

CASE REPORT

The foreign body in the urinary tract in paediatric population: a case series of self-insertion of metallic objects into the lower urinary tract

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ABSTRACT

Foreign bodies in the urinary tract are rare in paediatric patients, more often affecting adolescent boys. Symptoms are non-specific and include recurrent urinary tract infections, abdominal pain, dysuria, haematuria, and frequent urination. Medical history, physical examination, and imaging are key to diagnosis. The article presents three cases of self-insertion of metallic foreign bodies into the urinary bladder by adolescents. First two cases are teenage boys with recurrent urinary tract infections. Magnetic balls were found in their bladders, though self-insertion was not disclosed during history taking. The third case is a teenage girl who was admitted to the hospital due to self-insertion of a foreign body into the bladder. A foreign body should always be considered in the differential diagnosis of patients with prolonged and unresponsive urinary symptoms. Early recognition and thorough history taking are essential for effective management.

KEY WORDS:

foreign bodies, urinary tract, urinary bladder, magnets, adolescent.

INTRODUCTION

A foreign body (FB) in a child's body is one of the most common reasons for reporting to the hospital emergency department. This is most common for the gastrointestinal tract or respiratory tract. Foreign bodies in the genitourinary system represent a much less frequent problem [1]. They are usually self-introduced into the urethra and bladder for various reasons. But in children it has been rarely reported in the literature. It usually affects adult men [2, 3]. In the paediatric population, the problem mainly affects adolescents. So far, cases among males

have been reported much more often in the literature [4, 5]. Sexual pleasure is the main reason for self-insertion of FBs. It is also more frequent in patients with mental or psychiatric disorders. However, urethral FBs can sometimes be of iatrogenic origin [5, 6]. The symptoms of a FB in the urinary tract are non-specific. The most commonly observed were recurrent urinary tract infections (UTI), abdominal pain, increased frequency of micturition, dysuria and haematuria [1, 7]. The fact that the ailments affect the genitourinary system means that patients frequently hide the likely cause of the reported complaints which creates significant diagnostic difficulties. There-

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fore medical history plays a key role in diagnostics, followed by physical examination and appropriate imaging methods [3]. After initial identification the most effective treatment method is chosen, which is to remove a FB. Endoscopic or surgical methods are possible. The choice of the right method depends on the size, shape, and number of FBs inserted [6–8].

The following work presents three cases of the intentional introduction of a FB into the genitourinary system through the urethra. The aim of the study is to increase clinical awareness and to take into consideration the possibility of introducing a FB as a possible cause of symptoms affecting the genitourinary system.

CASE REPORTS

CASE 1

A 17-year-old boy with no past medical history presented to the Emergency Department at the Military Institute of Medicine – National Research Institute with complaints of dysuria, haematuria, purulent urethral discharge, leukocyturia, and periodically occurring fever. The symptoms had been persisting for 3 weeks. At that time, the patient had already been treated with antibiotics for a diagnosed UTI. He had also undergone abdominal ultrasound, which remained normal. He was admitted to the Department of Paediatrics, Nephrology, and Allergology for further diagnosis. No abnormalities were found during physical examination. Based on blood and urine tests, a complicated UTI was diagnosed. The abdominal ultrasound examination was normal; however, the bladder was only partially full. Urine culture confirmed the diagnosis of UTI.

According to the patient's medical history, he had recently returned from a youth camp before the onset of symptoms. Therefore, urethritis was considered in the differential diagnosis, and a urethral swab was taken. Due to previous antibiotic treatment, broad-spectrum antibiotic therapy was initiated, but there was no improvement. He was then consulted multiple times, with numerous urinalyses and urinary tract cultures performed (Table 1). The patient underwent extensive testing to exclude infectious, metabolic, rheumatological, and haematological diseases.

