

Management of foreign bodies in the urinary tract

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Keywords: Foreign bodies; foreign objects; urinary tract; bladder; urethra

Abstract

Introduction

Foreign bodies in the urinary tract may present in various ways. These require a wide range of interventions for retrieval. In this study, we describe our experience in managing foreign bodies in the urinary tract with emphasis on clinical presentation, mechanism of insertion, investigation and treatment of these patients from a South Asian country.

Methods

A retrospective analysis of 30 foreign bodies treated by a single urological surgeon in two teaching hospitals in Sri Lanka over 20 years was performed. Data were retrieved from clinical records and follow-up visits focussing on clinical presentation, nature of foreign bodies, mechanism of insertion, investigations, management and complications.

Results

The majority were males (73.3%, n=22) with a median age of 34 years (range:14-72). The majority were self-inserted (n=14) or iatrogenic (n=10). X-rays and ultrasound scans were useful in the majority to clinch the diagnosis. The majority were retrieved endoscopically through minimally invasive approaches. Open surgeries were needed for a patient with a large bladder stone associated with a metal chain and retrieval of a retained swab. Common complications associated with foreign bodies included infections (n=9), calcification/ stone formation (n=9) and acute urinary retention (n=4). Among deliberate self-insertions, two had a low intelligent quotient and the majority had no underlying psychiatric condition needing intervention.

Conclusions

Simple investigations such as X-ray and ultrasound scans are sufficient to locate and plan interventions in the majority. Minimally invasive approaches are successful in most. The

vast majority of the patients with self-insertion had no psychiatric conditions needing intervention.

Introduction

Patients presenting to emergency departments of hospitals with foreign bodies that cannot be removed from the body are not that uncommon. However, the male urethra may be considered a more inaccessible and unlikely site for the introduction of foreign bodies. However, the variety of foreign bodies found in the genitourinary tract defies the imagination and includes a wide range of objects [1]. The foreign bodies found in the urinary system include wooden sticks, wires, metal chains, intrauterine contraceptive devices (IUCDs), needles, parts of catheters and even bullets and shrapnel [2-5].

Clinical diagnosis of foreign bodies is often difficult as patients may feel embarrassed to divulge information about the self-insertion of objects for sexual gratification. Such patients may attempt different techniques to remove the foreign bodies causing further trauma, and inward migration of the foreign body and may present late when associated with significant symptoms or complications. Furthermore, patients may not recall previous procedures or intrauterine contraceptive devices inserted many years ago. Similarly, a lack of awareness among clinicians about such a possibility related to previous medical interventions may delay the diagnosis.

The literature related to foreign bodies in the urinary tract is restricted to case reports and few case series [2-5]. Therefore, we describe our experience in the clinical characteristics and management of such foreign bodies in a tertiary care urology unit in Sri Lanka.

Subjects and methods

A retrospective analysis of data was collected from all patients who presented with foreign bodies in the urinary tract to the Urology Units of Karapitiya Teaching Hospital, Galle from 1-January-2001 to 15-December-2009 and Colombo South Teaching Hospital, Kalubowila from 16-December-2009 to 31-December-2021 was performed. Forgotten ureteric double-J stents or parts of retained fragments of double J stents were excluded. The patients underwent an X-

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Received: 20-02-2022 Accepted: 17-06-2022

