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Various Foreign Bodies Causing Bladder Stones in Females: The Lessons Learnt

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Abstract

Background: Bladder stones are common in males but not so common in females. They account for nearly 5% of the urinary system stone disease. We here share our journey of bladder calculi in female patients and will let you know various foreign bodies that can cause bladder calculus, various treatment modalities that exist to treat them and the lessons that we learnt.

Methods: We did a retrospective study from August 2016 to July 2020 at SMBT IMS & RC, Nashik. A total nine patients were included out of the total twenty-three bladder stone patients. Diagnostic investigations included X-ray of kidney, ureter and bladder region, ultrasonography of abdomen and pelvis, computed tomography and if needed, cystoscopy before every planned surgical procedure.

Results: Nine patients of complicated bladder stone with or without foreign body were treated in the study. Two patients required open surgery. Six patients underwent per urethral cystolithotripsy for their stones and one patient underwent suprapubic percutaneous cystolithotripsy. Psychiatric evaluation was done for one patient. Clean intermittent catheterisation was advised for the neurogenic bladder patient.

Conclusion: To find and treat a bladder stone in a female patient is much easy as compared to find out the cause of that stone. The reason being the rarity of bladder calculus in females, more so the secondary calculus. Therefore, whenever you find a bladder calculus in female patient you should find out the cause by taking prior proper history, doing proper clinical examination, ordering relevant investigations and treating them as per the current strategies.

Keywords: Bladder calculus females; Foreign body; Calculus over foreign body; Giant bladder calculus; Fragmented D J stent.

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Background

Calculus disease affects all parts of urinary system including urinary bladder. Vesical calculus accounts for nearly 5% of urinary system calculus.[1] They occur because of foreign bodies, obstruction, or infection. Vesical calculi are commonly classified as primary or secondary. Primary vesical calculi are stones which pass from kidney via ureter and lodge in the urinary bladder, while, secondary vesical stones are due to causes in the bladder or the outlet viz. bladder outlet obstruction, bladder diverticulum, trauma, catheterization, neurogenic bladder, foreign body, etc.[2]

Bladder stones in females are further rare. They account for around 5% of total bladder stones and are usually associated with foreign bodies (sutures, synthetic tapes, or meshes) or urinary stasis.[3]

Patient with bladder stone may be asymptomatic or complains of dysuria, haematuria, suprapubic pain, frequency, poor stream, urinary retention

and recurrent urinary tract infection. Rarely some patients may develop serious complications such as hydronephrosis with impairment of renal function.[4]

We aim in this study to report our experience with this surgical problem and demonstrate the clinical presentation of the stones and associated foreign bodies, their nature, and methods used to remove them.

Methods

In our retrospective study, all the female patients admitted through casualty and outpatient department of SMBT IMS & RC, village - Dhamangaon, post- Ghoti, taluka – Igatpuri, district- Nashik, Maharashtra, India with bladder calculus from August 2016 to July 2020 were included out of total twenty three bladder stone patients. After admission, all the patients were evaluated with case history, clinical examination, routine blood and urine investigations and a urine culture & sensitivity test, plain X-ray of KUB (kidney, ureter and bladder) region, ultrasonography (USG) of abdomen and pelvis and computed tomography (CT scan) of the KUB region, if needed. Every patient underwent cystoscopy first for direct visualization of the calculus within the urinary bladder and cystoscopic removal attempted. If cystoscopic removal failed, then PCCL or open cystolithotomy was performed to remove it.

Results

Twenty three patients of bladder stone with or without foreign body were treated between August 2016 and July 2020, but nine patients with complicated bladder stones were included in the study. Two patients required open surgery. Six patients underwent per urethral cystolithotripsy for their stones and one patient underwent suprapubic percutaneous cystolithotripsy (PCCL). Patients were aged between the age group 28 - 70 years. The mean age was 44.77 years (Table 1).

Of the total nine bladder stones, only one was primary and rest were secondary stones. Of the total eight secondary stones, one was due to neurogenic bladder and rest were stones over various foreign bodies. The causes and various types of foreign bodies are shown in the table and the images.

The operative time for endoscopic cystolithotripsy was 15–45 minutes. It was more in cases of open cystolithotomy and was 45-60 minutes. The operative time in PCCL was also around 30-45 minutes. Per urethral catheter (PUC) was removed next day in endoscopic cystolithotripsy cases. The suprapubic catheter was removed first in PCCL and urethral catheter was removed 24 hours later. In open cystolithotomy the PUC was removed after seven days. No post-operative complications were observed except mild discomfort due to PUC in open surgery cases. Complete stone clearance was achieved in all the patients.