The boy repeatedly denied the possibility of self-inserting a FB into the urinary tract. An abdominal ultrasound performed after 1 month of treatment showed numerous hyperechoic reflections forming deposits at the bottom of the bladder, with a visible acoustic shadow and twinkle artifact. An abdominal X-ray (Figure 1) revealed multiple spherical FBs (each up to 5 mm in diameter) and minor amorphous calcifications within the bladder. Consequently, a urethrocystoscopy was performed. After inserting the catheter into the bladder, numerous magnetic balls covered with stones and fibre

were visible (Figure 2). The foreign bodies were removed *via* suprapubic cystostomy with a trocar under cystoscopic control (Figure 3).

CASE 2

A 15-year-old patient with Asperger's syndrome presented to the surgical department of the Paediatric Hospital in Dziekanów Lesny with abdominal pain. He also had a history of recurrent leukocyturia over the past 3 months, which persisted despite antibiotic therapy. Abdominal ultrasound revealed a 34 mm stone in the bladder. The boy was hospitalized in the Surgery Department, where a complete medical history was obtained.

The patient admitted that approximately one year earlier, he had self-inserted magnetic balls through the urethra. An abdominal X-ray showed numerous FBs in the bladder (Figure 4). Urethrocystoscopy was performed, during which a large stone was visualized in the bladder (Figure 5). The stone was fragmented using laser lithotripsy, which revealed multiple magnetic balls inside the crushed stone. A total of 26 foreign bodies were removed. The procedure was stopped due to mucosal bleeding and limited visibility.

After 3 weeks, the remaining metallic balls in the bladder were removed laparoscopically *via* a suprapubic approach.

CASE 3

A 14-year-old girl was admitted to the surgical department of the Paediatric Hospital in Dziekanów Lesny as an emergency due to the self-insertion of a FB into the bladder. An abdominal X-ray confirmed the presence of a metallic object in the bladder, likely a hairpin measuring 67 mm in length. Therefore, ultrasound was not performed. Subsequently, urethrocystoscopy was conducted, which showed no injuries to the bladder wall. The hairpin was visualized and easily removed with forceps.

DISCUSSION

The literature regarding self-insertion of FBs into the genitourinary tract in children is relatively limited. It mainly consists of case reports and small case series [1, 3, 8, 9]. There are only few studies involving larger groups of patients. Fath Elbab *et al.* [7] reported 24 children with intravesical, self-inserted, sharp FBs treated in their hospital over a 10-year period. Another significant group of patients was described in the study by He *et al.* [10]. The authors analysed the records of children with urogenital tract FBs admitted to their centre. They reviewed 188 cases, most of which involved vaginal FBs. However, 50 cases concerned FBs in the urethra and bladder [7]. Most cases of FBs in the genitourinary tract occur in adolescents and are more common in boys. Our case se-

TABLE 1. Results of urine cultures, urethral swabs and urinalysis (Case 1)

Parameters	1	2	3	4	Reference range
Urinalysis					
Colour	Pale yellow	Pale yellow	Pale yellow	Pale yellow	Yellow
Clarity	Cloudy	Cloudy	Cloudy	Clear	Clear
Specific gravity [g/l]	1.020	1.020	1.009	1.005	1.016–1.035
pH	6.0	6.5	5.5	6.5	4.5–7.5
Leukocytes	Positive	Positive	Positive	Positive	Negative
Nitrate	Negative	Negative	Negative	Negative	Negative
Protein [mg/dl]	100	15	15	Negative	Negative
Glucose [mg/dl]	Negative	Negative	Negative	Negative	Negative
Ketones [mg/dl]	Negative	Negative	Negative	Negative	Negative
Urobilinogen [mg/dl]	Negative	Negative	Negative	Negative	Negative
Bilirubin [mg/dl]	Negative	Negative	Negative	Negative	Negative
Blood	Positive	Positive	Positive	Negative	Negative
Epithelial [cells/ μ l]	0.5	0.8	0.2	0.0	< 5.7
WBC/ μ l	14284.7	1429.4	2961.1	206.3	< 13.2
RBC/ μ l	253.0	11.0	48.1	2.0	< 13.6
Bacteria/ μ l	652.0	88.8	137.2	< 58	< 58
Culture					
Urine culture	Gram-positive cocci Colony counts: 100 ca. 100.000 CFU/ml	Enterococcus faecalis Colony counts: 100 ok 100.000 CFU/ml	Various cocci Gram(+) Colony counts: 10^2 100 CFU/ml	Enterococcus faecalis Colony counts: 100+ > 100.000 CFU/ml	Absent
Urethral swab	Staphylococcus aureus Colony counts: ++++ High levels Escherichia coli Colony counts: ++++ High levels Enterococcus faecalis Colony counts: ++++ High levels				

