Urethral Foreign Body: Removal of Degraded Magnetic Spheres Using Hartmann Ear Forceps

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Lower urinary tract foreign bodies have been reported in both children and adults. It is helpful for urologists to review foreign body case reports to become familiar with alternative approaches for removal that may prove helpful during challenging cases. To our knowledge, we describe for the first time a degraded rare-earth magnet within the body and use of Hartmann ear forceps to remove a foreign body from the urethra under cystoscopic guidance through a limited urethrotomy. UROLOGY 84: 1214–1216, 2014. © 2014 Elsevier Inc.

Lower urinary tract foreign bodies have been reported in both children and adults. Most foreign bodies are self-inserted per urethra because of sophomoric curiosity, sexual curiosity, or psychiatric illness. The first publication of a penile foreign body dates back to 1755, and reported objects retrieved range from electrical cables to paper clips.[1] Urethral foreign bodies are encountered with low frequency by most urologists. However, it is helpful for urologists to review foreign body case reports to become familiar with alternative approaches for removal that may prove helpful during challenging cases. We describe a novel approach to removing degraded magnetic spheres from the urethra of a 12-year-old boy.

CASE PRESENTATION

A 12-year-old boy with Asperger syndrome and attention deficit hyperactivity disorder presented to his primary care physician with new-onset fever and dark urine for 3 months. He had no genitourinary history. He was diagnosed and treated for a febrile urinary tract infection (UTI) and was referred to our clinic for further evaluation.

At presentation, the patient denied lower urinary tract symptoms, and no genitourinary abnormalities were identified on physical examination. A staggered bell-shaped curve was identified on uroflowmetry (max flow, 16 mL/s; postvoid residual volume, 4 mL). Urine culture grew >100k colony forming units/mL of viridans group streptococcus, and he received antibiotics. Renal ultrasonography imaging identified normal kidneys and a distended bladder with mild debris. During attempted catheter placement for a voiding cystourethrogram, resistance was met in the penile urethra precluding catheter insertion. A scout image identified an irregular, homogeneous, completely radiodense material in the bulbar and proximal penile urethra measuring 10 × 1 cm (Fig. 1). During follow-up examination, the foreign body was palpable from the penoscrotal to the bulbar urethra but there was no overlying erythema, edema, or tenderness. The patient could not recall placing any foreign objects into his urethra in the recent or distant past. The family could not recall any suspicious events correlating with the foreign body.

At retrograde cystoscopy with a 10F rigid cystoscope, a large, charcoal-colored, irregularly shaped foreign object was seen filling the proximal penile urethra. On close inspection, the foreign object was in clumps, but also had occasional glints of bright silver with regions appearing as irregular masses of iron filings. The urethra was dilated with epithelial edema, erythema, and friability.

Despite fluoroscopic guidance, several attempts at passing a Bentson guidewire into the bladder beside the foreign object were unsuccessful. Several attempts at extracting the leading pieces using NCircle and NGage Nitinol baskets (Cook Medical Inc, Bloomington, IN) also failed because of the large diameter of the leading foreign body as well as a relative urethral narrowing just proximal to the foreign object, preventing antegrade removal. Given the metallic density and appearance, Holmium laser was deemed potentially unsafe and uncertain. Additional retrograde pushing or extraction through the bladder and posterior urethra seemed to likely be tedious and potentially more damaging.

Thus, a 1.5-cm penoscrotal urethrotomy was made over the distal most part of the foreign bodies. DeBakey and ring forceps were initially used to remove chunks of the foreign object, but they became ineffective deeper in the urethra. The most useful instrument for extraction proved

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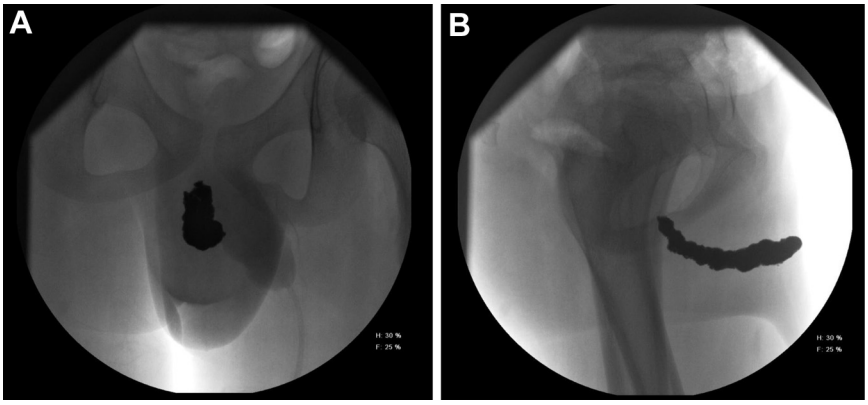

Figure 1. **(A)** Anteroposterior and **(B)** lateral views of the pelvis depicting the irregular radiodense urethral foreign body extending from the penoscrotal junction to the bulbar urethra.

