

Ureteral Duplication, A Rare Cause of Ureterovaginal Fistulas: About Two Cases and Review of the Literature

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Abstract

Ureteral duplication is a rare congenital disorder of the urinary system, defined as a doubling of the excretory tracts of a normal parenchymal renal unit. It may be associated with a ureterovaginal fistula when the ostium of the supernumerary ureter ends in the vagina, resulting in a clinical picture of congenital urinary incontinence. We performed a pelvic ultrasound and intravenous urography, which enabled us to confirm our diagnosis. Surgical treatment involving ureteral reimplantation in the bladder was performed, and the post-operative period was marked by drying of the dressing and no urine leakage.

Keywords

Duplication, Ureteral, Fistula, Ureterovaginal

1. Introduction

Also known as a duplex collecting system, ureteral duplication is a relatively common anatomical anomaly in which a patient has two ureters instead of one for each kidney [1]. It is defined as a doubling of the excretory tract of a renal unit, which is otherwise normal in terms of parenchyma. Total duplication or duplicity is when the two ipsilateral ureters are independent up to the bladder, each opening

into a separate orifice. It is a rare malformation of the urinary tract, present in 0.6% of the general population [2].

From an embryological perspective [3], ureteral duplications result from an abnormality in the development of the ureteric bud. There are two possible scenarios:

- Incomplete ureteral duplication: a single ureteric bud divides before fusing with the mesenchyme to form a bifid ureter. This results in the formation of two pyelocaliceal systems draining into two ureters, which join together to form a single ureter that empties into the bladder through a single meatus.
- Complete ureteral duplication: Two ureteric buds develop until they reach the renal mesenchyme. The ureters cross each other along their path.

Ureterovaginal fistulas are rare, accounting for 6 to 8% of urogenital fistulas [4]. They are rarely secondary to a congenital condition. In Senegal, a study conducted in 2019 revealed that of the 130 cases of urogenital fistula treated, 19 had ureterovaginal fistulas, including 15 after hysterectomies and 4 after cesarean sections [5].

In the DRC, a retrospective observational study conducted at PANZI Hospital from 2013 to 2018 revealed that of the 1,517 types of fistulas, 23, or 1.5%, were congenital [6].

The aim of our study is to present two patients treated at PANZI General Hospital in Bukavu for ureterovaginal fistula secondary to ureteral duplication.

2. Case Presentation

Patient No. 1

On June 7, 2023, we received a 15-year-old patient who came to us complaining of involuntary urine leakage from the vagina since birth. She is single and nulligravida. Her physical examination was unremarkable. On gynecological examination, her vulva was soiled with urine and her hymen was intact. We observed urine discharge from the urethral ostium as well as from another vaginal opening (Figure 1).



Figure 1. Identification of the ectopic ureteral orifice in patient No.1.

We concluded that she had a congenital vaginal fistula. Her intravenous urography revealed a ureteral duplication (**Figure 2**).



Figure 2. IVU of patient No.1 showing ureteral duplication.

Her abdominal-pelvic ultrasound showed kidneys in normal anatomical position and size with preserved parenchymal-sinus differentiation, no intraluminal lithiasis, and no dilatation of the pyelocaliceal cavities: insignificant post-void residual urine of 17 ml.

Her hematological tests: hemoglobin at 11.6 g/L; clotting time at 6 minutes, bleeding time at 1 minute 30 seconds; blood type A Rh positive; Rapid HIV test negative, RPR negative, and syphilis test negative; urea at 4.2 mmol/L and creatinine at 66.8 $\mu\text{mol/L}$. Urine cytology and bacteriology: 4 - 6 epithelial cells per field; no bacteria detected after culture.

She underwent surgery on June 22, 2023, via conventional laparotomy, during which we identified the ectopic ureter after dissection, followed by detachment of its vaginal insertion site (**Figure 3**). We performed a cystotomy, ureterovesical reimplantation after ureteral catheterization using a JJ stent, and cystorrhaphy. We cleaned the abdominal cavity, closed the abdominal wall, and applied a sterile dressing.