The patients were discharged after 24-48 hours of the cystoscopic removal of the calculus, 28-72 hours after PCCL and 3-4 days after open cystolithotomy. They were followed up after 1 week, 1 month and 3 months of discharge from the hospital.

Psychiatric evaluation was done for one patient, where ring was used for sexual pleasure and clean intermittent catheterisation was advised for the neurogenic bladder patient. In rest of the cases regular follow up with the surgeon was advised.

Table 1:

S. No.	Age (years)	Type of Calculus	Cause of stone formation	Method of removal
1.	56	Primary	Migration from kidney	Cystoscopic
2.	70	Giant bladder calculus (Fig. 1)	Neurogenic bladder	Open cystolithotomy
3.	45	Stone over Cu-T (Fig. 2,3)	Migration of Cu-T	Laproscopic assisted Cystoscopic
4.	38	Stone over sling (Fig. 4,5)	Migration of sling used for uterine prolapse	Cystoscopic
5.	52	Stone over DJ stent (Fig. 6)	Forgotten DJ stent	Percutaneous cystolithotripsy
6.	43	Stone over DJ stent	Forgotten DJ stent	Cystoscopic
7.	28	Stone over Foley's bulb fragments	Non-deflating bulb of foley's catheter that was blasted later on and forgotten fragment	Cystoscopic
8.	35	Stone over non-absorbable suture	Non-absorbable suture used during previous surgery - Iatrogenic	Cystoscopic
9.	36	Stone over ring(Fig. 7&8)	Ring used for sexual arousal	Open cystolithotomy and ring removal

Fig. 1: Giant Bladder Calculus.

Fig. 2: X-ray Stone over Cu-T.

Fig. 3: Cystoscopic view of Stone over Copper T.

Fig.4: Removed CuT unit.

Fig. 5: Stone over sling but sling not visible

Fig. 6: Cystoscopic view of sling inside the calculus.

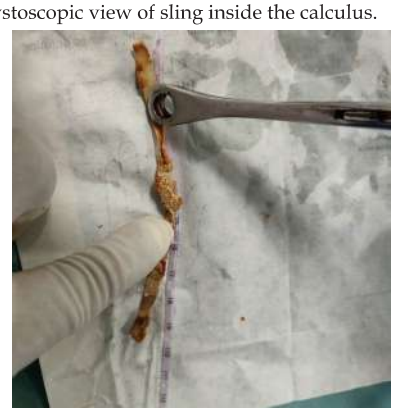

Fig. 7: Removed Sling.

Fig. 8: Stone over Forgotten DJ stent.

Fig. 9: Stone over Ring.

Fig.10: Cystoscopic view of stone over ring.

Discussion

The presence of bladder stones in females has always been an interesting topic representing a challenge of diagnosis and management to the urologist. Various treatment options for the removal of bladder stones are endoscopic, laparoscopic assisted (if doubt of foreign body originating outside the bladder), percutaneous, Cystolithotripsy and open surgery.[2] In some cases, a combination of techniques is required. But endoscopic retrieval is the preferred treatment among urologists. The method of choice for extraction varies according to the size and mobility of the stone inside the bladder. In addition, the availability of surgical instrumentations and urologist experience plays an important role. The aim of each procedure is to achieve complete stone-free state in shortest possible time, with short hospital stay and minimal complications.

Although urinary stones in female patients is a rare phenomenon, there should always be a doubt in the mind of the urologist regarding its cause. Most of the times the stone occurs over a foreign body inside the urinary bladder. Primary urinary bladder stone looks further rare in this situation.

The vesical calculi primary or over foreign body have a varied presentation from completely asymptomatic to symptoms of suprapubic pain, urgency, dysuria[5], intermittency, frequency, hesitancy, nocturia, and urinary retention, terminal gross haematuria and sudden termination of voiding. Sometimes the pain referred to the labia, perineum, back, or hip. The discomfort could be dull or sharp and can be aggravated by sudden movements and exercise. The pain is sometimes relieved by assuming a supine, prone, or lateral head-down position by causing it to roll back into the bladder. In our study, 88.8% of the patients presented with obstructive/storage lower urinary tract symptoms except one patient (11.1%) who presented late with symptoms of renal failure.