1 – sample taken at first admission, 2 – sample taken 2 weeks after first admission, 3 – sample taken 4 weeks after first admission, 4 – sample taken 7 weeks after first admission

ries included two boys and one girl, all of whom were adolescents. In the study by He *et al.* [10], the peak ages were 3–5 years and 9–13 years. However, patients from the younger age group were predominantly girls with vaginal FBs. Teenage patients were more likely to be boys with bladder FBs. Kuang *et al.* [8] presented a case series of four boys aged 9–13 years. Similar findings were reported in the study by Warchol *et al.* [1], which described two teenage boys. The case series by Ceran and Uguralp [3] was slightly different, including a 13-year-old boy and a 6-year-old girl.

However, the most contrasting data was shown by Fath Elbab *et al.* [7], who included 24 patients in their study, of whom 20 were girls. Only 4 cases involved boys. The age of the girls range was 4–12 years, while the boys were 8–12 years old. Our findings are consistent with

most of the literature, which indicates that teenage boys predominate in cases of genitourinary FBs.

The most common symptoms of a FB in the urinary tract are described in the literature as recurrent UTIs, abdominal pain, frequent urination, dysuria, and haematuria. In the study by He *et al.* [10], most patients presented with haematuria or haemorrhage (60%), dysuria with or without increased frequency of urination (25%), flank pain or abdominal pain (20%), turbid urine (5%), and fever (20%). The most common presentations in the study by Fath Elbab *et al.* [7] were recurrent UTIs, increased frequency of micturition, dysuria, and recurrent intermittent episodes of haematuria.

Each patient in Kuang *et al.* [8] series exhibited different symptoms: one had recurrent dysuria and haematuria, another experienced urethral pain, a third had lower

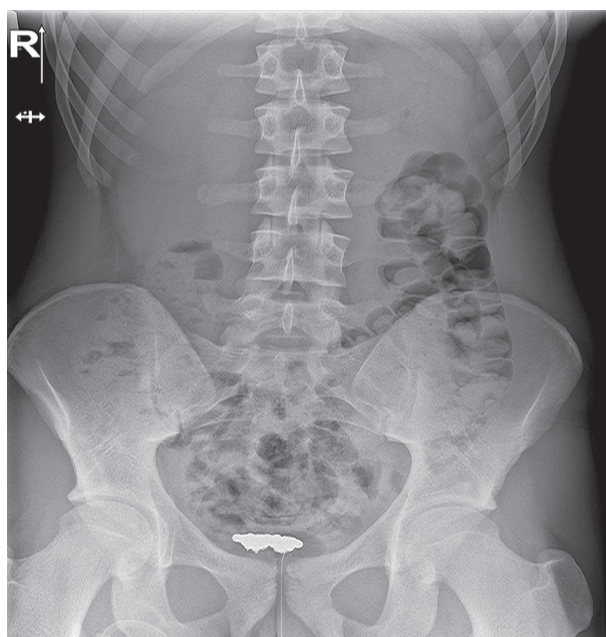


FIGURE 1. X-ray numerous spherical shading foreign bodies in bladder (Case 1)

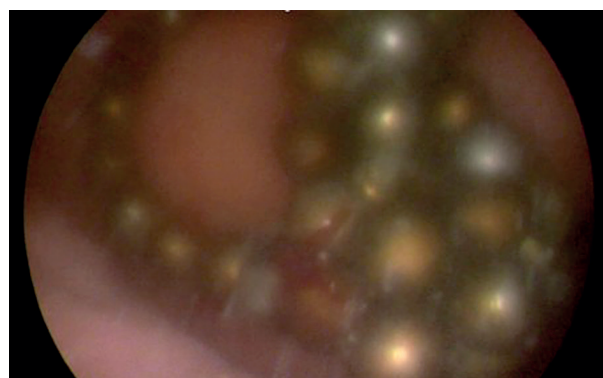


FIGURE 2. Intraoperative endoscopic view of metallic balls in the bladder (Case 1)



