Review Article

Ureteral clipping for managing persistent urinary dribbling caused by ectopic ureters associated with non-functioning renal moieties in girls with complex duplex kidneys: a narrative review of the literature

Giulia Lanfranchi[1], Irene Paraboschi[1,2], Guglielmo Mantica[3], Sara Costanzo[1], Giorgio Giuseppe Orlando Selvaggio[1], Manuel Lopez[4], Gloria Pelizzo[1,2]

[1]Department of Pediatric Surgery, "V. Buzzi" Children's Hospital, Milan, Italy; [2]Department of Biomedical and Clinical Science, University of Milano, Milan, Italy; [3]Department of Surgical and Diagnostic Integrated Sciences (DISC), University of Genova, Genoa, Italy; [4]Department of Pediatric General and Urogenital Surgery, Vall d'Hebron Hospital, Barcelona, Spain

Contributions: (I) Conception and design: G Lanfranchi, I Paraboschi; (II) Administrative support: G Lanfranchi, I Paraboschi, G Pelizzo; (III) Provision of study materials or patients: GGO Selvaggio, M Lopez, G Pelizzo; (IV) Collection and assembly of data: G Lanfranchi, I Paraboschi, G Pelizzo; (V) Data analysis and interpretation: G Lanfranchi, I Paraboschi, S Costanzo; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Professor Gloria Pelizzo, MD. Department of Pediatric Surgery, "V.Buzzi" Children Hospital, Via Lodovico Castelvetro, 32, 20154 Milan, Italy; Department of Biomedical and Clinical Science, University of Milan, Milan, Italy. Email: gloria.pelizzo@unimi.it.

Background and Objective: Persistent urinary dribbling in girls with duplex renal systems and ectopic ureters originating from poorly functioning renal moieties represents a complex clinical problem in pediatric urology. The incontinence associated with these anomalies is socially distressing and often refractory to conservative management. Traditional surgical options, including upper pole heminephrectomy or ureteroureterostomy, are effective but may be associated with significant operative morbidity, particularly when renal function is negligible and surgical access is challenging. In recent years, minimally invasive ureteral ligation—either laparoscopic or via open mini-incision—has emerged as a promising, low-risk alternative to excise or disconnect the ectopic ureter. This review article aims to critically evaluate the safety, efficacy, and clinical utility of ureteral ligation in this subset of pediatric patients.

Methods: A comprehensive literature search was conducted using PubMed and Web of Science through May 2024. Keywords included "ureteral clipping", "ureteral ligation", "ectopic ureter", and "paediatric urinary incontinence". Only English-language studies involving human pediatric populations were considered. Exclusion criteria included duplicate publications, animal studies, and articles that did not report clinical outcomes. Two independent reviewers performed data extraction and synthesis, focusing on postoperative continence, complications, renal outcomes, and procedural details.

Key Content and Findings: Ureteral ligation was consistently associated with resolution or significant improvement of urinary incontinence in girls with ectopic ureters and non-functional upper moieties. The procedure appears to be technically straightforward, with minimal operative time and negligible intraoperative blood loss. Complication rates were low, and only one case of subsequent symptomatic infection or functional loss in the remaining renal moiety were reported. However, available data derive predominantly from small, retrospective, single-center series, with limited follow-up durations and the absence of control groups.

Conclusions: Minimally invasive ureteral ligation represents a viable and effective surgical option for selected patients with ectopic ureters draining poorly functioning renal segments. Larger, multicenter prospective studies are warranted to confirm its long-term efficacy and establish clear clinical guidelines for its broader adoption.

Keywords: Ureteral clipping; ectopic ureter; duplex kidney; incontinence; children

Submitted Jan 07, 2025. Accepted for publication Mar 28, 2025. Published online Jun 25, 2025.
doi: 10.21037/tp-2025-17
View this article at: https://dx.doi.org/10.21037/tp-2025-17

Introduction

Persistent urinary incontinence or dribbling is the primary symptom of an ectopic ureter in females when the distal ureteral orifice is located below the external urethral sphincter. The most common insertion sites include the upper urethra (33%), vestibule (33%), vagina (25%), and less commonly, the uterus or cervix (5%) (1,2). The overall incidence of ectopic ureter in the population is 1:2,000–1:4,000, with a female-to-male ratio of 6:1 (3,4). Eighty-five percent of cases occur in the setting of a duplex kidney, and most cases are diagnosed in childhood, more rarely in adulthood (5). Urinary incontinence in children and adolescents is most often of functional origin, while organic urinary incontinence, such as that associated with ectopic ureters, is generally uncommon in infants. However, after surgical correction, the latter will likely achieve dryness (6).

