Urology Case Reports 61 (2025) 103081

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr

Pediatrics

Complete transverse vaginal septum complicated by pyocolpos, primary vesicoureteral reflux and ectopic ureter with renal loss: a case report

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ARTICLE INFO

Keywords:
Urogenital abnormalities
Imperforate vagina
Vesicoureteral reflux
Ectopic ureter
Pediatric urology

ABSTRACT

A transverse vaginal septum is a rare Müllerian anomaly caused by incomplete fusion between the Müllerian ducts and the urogenital sinus. It can obstruct menstrual flow, leading to hematocolpos, hydrocolpos, or pyocolpos. We report a 12-year-old girl with recurrent hematocolpos, abdominal pain, urinary symptoms, and infections. Imaging showed a complete transverse vaginal septum and grade II vesicoureteral reflux. She underwent surgical drainage, septum resection, and ureteral reimplantation. Recovery was favorable, with symptom resolution and preserved renal function. This case emphasizes the need for early diagnosis and a multidisciplinary approach to avoid long-term complications in complex urogenital anomalies.

1. Introduction

Müllerian malformations represent a spectrum of structural anomalies resulting from failure of midline fusion of the Müllerian ducts, incomplete connection with the urogenital sinus, or inadequate canalization of the upper vaginal and uterine cavity.[1] In the case of a complete transverse vaginal septum, there is a failure in the fusion and/or canalization between the urogenital sinus and the Müllerian ducts.[2] Vesicoureteral reflux (VUR) is characterized by the retrograde flow of urine from the bladder into the upper urinary tract. It is a known risk factor for febrile urinary tract infections (UTI) and may lead to renal parenchymal damage and chronic kidney disease.[3]

Ultrasonography is typically the first-line imaging modality for initial evaluation. Abdominopelvic magnetic resonance imaging (MRI) provides a comprehensive assessment of Müllerian anomalies, accurately identifies associated complications, and enhances anatomical detail when the presence or location of a vaginal septum is unclear.[4] Voiding cystourethrography (VCUG), which visualizes the retrograde flow of urine into the upper urinary tract, remains the gold standard for evaluating VUR and determining its severity.[5]

Early diagnosis and timely management – whether conservative or surgical – are essential to avoid long-term complications.[6,7] In this report, we presente the case of a 12-year-old girl with recurrent hematocolpos and UTI, referred to a specialized center for investigation and definitive resolution of the condition. Laboratory and imaging studies were initiated, followed by surgical interventions aimed at treating the underlying anomalies and their complications.

2. Case description

A 12-year-old white female, with no prior comorbidities or continuous medication use, was referred to a pediatric surgery center for investigation of cyclical hematocolpos.

Prenatal ultrasonography had shown a left renal malformation according to the mother's report, though neonatal outcomes were unremarkable. At 3 months of age, she developed fever and irritability and was diagnosed with a urinary tract infection (UTI), requiring hospitalization. Ultrasound performed during the period revealed right-sided vesicoureteral reflux (VUR) and an ectopic left ureter. She was discharged with antibiotic prophylaxis and outpatient follow-up, which was not maintained. Her mother reported recurrent UTIs (5–6/year), most often afebrile, urinary dribbling, and care through a primary health

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https://doi.org/10.1016/j.eucr.2025.103081
Received 30 April 2025; Received in revised form 21 May 2025; Accepted 27 May 2025
Available online 28 May 2025

unit. Neuropsychomotor development and school performance were normal. Family history included healthy parents and a younger sister with tetralogy of Fallot.

Three months prior to referral, she developed severe colicky abdominal pain and had not experienced menarche yet. The ultrasound showed a cystic image with anechoic content in the left adnexal region and a collection in the vaginal topography, corresponding to hematosalpinx and hematocolpos. At the initial care institution, she underwent three procedures vaginally to drain hydro/hematocolpos over six months before being referred for specialized care.

On physical exam, she appeared in good general condition, with a palpable, tender abdominal mass in the right hypochondrium and iliac fossa. Genital examination revealed bulging at the vaginal introitus and difficulty locating the urethral meatus. Abdominal CT showed left hydronephrosis with cortical thinning, uterine enlargement, a tubular formation adjacent to the vaginal canal, and bilateral ovarian cysts. In-house ultrasound confirmed a heterogeneous hypoechoic collection suggestive of hematocolpos and hematometra (Fig. 1).

