



Delayed Presentation of Post-Traumatic Urethrovaginal Fistula: Case Report

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Abstract

Objective: We present the case of a female with a history of severe pelvic injury at the age of five, who developed a fistula and vaginal stenosis 18 years later. This case underscores the importance of prompt diagnosis, thorough imaging, and consistent postoperative follow-ups. **Case report:** A 23-year-old female with a history of cyclic hematuria, lower abdominal pain, and difficulties with urinary and sexual activities following a severe motor vehicle accident at the age of 5 years, resulting in pelvic fractures, complete urethral transection, and vaginal lacerations. Surgery was performed, but irregular postoperative follow-up led to complications, including vaginal stenosis and cyclic hematuria coinciding with menstruation at age 12. Despite the vaginoplasty, the symptoms persisted. At 23 years of age, imaging studies confirmed the diagnosis of urethrovaginal fistula. **Result:** Two years after surgery, she had a normal sexual life and menstrual cycle. However, did not conceive for personal reasons and is currently on contraceptive use. **Conclusion:** This case highlights the delayed presentation, management, and importance of long-term follow-up, advanced imaging, and surgical strategies to achieve optimal outcomes of post-traumatic urethrovaginal fistulas in pediatric pelvic trauma.

Subject Areas

Obstetrics and Gynecology

Keywords

Urethrovaginal Fistula, Pelvic Injury, Pediatric Pelvic Trauma, Case Report

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1. Introduction

Urethrovaginal fistula (UVFs) is an uncommon yet significant cause of morbidity in women and is characterized by abnormal communication between the urethra and vagina [1]. This condition is a rare but devastating complication with an incidence rate ranging from 0.9% to 8.3%, and is often associated with obstetric trauma, malignancy, or pelvic surgery [2] [3]. Even rarer are post-traumatic UVFs, particularly those following severe pelvic injuries, which present unique challenges owing to their complexity and delayed onset of symptoms [4]. UVFs typically result in continuous or intermittent urinary leakage through the vaginal canal, leading to a significant impairment of the patient's physical, emotional, and social well-being. In post-traumatic cases, the presentation of complications can be delayed by years or even decades, making diagnosis and management particularly challenging [2].

Post-traumatic UVFs most often result from direct injuries to the pelvic region caused by pelvic fractures, high-energy blunt trauma, or penetrating injuries, such as motor vehicle accidents [5]. In pediatric populations, such injuries are uncommon but can have devastating long-term consequences. This is due to incomplete development of the pelvic anatomy and surrounding soft tissues, which makes them more vulnerable to severe damage [6]. When trauma occurs during childhood, the full extent of the injury may be unclear until puberty or early adulthood. Events such as menstruation, sexual activity, or pregnancy can unmask latent complications including vaginal stenosis, fistula formation, or obstructive symptoms caused by scarring and anatomical distortion [7].

Given the delayed presentation of post traumatic UVFs, diagnosis necessitates a heightened level of suspicion, especially in patients with a history of pelvic trauma who present with urinary incontinence or persistent urinary symptoms [8]. This case emphasizes the importance of long-term follow-up of pediatric pelvic trauma to identify and address delayed complications early in life. It also highlights the role of advanced imaging and surgical interventions in managing complex cases of post-traumatic UVFs. This report illustrates these challenges in the case of a young woman who experienced significant complications from pelvic injury sustained during childhood.

2. Case Presentation

This case presentation details the patient's history, diagnostic process, and multidisciplinary treatment approach, exemplifying the outlined complexities.

Patient history: An Asian female aged 23 years presented with a long-standing history of cyclic hematuria, persistent lower abdominal pain, urinary symptoms, and difficulty in sexual intercourse. Her symptoms began 18 years earlier following severe pelvic trauma sustained in a motor vehicle accident at 5 years of age. She underwent emergency urethral and vaginal anastomosis after pelvic fractures, complete urethral transection, and vaginal lacerations; however, postoperative follow-up was irregular. Due to the long-standing time, the detailed surgical

records of the patient when they were five years old could not be obtained. The only available information shows that a laparotomy was performed at that time, including ureterostomy and bladder rupture repair.