There are currently several surgical methods available for treating patients with urinary dribbling caused by ectopic ureters associated with duplex kidneys, including upper pole heminephrectomy, ureteroureterostomy, ureteral reimplantation, or ureteral clipping. Due to a lack of consensus on the optimal surgical treatment, the chosen procedures typically fall into two categories: upper urinary tract approaches or lower urinary tract approaches, with the decision primarily influenced by the function of the affected moiety. For treating dysplastic and poorly functioning moieties in a duplex system with an isolated ectopic ureter, the most common approach is an upper pole heminephrectomy (7). Conversely, if renal scintigraphy indicates adequate ipsilateral renal function, lower urinary tract reconstructive surgery may also be considered (8,9). In such cases, diverting the upper moiety into the lower moiety or performing vesicoureteral reimplantation could be viable options (10-12). All these techniques can be accomplished by open or minimally invasive techniques (either laparoscopically or robot-assisted).

We recognize that traditional methods such as heminephrectomy and ureteroureterostomy, as well as ureteric reimplantation, pose challenges including the damage of the renal pedicle during the operation (2–10%) (13-15), peri-nephric urinoma (1–12%) (16,17), bladder denervation (1%), retroperitoneal hematoma (3.5%) (14) and leakage from the anastomotic site (18). In contrast, ureteral clipping poses no risk to the spared kidney moiety, including de-vascularization, anastomotic leak or stricture, bleeding, and vesicoureteral reflux. For most patients with urinary incontinence for ectopic ureter, the procedure of ureteral clipping is relatively straightforward and at a low risk of perioperative complications (19).

However, there is a notable lack of high-quality comparative research on this topic in the scientific literature. Most available data are derived from case series or single-center reports with small sample sizes, and multicenter prospective studies are scarce, often lacking long-term follow-up. We want to underscore the need for further well-designed prospective research by emphasizing this gap.

Our study aims to review the current scientific literature on ureteral clipping in girls and determine whether it is a viable alternative to more complex reconstructive or demolition procedures for treating continuous urinary dribbling in children. We present this article in accordance with the Narrative Review reporting checklist (available at https://tp.amegroups.com/article/view/10.21037/tp-2025-17/rc).

Methods

The search strategy is summarized in *Table 1*. The PubMed and Web of Science databases were used to perform a comprehensive search of ureteral clipping up to May 2024. The inclusion criteria were articles related to urinary incontinence and ureteral clipping in pediatric population, regardless of study types.

The search terms included ureteral clipping, ureteral ligation, ectopic ureter, paediatric urinary incontinence. Only studies published in English were considered for inclusion. Additionally, the reference lists of relevant articles were reviewed to identify any further eligible studies. Duplicate publications and studies involving animal models were excluded. Two reviewers independently conducted

Table 1 The search strategy summary

Items	Specification
Date of search	May 25, 2024
Database and other sources searched	PubMed, Web of Science
Search and terms used	Ureteral clipping, ureteral ligation, ectopic ureter, paediatric urinary incontinence
Timeframe	January 1, 1959 to May 25, 2024
Inclusion and exclusion criteria	Inclusion criteria • Articles related to ureteral clipping for urinary incontinence in the pediatric population • Articles of any study type • Articles in English language Exclusion criteria • Repeated articles • Articles about animal models
Selection process	Articles were initially screened for inclusion by two reviewers and further discussion was necessary when there were discrepancies
Any additional consideration	The reference lists of the related articles were also searched for any additional included studies

Table 2 Main studies discussing the role of ureteral clipping in the pediatric population

