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Genitourinary

Ureterovaginal fistula secondary to retained vaginal foreign body in a young girl

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ABSTRACT

We present the case of a 13-year-old girl with a recurrent urinary tract infection, malodorous vaginal discharge, and urinary incontinence caused by a retained vaginal foreign body. The foreign body, an aerosol cap retained for over 2 years, resulted in the formation of a ureterovaginal fistula, an extremely rare complication. The critical value of ultrasound and magnetic resonance urography in delineating the foreign body, the fistulous tract, and the intraperitoneal urine leak is described. Through this unique diagnostic dilemma, we wish to highlight that the evaluation of persistent unusual urinary symptoms and vaginal discharge in a young girl must include a thorough pelvic examination and focused imaging to look for retained vaginal foreign bodies.

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Introduction

In developed countries, genitourinary fistulas occur most frequently after gynecological or obstetric surgeries, severe pelvic infections, and radiotherapy. On the other hand, in developing countries, these fistulas are often seen as a complication of obstructed labor during childbirth. Vaginal foreign bodies are also a known cause of vesicovaginal fistulas, and numerous such cases have been reported in the literature, mostly in adults [1]. Retained vaginal foreign bodies are not uncommon in young children, but the history is often difficult to elucidate and serious complications such as genitourinary fistula and incontinence can develop [2]. Almost all of the reported ureterovaginal fistulas have been a complication of gynecological and obstetric procedures [3,4]. Only 1 case report describes a ureterovaginal fistula as a sequela of a vaginal

foreign body, that too in combination with a vesicovaginal fistula [5]. To our knowledge, ours is the first report of a ureterovaginal fistula developing in relation to a retained vaginal foreign body in a young girl.

Case report

A 13-year-old otherwise healthy girl presented with a 2-year history of a recurrent urinary tract infection with foul-smelling urine. The girl also had a recurrent vaginal leakage and a presumed diagnosis of recurrent bacterial vaginosis. The patient had been toilet trained at 2 years of age and did not have a past history of incontinence. However, the patient now had constant drainage of clear-appearing fluid from the vagina during the day and at night. In the month preceding the patient's pre-

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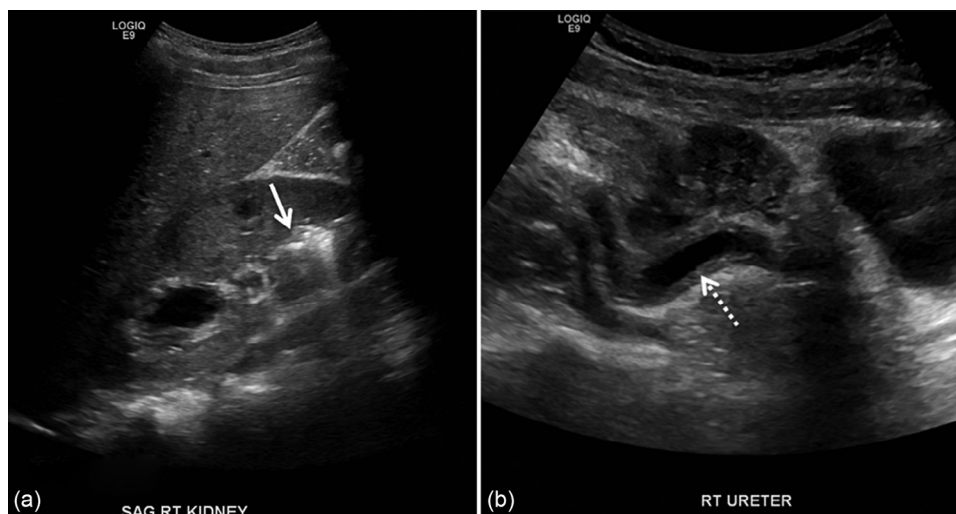


