African Urology 2022;2(2):85-87
https://doi.org/10.36303/AUJ.0029

AFRICAN UROLOGY
ISSN 2710-2750 EISSN 2710-2750

CASE REPORT

A case report of ureteroureterostomy for a complete duplex system of the kidney with an ectopic ureter

CNB Evans,[1] FE Suleman,[2] A Badenhorst,[3] SZ Pinto[1]

[1] *Department of Urology, Kalafong Provincial Tertiary Hospital, University of Pretoria, South Africa*
[2] *Department of Radiology, Kalafong Provincial Tertiary Hospital, University of Pretoria, South Africa*
[3] *Kalafong Provincial Tertiary Hospital, University of Pretoria, South Africa*

Corresponding author, email: christopher.evans@up.ac.za

Duplex anomalies are common and more frequently recognised in females. Presentation depends on the exact anatomical configuration of the abnormality. The anomalies can be associated with ectopic ureters, ureteroceles, obstruction, vesicoureteral reflux (VUR), urinary tract infections (UTIs), incontinence, and varying degrees of renal function loss.[1,2] There are multiple surgical approaches to correct these disorders when sequelae are sufficient to warrant intervention. There is, however, limited high-quality evidence to justify a certain approach over another. Traditional opinion has favoured an upper pole nephrectomy (UPN) for an upper moiety with poor function.[2]

There have been several studies highlighting the benefit of an ipsilateral ureteroureterostomy (IUU) as an alternative to the more invasive UPN, but little has been shown with regards to this presentation in an adult setting, or indeed high-quality radiographic follow-up.[2-4]

In this case report, an IUU for a young adult, with a delayed presentation, was performed. The patient had a complete duplication of her renal collecting system and a poorly functioning upper moiety, in which IUU proved to be a suitable intervention. Radiographic follow-up allowed accurate interpretation of the postoperative changes.

IUU is a viable option to treat anomalies associated with a duplex renal collecting system, which can be done safely with an acceptably low morbidity rate and higher renal function preservation rate as compared to UPN.

Keywords: ureteral duplication, adult, ipsilateral ureteroureterostomy

Case report

A 22-year-old female presented with recurrent UTIs in the preceding two years, which responded to antibiotic treatment. She reported no chronic medical conditions, allergies, or previous surgical procedures. The patient further reported continuous urinary incontinence from a young age mandating two incontinence pads per day. Her bladder and bowel functions were otherwise normal. The patient's family dismissed her complaints and blamed her for the condition. Doctors at primary care level failed to notice the significance of her incontinence, to investigate her appropriately, or refer her to an appropriate level of care during her childhood or adolescent years. The patient had been seeing a psychologist due to depression as her condition impacted her ability and confidence to follow academic pursuits. A generally well patient was observed on examination, with the only positive finding being that of clear fluid draining from her vagina. An ultrasound revealed a cystic mass in the region of the upper pole of the right kidney. A computerised tomography (CT) scan with contrast and delayed images (Figures 1a and b) confirmed the diagnosis of a complete duplex system on

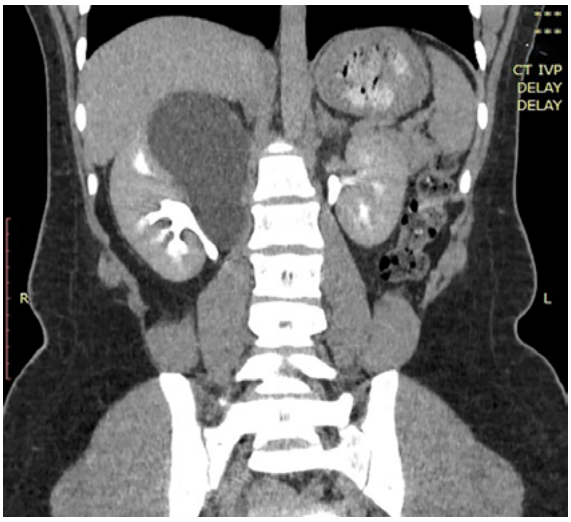

Figure 1a: Coronal CT IVP image at the level of the kidneys pre-intervention demonstrating hydronephrosis of the upper moiety of the right kidney with no excretion noted. The lower moiety of the kidney demonstrates a normal collecting system with the typical "drooping lily" sign and excretion of contrast into a normal ureter.

Figure 1b: Coronal CT IVP image demonstrating the duplex ureteral system of the right kidney. The normal lower pole ureter seen medially, is filled with contrast while the markedly dilated upper pole ureter seen laterally, with no contrast excretion noted.