At 12 years of age, the patient developed cyclic hematuria coinciding with menstruation along with lower abdominal pain. Gynecological evaluation revealed vaginal stenosis with a transverse septum, necessitating vaginal exploration surgery and vaginoplasty. Despite undergoing surgery, cyclic hematuria persisted every 28 days for five days, with associated lower abdominal pain, overflow urinary incontinence, bifurcated urinary stream, and frequent urinary urgency.

At age 23, she sought treatment for difficulty with sexual activity, and imaging revealed a severely narrowed vaginal cavity suggestive of a urethrovaginal fistula.

On admission, physical examination revealed a vaginal depth of 3 cm with a closed apex and no visible cervix. Bimanual examination revealed an enlarged, anteriorly positioned uterus with poor mobility and no adnexal abnormalities.

Diagnostic Findings: Imaging, including transabdominal ultrasound (**Figure 1**), revealed that the endometrium was 1.3 cm thick, and the upper vagina was approximately 2.95 cm long, showing a separated mucosal line and a small fluid presence. The lower vaginal segment measures approximately 2.70 cm in length. A strong echogenic line separates the upper and lower segments with the lower segment connected to the urethra. Pelvic MRI (**Figure 2**) identified a cystic dilation of the upper vagina measuring $1.63 \times 4.06 \times 2.97$ cm and abnormal communication between the urethra, vagina, and bladder, consistent with a urethrovaginal

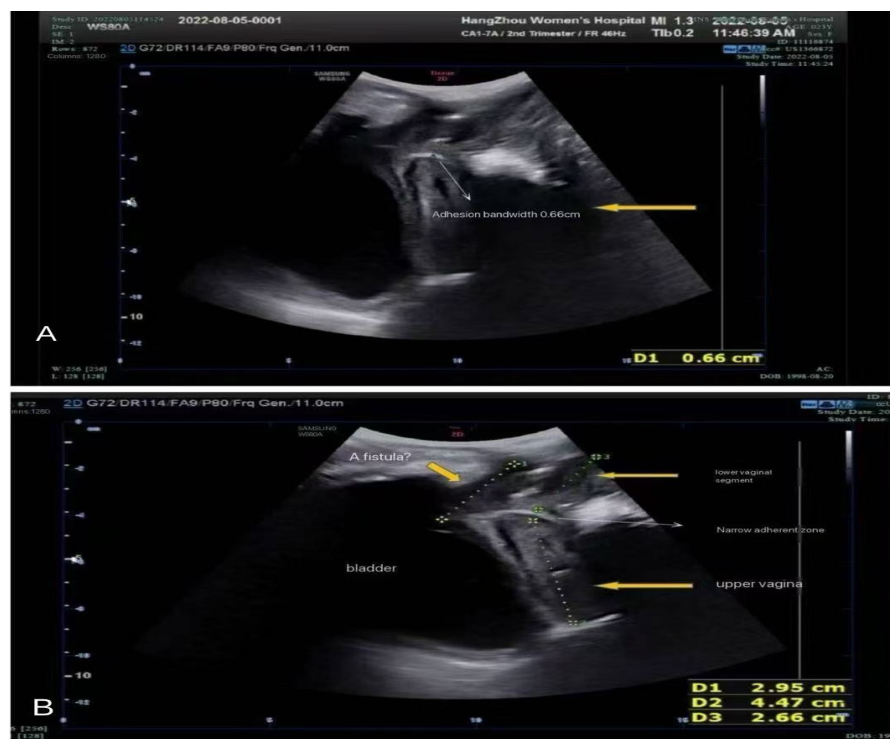


Figure 1. Transabdominal ultrasound.

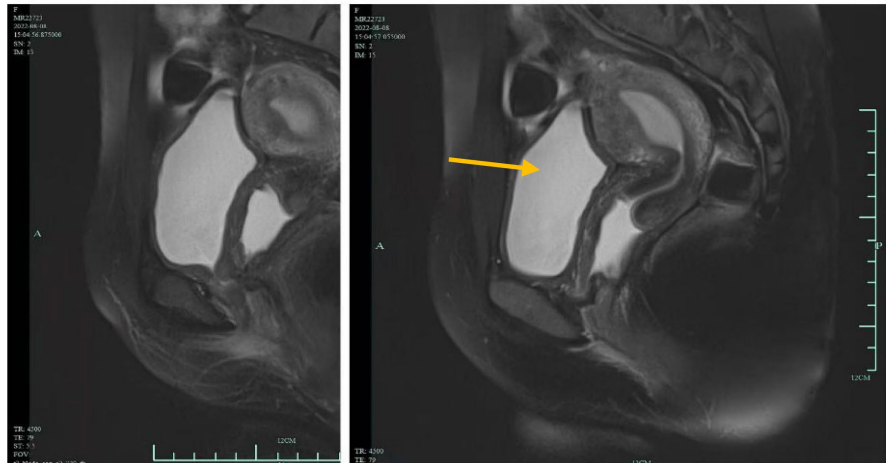


Figure 2. Pelvic MRI arrow showing cystic dilation of the upper vagina.