She was admitted for supportive care and started on gentamicin and ceftriaxone. The following day, under general anesthesia, genital examination confirmed a blind-ending vagina with a fluctuant area in the mid-anterior vaginal wall. A 25 × 7 mm needle puncture yielded thick, dark, foul-smelling pyohematic fluid. A 14G catheter drained 250 mL of pyocolpos, and the fluid was sent for culture. Progressive dilation with tracheal suction catheters (8, 10, 12 Fr) and marsupialization around a vaginal drain using 4-0 and 5-0 catgut sutures were performed.

She remained hospitalized for further anatomical assessment. Six days later, she underwent cystoscopy and right-sided retrograde pyelography. The bladder had smooth walls, with a dilated, dysmorphic right ureteral orifice near the bladder neck; no trigone or left ureteral orifice was visualized. Right-sided pyelography confirmed the anatomical correspondence without ureteral crossing. Genital inspection revealed a paraurethral orifice with citrine discharge, likely corresponding to an ectopic left ureter.

Intraoperative ultrasound showed residual hydrometrocolpos. A 14G puncture was performed, followed by serial dilation with tracheal suction catheters and Hegar dilators (sizes 8 to 14). Marsupialization was completed with 3-0 and 5-0 PDS sutures, and a 24 Fr Foley catheter was left intravaginally for healing. On postoperative day 7, with completed 14-day antibiotic therapy, the catheter was removed. The patient had good pain control and was discharged with outpatient follow-up.

At follow-up one month later, she reported two menstrual episodes with moderate flow, foul odor, dysmenorrhea, and persistent urinary dribbling. Renal scintigraphy (DMSA) showed a functional right kidney (98.96 %) with scarring, and a hypoplastic left kidney (1.04 %). VCUG revealed grade II right-sided VUR with distal ureteral dilation (Fig. 2).

Due to the presence of left renal dysfunction and recurrent episodes of pyelonephritis, elective laparoscopic left ureteronephrectomy and vaginoplasty were performed without complications.

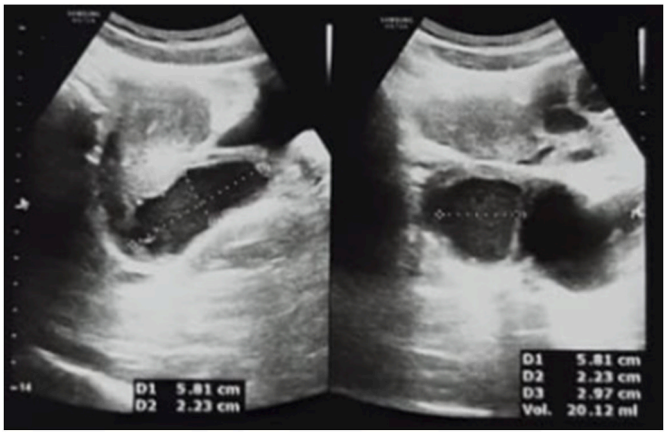

Fig. 1. Ultrasound suggestive of vaginal collection.

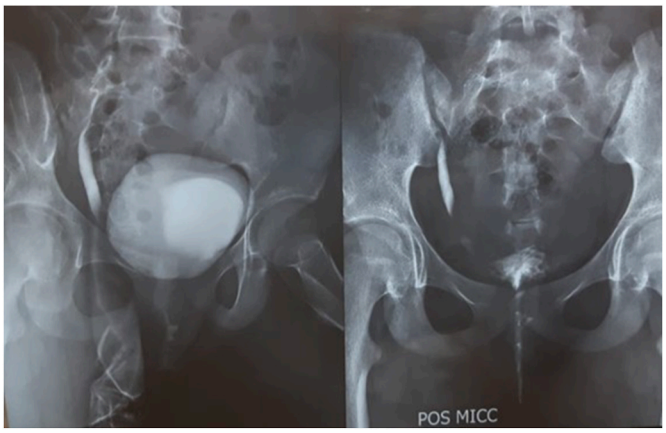

Fig. 2. VCUG revealing grade II right-sided.

The left ureteronephrectomy was carried out under general anesthesia via a laparoscopic approach. Upon accessing the abdominal cavity, no abnormalities were observed. Dissection of the left retroperitoneum revealed areas of friable connective tissue and perirenal adhesions. The left kidney and ureter were dissected and subsequently resected (Fig. 3).