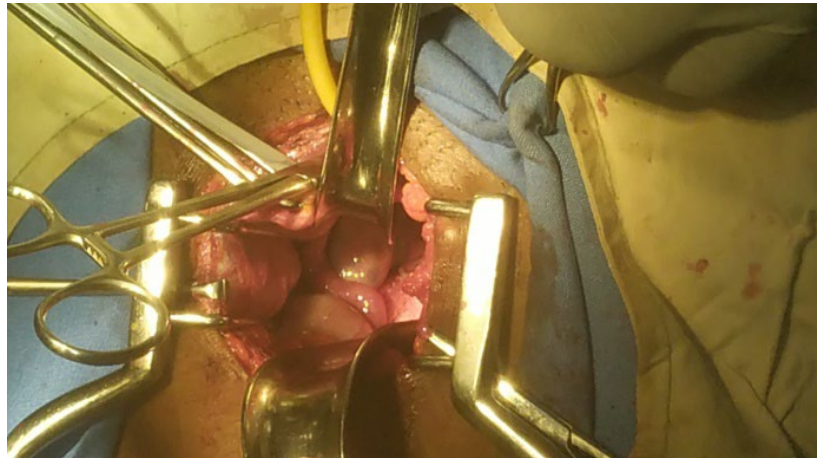


Figure 3. Individualization of the patient's ectopic ureter.

As a post-operative recommendation, we monitored the patient's anesthesia recovery, vital signs, and bleeding status. We placed the patient on a post-operative protocol consisting of:

- R/ Ampicillin vial 1 g S/3 × 1 g/day//3 days then oral replacement for 4 days.
- R/ Flagyl® infusion 500 mg S/3 × 500 mg/day//3 days then switch to oral administration for 4 days.
- R/ Paracetamol infusion 1 g S/ 2 × 1 g/day// 3 days then switch to oral administration for 4 days.
- Encourage early mobilization.
- Drink plenty of water.
- Remove the urinary catheter on day 14 and the JJ stent on day 30.

The post-operative course was marked by: on post-operative day 1, the bedding was already dry; on post-operative day 4, we removed the abdominal drains, which were no longer productive on post-operative day 5; the ureteral catheter was removed on post-operative day 30 (**Figure 4**).

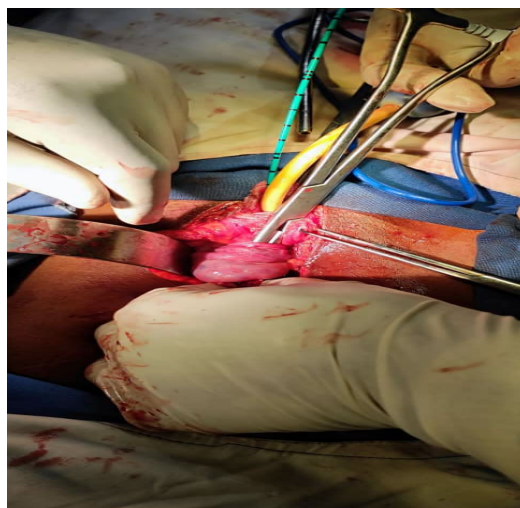


Figure 4. Removal of the ureteral probe under cystoscopy.

Patient No. 2

We received a 17-year-old patient who came for consultation on 06/14/2023 with complaints of involuntary urine leakage since birth. In her medical history, she has given birth once, had one pregnancy, no history of abortion, and has one living child. No history of previous surgery.

Her general physical examination was unremarkable. On examination of the genitals, her vulva was soiled with urine, and we observed urine leakage from the urethral ostium as well as from another opening on the left wall of the vagina.

The conclusion of the intravenous urography on June 16, 2023, revealed a ureteral duplication.

Her preoperative assessment: hemoglobin 13.7 g%, hematocrit 41.7%, negative pregnancy test, HIV negative, RPR negative, bleeding time 1 minute and clotting time 4 minutes, blood type A+.

We concluded that she had a congenital vaginal fistula secondary to ureterovaginal duplication.