fistula. Cystoscopic evaluation of the bladder revealed a morphologically abnormal mucosa with multiple inflammatory follicles. Both ureteric orifices were identified and appeared normal. No obvious fistula was visualised on initial inspection. To further assess for possible fistulous communication, melan fluid was injected through the diaphragm while observing the bladder under ultrasound. This resulted in expansion of the upper vagina and the appearance of gas shadow tracking from the vagina into the bladder near the bladder neck. Closer inspection revealed three small fistulous openings, each measuring approximately 0.3 cm, located at the 5, 6, and 7 o'clock positions adjacent to the urethral opening of the bladder neck. Injection of melan confirmed communication, as dye was seen spilling from the fistula (**Figure 3**). The bladder mucosa did not demonstrate melan fluid leakage. The final diagnosis was post-traumatic vaginal stenosis with atresia and a urethrovaginal fistula.

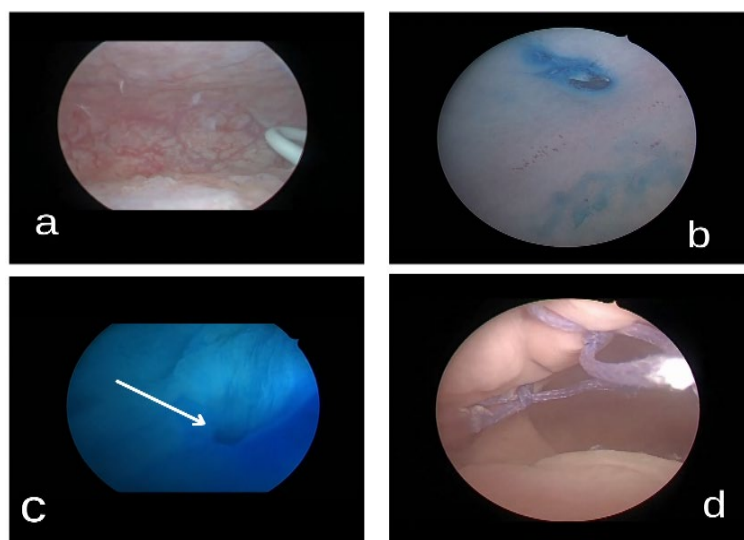


Figure 3. a, b: Cystoscopy, vaginal endoscopy; c: The arrow shows a fistula near the neck of the preoperative bladder; d: Postoperative cystoscopy showing urethrovaginal repair.

Treatment and outcomes: The patient underwent a combined surgical approach involving: 1) Cystoscopy; 2) Laparoscopy; 3) Vaginoplasty; 4) Urethrovaginal fistula repair (**Figure 3**), which resulted in good wound healing. The Meilan test, a diagnostic procedure used to assess the integrity of the repaired fistula, yielded negative results. These procedures collectively resulted in the resolution of cyclic hematuria, improved urinary function, and restored sexual activity.

This case demonstrates delayed presentation and complex management of post-traumatic urethrovaginal fistulas, highlighting the need for early intervention, multidisciplinary surgery, and long-term follow-up in pediatric urogenital trauma management.

3. Discussion

This case highlights the challenges in managing traumatic urethrovaginal fistulas, particularly in pediatric patients. Traumatic urethrovaginal fistulas are rare, but particularly challenging in pediatric populations, where pelvic trauma is less frequent [9]. This case illustrates the delayed presentation of complications, including urethrovaginal fistula and stenosis, arising from incomplete healing after early childhood surgery.

