Intravesical Foreign Bodies
Review and Current Management Strategies

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Introduction: The aim of this study was to evaluate the cause, diagnosis, and management of intravesical foreign bodies in patients treated at our hospital and to review and update management of intravesical foreign bodies reported in the current literature.

Materials and Methods: Sixteen patients had been treated for intravesical foreign bodies at Nishtar Medical College Hospital, Multan, Pakistan during a 5-year period. Records of these patients were analyzed retrospectively for etiology, presentation, diagnosis, and management.

Results: The age of the patients ranged from 14 to 70 years and 10 of them were men. Seven patients (43.8%) had iatrogenic intravesical foreign bodies, 5 (31.3%) had migrated foreign bodies from the adjacent organs, and 4 (25.0%) had self-introduced foreign bodies into the bladder. The objects included copper wire, carrot, lead pencil, intrauterine device, surgical gauze, pieces of Foley catheter, and teflon beak of resectoscope sheath. The most common presenting symptoms were urinary frequency and dysuria. Endoscopic retrieval was possible in 8 (50.0%) patients, and the remaining underwent open cystostomy.

Conclusion: Intravesical foreign bodies should be included in the differential diagnosis of patients with chronic lower urinary tract problems. Radiological evaluation is necessary to determine the exact size, number, and nature of them. The most suitable method for removal of intravesical foreign bodies depends on the nature of the foreign body, age of the patient, and available expertise and equipment. Most intravesical foreign bodies can be retrieved with minimally invasive techniques.

INTRODUCTION
During the past few decades, reports of intravesical foreign bodies have increased in the literature. A review of the literature on this subject reveals that almost any conceivable object has been introduced into the urinary bladder. Introduction into the bladder may be self-insertion (through the urethra), iatrogenic, migration from adjacent organs, or as a result of penetrating trauma.[1-4] Patients present with either acute or chronic symptoms due to complications. Each foreign body poses a challenge to the urologist and treatment has to be individualized according to the size and nature of the foreign body and age of the patient.[5] Previously, endoscopic extraction with or without perineal urethrotomy or open cystotomy were the only treatment options, but with the advent of newer minimally invasive
techniques, most intravesical foreign bodies can be removed endoscopically without resorting to open surgery.\(^{(6-9)}\)

This paper presents our experience of diagnosis and management of various intravesical foreign bodies at our hospital. In addition, the discussion focuses on reviewing and updating the knowledge on management of intravesical foreign bodies reported in the current literature.

**MATERIALS AND METHODS**

Hospital records of patients who had received treatment for intravesical foreign bodies during a period from January 2001 to December 2005 at the department of urology, Nishtar Medical College Hospital, Multan, Pakistan, were retrospectively analyzed. The patients’ age and sex, clinical presentation, diagnosis, and offered treatment were reviewed. The study was approved by the hospital’s ethics committee.

**RESULTS**

There were 16 patients who had received treatment of intravesical foreign bodies at our hospital during the studied period. Their age ranged from 14 to 70 years (median age, 33 years). Ten patients were men and 6 were women (male-female ratio, 1.7:1). They had presented with variable urinary symptoms (Table 1). The most common symptoms were urinary frequency and dysuria. Hematuria, difficulty with micturition, and urinary retention were the other complaints at presentation. Seven patients (43.8%) had iatrogenic foreign bodies including retained surgical gauze (namely *gossypiboma*) in 5, a piece of a Foley balloon catheter in 1, and Teflon beak of a resectoscope sheath in 1 patient. All of the patients with surgical gauze had undergone open transvesical prostatectomy at peripheral hospitals and presented at variable intervals after the primary surgical operation. A piece of the Foley catheter in 1 patient had probably been left in the bladder when the balloon of his “stuck” catheter was suprapubically punctured. One patient had transurethral resection of the prostate carried out 6 weeks before presentation, when the Teflon beak of the resectoscope sheath became detached and was incidentally left in the bladder. He presented with hematuria.