	Romao *et al.* (20)	Hosseini Sharifi *et al.* (21)	Lopes *et al.* (22)	Li *et al.* (23)	Hussain *et al.* (24)
Year of publication	2014	2017	2018	2021	2024
Type of study	Prospective	Prospective	Retrospective	Retrospective	Retrospective
No. of patients[†]	9	1	14	6	6
Median patient age at surgery (IQR), months	96 (48–204)	84	59 (11–120)	60 (32–108)	77 (39–186)
Surgical procedure	Lap UC	Lap UC + selective vascular clipping	12 Lap UC/2 open UC	Lap UC	Lap UC
Median operative time (IQR), min	ND	ND	108 (20–180)	91 (42–105)	94 (66–128)
Median post-operative hospital stay (IQR), days	2 (1–6)	1	1 (0–5)	1 (0–3)	1 (0–3)
Median follow-up (IQR), months	9 (1–27)	14	20 (6–50)	33 (22–72)	51 (29–66)
Success rate, %	100	100	100	100	100
Complications	1 flank pain	No	1 UTI	1 UTI	No
Max PO ureteral dilatation (mm)	ND	ND	ND	ND	34–40
Max PO hydronephrosis (mm)	ND	ND	ND	69–115	ND

[†], included in the study suffering from urinary incontinence associated with complex duplex kidney. IQR, interquartile range; Lap, laparoscopic; ND, not defined; PO, postoperative; UC, ureteral clipping; UTI, urinary tract infections.

the initial screening for inclusion. The technical aspect of ureteral clipping for ectopic ureter were reviewed and the relevant clinical outcomes were also analyzed.

A comprehensive search was performed using the PubMed database by entering the search term "ureteral ligation" to collect relevant studies on ureteral ligation for the treatment of incontinence in the pediatric population. The key studies are summarized in *Table 2*.

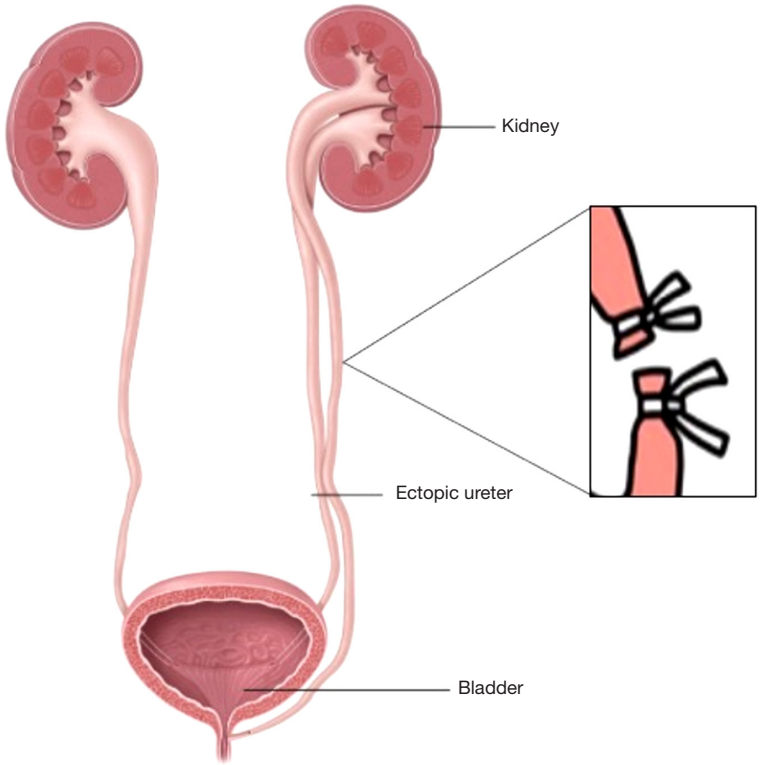

Figure 1 Diagram illustrating the ureteral clipping procedure for addressing persistent urinary dribbling due to ectopic ureters associated with non-functioning renal segments in patients with complex duplex kidney anatomy.

Results

In our research, a total of 667 articles and their reference lists were primarily screened. Finally, 5 articles met the inclusion criteria and were included for reviewing technical considerations and clinical outcomes of ureteral clipping for urinary incontinence. The key studies are summarized in *Table 2*.