Fig. 1 – Renal sonogram in a 13-year-old girl with a recurrent urinary tract infection and vaginal leakage of a foul-smelling discharge. (A) Grayscale longitudinal image of right kidney demonstrates a mild calyceal dilatation in the upper pole and a reverberation artifact (white arrow) from air in the lower pole calyces. (B) Grayscale longitudinal image of the right distal ureter shows ureteral dilatation and urothelial thickening (dotted arrow). The presence of air in the collecting system and pelvicalyceal and ureteral dilatations along with urothelial thickening are findings suspicious for genitourinary fistula. RT, right; SAG, sagittal.

sentation to our hospital, she developed suprapubic pain, high fever, and chills, and was diagnosed with pyelonephritis. The patient was started on antibiotics and needed to wear diapers around the clock because of urine leakage.

A review of the patient's systems showed that these were negative for allergies, chronic medical problems, and surgical history. The patient's vital signs and general physical exami-

nation were within normal limits. The test result for sexually transmitted infections was negative. The vaginal examination was normal externally with an orthotopic urethral orifice. Clear fluid, possibly urine, was noted pooling in the vaginal vault. An ectopic ureteral orifice could not be identified, but the fluid was certainly not emanating from the urethra.

Renal–bladder and pelvic sonograms, performed at an outside facility, showed a partially duplicated right collecting



Fig. 2 – Grayscale sagittal image of the uterus shows a fluid-distended vagina with a linear echogenic structure (arrow) within. This was noted to be the retained vaginal foreign body, in retrospect. SAG, sagittal.

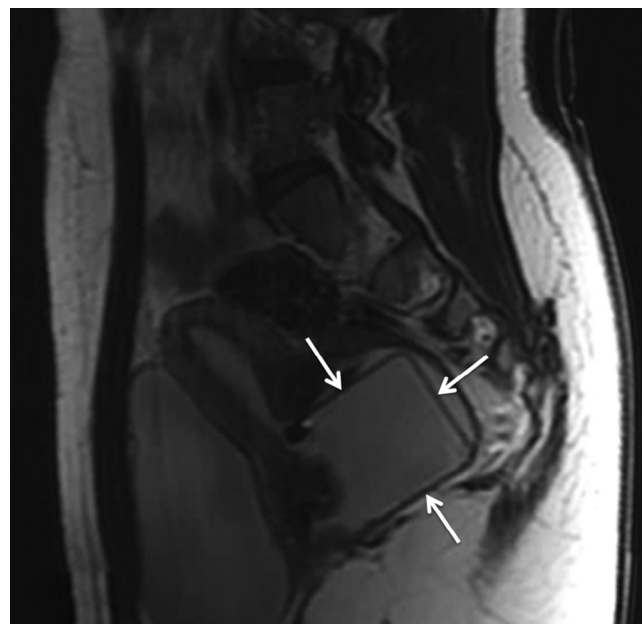


Fig. 3 – Midline sagittal T2-weighted magnetic resonance image of the pelvis shows the hypointense rectangular cup-shaped foreign body (arrows) located deep in the vaginal vault with hyperintense fluid in and around it.

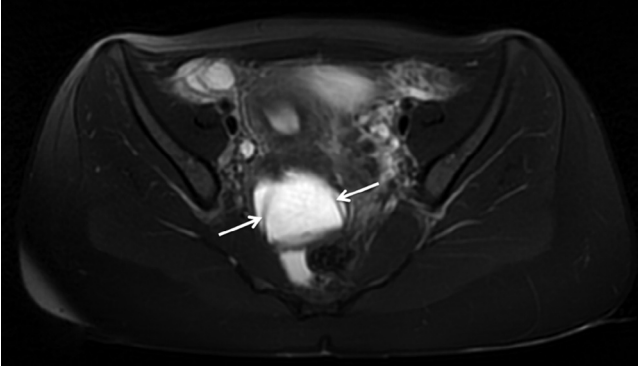


Fig. 4 – Axial T2 Fatsat Propeller magnetic resonance image of the pelvis shows the hypointense sidewalls of the rectangular cup-shaped foreign body (arrows) located in the vagina with hyperintense fluid in and around it.

