

Foreign Bodies in the Urinary Bladder: 10 Year Experience in Al-Ramadi Teaching Hospital

Niema Hamad Al-Heeti, Ehab Jasim Mohammad, Waleed Nassar Jaffal, Yahia Hameed Majeed

ABSTRACT:

BACKGROUND:

A wide range of objects have been inserted into the urinary bladder posing a challenge to urologists for diagnosis and management. Although it is not a fatal disease but can lead to serious complications.

OBJECTIVE:

To study the presentation, causes, diagnosis and treatment of urinary bladder foreign bodies.

PATIENTS AND METHODS:

From May 2001 to December 2011, 21 patients had been treated for intravesical foreign bodies at Al Ramadi teaching hospital , Anbar governorate / west of Iraq. All of the patients had underwent ultrasonography of the urinary tract , plain abdominal radiography and cystoscopy. The patient's records were reviewed retrospectively and their clinical data were analyzed.

RESULTS:

A total of 21 patients with mean age of 39.2 years with male: female ratio (1:2.5). The most common presentation was recurrent urinary tract infection. Frequency, dysuria, Hematuria, difficulty with micturition, and urinary retention were the other complaints at presentation. The most common cause is iatrogenic (42.9%) followed by self insertion (33.3%), migration from outside the bladder (14.3%) and external trauma (9.5%). Definitive diagnosis of vesical foreign body was achieved by ultrasonography only in (9.5%), by plain abdominal radiography only in (28.6%), by both in (14.3%) of patients and cystoscopy was needed to establish the diagnosis in (47.6%), of them 5 cases had been erroneously reported to be bladder calculi. Intravesical foreign bodies had been removed endoscopically in 19 (90.5%) patients, and in the remaining 2 (9.5%), by open surgery. No significant complications were recorded postoperatively.

CONCLUSION:

Urinary bladder foreign bodies are not uncommon and should be suspected in patients presenting with chronic lower urinary tract complains. The incidence of iatrogenic foreign bodies in the urinary bladder is increasing. Radiological evaluation and cystoscopy are necessary to confirm the presence of foreign bodies and to determine the size, number, and nature of foreign bodies. Most urinary bladder foreign bodies can be removed by endoscopic and minimally invasive techniques without the need for open surgery.

KEYWORDS: foreign bodies, urinary bladder, recurrent UTI.

INTRODUCTION:

The presence of foreign bodies in the urinary bladder has always been an interesting topic. Every urologist occasionally comes across such patients in his practice.

During the past few decades reports of intravesical foreign bodies have increased in the

literature. Almost any conceived object has been introduced into the urinary bladder, and these foreign bodies could be classified into five categories:

First: The self introduced foreign bodies through the urethra by the patients with senility, eroticism, sexual perversion, and abnormal psyche, alcoholism, for masturbation, abortion and mental retardation. Most of the patients were female due to short urethra and proximity to genital organs.^(1,2,3)

Department of Surgery ,College of Medicine,
Anbar University , Anbar Governorate -Iraq.

FOREIGN BODIES IN THE URINARY BLADDER

Second: Iatrogenic foreign bodies like surgical gauze after prostatectomy, bougie, tip of cystoscope, broken ureteric catheter, suture needle, piece of Foley balloon.^(4,5,6)

Third: Living foreign bodies like snake which was removed from bladder in pargue, cattle leech removed from female entered through urethral meatus while she was working in water in squatting position, and fish.^(7,8,9,10)

Fourth: Foreign bodies can migrate from without the urinary tract. e.g. metallic hip prosthesis⁽¹¹⁾ and intrauterine contraceptive device^(12,13).