Minimally invasive ureteral clipping in girls: surgical indications and technical considerations

Minimally invasive ureteral clipping in girls usually commences with a diagnostic cystoscopy in the lithotomy position. The vulva and introitus are inspected for signs of ureteral ectopia, followed by a meticulous examination of the urethra. Once in the bladder, the trigone area is assessed to ascertain the number and location of intravesical ureteric orifices, and, on the side in question, a 4 or 5 Fr ureteral catheter is introduced under fluoroscopic guidance into the lower pole ureter. Subsequently, the patient is moved to a supine position, and the bladder is catheterized with an appropriately sized Foley catheter, which is kept on free drainage. Standard laparoscopy uses a 5 mm umbilical port and two additional 3–5 mm working ports. Initial access is achieved at the umbilicus with 10–12 mmHg CO_2 insufflation and visualization via a 30° telescope. Two additional ports are inserted along the mid-clavicular line at the umbilical level, with configurations adjusted based on body habitus to optimize triangulation towards the affected side. After colon mobilization, the ureters are visualized at the crossing point anterior to the iliac vessels. The lower pole ureter containing the ureteral catheter is easily identified and preserved.

In contrast, the ectopic ureter is dissected free in the distal direction, doubly clipped with non-absorbable polymer locking (Hem-o-loks®) or titanium clips, and transected, as shown in *Figure 1*. The ureteric catheter and Foley catheter are removed at the end of the procedure. Postoperatively, patients may be discharged once they have passed urine and can be managed with

oral non-opioid analgesia.

Ureteral clipping in girls: surgical outcomes based on current literature

First introduced by Baquero *et al.* (25) in 1985 and initially used in seven patients undergoing renal transplantation, this procedure involves ligating the proximal ureter of the native kidney without performing a concurrent nephrectomy (i.e., leaving behind a poorly functioning obstructed system). Unexpectedly, these transplanted and high-risk immunosuppressed patients did not experience subsequent urinary tract infections (UTIs), post-ligation symptoms, or the need for native nephrectomy (25,26).

Based on the success of ureteral clipping in these first patients undergoing renal transplantation and the fact that these high-risk immunosuppressed patients didn't develop any postoperative complications, in 2014, Romao *et al.* (20) first applied this procedure in 9 girls suffering from persistent urinary incontinence due to ectopic ureters associated with non-functioning upper pole renal moieties. All patients were utterly continent immediately after surgery and were discharged on postoperative day 1. In a follow-up period ranging from 1 to 27 months, all patients remained symptom-free, with no recurrence of urinary incontinence. No postoperative UTIs were observed. One patient reported transient, mild back pain on the side of the surgical ligation, which resolved spontaneously without the need for intervention.

More recently, Hosseini *et al.* (21) presented the case of a 7-year-old girl presenting with life-long urinary incontinence due to ectopic ureter associated with a poorly functioning upper renal moiety (i.e., 9% on nuclear medicine scan) who underwent selective clipping of upper moiety vasculature and ureter without a concurrent partial nephrectomy. The operation was successfully performed, and postoperative follow-up results demonstrated a significant shrinking of the affected renal upper moiety. There was no evidence of hydronephrosis due to the vascular or collecting system being excluded from the upper moiety.

In a larger sample study conducted by Lopes *et al.* (22), the clinical outcomes of ureteral clipping were reported in 14 patients with a complex duplex system associated with ectopic ureter and signs of significant upper pole atrophy (a small rim of echogenic parenchyma with or without cysts) on ultrasound scan (USS) or nuclear medicine scan (upper moiety renal function ranging from 0% to 12%). Most ureteral ligations were performed laparoscopically (n=12 cases), with a few performed in an open fashion (the remaining 2 cases), based on surgeon preference. Over the median follow-up period of 20 months (ranging from 6 to 50 months), 93% of the patients remained asymptomatic with immediate resolution of urinary incontinence. One patient (7%) who had some residual upper pole function on a nuclear medicine scan presented 3 years post-operatively with a febrile UTI and persistent hydroureteronephrosis of the ligated moiety. She was treated with antibiotics and percutaneous drainage of the dilated upper moiety. Understandably significant differences were observed between the initial and last measurements of pelvis anteroposterior diameters (APD) of the patients included in the study [0.83±1.09 to 2.8±2.0 cm; P=0.001] confirming that with this procedure we left a dysplastic renal unit *in situ* and this decision could potentially lead to the development of a symptomatic close hydronephrotic system. Acknowledgments and concerns regarding the fate of persisting hydronephrosis are still debated.