system with mild dilatation of the upper pole calyces and right distal ureteric dilatation. There was fluid distending the vagina. Per report, the possibility of a right ectopic ureter inserting into the vagina, which may cause recurrent infections, was entertained; however, it was considered atypical to see it presenting this late. A retrospective review of the sonogram showed that there was reverberation artifact from air in the right renal collecting system, and a mild distal ureteral wall thickening, both findings suspicious for a genitourinary fistula (Fig. 1A and B). Additionally, a linear echogenic shadowing structure in the vagina was overlooked, which on hindsight was the retained foreign body in the vaginal vault (Fig. 2). It was decided to proceed with magnetic resonance urography for better delineation of the genitourinary system in this patient.

Contrast-enhanced dynamic diuresis magnetic resonance urography showed bilateral bifid collecting systems with a

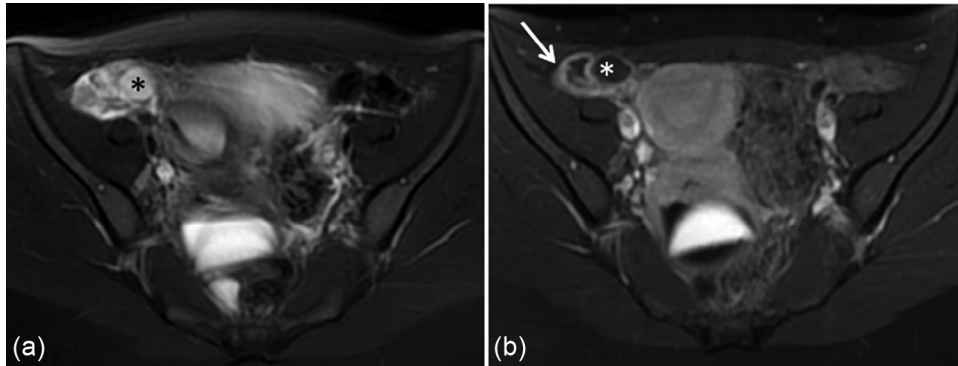


Fig. 5 – Pelvic magnetic resonance (A) axial T2-weighted Fatsat Propeller image shows a small amount of free fluid in the right lower quadrant surrounding the right ovary (asterisk). (B) Post contrast Axial T1 Fatsat image of pelvis at the same level shows an enhancement of the peritoneum and fluid in the right lower quadrant (arrow), findings suspicious for infection or inflammation.