DOI: <http://doi.org/10.4038/sljs.v40i2.8966>



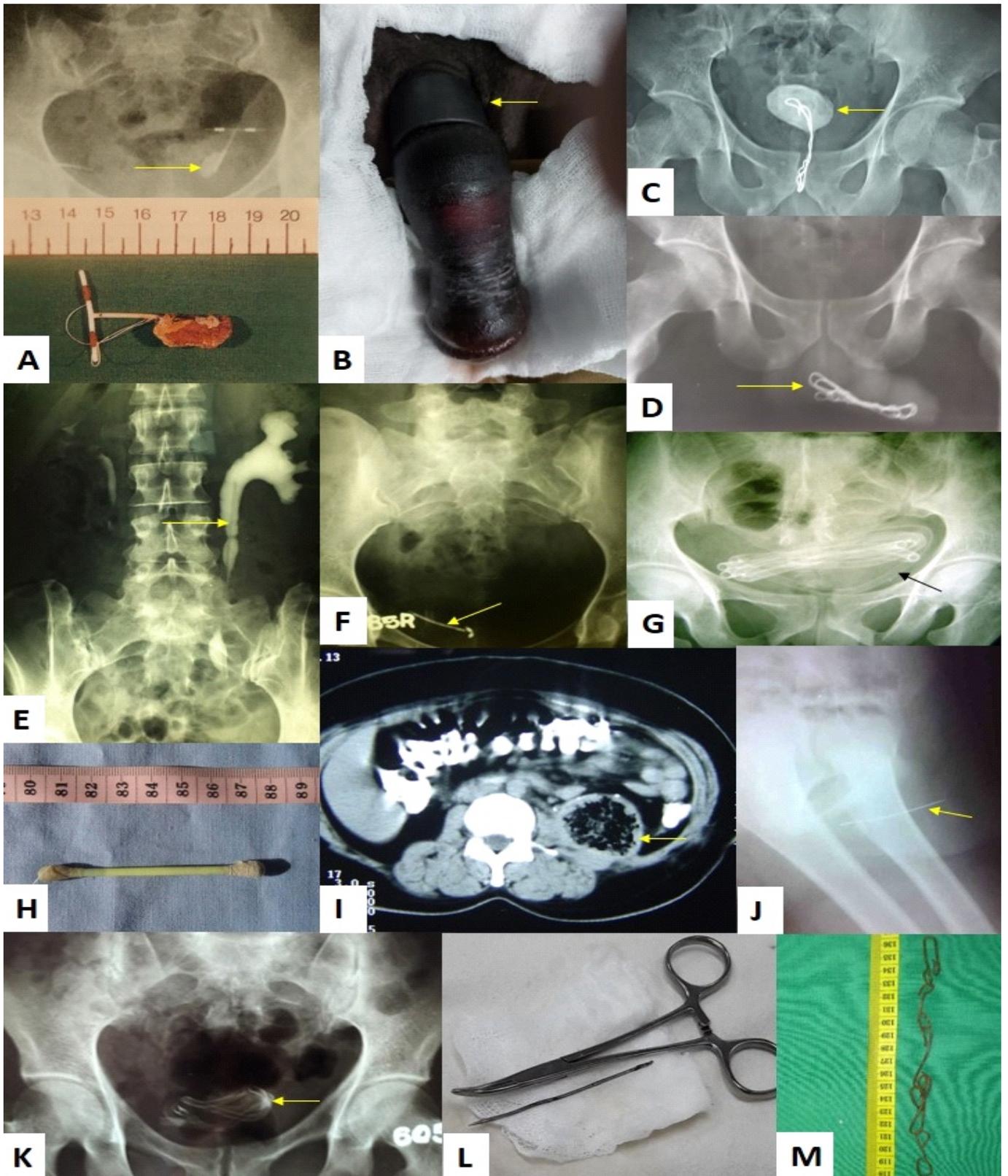


Figure 1. Images of various foreign bodies in the urinary system.

A: IUCD in the bladder with stone formation;
 C: Metal chain in bladder and urethra with large bladder stone;
 E: Ureteric anastomosis performed over a stent pusher instead of a JJ stent;
 G: Coiled plastic tube inside the bladder;
 I: CT image showing a retained swab;
 K: Coiled plastic tube inside the bladder;
 M: Retrieved metal chain

B: Penile ring with superficial gangrene;
 D: Metal chain in the urethra;
 F: IUCD inside the bladder;
 H: Retrieved cotton bud from urethra;
 J: Sewing needle inside the urethra;
 L: Retrieved bicycle spoke;

Table 1. Clinical profile and investigation findings of foreign bodies in the urinary tract

(NA: Not available, IUCD: Intra-uterine contraceptive device, AUR: Acute urinary retention, FB: foreign body, LUTS: lower urinary tract symptoms, USS: ultrasound scan, CT: computed tomography)

Mechanism of insertion/(N)	Type of FB/(N)	Age (year): Median and range /Sex	Marital status	Duration of symptoms due to FB	X-ray	USS/CT	Urine culture
Self-inserted for masturbatory purposes (N=12)	Tip of a pen (N=2), Metal wire (N=2), Elephant's tail hair, Cotton bud, Coiled saline tube, Safety pin, Tube used to transfer petrol, Metal chain, Sewing needle, Nylon threads,	33 (14-51)/ All males	Unmarried: 9, Married: 2 NA: 1	< 1 week: 6 1-4 weeks: 3 1-12 months: 1 >1 year: 2	FB detected: 10 Normal: 2	Not done: 8 FB detected in USS: 3 Normal USS: 1	Coliforms: 6 Pseudomonas: 1 Not done: 3 Negative: 2
Iatrogenic (N=10)	IUCD (N=3), Tip of the cold knife, Tip of Foley catheter, Non-absorbable sutures, Trans-obturator tape, JJ stent pusher, Retained swab, Lippes loop	41 (21-72)/ F=7 M=3	Married: 9 Unmarried: 1	1-12 months: 4 >1 year: 3 Asymptomatic: 3	FB detected: 8 Normal: 1 Not performed: 1	Not done: 3 FB detected in USS: 3 Normal USS: 3 FB detected in CT: 1	Negative: 5 Coliforms: 2 Not done: 3
Violence (N=3)	Bullet (N=2), Shrapnel	17, 19, 21 years/ M=3	Unmarried: 2 Married: 1	Soon after incident: 1 1-4 weeks: 1 1-12 months: 1	FB detected: 3	FB detected in USS: 2 FB detected in CT: 1	Not done: 1 Negative: 2
Accidental self-insertion (N=2)	Bicycle wheel spoke, IUCD	56/M, 21/F	Married: 2	1 day and	Not done: 1 FB detected: 1	Not done: 1 FB detected in USS: 1	Not done: 2
Third party insertion (N=2)	Metal ring (N=2),	45/M,	Married: 2	36 hours and	Not done: 2	Not done: 2	Not done: 2
Third party insertion for sexual gratification (N=1)	Plastic stillete	51/M	Married	2 weeks	Not seen	Foreign body detected	Not done