Li *et al.* (23) obtained similar results in 2021 on a cohort of 6 patients with worsening hydronephrosis of the ligated units postoperatively. The preoperative APD of the affected renal pelvis was 8.60 cm (range, 6.80 to 8.70 cm), whereas the postoperative APD was 9.1 cm (range, 6.90 to 11.50 cm).

In 2024, Hussain *et al.* (24) analyzed the risk of hydronephrosis and clinically significant dilatation after ureteral clipping. All 6 girls who underwent the operation were followed up for an median of 51 months. The results indicated that 2 patients had progressive postoperative ureteral dilatation (up to 34 and 40 mm before stabilizing) with no occurrence of symptoms. Both children had preoperative ureteric diameters >10 mm.

Ureteral clipping in girls: technical and surgical considerations based on current literature

Based on the literature available, we can conclude that laparoscopic clipping of the ureter may be a suitable alternative to ablative and reconstructive surgical procedures, which have traditionally been employed in the surgical treatment of persistent urinary dribbling due to ectopic ureters associated with non-functioning renal moieties in girls with complex duplex kidneys. Most authors who have experience in ureteral clipping believe that the indications for ureteral clipping are as follows (20-24): non-functioning and poorly functioning renal moieties associated with ureteral ectopia, ureteroceles, and worsening

hydroureteronephrosis. On the contrary, it is not advisable to perform this surgery in patients with recurrent UTIs, and the standard to define low or non-functioning moieties on dimercaptosuccinic acid (DMSA) scans is currently not yet established.

Performing ureteral clipping in patients with recurrent UTIs is generally not advisable due to the increased risk of complications. The procedure creates a physical obstruction, which can lead to urinary stasis in the clipped segment, providing a breeding ground for bacteria and increasing the likelihood of persistent or worsening infections. Additionally, chronic infection can contribute to abscess formation, localized inflammation, and even systemic complications such as sepsis. Chronic infections also cause fibrosis and tissue damage, which can interfere with proper healing and increase the risk of post-operative complications or the need for additional surgical interventions. Given these risks, alternative management strategies should be considered, such as antibiotic prophylaxis, ureteral reimplantation, or heminephroureterectomy in severe cases.

Considering the surgical technique, it is essential to note the following points. First, during cystoscopy, it is necessary to assess the trigone to determine the number and location of intravesical ureteric orifices. Then, it is advisable to insert a ureteral catheter into the lower pole ureter of the suspected side. This helps to identify the lower pole ureter during the laparoscopy. Ureteral catheters should be inserted on both sides in cases of bilateral duplication. Second, during the operation, it is essential to carefully dissect and preserve the blood supply of the lower pole ureter to minimize postoperative complications (such as stenosis). Thirdly, in case of bilateral duplication and equivocal side of the ectopic ureter, an anterograde guide wire under the transected ureter is advisable. The appropriate ligation device (Hem-o-lok, Titanium clip, or non-absorbable ligature) should also be decided based on the ureter's diameter (20,22,23).

According to a series of studies published (20,22-24), recurrent UTIs are not a significant postoperative complication following ureteral clipping. Despite concerns about leaving an obstructive system in place that still produces a small amount of urine, potentially increasing the risk of infection, only 2 out of 36 patients (5%) developed a UTI during the perioperative and follow-up periods. Early diagnosis and prompt antibiotic treatment effectively controlled these infections. In one case, percutaneous drainage was performed. Interestingly, despite a positive urine culture from catheterization, the percutaneous drain of the upper pole returned sterile results. Moreover, no data are available from micturating cystourethrogram (MCUG) for these 2 patients, which rules out the possibility of UTI due to vesicoureteral reflux of the lower moiety. Supporting this finding on a larger scale, previous reports indicate that patients undergoing kidney transplants did not develop urinary tract issues after ureteral clipping (25-27). This further confirms the low risk of recurrent UTIs associated with the procedure.