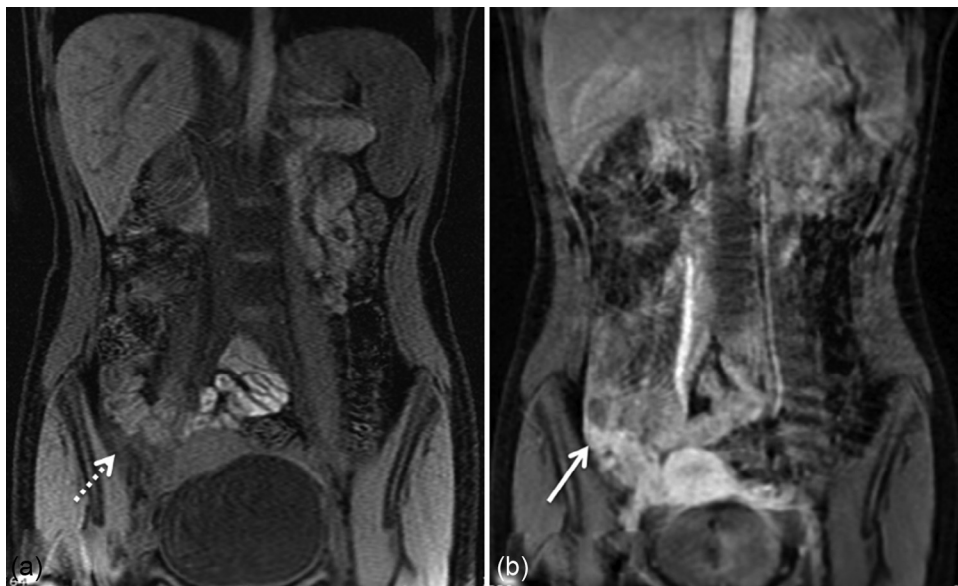


Fig. 6 – Contrast-enhanced dynamic diuresis magnetic resonance urography. (A) Precontrast coronal oblique LAVA-Flex image of the abdomen shows some free fluid in the right lower abdomen (dotted arrow). (B) Postcontrast coronal oblique LAVA-Flex image of the abdomen demonstrates a mildly dilated and enhancing right mid ureter with a diffuse contrast accumulation in the right lower abdomen (arrow) and pelvis, suggesting urine leakage.

normal left kidney and ureter. On the right side, there was a mild pelvicalyceal dilatation with hydroureter. The vagina was markedly distended with fluid and the right distal ureter appeared to insert into the vagina. A rectangular cup-shaped foreign body was wedged deep in the vaginal vault (Figs. 3 and 4). A small amount of free fluid was present in the right lower abdomen and pelvis, which on delayed postcontrast images demonstrated rim enhancement, suggesting inflammation or infection (Fig. 5A and B). The vaginal fluid also showed a postcontrast enhancement compatible with a ureterovaginal fistula, which was best appreciated on the sagittal multiplanar reconstructed images (Figs. 6A and B, 7, and 8).

Cystoscopy was performed and showed an intact urethra and bladder, and no evidence of ectopic ureter. A free left ureteral jet was seen, but no jet was seen from the right ureteral opening. Bilateral retrograde pyelogram revealed a normal left collecting system, but there was no opacification of the right ureter. Instead, on the right, contrast was seen extravasating in the right lower abdomen. The right ureteral catheter could not be advanced up the ureter but appeared to coil in a cir-

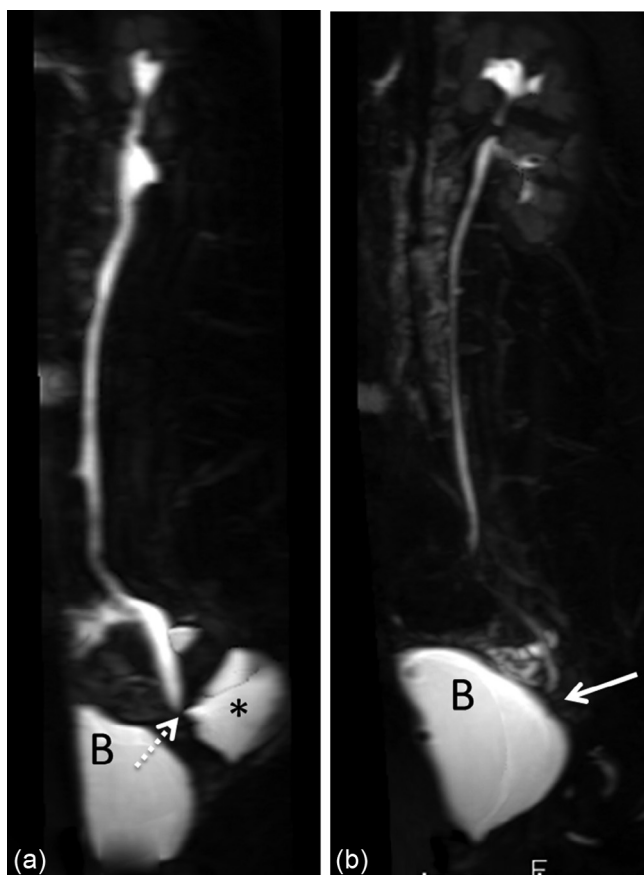


Fig. 7 – Contrast-enhanced dynamic diuresis magnetic resonance urography. (A) Sagittal oblique delayed MPR image of right kidney and ureter shows a mild dilatation of the right collecting system and the ureter. The right ureter (dotted arrow) is seen inserting posterosuperiorly into the contrast-filled vagina (*). (B) Sagittal oblique delayed MPR image of left kidney and ureter shows a normal orthotopic insertion of the left ureter (arrow) into the bladder (B). MPR, multiplanar reformation.