We performed ureteral reimplantation on June 29, 2023, during which we observed a left ureteral duplication with a megaureter (**Figure 5**). We performed the following procedures: longitudinal cystotomy (**Figure 6**), ureterovesical reimplantation passing behind the broad ligament followed by separate suture fixation (**Figure 7**). Placement of a JJ stent; cystorrhaphy. Cleaning, aspiration, and placement of an abdominal drain. We closed the wall with a dressing.

We put the patient on a post-operative protocol consisting of:

- R/ Ampicillin vial 1 g S/3 × 1 g/day//3 days then oral replacement for 4 days.
- R/ Flagyl® infusion 500 mg S/3 × 500 mg/day//3 days then oral replacement for 4 days.
- R/ Paracetamol infusion 1 g S/2 × 1 g/day//3 days then switch to oral administration for 4 days.
- Encourage early mobilization.
- Drink plenty of water.
- Remove the urinary catheter on day 14 and the JJ stent on day 30.

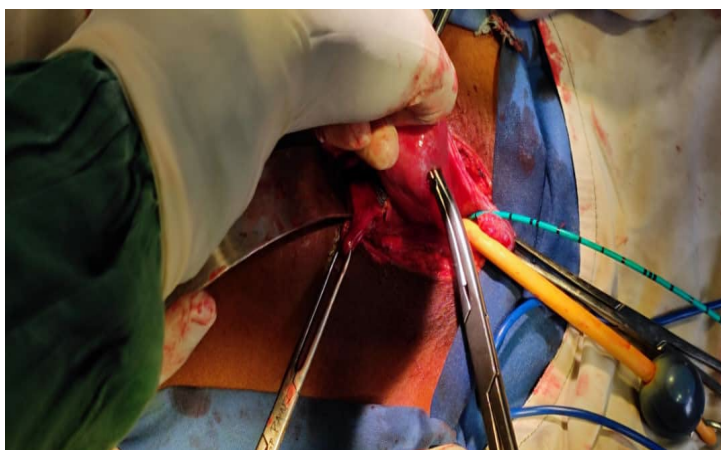


Figure 5. Identification of the megaureter.

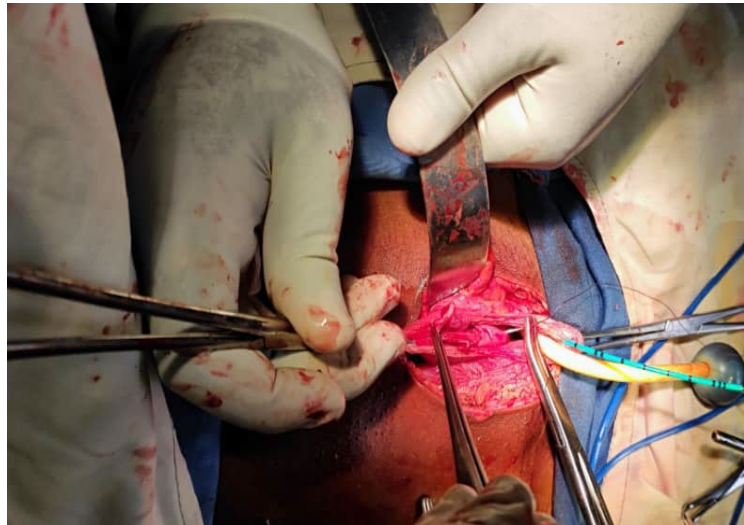


Figure 6. Cystotomy for ureteral reimplantation.

