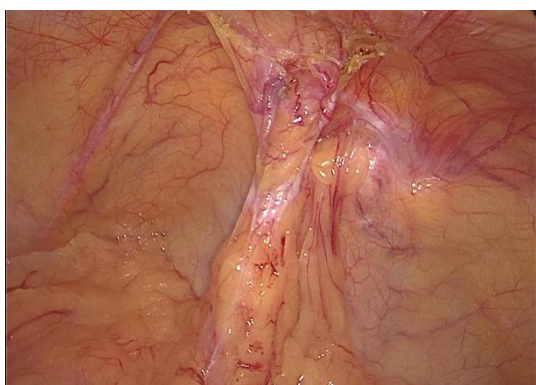
Adhesions were separated, see a metal filament exposed to the bladder serosal membrane, considered as the IUCD junction. Under the guidance of cystoscopy, the IUCD insertion was confirmed again, partial bladder resection was performed, the IUCD and surface stones were completely removed, and part of the bladder wall at the IUCD insertion was removed (Figure 4,5).

In the laparoscopic group, pneumoperitoneum was established, and Trocar was placed into the lower microscope,

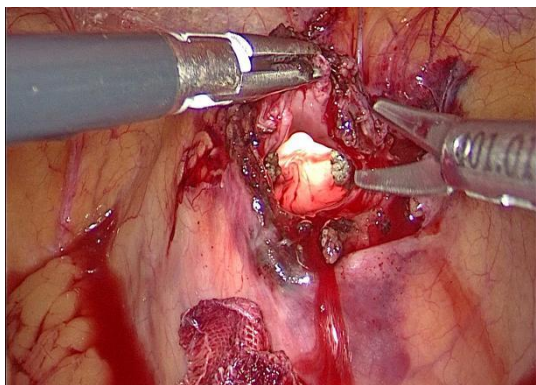
and the omental tissue adhesion of the bladder area in the pelvic cavity was found (Figure 3).



**Figure 2.** Under cystoscopy, the IUD was embedded in the bladder, and the exposed surface of the bladder at both ends formed the local rough mucosa rough, red and white



**Figure 3.** laparoscopic insertion of omental adhesion at the bladder



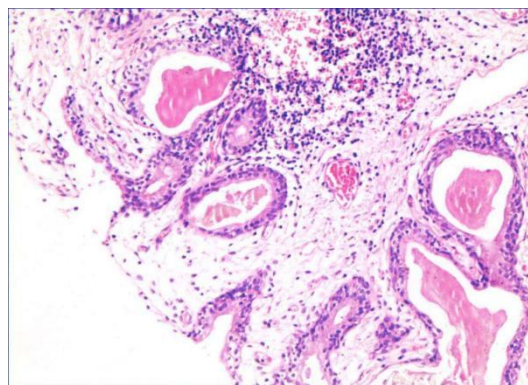
**Figure 4.** Laparoscopic local focal resection and contraceptive ring removal under cystoscopic guidance

The bladder wall defect was closed in 2 layers, and 200ml of normal saline was infused under cystoscopy, with no significant urine leakage. The F20 urinary catheter and abdominal drainage tube were retained, and the surgery was completed. The catheter was removed 1 week after surgery and the tissue was submitted for "adenular cystitis" (Figure 6).

After the operation, the patient was given "gemcitabine 50mg" bladder perfusion once a week, for a total of 5 times. Cystoscopy was reviewed at 3 months after the operation, showing no recurrence of intravesical adenular cystitis and no bladder fistula formation. In utero IUCD was removed half a year after surgery and followed up for 1 year after surgery, the patient did not develop urinary tract infection and lower abdominal swelling. After recovering from sexual life, she did not complain of pain and discomfort.



**Figure 5.** Removed UD and stones and surrounding bladder tissue;



**Figure 6.** Postoperative examination was adenular cystitis (HE, 20\*20).

### 3. Discussion

#### 3.1. Mechanism of IUCD ectopic occurrence

At present, the ectopic mechanism of IUCD is not clear, and there are two general views: First, the operation injury of IUCD leads to uterine wall penetration; The second is that the long-term chronic inflammatory response produced by IUCD that leads to IUCD perforation and displacement. The factors leading to uterine perforation mainly include uterine condition and iatrogenic injury. Normal uterine forward flexion, and proximity of the bladder, increases the risk of uterine perforation during IUCD placement. Of course, the extreme posterior uterus is also a risk factor for IUCD ectopic. Multiple production of the uterus, recent abortion, or pregnant uterus are also prone to uterine perforation when placed in IUCD. The proficiency of the IUCD insertion operator is also an important factor in determining whether the uterine perforation occurs. The probability of IUCD placement outside the uterus in skilled operator is much lower than that of the inexperienced. In addition, other factors such as the type and model of IUCD also affect the success rate of IUCD placement. IUCD placed in the uterus produces long-term chronic inflammation stimulation, which can cause uterine perforation and wandering of the IUD. The spontaneous uterine contraction, bladder autonomous contraction, abdominal viscera peristalsis and abdominal fluid flow further promoted the above process. The most common sites of IUCD ectopic location are the large omentum, rectum, sigmoid colon, peritoneal cavity, and bladder, and the different ectopic locations determine the differences in clinical manifestations and complications. This patient was a grand multipara with a history of multiple IUCD and, therefore, uterine perforation factors. The second patient became pregnant again at 2 months after IUCD placement, indicating that IUCD placement was not effective. No second

IUCD was found in the abortion and placement of the third IUCD. Therefore, the patient had a uterine perforation at the second IUCD placement, and the IUCD was possible outside of the uterus.