FIGURE 3. Metallic balls removed from the bladder (Case 1)

abdominal pain, and the last was asymptomatic. Similarly, in the work by Ceran and Uguralp [3], one patient was asymptomatic but had a history of self-insertion of a FB, while another experienced perineal pain and dysuria. Slightly different symptoms were reported by Warchol *et al.* [1], whose patients primarily presented with voiding difficulty.

In our case series, two patients had recurrent UTIs that were difficult to treat. They also exhibited additional symptoms such as haematuria, dysuria, and abdominal pain.

Foreign bodies in the urinary tract are usually self-inserted for sexual satisfaction or curiosity. However, they

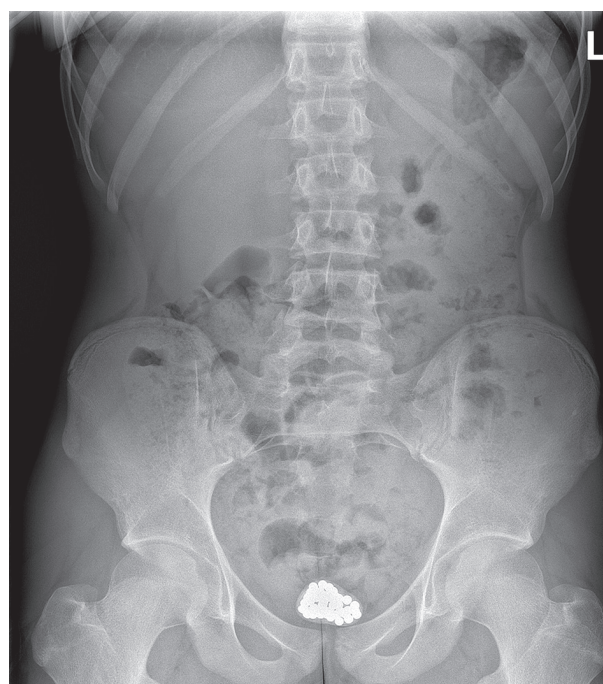


FIGURE 4. X-ray numerous spherical shading foreign bodies in bladder (Case 2)

can also be iatrogenic, migrate from adjacent organs, or result from sexual abuse. In all cases presented by Fath Elbab *et al.* [7], the FBs in the urinary tract were self-inserted. Similar findings were reported in the study by Kuang *et al.* [8] and in other case series concerning FBs in the urinary tract [1, 3, 9].

In most cases described by He *et al.* [10], the FBs were also isolated instances of iatrogenic introduction or accidental insertion related to acupuncture therapy. An extremely rare condition is migration of a FB into the urinary bladder, which was presented in the study by Alzubier *et al.* [11]. They reported two male paediatric patients from Sudan with FBs in the bladder, with a history of penetrating perineal trauma.

In the study by Bansal *et al.* [12], one of the cases involved a FB in the urinary tract resulting from sexual abuse. All FBs found in the patients included in our case series were self-inserted. The available literature regarding

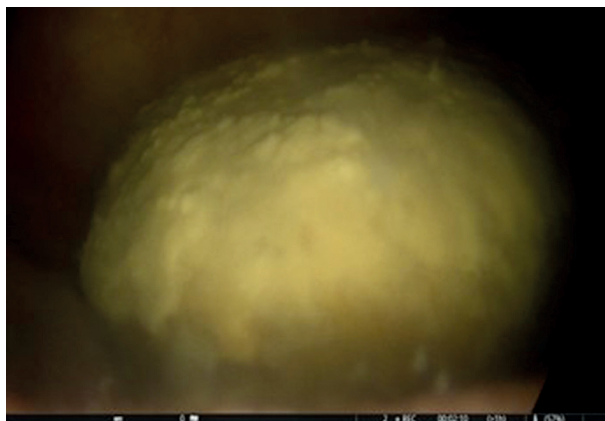


FIGURE 5. Intraoperative endoscopic view of calcified metallic balls in bladder (Case 2)