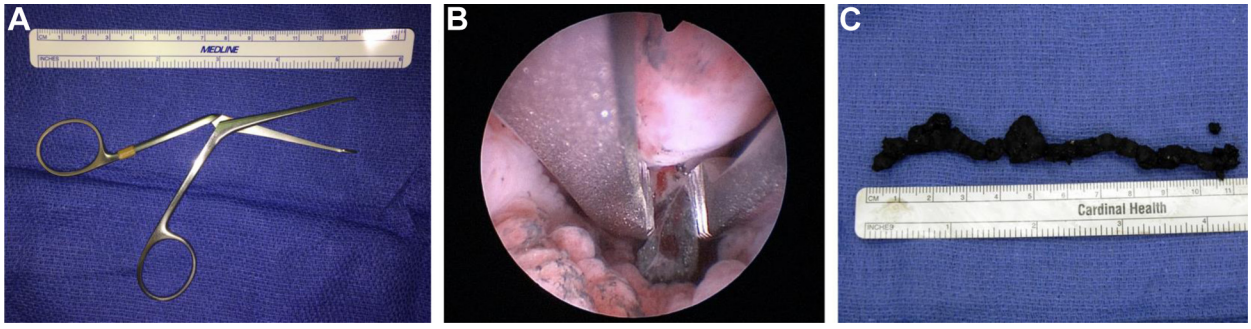

Figure 2. **(A)** Hartmann aural forceps with long opening jaw. **(B)** Hartmann aural forceps grasping a foreign body fragment under direct cystoscopic guidance. **(C)** Total specimen removed from the urethra. (Color version available online.)

to be Hartmann ear forceps, which are quite long and narrow (Fig. 2A). Tactile feedback and visual cystoscopic guidance were used to remove remaining large pieces (Fig. 2B). The dilated urethra could accommodate the Hartmann forceps and a 10F cystoscope owing to the small caliber of both instruments. It became obvious that the clumps of metal filings were magnetic, being attracted to the metal surgical instruments. The dimension of total foreign material removed was approximately 10 × 1 cm (Fig. 2C). Metal filing debris was wiped from the urethral lumen with Kittner sponges. The bladder was normal. An urethroplasty was performed followed by a meticulous multilayer closure. A 16F catheter was left in place for 1 month. After disclosing that the substance removed was a magnetic metal, the mother immediately concluded that he had inserted buckyballs into his urethra. At 2.5 months postoperatively, he was voiding without problems, his urine was clear, and a normal bell-shaped curve was identified on uroflowmetry (577 mL voided, max flow 23 mL/s, average flow 16 mL/s) with a postvoid residual volume of 45 mL by bladder scan.

Figure 3. Buckyballs (rare-earth magnet). (Color version available online.)

COMMENT

The toy, commonly known as buckyballs, is a collection of magnetic spheres that can be arranged into imaginative shapes (Fig. 3). Typically sold in aliquots of at least 100 spheres, each small sphere ranges from 3-6 mm in diameter and is composed of a core of neodymium iron boron (rare-earth magnet) coated with a 3-layer plating of either a colored glaze or nickel. An analysis of the National Electronic Injury Surveillance System database, managed by the US Consumer Products Safety Commission,

estimated 22,581 nationwide emergency room visits between 2002 and 2011 involving any type of magnet in patients aged <21 years.[2] Buckyballs or small magnets similar to buckyballs were involved in 23.4% of cases. The Consumer Product Safety Commission finalized a mandatory recall of buckyballs in 2014 to protect consumers from injury. Life-threatening injuries such as ingestion can occur, where magnets can attract across loops of bowel and cause erosion or blockage.[3,4]

Less than 6% of 22,581 estimated cases were attributed to magnets inserted in the ear, vagina, or rectum or magnets entrapped in oral or genital tissue. Magnets involving the lower urinary tract are therefore rare. Several reports describe the retrieval of buckyballs from the lower urinary tract (predominantly the bladder) using either endoscopic or open techniques.[5-7] We describe a complex urethral case that required a combined approach of both urethrotomy and cystoscopy. Although somewhat uncertain, we suspect our patient placed magnetic spheres into his urethra at least 3 months before diagnosis, during which time the coating degraded, exposing the rare-earth magnet component.

To our knowledge, we describe for the first time a degraded rare-earth magnet within the body and use of Hartmann ear forceps to remove a foreign body from the urethra. Typically used by otolaryngologists for extraction of objects from the external auditory canal, Hartmann ear forceps have a larger bite excursion compared with endoscopic graspers and yet are narrow and long enough to traverse the urethra alongside a cystoscope. As most urologists are unfamiliar with this type of forceps, we found them perfect for our needs to remove his urethral foreign bodies through a very small urethrotomy.

Diagnosing a foreign body may be challenging. Albeit rare, foreign bodies should be included in the differential diagnosis for patients who present with unusual lower urinary tract histories, such as this patient. Despite questioning this preteen with his first febrile UTI about a foreign object insertion, he denied it. Diminished communication and altered perceptions associated with Asperger syndrome probably contributed to the delay in diagnosis. Physical examination including urethral palpation might have led to the diagnosis sooner but still would have required radiologic confirmation. Furthermore, viridans streptococcus is most classically recognized for causing endocarditis following tooth extraction, not as a bacteria commonly causing UTI. Growth of abnormal bacteria in the urine should also raise flags for a urinary foreign body.

CONCLUSION

Removing urethral foreign bodies may be challenging and requires several approaches. We introduce a novel technique using Hartmann ear forceps to remove degraded metallic spheres under cystoscopic guidance through a limited urethrotomy.

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