In 5 patients (31.3%), the foreign bodies had migrated into the urinary bladder from the

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Sex</th>
<th>Foreign Body</th>
<th>Cause</th>
<th>Presentation</th>
<th>Time to Presentation</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60</td>
<td>M</td>
<td>Surgical gauze</td>
<td>Iatrogenic</td>
<td>Acute urinary retention</td>
<td>3 months</td>
<td>Cystoscopy</td>
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<td>2</td>
<td>70</td>
<td>M</td>
<td>Surgical gauze</td>
<td>Iatrogenic</td>
<td>Frequency, dysuria, difficulty with micturition</td>
<td>6 years</td>
<td>Open cystotomy</td>
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<td>3</td>
<td>70</td>
<td>M</td>
<td>Surgical gauze</td>
<td>Iatrogenic</td>
<td>Difficulty with micturition, recurrent UTI</td>
<td>3 years</td>
<td>Open cystotomy</td>
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<td>4</td>
<td>67</td>
<td>M</td>
<td>Surgical gauze</td>
<td>Iatrogenic</td>
<td>Difficulty with micturition</td>
<td>3 weeks</td>
<td>Cystoscopy</td>
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<td>5</td>
<td>65</td>
<td>M</td>
<td>Surgical gauze</td>
<td>Iatrogenic</td>
<td>Urinary retention</td>
<td>4 months</td>
<td>Open cystotomy</td>
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<td>6</td>
<td>30</td>
<td>M</td>
<td>Piece of Foley balloon catheter</td>
<td>Iatrogenic</td>
<td>Recurrent UTI</td>
<td>6 months</td>
<td>Cystoscopy</td>
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<td>7</td>
<td>60</td>
<td>M</td>
<td>Teflon beak of TUR sheath</td>
<td>Iatrogenic</td>
<td>Hematuria, difficulty with micturition</td>
<td>6 weeks</td>
<td>Cystoscopy</td>
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<td>8</td>
<td>28</td>
<td>F</td>
<td>Calculus on IUD</td>
<td>Migration</td>
<td>Recurrent UTI</td>
<td>5 years</td>
<td>Cystoscopy and litholapaxy</td>
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<td>9</td>
<td>32</td>
<td>F</td>
<td>Calculus on IUD</td>
<td>Migration</td>
<td>Hematuria</td>
<td>5 years</td>
<td>Open cystotomy</td>
</tr>
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<td>10</td>
<td>35</td>
<td>F</td>
<td>Calculus on IUD</td>
<td>Migration</td>
<td>Frequency, dysuria</td>
<td>3 years</td>
<td>Open cystotomy</td>
</tr>
<tr>
<td>11</td>
<td>40</td>
<td>F</td>
<td>Calculus on IUD</td>
<td>Migration</td>
<td>Hematuria, dysuria</td>
<td>2 years</td>
<td>Cystoscopy and litholapaxy</td>
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<td>12</td>
<td>14</td>
<td>F</td>
<td>Metal wire</td>
<td>Migration</td>
<td>Hematuria, dysuria</td>
<td>3 weeks</td>
<td>Open cystotomy</td>
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<td>13</td>
<td>25</td>
<td>M</td>
<td>Copper wire</td>
<td>Self-insertion</td>
<td>Hematuria</td>
<td>3 weeks</td>
<td>Open cystotomy</td>
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<td>14</td>
<td>28</td>
<td>F</td>
<td>Carrot</td>
<td>Self-insertion</td>
<td>Hematuria</td>
<td>2 weeks</td>
<td>Cystoscopy and TUR resection</td>
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<td>15</td>
<td>18</td>
<td>F</td>
<td>Lead pencil</td>
<td>Self-insertion</td>
<td>Hematuria, dysuria</td>
<td>4 weeks</td>
<td>Cystoscopy</td>
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<tr>
<td>16</td>
<td>16</td>
<td>F</td>
<td>Ball pen</td>
<td>Self-insertion</td>
<td>Recurrent UTI</td>
<td>6 months</td>
<td>Open cystotomy</td>
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*M indicates male; F, female; UTI, urinary tract infection; TUR, transurethral resection; and IUD, intrauterine device.*
surrounding structures. In 4 of them, intrauterine device (IUD) had migrated into the bladder, and these patients presented between 2 and 5 years after insertion of the device when calculi had been formed over the IUDs (Figure 1). A mentally disabled boy who had swallowed a 3-in long metal wire 6 weeks earlier presented with hematuria and dysuria, and the metal wire was found to be lying in the bladder.

In 4 patients (25.0%), the foreign bodies had been self-introduced into the bladder for sexual pleasure. These included a copper wire (Figure 2), a carrot, a lead pencil (Figure 3), and a ball pen. These patients were rather young with the ages ranged between 14 and 28 years.