children does not include data on recurrent self-insertion of FBs. In our case series, all three patients had no history of previous self-insertion of FBs. Many different FBs are self-inserted into the urinary tract by patients. Differences can be observed depending on gender. The most commonly reported FBs in girls include pins, hair clips, and wooden pencils [3, 7]. There have also been cases involving swabs or plastic sticks [7]. In boys, very common FBs are electric wires and magnetic balls. However, a wide range of objects can be found. In He *et al.* [10] study, they described: sewing needles, plant fibres, rags, infusion tubes, silk threads, and wooden sticks. Kuang *et al.* [8], in addition to hair pins and magnetic beads, also reported skipping ropes and acne needles. In the case series presented by Warchol *et al.* [1], one patient had magnetic balls in the bladder, and another had metallic tweezers in the urethra. This aligns with the data from our study: two boys had magnetic balls in the bladder, and the girl had a hairpin.

It should be emphasised that obtaining an adequate history from children, especially teenagers, can be challenging. Most adolescents are reluctant to admit that they have self-inserted an object into the urethra due to the em-

barrassing nature of the situation. In many cases described in the presented studies, patients denied self-insertion of any FB [8, 9]. In such circumstances, a psychological consultation might be helpful. After confirming the suspicion, psychological follow-up should be continued to address and work through the underlying problem.

Management of FBs in the lower urinary tract in paediatric patients has been discussed in several studies [3, 7, 8, 10]. The approach proposed by Kuang *et al.* [8] is shown in Figure 6. The basis for correctly diagnosing FBs in the urinary tract is diagnostic imaging. The situation is relatively straightforward if the patient admits to self-inserting a FB into the urethra. In such cases, a plain X-ray of the urinary tract can reveal most FBs. Abdominal ultrasound may also be helpful, especially for non-radiopaque FBs [7].

The real challenge lies with patients whose medical history does not suggest the presence of a FB in the urinary tract. The symptoms they present are equivocal, potentially indicating other disorders. Every patient with recurrent symptoms and signs from the urinary tract which cannot be explained by other objective causes like for example neurogenic bladder or congenital anomalies of the kidney and urinary tract should raise suspicion of FBs. In these cases, abdominal ultrasound is the preferred imaging test. Unfortunately, ultrasound examination is a highly subjective assessment, and its results depend on several factors: the patient's preparation, the equipment quality, and the examiner's experience. Owing to its wide availability and non-invasive nature, the examination should be repeated in unclear clinical scenarios. Our clinical experience further underscores and exemplifies this point. In one of the most challenging cases, two initial abdominal ultrasounds (one at our clinic and one externally) did not detect any FBs in the bladder, likely due to suboptimal preparation with a partially filled bladder. One month later, the foreign bodies became clearly visible after calcification and mass formation.

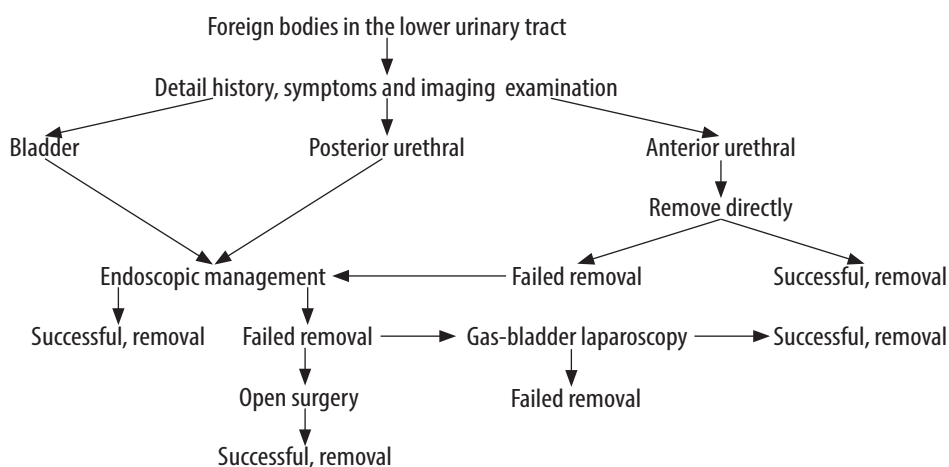


FIGURE 6. Algorithm for management of foreign bodies in the lower urinary tract in pediatric patient [8]