### 3.2. IUCD bladder ectopic and adenandular cystitis

In addition to the two aforementioned mechanisms, for abnormal vulvar development patients, where the urethral opening is close to the vaginal mouth, there is the possibility of direct placement into the bladder from the meatus urinarius. In particular, some patients found that IUCD is free in the bladder cavity, which may be mistakenly inserted from the urethral orifice, or may be completely free from the bladder after displacement from the uterus.

IUCD atuses contraception by creating sterile inflammation in utero that prevents the fertilized egg from implantation. When IUCD is displaced, inflammatory stimulation occurs in different organs of the pelvic and abdominal cavity, often leading to inflammatory adhesion of tissues and organs, and even necrosis and perforation of. IUCD displacement to the bladder is relatively rare, and the ectopic bladder can cause bladder perforation of, stone formation of, and even malignant changes possibility. IUCD becomes the core matrix of stones in the bladder, therefore, IUCD after ectopic bladder, often accompanied by stone formation. The cause and mechanism of adenotropic cystitis are not fully clear, but a relatively recognized theory is the theory of epithelial tissue transformation: Under the action of chronic stimulation factors, transitional epithelial tissue hyperplasia, proliferative tissue is gradually wrapped by connective tissue and separated from the urothelium, forming Brunn's nest, then adenular metaplasia, gland cells secrete mucus and aggregation, produce cystic cystitis, followed by the luminal columnar epithelium formation, called glandular cystitis .IUCD can continuously release  $Cu^{2+}$  to cause chronic inflammatory response , when IUCD displacement into the urinary metaplasia factor , and the surface secondary bladder stone itself is also one of the factors causing adenadenular cystitis. The IUCD embedded in the bladder, secondary surface stones, rough local mucous membrane, IUCD embedding, and the postoperative disease test results confirmed the occurrence of adenular cystitis.

### 3.3. Clinical manifestations

After IUCD bladder ectopic, many patients can have no symptoms or mild symptoms of in the early stage, but long-term foreign body stimulation leads to gradual complications, such as the formation of surface stones and repeated urinary tract infection, and the lower urinary tract irritation symptoms will become obvious and aggravated, and hematuria and lower urinary tract obstruction will appear as . Some patients develop lower abdominal distension pain and chronic pelvic regional pain, long-term pelvic regional pain leads to dyspareunia, sexual disharmony and decreased libido, and even stop sexual life. In this case, IUCD has no symptoms for a long time, which may be related to the placement of IUCD outside the uterus and walk into the bladder. In addition, it takes some time for IUCD to enter the bladder to form stones and produce stimulating symptoms. It is precisely because of the absence of clinical symptoms that the ectopic IUCD has been undetected. The patient's abdominal distension pain and sexual pain in the past 1 year were considered to be associated with repeated inflammatory irritation and pelvic tissue

adhesion.

### 3.4. Diagnosis of IUCD

Urinary tract infections are more common in women, but if women have recurrent urinary tract infections with not good treatment effect and a history of pelvic surgery or IUCD placement, the possibility of IUCD ectopic should be highly suspected. For this part of patients, ultrasound examination is preferred, and urological ultrasound examination can often find ectopic IUCD and surface stones in the bladder. Pelvic plain radiographs can understand whether ectopic IUCD is in vivo and whether stones form, providing clues for diagnosis. CT plain scan and 3D reconstruction can provide a more accurate assessment of the location of IUCD and the surface stone formation status, while helping to judge the depth of IUCD embedded in the bladder and the relationship with the surrounding organs and tissues. If tissue malignancy around IUCD is highly suspected, a CT enhanced scan can be performed for further evaluation. Therefore, the CT examination has an important role in the preoperative evaluation. Cystoscopy can more intuitively evaluate the position of IUCD in the bladder, understand the tissue reaction surrounding IUCD and surface stone formation, but also in the mirror downward lithotripsy treatment, remove the IUCD. In this case, the IUCD ectopic condition was confirmed by ultrasound and CT, and was incarcerated in the bladder wall. To reduce the pain of cystoscopy, cystoscopy was performed in the patient after general anesthesia, and the local inflammatory response changes in the embedded tissue were detected below the microscope. Considering the risk of fracture and residual involvement of the IUCD extraction after cystoscopic lithotripsy, and the unevaluable damage to the bladder and external bladder tissue, the postoperative risk of a urinary fistula, therefore, surgery has not been performed directly under cystoscopy.