All of the patients had undergone ultrasonography of the urinary tract and plain abdominal radiography of the kidney, ureters, and bladder (KUB) at the time of admission to our hospital. In 15 patients (93.8%), ultrasonography had detected the presence of an echogenic object in the bladder; however, only in 6 (37.5%), the presence of vesical foreign bodies had been correctly reported by the radiologist. Nine of the cases (52.3%) had been erroneously reported to be bladder calculi. In 1 patient ultrasonography had failed to diagnose the presence of a piece of Foley balloon catheter. Plain KUB had revealed the presence of a foreign body in 7 patients (43.8%), while in 2 patients (12.5%), who had a surgical gauze in the bladder, a faint radio-opaque shadow in the bladder area had been reported. In 2 patients who had transvesical prostatectomy, cystography had been performed that had strongly suggested the presence of a foreign body in the bladder by showing contrast material in some areas of filling defect.

Eight intravesical foreign bodies (50.0%) had been removed endoscopically, and the remaining, by open surgery. The operation had been carried out by different surgeons and surgeons in training. The number of the foreign bodies removed endoscopically could have been higher had the required endoscopic equipment and
expertise be available at the time of treatment of all cases. Postoperatively, 2 patients had fever with rigors that settled with appropriate intravenous antibiotic therapy. One patient who had open surgical removal of a surgical gauze developed superficial wound infection. No other complications were recorded.

DISCUSSION

Intravesical foreign bodies are an important consideration in the differential diagnosis of lower urinary tract problems. Usually, foreign bodies are self-introduced, result of medical errors, migrated from the surrounding organs, or result of a penetrating injury. The variety of foreign bodies inserted into bladder defies imagination and includes any types of objects. The most common motive associated with intravesical insertion of foreign bodies is sexual gratification. In some cases, it may be a consequence of a psychiatric illness. It is therefore surprising that objects as diverse as light bulbs, electric wire, glass rod, thermometer, battery, and blue tack have been self-introduced by patients. Occasionally, a foreign body is inadvertently inserted into the female urethra in an attempt to procure abortion or prevent conception.

A variety of objects have been reported to migrate into the urinary bladder from the surrounding pelvic organs, including IUD, vaginal pessary, artificial urinary sphincter, prosthetic slings, nonabsorbable sutures used in Stamey procedures, surgical gauze, etc. Almost any foreign body placed in the vicinity of the bladder has a potential of migration into the urinary bladder. Calculus formation may develop on such foreign bodies.

Catheters and endoscopic instruments are the most common objects introduced into the bladder by urologists. Thus, fragments of these instruments are the most common iatrogenic foreign bodies remaining in the bladder. Catheter tips, parts of catheter balloon, bougies, and beak of resectoscope sheath are some of the reported iatrogenic foreign bodies recovered from bladder. In addition, urethral stents used in reconstructive urological procedures such as hypospadias repair may migrate into the bladder. Retained suture material or staples used in bladder surgeries are of other iatrogenic objects, which may subsequently present as bladder calculi. Occasionally, surgical gauze or sponge (gossypiboma) may be left in the bladder. Recently, transvaginal tape has become one of the common procedures performed for the treatment of female stress incontinence. Perforations of the bladder during the placement of transvaginal tape are relatively common, but are usually noted on cystoscopy and corrected intraoperatively. Undetected bladder perforation may result in several complications including recurrent urinary tract infections, bladder calculus formation, and pelvic pain.

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. 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.

Radio-opaque intravesical foreign bodies can usually be detected on KUB radiography. Intravenous urography or retrograde urethrogram may provide additional information and occasionally reveal surprising findings and unexpected radiolucent objects. The use of abdominal and transvesical ultrasonography has been reported for the detection of non-radio-opaque intravesical foreign bodies. 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.\(^{(36)}\) To confirm the presence of intravesical foreign body cystoscopy is utilized. In addition, cystoscopy will identify the type and location of the foreign body, as well as being the most adequate method for treatment.\(^{(2)}\)

Complications of intravesical foreign bodies consist of chronic and recurrent urinary tract infections, acute urinary retention, calcification, obstructive uropathy, scrotal gangrene, vesicovaginal fistula, squamous cell carcinoma, and even death of sepsis.\(^{(37-44)}\)

