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Original Article

Bilateral Ureteral Triplication with Bilateral Complete Duplex Kidney: Surgical Challenges and Management via Laparoscopic Surgery

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Abstract

Bilateral ureteral triplication is a very rare form of congenital urinary tract anomaly; so far, less than 10 cases have been reported worldwide. We report an infant with bilateral complete duplex kidneys and a rare variant of Type II bilateral ureteral triplication. The diagnostic challenges and successful laparoscopic management are discussed.

Key words: ureteral triplication, complete duplex, laparoscopy

INTRODUCTION

Bilateral ureteral triplication is a very rare form of congenital urinary tract anomaly. Most of the cases were incidental findings during surgery.[1–5] The origin of the ureters whether they are from the upper or lower moiety is very important and can pose a real challenge to surgeons.

CASE REPORT

A baby girl was diagnosed antenatally at 22 weeks gestation with bilateral hydronephrosis. At birth, a repeat postnatal ultrasound confirmed the presence of bilateral duplex kidney without evidence of ureterocoeles. She had early episodes of urinary tract infection starting from neonatal period. A MAG-3 scan revealed non-functioning upper moieties bilaterally (Fig. 1). Decision was made for a staged laparoscopic nephroureterectomies.

The right system was chosen first because of the amount of debris collection in the upper moiety. Magnetic resonance urography (MRU) was also performed and reported as bilateral duplication of the ureters with bilateral gross upper moiety hydroureter (Fig. 2). Right upper moiety laparoscopic nephroureterectomy was carried out at 3 months of age. At surgery, the upper moiety nephrectomy was carried out in usual manner using an ultrasonic dissector. The normal looking right lower moiety ureter i.e., the second right ureter was identified and preserved. However, when the upper moiety right hydroureter was transected distally, the authors noted the presence of a right third ureter transected together with the hydroureter. The third right ureter was adherent to the posterior aspect of the hydroureter. At laparoscopy the origin of the right third ureter seemed to be arising from the lower moiety despite following the course of the hydroureter, the authors decided to reimplant it back into the bladder via a small pfannensteil wound (open method). During the reimplantation, there were four vesico-ureteric orifices (VUOs) within the bladder; two VUOs were within the trigon and the other two VUOs were below the trigon of the bladder.

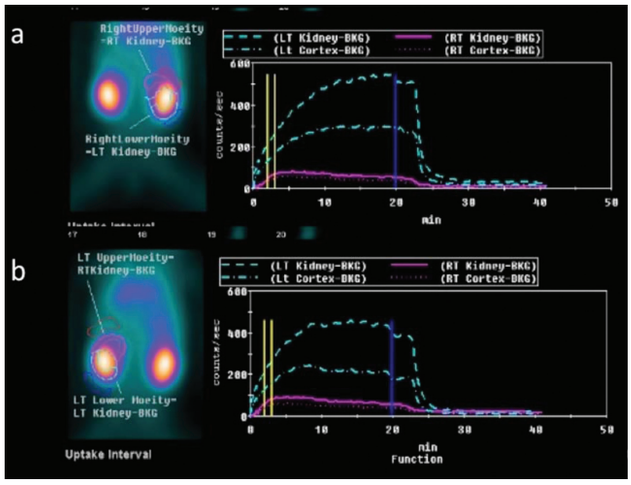

Figure 1: MAG3 renogram: (a) right kidney (upper & lower moiety) and (b) left kidney (upper & lower moiety) with IV lasix given at 20 min; showing reduction in function of both upper moieties approaching to non-function state (magenta lines) with symmetrical and good functioning bilateral hydronephrotic lower moieties (turquoise lines).