In contrast with other upper and lower urinary tract approaches, ureteral clipping, by definition, creates a mechanical obstruction within the urinary pathway, preventing normal urine drainage. Despite being dysplastic and low-functioning, the affected renal moiety retains its ability to produce urine, leading to a progressive increase in upper pole hydronephrosis. This accumulation of urine within the obstructed system results in elevated intrapelvic pressure, which we believe can significantly impact renal physiology by reducing glomerular filtration rate (GFR) and renal plasma flow. Prolonged obstruction may further exacerbate these effects, leading to ischemic injury, tubular atrophy, and interstitial fibrosis, ultimately compromising the viability of the renal moiety. If left untreated, the sustained increase in pressure can cause irreversible parenchymal damage, resulting in the complete loss of function in the affected segment (28,29).

Hussain *et al.* (24) analyzed the risk of developing hydroureteronephrosis during follow-up. Based on their study, this risk is likely related to the function of the dysplastic moiety and the compliance of the ureter; patients with pre-operative ureteral dilatation have a significant risk of postoperative dilatation. However, postoperative USS in all patients showed a normal-appearing lower moiety, unchanged from preoperative exams, meaning that this hydronephrosis didn't intact the lower moiety function. As a relative disadvantage of this technique, we must mention the requirement for prolonged follow-up and repeated USS, especially for patients with dilatation.

In recent years, intraoperative indocyanine green (ICG) near-infrared fluorescence guidance has significantly improved surgical outcomes in urology, particularly in duplex kidney and nephron-sparing surgery (30-35). The potential utility of ICG during ureteral clipping lies in its ability to elucidate the precise anatomy of the upper and lower pole ureters through intraureteral injection. Furthermore, this technology offers a significant advantage in delineating the vascular anatomy of the moieties. When administered intravenously, ICG highlights the blood

supply to the moieties, which can be particularly beneficial in facilitating the selective clipping of the upper moiety vasculature during combined procedures (21). Considering this, the approach proposed by Hosseini Sharifi (21), which involves selective clipping of the upper moiety vasculature and ureter to avoid the risk of hydronephrosis, could be effectively implemented with ICG. By providing a clear visualization of the vascular structures, ICG can help ensure the precise and safe execution of this technique. However, while the theoretical advantages of ICG in ureteral clipping are evident, to the best of our knowledge, no clinical experience has been reported regarding its application in this specific context. Incorporating ICG into this procedure could enhance the accuracy and safety of ureteral clipping, minimizing the risk of complications such as inadvertent vascular compromise or incomplete obstruction. Future studies and clinical evaluations are necessary to assess its feasibility and effectiveness, paving the way for its potential integration into routine surgical practice.

According to the published literature's clinical outcome, all the patients achieved daytime continence without further needing continence surgery (success rate of 100%). Consequently, this technique could be implemented in cases of urinary incontinence, offering surgeons a viable solution to minimize risks during the operative time.

Only a few studies on ureteral clipping are available; most available data are derived from case series or single-center reports with small sample sizes, limiting the generalizability and robustness of the findings. Additionally, the absence of multicenter prospective studies with long-term follow-up restricts the ability to draw definitive conclusions regarding efficacy, safety, and optimal clinical approaches. Addressing this gap through well-designed prospective research would enhance the reliability of evidence, provide more comprehensive outcome data, and ultimately improve clinical decision-making. Ultimately, such studies will enable patients to make informed decisions and choose the most suitable method to benefit them. Future studies should focus on standardized methodologies, larger patient cohorts, and extended follow-up periods to establish more explicit guidelines and best practices.

Conclusions

Ureteral clipping is a safe, feasible, and effective surgical approach for managing urinary dribbling caused by ectopic ureters in duplex kidneys among female patients. However, these promising preliminary outcomes require confirmation through prospective, multicenter studies with larger sample sizes and extended follow-up periods.

Acknowledgments

We gratefully acknowledge the support of the Foundation Romeo and Enrica Invernizzi for this project and the University of Milan's APC central fund for its assistance.