Table 2. Characteristics, location and complications of foreign bodies in the urinary tract and the treatment

(NA: Not applicable, AUR: Acute urinary retention, UTI: Urinary tract infections, FB: foreign body, USS: ultrasound)

Mechanism of insertion/(N)	Location/(N)	Complication of FB	Treatment	Treatment complication (Clavien-Dindo grade)
Self-inserted for masturbatory purposes (N=12)	Anterior urethra (N=4), Posterior urethra (N=2), Bladder (N=6) with two involved urethra as well	Stones: 4, UTI: 7, AUR: 2, None: 4	Endoscopic removal: 7 Suprapubic catheter and endoscopic removal: 2 Manipulated and removed under anaesthesia: 1 Refused surgery: 1 Open Vesicolithotomy: 1	None
Iatrogenic (N=10)	Bladder (N=4), Bladder neck (N=2), bulbar urethra, Ureter, Peri-nephric space, Retroperitoneal space next to ureter	Stones: 4, None: 3, Calcification: 1, UTI: 2, Intraoperative bleeding: 1, Discharging sinus: 1	Endoscopic removal: 8 Surgical exploration and removal of the retained gauze swab: 1 Exploration and removal of Lippes loop during open pyelolithotomy: 1	None
Violence (N=3)	Kidney (N=2), Bladder	None	Endoscopic removal: 1 Managed conservatively: 2	Repeat cystoscopy excluded a stricture (Grade 1): 1
Accidental self-insertion (N=2)	Urethra, Bladder	None	Endoscopic removal: 1 Manipulated and removed under anaesthesia: 1	None
Third party insertion (N=2)	Penile shaft (N=2)	Gangrenous penile skin and AUR: 1, AUR and superficial skin necrosis and infection: 1	Rings were removed with metal cutter after suprapubic catheterization. Urethral reconstruction and skin graft was required in one patient	None
Third party insertion for sexual gratification (N=1)	Bladder	None	In the morning of the day of surgery, he passed the FB. The repeat USS was normal	None

ray Kidney-Ureter-Bladder (KUB) and ultrasound scan KUB where relevant and Computed Tomography (CT) scans in a few selected patients. The offered treatment modalities such as conservative, minimally invasive and open strategies were recorded and post-procedural complications were classified according to the Clavien and Dindo classification system [7]. Those with a history of deliberate self-insertion were referred to the psychiatrist to look for any underlying psychological conditions. Approval was obtained from the Ethics Review Committee of the Colombo South Teaching Hospital, Dehiwala, Sri Lanka and informed consent were obtained before collecting data. We report our findings under the Declaration of Helsinki and all methods were performed per the relevant guidelines and regulations.

Results

A total of 30 foreign bodies in 28 patients were included in this analysis. The majority of the patients were males (73.3%, n=22) and the median age was 34 years (range: 14-72). The foreign bodies found in our cohort included IUCDs, tips of pens, tubes, bullets, shrapnel, hair from elephant's tails, bicycle wheel spoke, the tip of a cold knife, the tip of Foley catheter, non-absorbable sutures, metal chain, wires and rings, trans-obturator tape, plastic stilette, sewing needle, nylon threads, double J stent pusher, retained swab and Lippes loop (Figure 1). The mechanisms of insertion included self-insertion for sexual gratification (n=12), accidental self-insertion (n=2), iatrogenic (n=10), violence (n=2) and third-party insertions (n=3). The clinical presentation and basic investigations are given in Table 1. The associated common complications related to foreign bodies were infections (n=9), stone formation/ calcifications (n=9) and acute urinary retention (n=4).