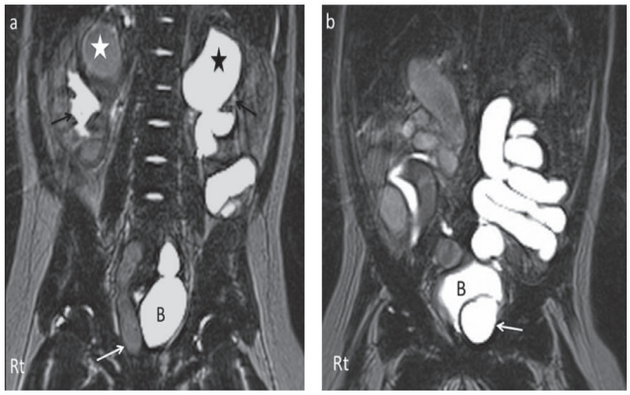

Figure 2: T2-weighted magnetic resonance urography: (a) & (b) shows bilateral complete duplex systems with bilateral gross hydronephrosis and hydroureters. The right upper moiety contains debri which show lower signal intensity within the dilated system (white star) as compared to the dilated left upper moiety (black star). Both lower moieties shows mild hydronephrosis (black arrows). Distally, there is ectopic ureteric insertion of the upper moiety ureters as evidenced by the tip of the dilated ureters (white arrows). Post-gadolinium showed absence of excretion from right upper moiety system (not shown). B = bladder.

A ureteric stent was inserted intra-operatively for the reimplanted right third ureter and the distal end was brought out through the pfannensteil wound. Post-operative period was uneventful. An antegrade study from this stent confirmed that the right third ureter belong to the right lower moiety (Fig. 3). Six weeks later she underwent left upper moiety laparoscopic nephroureterectomy. The expectant findings were that there was likely presence of three ureters as well on the left side. At surgery, these findings were found to be true, there was a third ureter identical in position to the right side; however the left third ureter was traced back to the left upper moiety (Fig. 4). The third left ureter was sacrificed along with the left upper moiety.

Post bilateral laparoscopic procedures, the patient was well for 2 months before experiencing another episode of urinary tract infection again. Ultrasound assessment revealed residu-

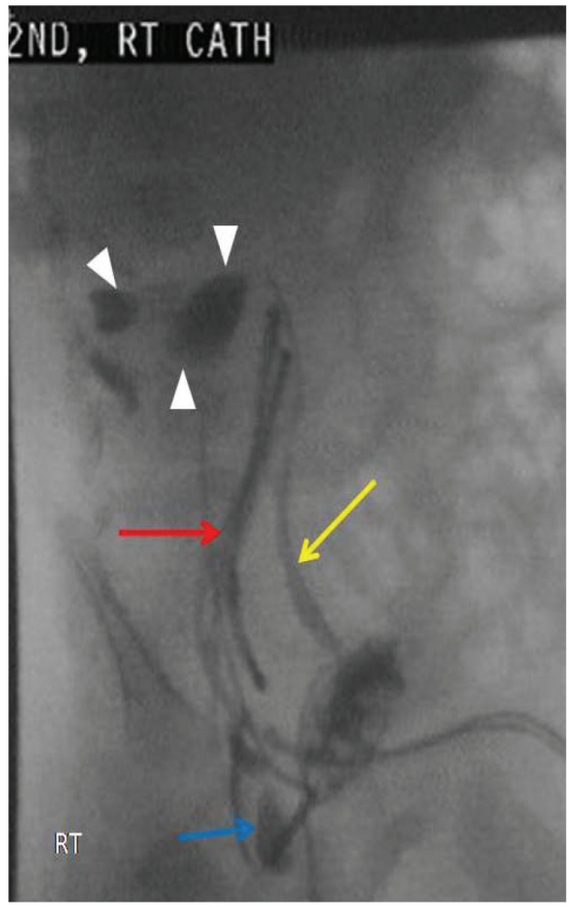

Figure 3: Antegrade study confirmed the third right ureter (red arrow) belongs to the right lower moiety (LM) (arrowheads) with opacified right LM ureter (yellow arrow). The upper moiety distal remnant ureter is labeled as blue arrow.