Footnote

Reporting Checklist: The authors have completed the Narrative Review reporting checklist. Available at https://tp.amegroups.com/article/view/10.21037/tp-2025-17/rc

Peer Review File: Available at https://tp.amegroups.com/article/view/10.21037/tp-2025-17/prf

Funding: None.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://tp.amegroups.com/article/view/10.21037/tp-2025-17/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

1. Kaplish D, Vagha JD, Meshram RJ, et al. A Case of Ectopic Ureter With Right Atrophied Kidney in a Pediatric Patient. Cureus 2024;16:e53360.
2. Hanson GR, Gatti JM, Gittes GK, et al. Diagnosis of ectopic ureter as a cause of urinary incontinence. J Pediatr Urol 2007;3:53-7.

3. Connolly J, Neild G. Congenital kidney and urinary tract anomalies. Floege J, Johnson R, Feehally J. editoes. Comprehensive Clinical Nephrology. Elsevier eBooks; 2010:609-26.
4. Ahmed S, Morris LL, Byard RW. Ectopic ureter with complete ureteric duplication in the female child. J Pediatr Surg 1992;27:1455-60.
5. Paraboschi I, Farneti F, Mantica G, et al. Surgical management of complicated duplex kidney: A tertiary referral centre 10-year experience. Afr J Paediatr Surg 2023;20:51-8.
6. Himsl KK, Hurwitz RS. Pediatric urinary incontinence. Urol Clin North Am 1991;18:283-93.
7. Chowdhary SK, Lander A, Parashar K, et al. Single-system ectopic ureter: a 15-year review. Pediatr Surg Int 2001;17:638-41.
8. Prieto J, Ziada A, Baker L, et al. Ureteroureterostomy via inguinal incision for ectopic ureters and ureteroceles without ipsilateral lower pole reflux. J Urol 2009;181:1844-8; discussion 1848-50.
9. Lee YS, Jung HB, Han JH, et al. Laparoscopic ureteroureterostomy and transvaginal ureterectomy for complete duplicated ureters. J Endourol 2014;28:825-30.
10. Liu W, Du G, Wu X, et al. Peadiatric transvesicoscopic dismembered ureteric reimplantation for ectopic upper ureter in duplication anomalies. J Pediatr Urol 2021;17:412.e1-5.
11. Castagnetti M, Canali R, Mastrocinque G, et al. Dismembered extravesical reimplantation of dilated upper pole ectopic ureters in duplex systems. J Pediatr Surg 2013;48:459-63.
12. Chandna A, Kaundal P, Parmar KM, et al. Dismembered extravesical reimplantation of ectopic ureter in duplex kidney with incontinence. BMJ Case Rep 2020;13:e234915.
13. Wallis MC, Khoury AE, Lorenzo AJ, et al. Outcome analysis of retroperitoneal laparoscopic heminephrectomy in children. J Urol 2006;175:2277-80; discussion 2280-2.
14. Gundeti MS, Ransley PG, Duffy PG, et al. Renal outcome following heminephrectomy for duplex kidney. J Urol 2005;173:1743-4.
15. Wang D, Cui M, Chu X, et al. Risk factor of postoperative adverse events among children with duplex kidney undergoing upper pole heminephrectomy: a single-center experience. Front Pediatr 2024;12:1305456.
16. Jayram G, Roberts J, Hernandez A, et al. Outcomes and fate of the remnant moiety following laparoscopic heminephrectomy for duplex kidney: a multicenter review. J Pediatr Urol 2011;7:272-5.
17. Dingemann C, Petersen C, Kuebler JF, et al. Laparoscopic transperitoneal heminephrectomy for duplex kidney in infants and children: a comparative study. J Laparoendosc Adv Surg Tech A 2013;23:889-93.
18. Lashley DB, McAleer IM, Kaplan GW. Ipsilateral ureteroureterostomy for the treatment of vesicoureteral reflux or obstruction associated with complete ureteral duplication. J Urol 2001;165:552-4.
19. Capocasale E, Busi N, Mazzoni MP, et al. Ligation of the native ureter in kidney transplant. Urologia 2007;74:152-4.
20. Romao RL, Figueroa V, Salle JL, et al. Laparoscopic ureteral ligation (clipping): a novel, simple procedure for pediatric urinary incontinence due to ectopic ureters associated with non-functioning upper pole renal moieties. J Pediatr Urol 2014;10:1089-94.
21. Hosseini Sharifi SH, Nabavizadeh B, Mozafarpour S, et al. Laparoscopic selective clipping of upper moiety vasculature and ureter without partial nephrectomy: A novel technique for pediatric urinary incontinence due to ectopic ureter associated with poor functioning upper renal moiety. J Pediatr Urol 2017;13:217-8.
22. Lopes RI, Fernandez N, Koyle MA, et al. Clinical Outcomes of the Upper Urinary Tract after Ureteral Clipping for Treatment of Low Functioning or Nonfunctioning Renal Moieties. J Urol 2018;199:558-64.
23. Li Z, Psooy K, Morris M, et al. Laparoscopic ligation of ectopic ureter in pediatric patients: a safe surgical option for the management of urinary incontinence due to ectopic ureters. Pediatr Surg Int 2021;37:667-71.
24. Hussain SNF, Phillips LAF, Godse A, et al. Ureteric Clipping for the Treatment of Urinary Incontinence in Girls With Ectopic Ureters: Predicting Who Is Going to Dilate and Does It Matter? Urology 2024;184:199-205.
25. Baquero A, Ginsberg PC, Kaschak D, et al. Experience with pyeloureterostomy associated with simple ligation of native ureter without ipsilateral nephrectomy in renal transplantation. J Urol 1985;133:386-7.
26. Gallentine ML, Wright FH Jr. Ligation of the native ureter in renal transplantation. J Urol 2002;167:29-30.
27. Torino G, Innocenzi M, Mele E, et al. Comparison of Native Ureteral Ligation and Open Nephrectomy for Pediatric Renal Transplantation. J Urol 2016;196:875-80.
28. Klahr S, Morrison A, Buerkert J. Effects of urinary tract obstruction on renal function. Contrib Nephrol 1980;23:34-46.
29. Mesrobian HG, Mirza SP. Hydronephrosis: a view from the inside. Pediatr Clin North Am 2012;59:839-51.