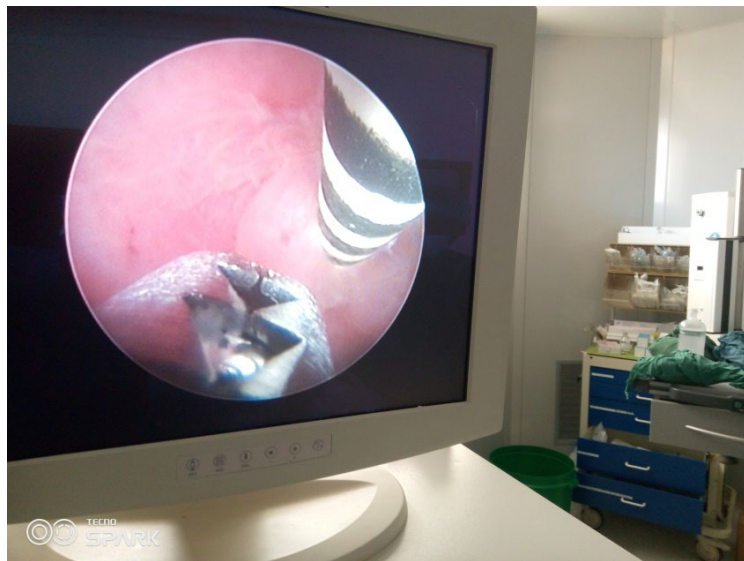


Figure 7. Reimplantation of the ureter at the bladder dome.

In the post-operative period, on post-operative day 2, the bedding was already dry, and on post-operative day 5, we removed the abdominal drains, which were no longer productive. On post-operative day 30, the ureteral catheter was removed.

3. Discussion

Ureteral duplication is one of the rarest urological anomalies in the general population [2]. The ectopic ureter may be located in the vagina, leading to a clinical picture of congenital urinary incontinence, a rare cause of ureterovaginal fistula.

In terms of age, our patients were 15 and 17 years old, respectively. Females were the most frequently affected, as demonstrated by several studies on urethral duplication [7] [8].

No significant history was found in either of our two patients. This confirms the congenital nature of the condition, given that despite our second patient being primiparous, she reported that involuntary urination had been present since birth.

The main complaint was involuntary urination since birth. This is typical in all cases of congenital genitovaginal fistulas [9]. Our examination of the external genital organs showed a negative methylene blue test. However, when furosemide was administered intravenously, we were able to detect urine leakage through a vaginal opening. This allowed us to diagnose a ureterovaginal fistula with suspected ureteral duplication.

A comparative analysis of our two patients reveals several points:

- Both patients are of pubertal age, but patient No. 2 has a child despite her congenital urinary incontinence. This confirms the difficulty of social integration in society for patients with urogenital fistulas in general.
- During surgery, the presence of a megaureter indicates an obstacle, even a partial one, to the flow of urine, with inflammation of the ureter wall. In the event of ureteral reimplantation in the bladder, it is imperative to monitor the condition of the urinary tract postoperatively by performing follow-up ultrasounds.

Intravenous urogram was the key test for a positive diagnosis in both of our patients. Some authors believe that IVU often provides incomplete information, given the frequent non-functionality of all or part of the affected kidney [8]. In such cases, other more advanced tests, such as CT and MRI scans, can provide a more accurate diagnosis [3] [10]. In our context, the technical facilities, particularly with regard to imaging services, are characterized by the absence of MRI. And also, given the cost of performing these examinations, we are forced to resort to accessible examinations for the care of our patients.

Surgical treatment consisted of urethral reimplantation followed by the placement of a JJ ureteral stent. Some authors recommend ureterovesical reimplantation as the treatment of choice, as it offers the advantage of replacing the damaged part of the ureter with the well-vascularized bladder wall [3] [11] [12]. Rodrigues Isabel *et al.* [13], in their study, reveal that 6 of the 41 ureteral units benefited from ureteral reimplantation. The laparoscopic approach could effectively determine the location and number of ectopic ureters by imaging and cystoscopy [14].

The post-operative protocol following ureteral reimplantation is as follows: dual antibiotic therapy consisting of Ampicillin and Metronidazole, administered parenterally for 3 days and then orally for 4 days. A first-line analgesic (paracetamol) is given for 3 days, then switched to oral administration to be given in case of pain. We encourage early mobilization and drinking plenty of water, at least 1 liter per day. We plan to remove the urinary catheter on the 14th day and the JJ ureteral stent on the 30th day after surgery.

In the post-operative course, the patient's recovery was healthy, with dry bedding from the first two days after surgery. The abdominal drains were no longer productive by the fourth and fifth days and were removed on the fifth post-oper-

ative day. The urethral catheter was removed on the 14th day, as described by some authors [5].