The majority were retrieved endoscopically and through minimally invasive approaches (n=23). Two patients were managed conservatively and one patient refused surgery. One patient passed the foreign body on the morning of planned surgery. Open surgeries were needed for a patient with a large bladder stone associated with a metal chain and for retrieval of a retained perinephric swab. Another patient with a renal pelvic stone with an incidentally found Lippes loop in X-ray, underwent exploration and removal of the foreign body during the index surgery (via transcostal approach) for a renal pelvic stone. The types of foreign bodies, mechanisms and treatment in our cohort are given in Table 2. We observed only 1 complication during interventions for foreign bodies which was a suspected injury to the urethra while retrieving a sharp object. The patient was managed with a catheter for 2 weeks and a repeat cystoscopy excluded a stricture. Two patients with deliberate self-insertion had a low intelligent quotient. One patient with an already diagnosed severe schizophrenia and institutionalised had inserted a safety pin. However, the

remaining patients with a history of deliberate self-insertion had no psychiatric conditions needing intervention.

Discussion

In this cohort of 30 foreign bodies in the urinary tract for 2 decades, we found that self-insertion for sexual gratification (n=12) and iatrogenic (n=10) causes were the main mechanisms. Although females with deliberate self-insertions have been reported in the literature [3, 4], all patients with deliberate self-insertions in our cohort were males, which can be explained by the sociocultural differences. Furthermore, all deliberate self-insertions were performed for sexual gratification. Iatrogenic causes were mainly observed in females. Interestingly, we had rare instances of accidental self-insertion which have not been commonly reported in the literature [3].

The clinical presentation varied depending on the mechanism of insertion. Self-insertions or violence may present as emergencies and iatrogenic causes generally present with chronic insidious symptoms. Some may ignore their symptoms as long as their lifestyle is not affected. Those with deliberate/ accidental self-insertion presented after a median duration of 7 days (range: 1 day to 2 years) which indicates a delayed presentation. One patient with a penile ring inserted presented after 36 hours after spending many agonising hours trying to remove it by himself. This led to superficial skin necrosis and a urethral defect. The delayed presentation is mainly due to embarrassment and anxiety with fear of being ridiculed by others including the hospital staff. Sexual education is not given prominence in school education and sexual orientation is not a commonly discussed topic in the community due to sociocultural barriers inherent to most Asian populations [6]. The healthcare staff should be aware of the pain and embarrassment in these patients and should act with empathy.

Attempts at catheterising patients with urethral foreign bodies with obstructive urinary symptoms are likely to fail and applying force may traumatise the urethra. Patients should undergo a preliminary X-ray and ultrasound scan of KUB for confirmation before intervention. CT scans were rarely used in our cohort. Endoscopic evaluation of the lower urinary tract is the ideal investigation which is diagnostic and therapeutic. Catheterisation or retrieval of foreign bodies should be performed after delineating the size, shape, extent and location of the foreign body, although a gentle attempt by an experienced clinician may be justifiable in the absence of imaging [8].

Self-insertion of foreign bodies has been reported to be associated with psychiatric disorders [9]. In our cohort, all patients with a history of deliberate self-insertion were

referred to the psychiatrist for assessment. Of them, two were found to have a low intelligent quotient. One of the two had repeatedly inserted foreign bodies within several years needing multiple interventions. In our cohort of 12 males with deliberate self-insertion, there was only one patient with an already diagnosed psychiatric illness. None of the others was found to be having an underlying psychiatric illness requiring treatment.

The reported cases of iatrogenic foreign bodies in the urinary system seem to be increasing, possibly due to the advancement and increasing number of interventions performed in the urogenital systems [2-5]. This is more common in females due to interventions performed for gynaecological conditions and contraception. In our cohort, 7 females had iatrogenic foreign bodies. Although some gradually migrate into the urinary tract, others are due to wrong techniques and medical errors. We had three patients with IUCDs inserted into the bladder, one patient with a retained swab in the peri-nephric region and one patient who had an unintentional ureteric anastomosing over a stent pusher rather than a JJ stent. These are largely preventable never events in medical practice.

The objective of treatment is to retrieve the foreign object completely while minimising injury to the urinary tract. Some foreign bodies such as bullets or shrapnel in the kidney can be managed conservatively in the absence of recurrent infections, bleeding or stone formation. This is possible if the bullet is in the renal parenchyma rather than in the pelvicalyceal system. The modality of surgery is based on the type, size, location and associated complications of the foreign body [5]. The majority can be managed endoscopically using the retrieval forceps or stone punch forceps. Percutaneous cystoscopy sheaths, percutaneous suprapubic cystolithotripsy (PCCL), rigid nephroscope, laser and pneuovesicoscopy may be used in difficult cases [10].

Conclusions

In our cohort of 30 foreign bodies in the urinary tract, self-insertion and iatrogenic causes were the main mechanisms. Simple investigations such as X-ray and ultrasound scans are sufficient to locate and plan interventions in the majority. Minimally invasive approaches were successful in the majority with minimal long-term complications. The vast majority of patients with self-insertion did not have an underlying psychiatric condition needing intervention.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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