Vaginoplasty was performed under general anesthesia. Upon speculum examination, a scar was noted on the posterior vaginal wall. Puncture of the vaginal cul-de-sac yielded 40 mL of purulent secretion. An incision was made at the vaginal fundus, followed by the division of

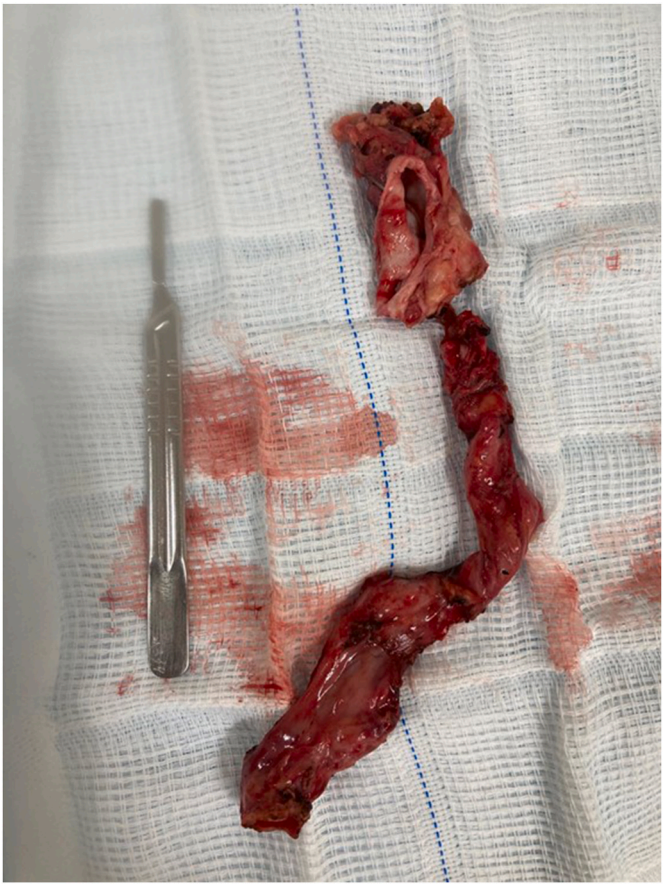

Fig. 3. Left nephroureterectomy product. It is possible to visualize total loss of the renal cortex and significant ureteral dilation.

the septum separating the two hemi-vaginas. The vaginal edges were sutured with 2-0 Vicryl. Speculum examination post-procedure allowed visualization of the cervix, and bimanual examination was unremarkable.

Additionally, urodynamic evaluation was performed outpatient. Uroflowmetry revealed a voided volume of 472 mL, a post-void residual of 10 mL, and a maximum flow rate of 30 mL/second, with a bell-shaped curve. Cystometry demonstrated a functionally reduced bladder capacity, difficult assessment of bladder sensitivity due to urinary leakage, and detrusor overactivity characterized by low-amplitude involuntary contractions associated with significant urinary leakage. The estimated leak point pressure was 14 cm H_2O.

The patient was admitted electively for a right ureteral reimplantation aiming to correct vesicoureteral reflux (VUR). Upon admission, she was menstruating but reported no gynecological complaints. Genital examination showed a patent vaginal canal approximately 2 cm in diameter along its entire length, with a fibrotic band on the posterior vaginal wall (Fig. 4).

The ureteral reimplantation was performed under general anesthesia via a Pfannenstiel incision, followed by layered dissection. The right ureteral orifice was identified approximately 5 mm from the bladder neck, catheterized with an 8 Fr probe, and mobilized. Dissection of the ureter and bladder wall was carried out, and a submucosal tunnel approximately 4 cm in length was created (Fig. 5). The ureter was reimplanted using 5-0 PDS sutures, and the bladder wall was closed with 3-0 and 5-0 PDS sutures. A double-J stent was inserted on the right side, scheduled for removal by cystoscopy after 30 days.

Prior to surgical intervention, the patient experienced recurrent hematocolpos secondary to an imperforate vagina, along with multiple urinary tract infections attributed to left renal atrophy. Following drainage of the pyocolpos and vaginoplasty, the patient exhibited irregular menstruation but with proper externalization of menstrual flow and no further episodes of pelvic abscess formation.