Fifth: Foreign bodies as a result of penetrated trauma as bullet or shell⁽¹⁴⁾

Not all patients volunteer their history of insertion, especially those who have inserted the objects for sexual satisfaction. Many patients do not seek advice for months due to embarrassment. The presenting features usually include urinary tract infection, haematuria, dysuria, urinary frequency, suprapubic pain, swelling of the penis and external genitalia, extravasations or abscess formation.^(15,16) The physical examination is almost always unremarkable, and urine microscopy usually reveals pus cells and red blood cells. Radiopaque objects can easily be seen on radiographs, while others are identified by the ultrasonography. Cystoscopy studies are often required to confirm the diagnosis and plan management⁽¹⁷⁾. Complications of intravesical foreign bodies consist of chronic and recurrent urinary tract infections, acute urinary retention, stone formation, obstructive uropathy, scrotal gangrene, vesicovaginal fistula, squamous cell carcinoma, and even death of sepsis^(6,18). The management includes extraction of the foreign body and prevention of long-term complications in addition to assessment of patient motivation. Most of the inserted objects can be retrieved endoscopically using the latest available equipment and open surgery is usually not required⁽¹⁹⁾.

In this study, we present our experience with foreign bodies in the urinary bladder over the course of ten years.

PATIENTS AND METHODS:

From May 2001 to December 2011, twenty-one patients had been treated for intravesical foreign

bodies at Al Ramadi teaching hospital, Anbar governorate / west of Iraq. The patient's records were reviewed retrospectively. All of the patients had undergone ultrasonography of the urinary tract and plain abdominal radiography of the kidney, ureter, and bladder (KUB) at the time of admission to our hospital and latter on cystoscopy. Their clinical features, mode of insertion, diagnosis, management and complications were analyzed.

RESULTS:

There were twenty-one patients who had received treatment of intravesical foreign bodies at our hospital during the study period. Their age ranged from 17 to 79 years with median \pm SD age: 39.25 ± 17.33 years. Six patients were men (28.5%) and 15 (71.5%) were women (male:female ratio 1:2.5). All data for those 21 patients included in this study were summarized in the table 1 & 2.

They had presented with variable urinary symptoms. The most common presentation was recurrent urinary tract infection in 9 cases (42.85%). Frequency, dysuria, hematuria, difficulty with micturition, and urinary retention were the other complaints at presentation.

The most common cause is iatrogenic which was seen in 9 (42.9%) patients followed by self insertion in 7 (33.3%), migration from outside the bladder in 3 (14.3%) and external trauma in 2 (9.5%). In all self insertion group patients, psychiatric consultation was advised but all patients refused.

Table-3 showed the best diagnostic method in each case. Definitive diagnosis of vesical foreign body was achieved by ultrasonography only in 2 (9.5%) patients, by KUB only in 6 (28.6%), by both in 3 (14.3%) and cystoscopy was needed to establish the diagnosis in 10 (47.6%), of them 5 cases had been erroneously reported to be bladder calculi.

Intravesical foreign bodies had been removed endoscopically in 19 (90.5%) patient, and in the remaining 2 (9.5%) by open surgery. No complications were recorded postoperatively, except 4 patients had fever with rigors that settled with appropriate intravenous antibiotic therapy.

FOREIGN BODIES IN THE URINARY BLADDER

Table 1: Female patients presented with intravesical foreign bodies.