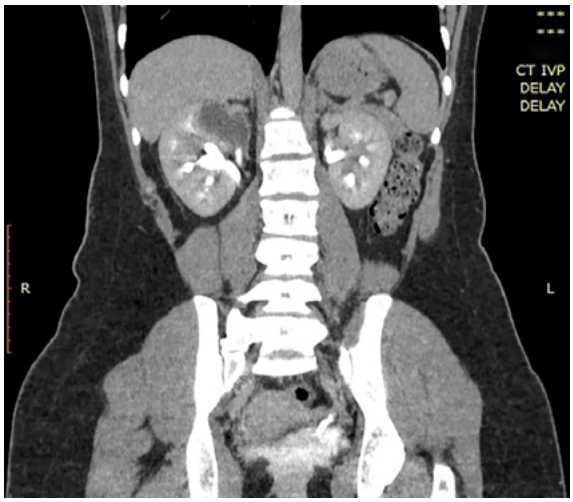

Figure 2a: Coronal CT IVP image at the level of the kidneys post-intervention, demonstrates a marked reduction in hydronephrosis of the upper collecting system of the right kidney. Excretion of contrast into the upper pole ureter is also noted.

Figure 2b: Coronal CT IVP image post-intervention, demonstrating contrast excretion in both ureters of the right kidney. The upper pole ureter seen laterally no longer demonstrates hydro-ureter.

the right, with a severely dilated upper moiety which demonstrated no excretion and marked hydroureter. Cystoscopy excluded the presence of a ureterocele and no ectopic ureteral orifice was noted. The ectopic ureter was presumed to be opening into the vagina through a Gartner duct cyst.

After requisite counselling, the patient opted for an IUU. This procedure was performed via a Pfannenstiel incision, the duplex ureters were identified, and meticulous handling was ensured. The upper moiety ureter was divided, spatulated, and anastomosed to the lower moiety ureter at the level of the pelvic brim. A JJ stent was left across the anastomosis and was removed six weeks post-reconstruction. At three-, six-month, and one-year follow-up there were no complications from the procedure and the patient's satisfaction with her improved quality of life and outcome was significant. The follow-up CT scan (at six months) with delayed imaging demonstrated marked improvement in the hydronephrosis of the upper pole of the right kidney with improved excretion noted (Figure 2a). There was also resolution of the hydro-ureter noted previously in the ectopic ureter (Figure 2b).

Discussion

Management options for a duplex renal collecting system discussed in the literature include common sheath reimplantation, ureter re-implantation of the ectopic ureter, a UPN, or an IUU.[2] Surgical management options considered for this particular case included a UPN where the upper pole moiety is excised versus an IUU which preserves the upper pole moiety and reimplants the ectopic upper pole ureter into the lower pole ureter via an end-to-side anastomosis.[1,5] Both IUU and UPN can be performed through different techniques: laparoscopic, open or robot-assisted.[1]

The decision between a UPN and IUU remains controversial and depends on numerous factors, namely: the age of the patient, the surgeon's experience and preference, the degree of VUR or ureter obstruction, pathology of the ureters, or kidneys, and the presence of a ureterocele.[2]

Traditionally a UPN is the preferred choice of management for cases where the upper moiety has been assessed to have poor function. However, it has been described in the literature that there is a risk of vascular injury, due to unrecognised segmental renal artery ligation, or vasospasm. An overall complication rate of 5–10% has been reported for UPN.[6] Complications include urine leak, bleeding, and loss of the functional lower moiety.[6] Complete loss of the lower moiety assessed on long-term follow-up accounted for up to 4.9% of cases described by Jayram et al.[6] A study done on 60 patients by Gundeti et al. reported a decrease in renal function of 6.8%, whilst 8% of the patients experienced a decrease of greater than 10%.[7]

In contrast, a study conducted in 2013 by McLeod et al. showed that an IUU can safely be performed even if the upper pole moiety is poorly functional or non-functional.[8] This observation was later confirmed by Kawal et al. who showed that there was no difference in terms of outcomes (complications, need for secondary interventions, or radiographic resolution) when their cohort was divided by function of moiety at < 10% and ≥ 10%.[2] The median function in the poor moiety function group was 0%.[2] Levy et al. reported in their study that the preservation of the upper tract is not linked to the previously believed increased risk of hypertension.[9]

IUU does not place the kidney at direct risk of damaging the functional renal moiety.[2] IUU has a low risk of reoperation rates irrespective of preoperative VUR or the degree of donor ureteral dilation.[4] This important observation was shown by Harms et al., in that a larger diameter of the upper moiety ureter (≥ 1.2 cm), was not shown to have a negative impact on outcome following IUU.[3] A large donor ureter was in fact shown to be associated with a more pronounced reduction in hydronephrosis and ureter diameter as was the case observed in our patient.[3] Concerns regarding the theoretical 'yo-yo' reflux have not been ubiquitously observed across all cohorts with some observations having challenged this concept.[4]