30. Kanno T, Takahashi T, Somiya S, et al. Indocyanine Green Fluorescence-Guided Laparoscopic Lower-Pole Heminephrectomy for Duplex Kidney in Adult. J Endourol Case Rep 2020;6:384-7.
31. Abdelhafeez AH, Murphy AJ, Brennan R, et al. Indocyanine green-guided nephron-sparing surgery for pediatric renal tumors. J Pediatr Surg 2022;57:174-8.
32. Esposito C, Borgogni R, Autorino G, et al. Applications of Indocyanine Green-Guided Near-Infrared Fluorescence Imaging in Pediatric Minimally Invasive Surgery Urology: A Narrative Review. J Laparoendosc Adv Surg Tech A 2022;32:1280-7.
33. Preziosi A, Paraboschi I, Giuliani S. Evaluating the Development Status of Fluorescence-Guided Surgery (FGS) in Pediatric Surgery Using the Idea, Development, Exploration, Assessment, and Long-Term Study (IDEAL) Framework. Children (Basel) 2023;10:689.
34. Paraboschi I, Mantica G, Minoli DG, et al. Fluorescence-Guided Surgery and Novel Innovative Technologies for Improved Visualization in Pediatric Urology. Int J Environ Res Public Health 2022;19:11194.
35. Paraboschi I, De Coppi P, Stoyanov D, et al. Fluorescence imaging in pediatric surgery: State-of-the-art and future perspectives. J Pediatr Surg 2021;56:655-62.

Cite this article as: Lanfranchi G, Paraboschi I, Mantica G, Costanzo S, Selvaggio GGO, Lopez M, Pelizzo G. Ureteral clipping for managing persistent urinary dribbling caused by ectopic ureters associated with non-functioning renal moieties in girls with complex duplex kidneys: a narrative review of the literature. Transl Pediatr 2025;14(6):1317-1325. doi: 10.21037/tp-2025-17