Challenges in Diagnosis: In patient's delayed manifestations of symptoms, including cyclic hematuria, urinary incontinence, and sexual dysfunction, are consistent with previous studies suggesting that pelvic injuries sustained during childhood may not fully manifest until critical physiological milestones such as puberty, menarche, or sexual activity [7]. For instance, menarche or pregnancy can worsen scarring and cause anatomical disruptions, potentially leading to the development of conditions, such as vaginal stenosis or fistula formation. This case emphasizes the need for long-term follow-up to detect complications that can affect a patient's quality of life.

Advanced imaging, particularly MRI and ultrasound, is vital for diagnosis and surgical planning. Pelvic MRI showed detailed anatomy, revealing cystic dilation of the upper vagina and abnormal vaginal-urethral communication. MRI has been identified in the literature as a cornerstone for the evaluation of complex fistulas [10]. This imaging modality is particularly valued for its ability to define the soft tissue anatomy and guide surgical planning [11]. Given the complexity and multiple fistulas observed near the bladder neck, cloacal malformation was considered among the differential diagnoses. However, cystoscopy revealed distinct ureteric orifices, without evidence for a congenital common channel. Coupled with the patient's history of trauma-associated onset, these findings effectively excluded cloacal malformation and supported post-traumatic urethrovaginal fistula as the diagnosis. This case further supports the utility of imaging as an essential tool for defining complex anatomy, particularly in patients with a history of severe childhood trauma.

Surgical management: This approach combines cystoscopy, laparoscopy, vaginoplasty, and urethrovaginal fistula repair, thereby addressing both the functional and anatomical challenges. Minimally invasive procedures such as laparoscopy have

been particularly valued because of their precision, reduced morbidity, and enhanced recovery in complex cases [12] [13]. The successful resolution of the patient's symptoms emphasizes the importance of a comprehensive surgical strategy. The decision to proceed with a combined laparoscopic and vaginal approach for fistula repair aligns with pediatric and urotrauma recommendations that advocate prompt surgical reconstruction in stable patients with urethral injuries accompanied by vaginal involvement, preferably via a multidisciplinary, minimally invasive approach in a single setting when local and systemic conditions permit [14].

The importance of follow-up: Multidisciplinary collaboration involving urology, gynecology, and reconstructive surgery is instrumental in achieving positive outcomes. The resolution of cyclic hematuria, improved urinary function, and restored sexual activity demonstrate the effectiveness of these approaches. This case aids in the understanding of delayed complications after pediatric pelvic trauma, and highlights the importance of advanced imaging, multidisciplinary care, and long-term follow-up for optimal outcomes.

4. Follow Up

Two years after the operation, a follow-up examination showed that the patient's urination was normal, with no urine leakage. The residual urine volume measured by ultrasound was zero. The patient also reported a satisfactory quality of sexual life, with a Female Sexual Function Index (FSFI) score of 28. However, she did not conceive for personal reasons and is currently on contraceptive use.

Future fertility considerations: Given the extent of vaginal and urethral reconstruction required after pelvic trauma, ongoing monitoring of future fertility and pregnancy outcomes is important; current urotrauma guidelines emphasize that even in complex genitourinary reconstructions, attention should be paid to preserving reproductive potential and minimizing adhesions and scarring to preserve fertility planning [14] [15].

5. Conclusion

This case demonstrates the challenges of delayed post-traumatic UVFs in pediatric patients. This highlights the need for an early diagnosis, thorough imaging, and multidisciplinary management. It also emphasizes consistent postoperative follow-up in pediatric trauma cases to address complications and improve outcomes.

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Authors' Contributions

Every author played a role in composing and critically evaluating the manuscript and offered input on its readiness for publication.

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Availability of Data and Materials

The data analyzed in this report can be made available by the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

This case report received ethical approval from Hangzhou Obstetrics and Gynecology Hospital. Stringent protocols were implemented to safeguard patient privacy and ensure confidentiality with no disclosure of personal information. The research was conducted in compliance with established ethical guidelines and regulations for clinical practice and protection of human subjects.

Consent for Publication

The individual described in this case study granted permission for publication of their medical information and associated images. The Editor-in-Chief of the journal had access to review the patient's signed authorization form.

Declaration of Generative AI and AI Assisted Technologies in the Writing Process

Generative AI was not used in this study.

Conflicts of Interest

The authors declare no conflicts of interest.

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Abbreviations

AUA	American Urological Association
MRI	Magnetic Resonance Imaging
UVFs	Urethrovaginal fistulas