In cases where appropriate treatment of a UTI does not lead to the desired effect, the diagnostic process should be extended. The examinations conducted include cystography and cystometry. The final procedure is cystoscopy, which is the most invasive but serves both diagnostic and therapeutic purposes.

The role of social media and the Internet should also be emphasised. Access to various online content can provide information on a wide range of topics, but some of it may be threatening or potentially harmful to adolescents. They might use this content as an inappropriate guide to achieve sexual satisfaction or to undertake dangerous challenges. Certain online materials encourage children to experiment, often involving harmful interventions that can directly threaten their health or even their life. Adolescents may decide to engage in risky behaviours under peer pressure and the desire to impress their peers.

CONCLUSIONS

A foreign body should always be considered in the differential diagnosis of patients with prolonged and unresponsive urinary symptoms. The cases presented in this article demonstrate the importance of a thorough medical history and early identification of the clinical problem in the diagnostic process. This also reduces the risk of complications and helps to avoid polypharmacy.

DISCLOSURES

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4. Conflicts of interest: None.

REFERENCES

1. Warchoł S, Wolski M, Jaworski-Martycz A, Dudek-Warchoł T. Wprowadzanie ciał obcych do cewki moczowej przez nastoletnich chłopców: narastający problem. *Pediatr Med Rodz* 2018; 14: 431-434.
2. Moskalenko VZ, Litovka VK, Zhurilo IP, Mal'tsev VN, Latyshev KV. Inorodnoe telo mochevogo puzyrja u detei [Foreign body of bladder in children]. *Klin Khir* 2002; 4: 43-45.
3. Ceran C, Uguralp S. Self-inflicted urethrovesical foreign bodies in children. *Case Rep Urol* 2012; 2012: 1-3.
4. Crawford SB, Lowry D, Watts SH. Evaluation and management of urethral foreign bodies and description of a novel ultrasound-guided catheter-based extraction technique. *JACEP Open* 2021; 2: e12398.
5. Rieder J, Brusky J, Tran V, Stern K, Aboseif S. Review of intentionally self-inflicted, accidental and iatrogenic foreign objects in the genitourinary tract. *Urol Int* 2010; 84: 471-475.
6. Palmer CJ, Houlihan M, Psutka SP, Ellis KA, Vidal P, Hollowell CMP. Urethral foreign bodies: clinical presentation and management (*Urology* 2016; 97: 257-260). *Urology* 2017; 100: 256-258.
7. Fath Elbab TK, Abdelhamid AM, Galal EM, Anwar AZ, Malek MA, Tawfik ER. Management of intravesical self-inflicted sharp objects in children: 10-year single-center experience. *J Pediatr Urol* 2016; 12: 97.e1-97.e5.
8. Kuang T, Cai W, Qian W, Lin X. Foreign bodies in children's lower urinary tract: a case series and literature review. *Front Pediatr* 2023; 10: 1095993.
9. Mujagić S. Foreign body in the urinary bladder of 14-year-old boy: case report and review of literature. *Paediatr Today* 2015; 11: 54-58.
10. He Y, Zhang W, Sun N, Feng G, Ni X, Song H. Experience of pediatric urogenital tract inserted objects: 10-year single-center study. *J Pediatr Urol* 2019; 15: 554.e1-554.e8.
11. Alzubier MAA, Alasmi R, Taha SM, Osman YM. Migrating foreign body into the urinary bladder of children postperineal trauma. *Urol Ann* 2023; 15: 109-112.
12. Bansal A, Yadav P, Kumar M, Sankhwar S, Purkait B, Jhanwar A, et al. Foreign bodies in the urinary bladder and their management: a single-centre experience from North India. *Int Neurourol J* 2016; 20: 260-269.