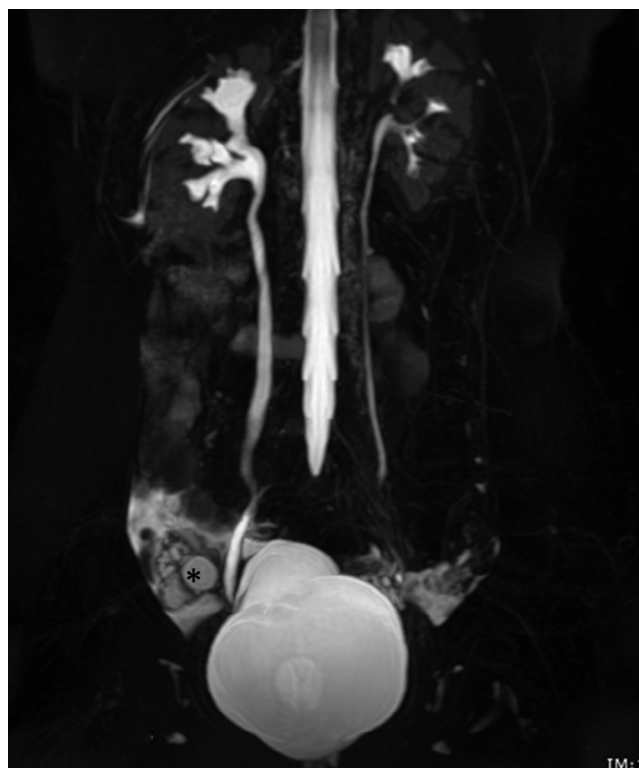


Fig. 8 – Delayed coronal oblique 3-dimensional T2 FS RTR image redemonstrates free contrast in the right lower abdomen consistent with the urine leak. There is a mildly dilated right renal collecting system and ureter. The right ovary (asterisk) is seen surrounded by free fluid in the right lower quadrant.

cular object in the pelvis (Fig. 9). While still under anesthesia, a vaginal examination was performed but did not reveal any abnormality. On bimanual examination, however, a squarish foreign body was palpated. With use of a hot-tip cautery pen to melt the plastic, the cup was successfully removed. This plastic cup had been wedged within the vaginal vault with some granulation of vaginal tissue around it. The cup edge had eroded into the right ureter, creating a ureterovaginal fistula and causing the patient's vaginal leakage of urine, clinically presenting as incontinence. Because of the significant phlegmon, the patient was discharged on antibiotics. Two weeks' follow-up renal ultrasound showed mild vaginal fluid but no hydronephrosis. Six weeks later, the patient underwent a definitive repair with right ureteral reimplantation and stent placement. The patient did very well postoperatively with minimal pain and discomfort. The right ureteral stent was removed after 5 weeks. A follow-up renal sonogram was reassuring and did not reveal hydronephrosis or hydroureter.

Discussion

The incidence of vaginal foreign bodies in girls younger than 13 years was 4% in a meta-analysis by Siddiqui and Paraiso [1]. The