After the laparoscopic left ureteronephrectomy and right ureteral reimplantation, no new urinary tract infections were reported. Initial pharmacological management was attempted with anticholinergic monotherapy (oxybutynin 5 mg every 8 hours), but with little therapeutic response. Thus, the use of a tricyclic antidepressant (imipramine 25 mg every 12 hours) was associated, resulting in the resolution of urinary incontinence and a significant improvement in the patient's reported quality of life. She was also referred for follow-up with nephrology to monitor the renal function of her single kidney.

Future sexual function and reproductive potential remain uncertain due to the presence of a fibrotic band along the posterior vaginal wall, which may pose challenges for sexual intercourse or pregnancy.

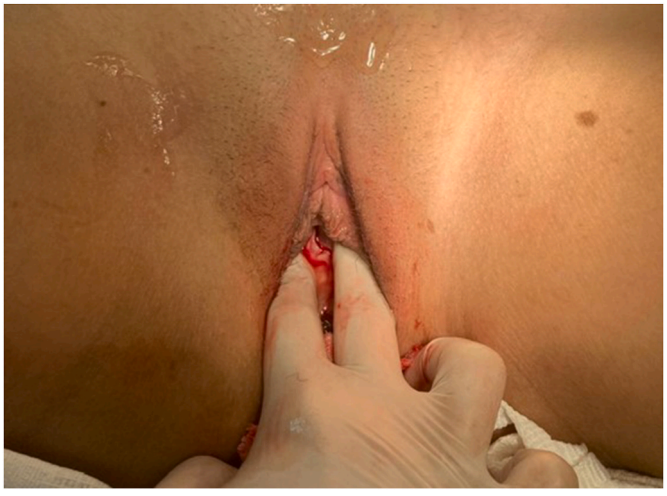

Fig. 4. Vaginal examination showing menstrual bleeding and fibrotic band on the posterior wall of the vagina.

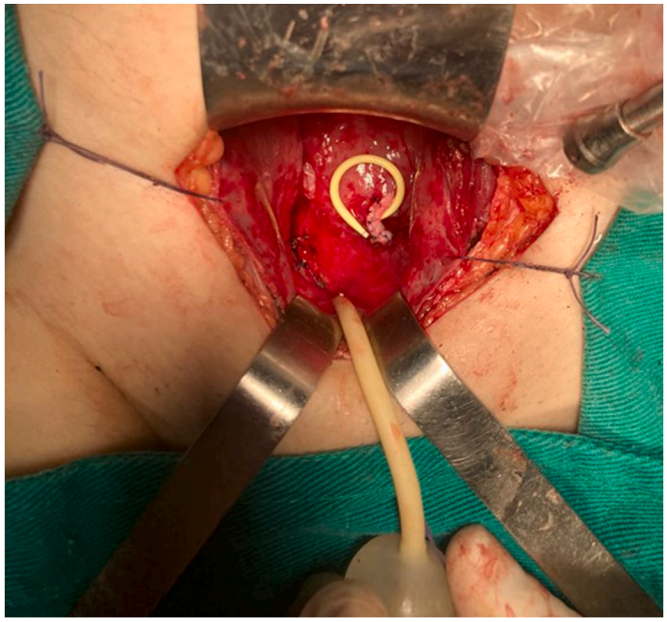

Fig. 5. Right ureteral reimplantation surgery. Possible to identify opening of the bladder cavity with repairs of the bladder walls; internal urethral ostium with Foley catheter; bladder closure points in the original anomalous implantation of the right ureter; band of bladder mucosa over the right ureter with new fixation of the ureter, where a double J catheter was placed.

3. Discussion

A transverse vaginal septum is a rare congenital anomaly of the female genital tract, resulting from failed fusion or canalization between the urogenital sinus and the Müllerian ducts. Its estimated incidence ranges from 1 in 30,000 to 1 in 80,000 females.[1] Septa can occur at any level from the hymen to the cervix, most commonly at the mid-vaginal junction.[2] While typically less than 1 cm thick, thicker variants have been described.[8]

Complete vaginal obstruction in premenarchal patients may lead to mucocolpos, due to retained cervical and Müllerian secretions. In menstruating adolescents, this may progress to hematocolpos or pyohematocolpos if infection is present.[8,9]