Patient	Age/ years	Foreign body	Cause	Presentation	Time to presentation	Treatment
1	32	IUCD with stone	Migrat ion	Hematuria and dysurea	4years	Cystoscopy and litholapaxy
2	35	IUCD with stone	Migrat ion	Recurrent UTI	4. 5years	Open cystostomy
3	42	IUCD with stone	Migrat ion	dysurea,pyr ea	1 year	Endoscopy
4	26	Silk suture with stone	Iatrogenic	Recurrent UTI	4years Hysterectomy 7years ago	Open cystostomy
5	31	Silk suture with stone	Iatrogenic	Recurrent UTI	2years Hysterectomy 4years ago	Cystoscopy and litholapaxy
6	41	Silk suture with stone	Iatrogenic	Recurrent UTI	1year Hysterectomy 4years ago	Cystoscopy and litholapaxy
7	45	Broken JJ stent	Iatrogenic	Recurrent UTI	7weeks -Removal of stent 6months ago	Endoscopy
8	79	Tomato skin	Self insertion	Frequency, dysurea	1.5years	Endoscopy
9	20	Wooden pencil	Self insertion	Hematuria	3days	Endoscopy
10	18	Earphone of mobile	Self insertion	Dysurea, difficult micturation	2 days	Endoscopy
11	22	Sewing needle	Self insertion	Hematuria	2weeks	Endoscopy
12	17	Coiled wire	Self insertion	Dysurea	3weeks	Endoscopy
13	56	Coiled hair	Self insertion	Recurrent UTI	2years	Endoscopy
14	18	Hair pin	Self insertion	Hematuria,d ysurea	4weeks	Endoscopy
15	39	Shell with stone	traumatic	Recurrent UTI	5years	Cystoscopy and litholapaxy

FOREIGN BODIES IN THE URINARY BLADDER

Table 2 : Male patients presented with intravesical foreign bodies.

Patient	Age/ years	Foreign body	Cause	Presentation	Time to presentation	Treatment
1	43	Shell with stone	traumatic	Recurrent UTI	4years shell Injury 15years ago	Cystoscopy and litholapaxy
2	62	Tip of Foley catheter	Iatrogenic	Dysurea, frquency	3weeks	Endoscopy
3	45	Tip of Foley catheter	Iatrogenic	Burning micturation	5weeks	Endoscopy
4	58	Inflated ballon of Foley catheter	Iatrogenic	Urinary retention	1day	Endoscopy
5	61	Piece of ballon of Foly catheter	Iatrogenic	Recurrent UTI	2years	Endoscopy
6	33	Broken cold knife	Iatrogenic	Hematuria	2weeks Optical urethrotomy 2weeks ago	Endoscopy

Table 3: Best diagnostic method for each case.

No. of case	Method of diagnosis
Female: 1,2,3	KUB and Ultrasonography
4,5,6,15	Cystoscopy confirmed presence of silk and shell with the stones seen in KUB and Ultrasonography
7,10,11,12,14	KUB
8,13	Cystoscopy
9	Ultrasonography
Male 1	Cystoscopy confirmed presence of shell with the stones seen in KUB and Ultrasonography
2,3,5	Cystoscopy
4	Ultrasonography
6	KUB

DISCUSSION:

Foreign bodies may reach the urinary bladder by one of the following modes: iatrogenic, perforation from adjacent organs, via the urethra or the traumatic route.⁽³⁾ Most of our cases were iatrogenic in nature (42.9%). The incidence of iatrogenic foreign bodies in the urinary bladder is on the rise as a result of the large number of surgical procedures being conducted all over the world⁽⁵⁾. In our study, pieces of balloon, inflated balloon, the tips of Foley catheters, Broken JJ stent piece with encrustations, silk suture after hysterectomy with stone formation, and broken cold knife after optical urethrotomy have been

found in the bladder. Many iatrogenic foreign bodies have also been reported following open bladder surgery. These include ribbon gauze,⁽²⁰⁾ clips⁽²¹⁾ and sutures with stones.⁽²²⁾ Non was seen in our study. The increased incidence of iatrogenic foreign bodies found in the urinary bladder is alarming⁽⁵⁾. Special attention must be taken to avoid such occurrences. The doctors and nursing staff must be very careful when performing procedures. For example, it is important to examine the tip of the Foley catheter after removal. Endoscopic instruments should be examined before and after use.

FOREIGN BODIES IN THE URINARY BLADDER

Moreover, patients with stents should be informed about their presence and instructed about the time for their removal.