### 3.5. Treatment of IUCD ectopic and adenular cystitis

Due to concerns that surgical removal of the IUCD caused further aggravation of pelvic tissue adhesions, there is controversy about whether the surgical treatment of extruterine IUCD in asymptomatic patients. However, even if it is asymptomatic, because IUCD can cause inflammatory damage and adhesion in the surrounding organs and tissues, the World Health Organization and the International Medical Advisory Group for Family Planning recommended that ectopic IUCD, once found, should actively remove the , regardless of its type and location. In this case, the patient had no obvious symptoms after ectopic IUCD, but the adhesion and wrapping of omental tissue near IUCD were found by intraoperative laparoscopy, further confirming that although IUCD is asymptomatic in the early stage, it continuously produced inflammatory response during displacement, which eventually caused inflammatory reaction in pelvic tissue and damage to the bladder wall. Therefore, once IUCD ectopic is found, whether it produces symptoms, it should intervene as early as possible.

There are many treatment methods for bladder IUCD ectopic disease, such as cystoscopy, laparoscopy and open surgery, which need to determine the surgical method according to the location of IUCD, the depth of IUCD embedding, and whether the tissue malignant change or fistula tract is combined. In principle, the IUCD should be removed to remove the lesion, repair the tissue damage, and

prevent postoperative urinary fistula and fistula tract formation. If the IUCD and stones are completely located in the bladder, the IUCD can be crushed and removed under the cystoscopy, avoiding large trauma. For most patients with IUCD complicated with stones, the treatment purpose can be achieved through endoscopic operation. For IUCD-embedded patients, after endoscopic lithotripsy, the IUCD was removed, and the IUCD fracture existed, and the difficulty of fistula healing, etc. If the IUCD is embedded in the bladder wall, laparoscopic removal of the IUCD, resection of the diseased tissue, and separation of the abdominal adhesions may be considered. Due to the advantages of small injury and fast recovery, the preferred laparoscopic treatment can be considered. However, if the stone is large, the surrounding tissue adhesion is serious, and the laparoscopy is difficult to remove the fistula tract and tissue reconstruction, the open surgical can be considered. In this group, patients combined cystoscopy and laparoscopy, and evaluated the IUCD position and embedding under direct cystoscopy, and judged the bladder mucosal lesions where the IUCD was embedded, so as to provide a basis for the choice of surgical plan. At the same time, cystoscopy can assist laparoscopy to more accurately locate the lesion, avoid excessive free and removal of the bladder wall, and avoid leaking the diseased tissue; in addition, direct vision can observe the bladder suture in real time, reducing the chance of postoperative urine leakage.

IUCD ectopic bladder can produce stones, stones and IUCD both can stimulate the local tissue to produce an inflammatory response, and even produce dysplasia or cancerous. In this patient, adenular cystitis was examined, which further confirmed that the presence of ectopic bladder in IUCD caused metaplasia and even malignant changes of bladder tissue. Therefore, it is recommended that the suspicious local tissue in the embedding area should be removed for the disease examination. In addition, the local tissue in the embedding area showed an inflammatory reaction. If the IUCD is removed, whether the tissue can heal without forming the fistula tract is a concern. In conclusion, IUCD if embedded in the bladder, laparoscopic or open surgery resection is recommended, which can reduce the production of tissue malignant lesions and urinary fistula.

For the treatment of adenular cystitis, it is controversial whether to perform bladder perfusion therapy after surgery, and there exists a risk of postoperative bladder perfusion chemotherapy secondary injury of chemical cystitis. Worried of of changes in bladder tissue, the patient chose active perfusion therapy. Postoperative follow-up showed no lower urinary tract stimulation symptoms, and review cystoscopy showed no recurrence of adenular cystitis.

The postoperative follow-up was 1 year, and the patient had no recurrent urinary tract infection, lower abdominal distension, and recovered to sexual life. Intraoperative full free pelvic adhesion tissue, removal of suspicious bladder lesions, and removal of IUCD play an important role in relieving postoperative symptoms, while bladder perfusion treatment plays a role in preventing the recurrence and degeneration of adenular cystitis.

### 3.6. Conversion and prevention of ectopic bladder IUCD

IUCDectopicshould emphasize early detection, early treatment. When pregnancy with IUCD occurs, we should be alert to ectopic possibility, and further examination is required to evaluate IUCD for ectopic. Female patients with recurrent

urinary tract infections, pain and discomfort in the pelvic area, and bladder stones should be highly suspected the possibility of bladder ectopic position in IUCD. At present, bladder IUCD is treated through surgical intervention to remove IUCD and also dealing with the complications, at the same time. The vast majority of patients recover well after surgery, and there are no late complications such as urinary fistula and lesion recurrence after follow-up. However, it is necessary to be alert to delayed diagnosis and treatment, and serious consequences may cause . In order to avoid and reduce the bladder IUCD ectopic, the training and guidance of doctors should be strengthened to accumulate experience and reduce iatrogenic uterine perforation; for those with difficulty in placement, pay attention to the ultrasound examination to assess the placement situation, to avoid violent operation. For patients with pregnancy and abortion, IUCD placement should be considered half year after uterine recovery. For patients who developed IUCD ectopic, IUCD in the uterine cavity was removed as early as possible to change the contraceptive mode and avoid the occurrence of another ectopic again.

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