Normal embryologic development of the urogenital tract depends on interaction between the mesonephric (Wolffian) and paramesonephric (Müllerian) ducts.[10] Disruption in Wolffian duct development can lead to coexisting anomalies in the Müllerian system and ipsilateral urinary tract, such as renal agenesis or vesicoureteral reflux (VUR).[11]

The association between Müllerian anomalies and urinary tract malformations is well documented. VUR is reported in 30–50 % of patients with uterine anomalies and is often bilateral.[12] VUR is defined as retrograde urine flow from the bladder to the upper urinary tract and is classified as primary (congenital defect of the ureterovesical junction) or secondary (due to bladder outlet obstruction or dysfunctional voiding).[3] Reflux severity is graded from I to V based on the International Reflux Study Committee scale.[5]

VUR is a leading cause of recurrent pyelonephritis and may lead to chronic kidney disease (CKD), particularly when associated with voiding dysfunction or structural anomalies.[13,14] Early diagnosis and proper management are essential to prevent irreversible renal damage. Treatment options include antibiotic prophylaxis, surgical intervention (e.g., ureteral reimplantation), and management of bladder dysfunction.[6]

Diagnosis of a transverse vaginal septum can be challenging in children. Pelvic ultrasound is typically the first imaging modality, though it provides limited anatomic detail.[15,16] MRI is the preferred

method for detailed assessment, offering multiplanar views and high soft tissue contrast. To confirm the diagnosis, MRI will demonstrate a thick transverse septum with fluid accumulation in the uterus and vagina, consistent with hematocolpos.[4]

Voiding cystourethrography (VCUG) remains the gold standard for diagnosing VUR, especially in pediatric patients with recurrent febrile UTIs.[17] Urethrocystoscopy may aid in assessing ureteral orifices and the urethra in selected cases.[18]

Surgical management of a transverse vaginal septum depends on its location and thickness.[15] Thin septa can be treated with simple excision and vaginal anastomosis. Thick or high septa often require complex approaches, potentially involving laparoscopy or laparotomy.[7] In cases of recurrence or stenosis, vaginal molds or grafts may be needed. Surgical expertise and thorough anatomical knowledge are crucial to avoid complications such as stenosis or organ injury.[19,20]

In this case, the patient presented with a thick transverse vaginal thick transverse vaginal septum, primary VUR on the right and ectopic ureter on the left. Vaginal excision of the septum and drainage of the retained contents were successfully performed. Early diagnosis and a multidisciplinary approach were key to a favorable outcome and prevention of renal sequelae.

4. Conclusion

Disruptions in the process of normal development of the Müllerian ducts can result in congenital anomalies of genital structures. In the case of a complete transverse vaginal septum, the physiological drainage of secretions produced by cervical glands is interrupted, potentially leading to hydrocolpos during infancy and hematocolpos at puberty. Primary VUR results from inadequate or incompetent closure of the ureterovesical junction. The most common clinical manifestations of VUR are urinary tract infection and prenatal hydronephrosis. Diagnosis through imaging modalities such as ultrasonography, magnetic resonance imaging, or diagnostic laparoscopy enables early treatment and reduces the risk of severe complications. Treatment strategies must be individualized based on the severity of clinical presentation. In cases of transverse vaginal septum, surgical correction is required in almost all instances. For VUR, surgical intervention is typically reserved for intermediate-to high-grade cases with clinical complications, given the potential for spontaneous resolution in lower-grade reflux. Regular follow-up is necessary for patients undergoing surgical correction, ideally within a multidisciplinary care team, to minimize the risk of postoperative complications and optimize long-term outcomes.

CRediT authorship contribution statement

Izadora Gabriela Coutinho: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Paulo Acácio Egger:** Supervision, Resources, Project administration, Methodology, Investigation. **Ailton Fernandes Junior:** Writing – original draft, Formal analysis. **Angelo Cezar Bolognese Junior:** Writing – original draft, Formal analysis. **Abikeilla Ariane Bomfim Gomes Bernardi:** Writing – original draft, Formal analysis. **Amanda Yumi Ono Valderrama:** Writing – original draft, Methodology, Investigation.

Statements

"Informed Consent" was obtained by the patient and her parentes.

ALL Authors report administrative support and equipment, drugs, or supplies were provided by Regional University Hospital of Maringá. Administrative support was provided by State University of Maringá. All other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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