Urethral insertion is encountered in both male and female patients; however, it is more common in the female due to the presence of a short urethra. A variety of objects can be introduced via the urethral route into the bladder. Some of the common causes of urethral insertion include psychiatric disorder, autoerotic stimulation and senility.⁽²³⁾ Foreign bodies can sometimes be inadvertently placed in the bladder by women in order to induce an abortion.⁽²⁴⁾ Suicide attempts have also been reported among mentally retarded persons through the self-insertion of foreign bodies into the urinary bladder. These patients require psychiatric evaluation.⁽²⁵⁾ Self-insertion among children is rare⁽⁶⁾. It is rare, however, for foreign bodies to be forcibly pushed into the urethra by another person.⁽³⁾ None was in our study. In our cases, we encountered wooden pencil (figure-1), hair pin, Earphone of mobile (figure-2), Sewing needle (figure-3), Coiled wire for sexual stimulation. Coiled hair encountered in patient with neurogenic bladder managed by self intermittent catheterization. Tomato skin encountered in old female with senility (figure-4). Patients with self inserted foreign bodies were all female and rather young and account 33.3% of cases in our study.

The perforation of foreign bodies into the urinary bladder from the adjacent organs is extremely rare. Foreign bodies can perforate the urinary bladder from the gastrointestinal or female genital tract. IUCDs can perforate either at the time of insertion or by slow migration across the bladder and uterine walls.⁽²⁶⁾ Most of the perforations take place at the time of insertion and go unnoticed. Encrustations and stone formation over a migrated IUCD are common; however, the duration is variable. In rare cases, foreign bodies can erode the gastrointestinal tract and produce enterovesical fistulae. Many such cases have been reported in the literature. These include a chicken bone,⁽²⁷⁾ wooden stick,^[28] knife blade,⁽²⁹⁾ thermometer⁽³⁰⁾ and a piece of gauze.⁽³¹⁾

In our study, we retrieved three IUCDs with stones from the urinary bladder which account 14.3% of cases (figure 5&6).

Foreign bodies may sometimes reach the urinary bladder by the traumatic route. These include

bullets, pieces of shells. Bullets are able to stay in the bladder without significant symptoms being reported⁽³²⁾. In our study, we encountered two cases with shells from previous external trauma with stone formation and they account for 9.5% of cases as in figure- 7.

In rare instances, living foreign bodies can also reach the urinary bladder by the urethral route⁽¹⁰⁾ but none in our study.

Symptoms of intravesical foreign bodies are usually those of acute cystitis including urinary frequency, dysuria, hematuria, and strangury. Some patients may present with swelling of the external genitalia, poor urinary stream, and urinary retention. More importantly, patients occasionally present with no symptoms or complaint of minimal discomfort.⁽⁶⁾ However, signs that should raise the physician's suspicion include undue anxiety during sexual history taking or attempts to avoid genital or rectal examination. Previous bladder surgery or surgery on the adjacent organs may well be relevant.⁽³³⁾ In our study no significant complications were seen and the commonest presentation was recurrent urinary tract infection which was seen in 9 cases (42.85%). So urinary bladder foreign body must be considered in differential diagnosis in cases of recurrent UTI especially with long history, and in any patient with chronic unexplained lower urinary tract symptoms.

Radio-opaque intravesical foreign bodies can usually be detected on KUB radiography. The use of abdominal and transvaginal ultrasonography has been reported for the detection of non-radio-opaque intravesical foreign bodies.^(36,37,38) The degree of the echogenicity of a foreign body is dependent on the difference in acoustic impedance between the foreign body and surrounding tissues. Hence, the ultrasonographic appearance of intravesical foreign bodies will vary depending on their nature.⁽³⁹⁾ Intravenous urography or retrograde urethrography and cystography may provide additional information and occasionally reveal surprising findings and unexpected radiolucent objects.⁽³³⁾ In our study KUB film alone was enough to achieve the diagnosis in 6 patients (28.5%), ultrasonography alone in 2 (9.5%), and both in 3 (14.3%). In 10 (47.7%) cases cystoscopy was needed to establish the

FOREIGN BODIES IN THE URINARY BLADDER

diagnosis of foreign bodies and also it was used to confirm the presence of intravesical foreign body in all cases. In addition, cystoscopy will identify the type and location of the foreign body, as well as being the most adequate method for treatment. Intravenous urography ,and retrograde urethrography or cystography were not needed in diagnosis of our cases.