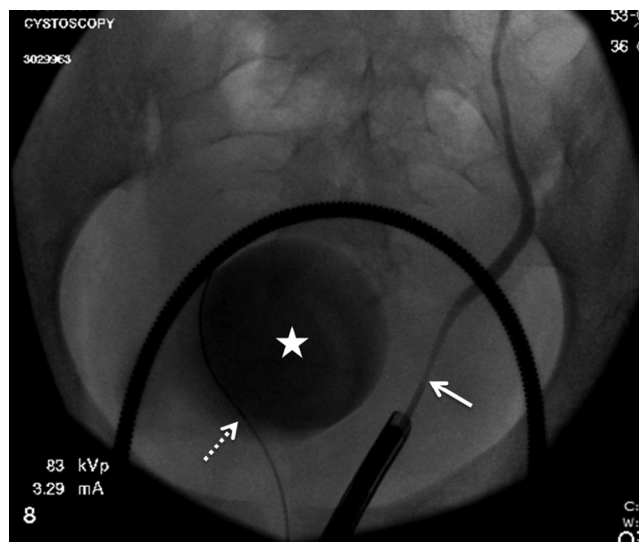


Fig. 9 – Frontal image of the pelvis during cystoscopy and retrograde pyelogram shows optimal contrast opacification of the normal left ureter (arrow). The right ureteral catheter (dotted arrow) could not be advanced up the ureter but appeared to coil in a circular object in the pelvis, which showed contrast pooling within (star). The contrast was in fact pooling within the vaginal foreign body.

most common vaginal foreign body reported in prepubertal girls is toilet paper. Other common foreign bodies include marbles, beads, toys, crayons, coins, stones, hair pins, fruit pits, and bottle caps [1]. The presence of foreign body in the vagina may remain undetected for a long time [6]. A foreign body reaction and inflammatory response of the vaginal wall may cause a papillary growth of mucosa around the foreign object, resulting in prolonged retention [1]. In a study by Stricker, 11% of girls had symptoms for more than a year before evaluation and treatment [1]. Reasons for delayed diagnosis include unclear history, fear and embarrassment about vaginal complaints, and difficulty performing a thorough physical examination in a child [1]. Foreign bodies in the vagina may often be self-inserted either because of childhood curiosity or for sexual gratification, and the latter association can contribute to a lack of accurate history [1]. A brief communication has described that, in some communities, it is a common practice for girls to masturbate using aerosol canisters [7]. However, the presence of any vaginal foreign body in a prepubertal girl should elicit concern for sexual abuse, and testing for sexually transmitted infections should be included in the workup [8].

The potential of abuse was raised in our case, and a multidisciplinary approach between the primary providers, social services, and urology and gynecology teams proved to be useful. During a confidential examination with the gynecologist, the patient admitted to placing capped aerosol bottles of different sizes in the vagina because it felt good, but stated she had not indulged in that for over 2 years. The patient had no idea the aerosol cap was in her body. She denied anyone assisting with placing things in the vagina or touching her inappropriately. Safe expressions of sexuality and abstinence through high school were encouraged in the counseling session.

The main symptom of patients with genitourinary fistula is a continuous involuntary discharge of urine into the vaginal vault [3]. Vaginal discharge is also a common presentation in

patients with vaginal foreign bodies [6]. Diagnostic strategies to rule out a vaginal foreign body include careful history taking, thorough genital examination, pelvic ultrasound, plain radiography of the abdomen and pelvis, cystoscopy, vaginoscopy, computed tomography, and magnetic resonance imaging (MRI). In young girls, magnetic resonance urography is preferred to computed tomography because MRI provides a complete view of the entire urogenital tract without the need for ionizing radiation, and offers excellent soft tissue resolution of the pelvic and abdominal visceral pathology. After the administration of an intravenous paramagnetic contrast, the contrast accumulation in the vaginal vault on the delayed sequences allows diagnosis of a genitourinary fistula formation. MRI not only delineates the fistulous tract but also demonstrates an intraperitoneal urine leak with ease, and these critical observations further aid in appropriate surgical planning.

In conclusion, persistent urinary leakage is a hallmark sign of genitourinary fistula formation with vaginal discharge being commonly associated. Ureterovaginal fistula is an extremely rare complication of a retained vaginal foreign body in a child. The possibility of a vaginal foreign body must be considered in a child presenting with vaginal discharge, not responding to hygienic measures and medical therapy. Through our case report, we demonstrate the diagnostic potential of ultrasound and magnetic resonance urography in reliably detecting the retained vaginal foreign body, ureterovaginal fistula, and intraperitoneal urine leak.

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