Large vesical calculus can block the ureteral orifices and cause hydronephrosis. This occurs when it goes undiagnosed and increases in size slowly to obstruct the ureters. This longstanding obstruction compromises renal function and leads to renal failure.[6] A vesical calculus can be formed over a prolonged retention of foreign bodies, and can cause renal failure.[5] In our series also, 11.1% patients presented with renal failure.

The cause of bladder stone in females could be migration from kidney, bladder outlet obstruction, neurogenic voiding dysfunction, urinary tract infections (UTIs) or foreign bodies.[7] In our study most of the stone 77.7%, were formed over a foreign body. One patient with giant vesical calculus has neurogenic bladder and in other it was a primary bladder calculus (22.2%).

Vesical calculus is basically diagnosed very easily with X-ray KUB. Infact, most of the times the type of foreign body, if present, is also seen clearly. Ninety percent of the vesical calculus can be diagnosed with a plain x-ray KUB8. In our study 100% calculus were diagnosed on the x-ray KUB.

The sonography confirms the presence of stone and the type of foreign body, if present. CT scan is needed sometimes when there are associated complications like formation of vesico-vaginal fistula, renal failure, to find out the extent of the foreign body, etc. In our study, we did CT scan in 11.1% of the cases to look for the extent of the calculus and to map the renal system.

Usually, the bladder stones can be easily dealt with minimal invasive cystoscopic lithotripsy. However, for removing different bladder stones over foreign bodies we require different instruments to grasp the stone or the foreign body. These include stone basket- flexible/rigid[9,10], grasping forceps - flexible/

rigid[11], stone punch, snares, endoscopic scissors-flexible/rigid and other modified instruments.[12] Success rate for cystoscopic removal of bladder stones over foreign body ranges from 50 to 94%.[11] In our study we used nearly all the endoscopic instruments (including resectoscope, nephroscope) and manoeuvres to fragment and remove the stones and/or foreign bodies.

Sometimes, removal of bladder stones is not possible with cystolithotripsy alone. It may require suprapubic, laproscopic assistance or open cystolithotomy. Suprapubic assistance in the form of percutaneous cystolithotripsy (PCCL) is required when the stone size is 2-4 cms. This is because per urethral cystoscopic removal risks the urethra in long term with respect to stricture formation. We did PCCL in 11.1% of the cases in our study. Laproscopic assistance is required when there is stone over the foreign body and one of the ends of the foreign body is embedded in the bladder wall. Laproscopy helps in identifying the outer end of the foreign body and removal of that end if needed. We did diagnostic laproscopy in 11.1% of the patients to confirm the outer end of copper-T.[13,14]

Open cystolithotomy is required in cases of giant bladder calculi[15] or in cases where endoscopic method is not suitable or it has failed viz. when there is stone over the foreign body, when we can't remove the foreign body endoscopically.[16] Open surgery allows complete removal of the stone or the foreign body and reduces the chances of complications like vesico-vaginal fistula, perforation of bladder or stricture urethra.[17,18] In our study we did open cystolithotomy in 22.2% cases. In 11.1% cases it was a giant calculus as the indication and in other 11.1%, it was the stone over the ring and the ring was difficult to remove endoscopically.

Psychiatric evaluation should be done in patients with stones over foreign bodies in the bladder when that foreign body was used for sexual arousal. This is due to the high chances of psychiatric disease, mental retardation, and dementia in these patients.[19] In our study we had one such patient and psychiatric evaluation was done by the psychiatrist and was normal.

Conclusion

Endoscopic retrieval of the bladder stone though, easier, may become challenging sometimes. It sometimes surprises the surgeon when he/she finds a foreign body inside it. It can be treated successfully by endoscopy. However, open surgery still has a role in cases with large sized bladder stones or stones over migrated or impacted foreign bodies. Open surgery is also indicated if endoscopic equipments are not available or the surgeon lacks the experience with the endoscopic procedures and manoeuvres. The increased usage of synthetic material in reconstructive pelvic floor surgery in women has led to increase incidence of vesical calculus on intravesical foreign bodies. Each woman should be investigated for bladder stones when she presents with storage or obstructive bladder symptoms or recurrent urinary tract infection. Lastly, always suspect a foreign body whenever a female comes with a bladder stone.

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