Initial management of patients with intravesical foreign bodies should consist of providing pain relief and control of irritative voiding symptoms by prescribing analgesics and anticholinergic drugs, respectively. Antibiotics will be required for the control of urinary tract infection and prevention of sepsis in infected patients. Definitive management of intravesical foreign bodies is aimed at providing complete removal of the foreign body with minimal complications such as trauma to the bladder and urethra, peritonitis, urinary tract infection, hematuria, etc. On rare occasions, foreign bodies may be spontaneously expelled from the bladder during urination.\(^{(45)}\) 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, associated urinary tract injuries and size, and shape and nature of the foreign body. Table 2 gives a brief summary of various authors’ experiences of management of intravesical foreign bodies recorded in the current literature.\(^{(1,3,7-11,13,16-18,24,45-80)}\)

Conventionally, grasping forceps and retrieval baskets are used for removal of a foreign body. In some cases, grasping an object with an alligator or calculus forceps increases the effective diameter of that object and may make removal difficult and hazardous. In the past few decades, several modifications of endoscopic instruments and devices have been developed, especially for removing foreign bodies. Reportedly, cylindrical foreign bodies and thermometers have been removed via transurethral route using rigid and flexible cystoscopy, respectively.\(^{(46,47)}\)

Wise and King\(^{(48)}\) reported magnetic extraction of a metallic foreign body (hair pin) from the bladder by specially designed magnetic retriever. In recent years, because of their larger diameter and straight and strong design, the use of percutaneous instruments has been suggested for removing longer and stiff intravesical foreign bodies.\(^{(49)}\) Younesi and colleagues\(^{(6)}\) reported a similar technique for removal of a fragile glass foreign body (a lidocaine carpule) from the bladder. While Marshall and associates\(^{(50)}\) reported the use of a specially constructed prolene snare intra-operatively to facilitate safe and rapid extraction of an intravesical metallic pipe by cystoscopy. Metal wires introduced into the bladder usually get curled up due to bladder contractions. In some cases, a wire can be removed endoscopically\(^{(12)}\); however, in most cases, open surgery is required to minimize urethral trauma during perurethral extraction. Ejsstrud and Poulsen\(^{(51)}\) reported the use of intravesical laparoscopy to untie a complete knot of an electric wire. The bladder was distended with 100 mL of saline during the procedure.

Paraffin objects such as candles and crayons are frequently introduced into the bladder. In the past, various solvents like xylol, benzene, and kerosene had been used for minimally invasive treatment of such objects. Since these solvents are known to be carcinogenic, their use is no longer suitable. Endoscopic removal of wax and paraffin objects is often complicated by their characteristic of floating on water. This problem may be solved by infusing gases such as carbon dioxide for cystoscopic examination and removal.\(^{(1)}\) Wyatt and Hammontree\(^{(8)}\) reported the use of holmium:yttrium-aluminum-garnet laser to cut a foreign body, ie, a weed trimmer line, to facilitate its perurethral removal. They also tested many reported intravesical foreign bodies \textit{ex vivo} and reported that most foreign bodies except glass appeared to be cut by the laser. As the glass object would not absorb laser energy, it was not fragmented. During the procedure, potential safety concerns about burns and exposure to byproducts of combustion appear to be mitigated by irrigation fluid. The authors suggest that many commonly reported intravesical foreign bodies are amenable to
Habermacher and Nadler(7) reported the use of holmium laser to fragment a detached 26-F resectoscope sheath tip before its transurethral removal without any complications. Hong and colleagues(32) used holmium laser to remove bladder-penetrating polyester suture in an earlier sling surgery that could not be removed completely by conventional cystoscopic equipment. The use of laser for intravesical fragmentation and subsequent removal of large intravesical foreign bodies is a promising new technique for urological surgeons.

Szlyk and Jarrett(52) described the use of 20-F rigid hysteroscope in urological practice to remove deeply embedded foreign bodies from the lower
Intravesical Foreign Bodies

Intravesical foreign bodies are not uncommon and their presence should be included in the differential diagnosis of patients presenting with chronic lower urinary tract problems. Radiological evaluation is necessary to determine the exact size, number, and nature of foreign bodies. The most suitable method for removal of intravesical foreign bodies will depend on the nature of the foreign body, age of the patient, and the available expertise and equipment. Most intravesical foreign bodies can be retrieved with endoscopic and minimally invasive techniques without resorting to open surgery.

CONCLUSION

CONFLICT OF INTEREST

None declared.

REFERENCES


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