An IUU can be done via a distal approach using a Pfannenstiel or Gibson incision which allows for more complete excision of the

ectopic ureteral stump, therefore reducing the risk of UTI, and sparing the patient a flank incision with its known morbidity including pain and abdominal wall asymmetry.[4,10] No intervention should be used indiscriminately, however, and the greatest predictors of adverse outcomes following IUU have been shown to be both upper and lower moiety hydronephrosis, ectopic ureteroceles, and in situations where a concomitant ureter re-implantation is required.[4]

Albeit based on small cohorts and retrospective analysis, the literature reviewed clearly supported IUU as a surgical option to be considered in this case. The patient's final choice was to proceed with a distal IUU.

Conclusion

IUU is a viable option to treat anomalies associated with a duplex renal collecting system, which can be done safely with an acceptably low morbidity rate and higher renal function preservation rate as compared to UPN. In this case report, we demonstrated the safety and benefit in a young adult, who did not fit into the classic paediatric cohorts assessed in published medical literature. This is important in our context, where there are issues pertaining to the access of quality health care. As a result, we do encounter delayed presentations, in which IUU can be considered. The high-quality CT scans further provide a good indication of the anatomical and functional improvement in the postoperative setting.

Acknowledgements

Dr Chris Evans would like to acknowledge the input of his moderators from the University of Edinburgh, ChM (Urology) programme. For this case, particular thanks need to be given to the paediatric moderators: Mr Stephen Griffin, Mr Milind Kulkarni, and Mr Pankaj Mishra, who encouraged critical thinking on this topic.

Conflict of interest

The authors of this research declare that no specific grant from funding agencies in the public, commercial, or not-for-profit sectors was provided.

Ethical approval

Ethics approval was granted by the Faculty of Health Sciences Research Ethics Committee, University of Pretoria, reference number: 705/2021.

ORCID

CNB Evans https://orcid.org/0000-0001-5924-5107
FE Suleman https://orcid.org/0000-0001-5097-2092
SZ Pinto http://orcid.org/0000-0002-6042-0416

References

1. Michaud JE, Akhavan A. Upper pole heminephrectomy versus lower pole ureteroureterostomy for ectopic upper pole ureters. Curr Urol Rep. 2017;18(3):21. https://doi.org/10.1007/s11934-017-0664-0.
2. Kawal T, Srinivasan AK, Talwar R, et al. Ipsilateral ureteroureterostomy: does function of the obstructed moiety matter? J Pediatr Urol. 2019;15(1):50.e1-.e6. https://doi.org/10.1016/j.jpurol.2018.08.012.
3. Harms M, Haid B, Schnabel MJ, et al. Ureteroureterostomy in patients with duplex malformations: does a large diameter of the donor ureter affect the outcome? J Pediatr Urol. 2019;15(6):666.e1-.e6. https://doi.org/10.1016/j.jpurol.2019.09.016.
4. Abdelhalim A, Chamberlin JD, Truong H, et al. Ipsilateral ureteroureterostomy for ureteral duplication anomalies: predictors of adverse outcomes. J Pediatr Urol 2019;15(5):468.e1-.e6. https://doi.org/10.1016/j.jpurol.2019.05.016.
5. Storm DW, Modi A, Jayanthi VR. Laparoscopic ipsilateral ureteroureterostomy in the management of ureteral ectopia in infants and children. J Pediatr Urol. 2011;7(5):529-33. https://doi.org/10.1016/j.jpurol.2010.08.004.
6. 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(3):272-5. https://doi.org/10.1016/j.jpurol.2011.02.029.
7. Gundeti MS, Ransley PG, Duffy PG, Cuckow PM, Wilcox DT. Renal outcome following heminephrectomy for duplex kidney. J Urol. 2005;173(5):1743-4. https://doi.org/10.1097/01.ju.0000154163.67420.4d.
8. McLeod DJ, Alpert SA, Ural Z, Jayanthi VR. Ureteroureterostomy irrespective of ureteral size or upper pole function: a single center experience. J Pediatr Urol. 2014;10(4):616-9. https://doi.org/10.1016/j.jpurol.2014.05.003.
9. Levy JB, Vandersteen DR, Morgenstern BZ, Husmann DA. Hypertension after surgical management of renal duplication associated with an upper pole ureterocele. J Urol. 1997;158(3 Pt 2):1241-4. https://doi.org/10.1016/S0022-5347(01)64441-0.
10. Inkiläinen A, Blomqvist L, Ljungberg B, Strigård K. Patient-reported outcome measures of abdominal wall morbidity after flank incision for open partial nephrectomy. BJU Int. 2021;128(4):497-503. https://doi.org/10.1111/bju.15420.