Initial management of patients with intravesical foreign bodies should consists of providing pain relief and control of irritative voiding symptoms by prescribing analgesics and anticholinergic drugs, respectively⁽⁶⁾. Foreign bodies may be spontaneously expelled from the bladder during urination.⁽⁴⁰⁾Most foreign bodies in the bladder may be removed either complete or after fragmentation via the endoscopic approach. However, the optimal technique is dictated by the patient's condition and age, associated urinary tract injuries and size, and shape and nature of the foreign body.⁽³⁾

In 19 (90.5%) cases of our study the foreign bodies were removed by endoscopy while in 2(9.5%) open cystostomy was required to extract the foreign body with associated big stone. The foreign bodies in our cases were successfully removed endoscopically using grasping forceps, stone punch, glass syringe, basket or cutting loop. Smaller foreign bodies can be retrieved intact, whereas bigger ones with stones require fragmentation⁽⁶⁾. In our study, a

stone punch was used to cut up the foreign bodies on one occasions (figure- 6) or their associated calculi in 5 occasions. A resectoscope loop may sometimes be used to remove foreign bodies from the urinary bladder. Care must be taken to avoid bladder mucosal injury during removal. Endoscopic removal is associated with minimal morbidity and hospital stay. With the advent of a variety of modern endoscopic instruments, open surgery is rarely required.

Since laparoscopy has become a popular technique, innovations have been made to utilize its instruments in the urinary bladder. Recently, some studies have reported the use of laparoscopic techniques to retrieve foreign bodies from the urinary bladder.^(41,42)These techniques are especially useful in children, where bigger scopes cannot be used transurethrally.⁽⁴³⁾

A nephroscope sheath may sometimes be useful to extract larger foreign bodies from the urinary bladder.⁽³⁰⁾ Wise and King⁽⁴⁴⁾ reported magnetic extraction of a metallic foreign body (hair pin) from the bladder by specially designed magnetic retriever.

Recently, a holmium laser was utilized to fragment complex foreign bodies in the urinary bladder in order to save patients from having to undergo cystotomy. It was used to fragment a suture needle with a stone,⁽⁴⁵⁾propylene mesh^[46] and the ceramic beak of a resectoscope.⁽⁴⁷⁾



Figure 1: Wooden pencil



Figure 2: Plain radiograph shows earphone of mobile

FOREIGN BODIES IN THE URINARY BLADDER



Figure 3: Sewing needle



Figure 4: Photograph shows tomato skin.



Figure 5: Photograph shows IUCD with stone



Figure 6 :Photograph shows IUCD with stone



Figure 7: Photograph shows shell with stone.

CONCLUSION:

Urinary bladder foreign bodies are not uncommon and should be suspected in patients presenting with chronic lower urinary tract complaints. The incidence of iatrogenic foreign bodies in the urinary bladder is increasing. Radiological evaluation and cystoscopy are necessary to confirm the presence of foreign bodies and to determine the size, number, and nature of foreign bodies. Most urinary bladder foreign bodies can be removed by endoscopic and minimally invasive techniques without the need for open surgery.

REFERANCES:

1. Robinson D. Foreign body in the bladder. *J Emerg Med* 2005;29:215.
2. Singh I. Intravesical Cu-T emigration: an atypical and infrequent cause of vesical calculi. *Int Urol Nephrol* 2007;39:457-59.