4. Limitations of the Study

Like any scientific study, our study has certain limitations, namely: This is an observational study of two cases, which does not allow us to randomize subjects or generalize the results obtained after treatment. The lack of long-term follow-up would allow, in the context of a longitudinal study, analysis of the condition of the ureters and the occurrence of likely lithiasis or infections.

5. Conclusion

Ureteral duplication is a rare cause of ureterovaginal fistulas. Clinicians should consider this condition when faced with a case of congenital urinary incontinence. Paraclinical tests can be used to confirm the diagnosis, and surgical treatment generally yields good results.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Spiegato: What Is Ureteral Duplication.
<https://spiegato.com/fr/quest-ce-que-la-duplication-ureterale>
- [2] Cussenot, O. (2000) Malformations of the Urinary Tract and Cystic Dysplasia of the Kidneys. *Progrès en Urologie*, **10**, 989-1013.
- [3] Veyrac, C. (2004) Anomalies congénitales du rein et de la voie excrétrice supérieure chez l'enfant. *EMC—Radiologie*, **1**, 491-541.
<https://doi.org/10.1016/j.emcrad.2004.05.001>
- [4] Aichouni, N. (2008) Ureterovaginal Fistulas (3 Cases). HASSAN II.
- [5] Diallo, A., Zouka, A., Pereira, E., Jalloh, M., Ndoye, M., Niang, L., *et al.* (2019) Management of Urogenital Fistulas in the Urology Department of Grand Yoff General Hospital (Dakar). *Uro' Andro*, **2**, 24-28.
- [6] Maroyi, R., Keyser, L., Hosterman, L., Notia, A. and Mukwege, D. (2020) The Mobile Surgical Outreach Program for Management of Patients with Genital Fistula in the Democratic Republic of Congo. *International Journal of Gynecology & Obstetrics*, **148**, 27-32. <https://doi.org/10.1002/ijgo.13036>
- [7] Pintér, A., Jilling, A., Vajda, M., Baranyi, E. and Farkas, A. (1991) Ectopic Ureter in Infancy and Childhood. *Orvosi Hetilap*, **132**, 1143-1148.
- [8] Kawamura, N., Okumura, S., Nishimura, T. and Akimoto, M. (1985) The Ectopic Ureter: A Report of 7 Cases. *Hinyokika Kyo*, **31**, 1183-1188.
- [9] Mz, D. and Mt, C. (2022) Incomplete Right Ureteral Duplication and Calculus in an Adult at Gabriel Toure University Hospital: Incidental Intraoperative Finding. 23 p.
- [10] Colin, P., Ballereau, C., Puech, P., Gilliot, P., Leroy, X. and Biserte, J. (2006) A Case of Ureteral Duplication in an Adult. *Progrès en Urologie*.
- [11] Castagnetti, M., Canali, R., Mastrocinque, G., Esposito, C. and Rigamonti, W. (2013)

Dismembered Extravesical Reimplantation of Dilated Upper Pole Ectopic Ureters in Duplex Systems. *Journal of Pediatric Surgery*, **48**, 459-463.

<https://doi.org/10.1016/j.jpedsurg.2012.11.050>

- [12] Bentaleb, H., Karni, H., Karmouni, T., Tazi, K., Khader, K., Ibn Attya, A., *et al.* (2009) Fistules urétéro-vaginales: A propos de 15 cas. *African Journal of Urology*, **15**, 200-205. <https://doi.org/10.1007/s12301-009-0037-0>
- [13] Rodrigues, I., Estevão-Costa, J. and Fragoso, A.C. (2016) Complete Ureteral Duplication: Outcome of Different Surgical Approaches. *Acta Médica Portuguesa*, **29**, 275-278. <https://doi.org/10.20344/amp.6329>
- [14] Wang, S., Wan, L., Wang, Y., Yi, Z., Xiao, C., Cao, J., *et al.* (2022) Laparoscopic Treatment of Bilateral Duplex Kidney and Ectopic Ureter: A Case Report. *World Journal of Clinical Cases*, **10**, 8344-8351. <https://doi.org/10.12998/wjcc.v10.i23.8344>