FOREIGN BODIES IN THE URINARY BLADDER

3. Van Ophoven A, deKromon JB. Clinical management of foreign bodies of the genitourinary tract. *J Urol* 2000;164:274-87.
4. Barks EB, Ramani A, Monga M. Intravesical weck clip migration after laparoscopic radical prostatectomy. *Urology* 2008;71:351-53.
5. Mannan A, Anwar S, Qayyum A, Tasneem R A. Foreign bodies in the urinary bladder and their management :a Pakistani experience. *Singapore Med J* 2011;52:24-28.
6. Rafique M. Intravesical foreign bodies, review and current management strategies. *Urol J* 2008;5:223-31.
7. Gupta KK, Sharma BG, AL Haj FA, Pillai SB: vesical calculus on a foreign body, a case report; *Saudi Medical J*. 1998; 19:78-80.
8. Mukherjee G. Unusual foreign body causing haematuria. *J Indian Med Assoc*. 1974;63:284-5
9. Kochakarn W, Pummanagura W. Foreign bodies in the female urinary bladder: 20-year experience in Ramathibodi hospital. *Asian J Surg* 2008;31:130-33
10. G. Vezhaventhan & R. Jeyaraman: Unusual Foreign Body In Urinary Bladder: A Case Report. *The Internet Journal of Urology*. 2007; 4:www.ispub.com.
11. Sharma VP, Noobeebox y. Petni J. Unusual foreign body in the bladder. *Brit J Urol* 1987;59:92.
12. Mustafa M. Erosion of intra uterine contraceptive device through the bladder wall causing calculus. *Urol Int* 2009;82:370-71.
13. Feliu X, Claveria R, Besora P, Luque D, Viñas X. A Calcified Foreign Body in the Bladder due to a Displaced Tack: An Unusual Complication After Laparoscopic Incisional Hernia Repair. *Surgical Laparoscopy, Endoscopy & Percutaneous Techniques*:2011;21:28-30.
14. Halkic N, Wisard M, Abdelmoumene A, Vuilleumier H. A large bullet in the bladder. *Swiss Surg*. 2001;7:139-40.
15. Tanagho EA. Disorders of the bladder, prostate and seminal vesicles. In: Tanagho EA, McAninch JW, eds. *Smith's general urology*. 15th ed. Singapore: McGraw Hill, 2004:576-89.
16. Pal DK, Bag AK. Intravesical foreign body in urinary bladder. *Int Braz J Urol* 2005;31:471-74.
17. Barzilai M, Cohen I, Stein A. Sonographic detection of a foreign body in the urethra and urinary bladder. *Urol Int*. 2000;64:178-80.
18. Bhatt RI, Lau M, Ramani VAC. Renal failure secondary to a foreign body in the bladder. *BJU Int*. 2001;88:644-46.
19. Malik M A, Rehan A G, Javed S H, Iqbal Z. Endoscopic Management of Foreign Body in Urethra and Urinary Bladder. *Int J Nephrol Urol*, 2009;1:56 -60.
20. Zafar M, Murtaza B, Saeed S. Two displaced intrauterine contraceptive devices (copper-T). *J Coll Physicians Surg Pak* 2004;14:427-29.
21. Ward HC. Surgical staples in bladder calculi after caecocystoplasty. *Br J Urol* 1987;60:375.
22. Forester ND, Evans C, Thomas DFM, Najmaldin A. Bladder stones associated with synthetic absorbable sutures in children. *BJU Int* 2001;88:984.
23. Rahman NU, Elliott SP, McAninch JW. Self-inflicted male urethral foreign bodies insertion: endoscopic management and complications. *BJU Int* 2004;94:1051-53.
24. Mufti Mahmood, Vipul Tandon, US Dwivedi, PB Singh. Foreign Body In Bladder : A Diagnostic Dilemma- *JK-Practitioner* 2005;12:203-4.
25. Kenney RD. Adolescent males who insert genitourinary foreign bodies: is psychiatric referral required? *Urology* 1988;32:127-29.
26. el-Diasty TA, Shokeir AA, el-Gharib MS, Sherif LS, Shamaa MA. Bladder stone: a complication of intravesical migration of Lippes loop. Case report. *Scand J Urol Nephrol* 1993;27:279-80.
27. Andrews NJ, Hall CN, Taylor TV. Colovesical fistula caused by a chicken bone. *BJU Int* 1988; 62:617.
28. Potter D, Smith D, Shorthouse AJ. Colovesical fistula following ingestion of a foreign body. *BJU Int* 1998;81:499-500.
29. Napier-Hemy R, Thampuran S, Elem B. Colovesical fistula after ingestion of a modelling-knife blade. *BJU Int* 1999;83:350.
30. Nishiyama K, Shimada T, Yagi S, Kawahara M, Nakagawa M. Endoscopic removal of intravesical thermometer using a rigid nephroscope and forceps. *Int J Urol* 2002;9:717-18.

FOREIGN BODIES IN THE URINARY BLADDER

31. Lin TY, Chuang CK, Wong YC, Liao HC. Gossypiboma, Migration of retained surgical gauze and spontaneous transurethral protrusion. *BJU Int* 1999;84:879-80.
32. Gulanikar A, Pandey P, Terrell F. A bullet in the bladder. *BJU Int* 1998;82:304.
33. Eckford SD, Persad RA, Brewster SF, Gingell JC. Intravesical foreign bodies: five-year review. *Br J Urol.* 1992;69:41-45.
34. Schnall RI, Baer HM, Seidmon EJ. Endoscopy for removal of unusual foreign bodies in urethra and bladder. *Urology.* 1989;34:33-35.
35. Sivaloganathan S. Catheteroticum. Fatal late complication following autoerotic practice. *Am J Forensic Med Pathol.* 1985;6:340-42.
36. Lazar J, Asrani A. Sonographic diagnosis of a glass foreign body in the urinary bladder. *J Ultrasound Med.* 2004;23:969-71.
37. Barzilai M, Cohen I, Stein A. Sonographic detection of a foreign body in the urethra and urinary bladder. *Urol Int.* 2000;64:178-80.
38. Huang WC, Yang JM. Sonographic appearance of a bladder calculus secondary to a suture from a bladder neck suspension. *J Ultrasound Med.* 2002;21:1303-5.
39. Boyse TD, Fessell DP, Jacobson JA, Lin J, vanHolsbeeck MT, Hayes CW. US of soft-tissue foreign bodies and associated complications with surgical correlation. *Radiographics.* 2001;21:1251-56.
40. DiDomenico D, Guinan P, Sharifi R. Spontaneous expulsion of an intravesical bullet. *J Am Osteopath Assoc.* 1997;97:415-16.
41. Chitale SV, Burgess NV. Endoscopic removal of a complex foreign body from the bladder. *BJU Int* 1998;81:756.
42. Ingber MS, Stein RJ, Rackley RR, Firoozi F, Irwin BH, Kaouk JH, Desai MM. Single-port transvesical excision of foreign body in the bladder. *Urology* 2009;74:1347-50.
43. Hutton KAR, Huddart SN. Percutaneous retrieval of an intravesical foreign body using direct transurethral visualisation: a technique applicable to small children. *BJU Int* 1999;83:337.
44. Wise KL, King LR. Magnetic extraction of intravesical foreign body. *Urology.* 1989;33:62-63.
45. Lane BR, Singh D, Meraney A, Strem SB. Novel endourologic applications for holmium laser. *Urology* 2005; 65:991-93.
46. Howered B, Goldman MD. Managing iatrogenic foreign bodies within the bladder. *Urology News, Vol 13, The Cleveland Clinic* 2005-2006:27.
47. Habermacher G, Nadler RB. Intravesical holmium laser fragmentation and removal of detached resectoscope sheath tip. *J Urol* 2005;174:1296-97.