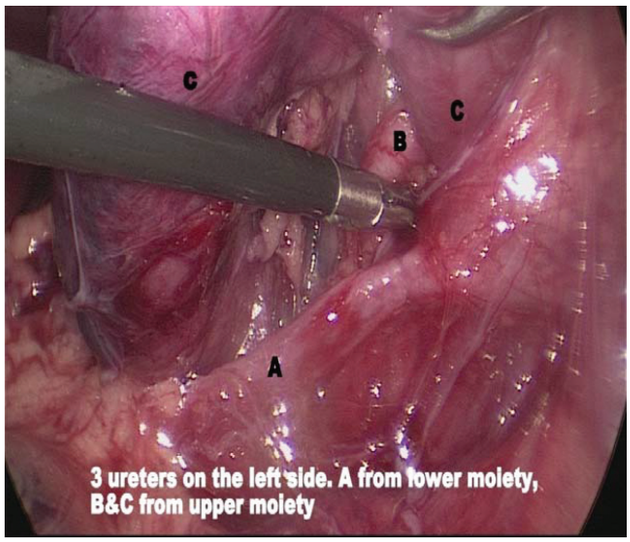

Figure 4: Laparoscopic view. Ureter C is a very dilated and tortuous hydroureter from left upper moiety compared to the normal size ureter A and B.

al ureteric remnant measuring 5 cm in length posterior to the bladder on the left side. A third operation was carried out; a laparoscopic excision of the remnant of the left hydroureter was successfully done. The patient's condition improved and she remained asymptomatic. She is currently well at one year follow up.

DISCUSSION

Ureteric triplication usually presents with recurrent UTI, urinary incontinence, or renal colic.[1,2] In our patient these symptoms presented early in life. Despite starting her on prophylactic antibiotics of syrup Trimethoprim, repeated urinary tract infections occurred and warranted an early intervention. There were many reports stating the use of MR nephrography in diagnosing complex urological abnormalities. [3, 4] However the MRU in this patient did not pick up presence of the third ureters bilaterally, most likely due to the grossly dilated hydroureters. This led to the accidental transection of the unsuspected right third ureter. During the second surgery, anticipation of similar findings was useful. We were able to look for and visualize all three ureters on the left without difficulty. Our patient had a rare variant of Type II ureteral triplication according to Smith classification[5] (Fig. 5).

The use of laparoscopy has allowed us to visualize the entire renal system and enabled easier dissection and resection even for the re-operation to remove the residual hydro-ureteric remnant. The patient had a fast recovery post surgery and the esthetic value of the wound was definitely superior (Fig. 6).

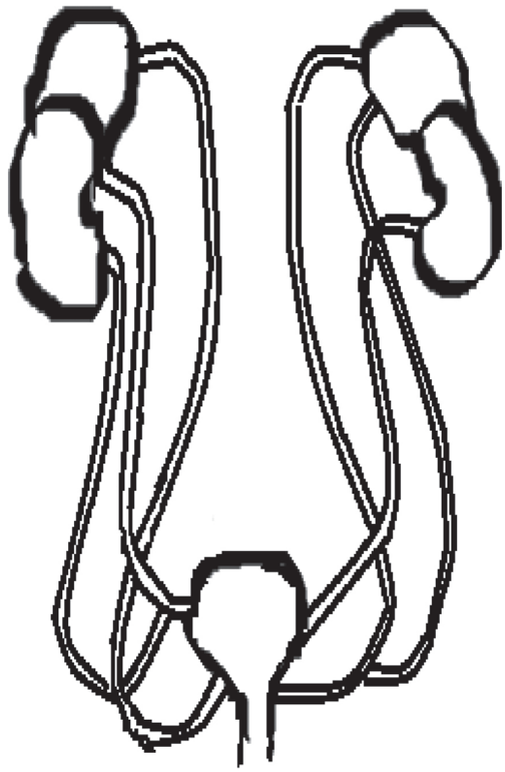

Figure 5: Schematic diagram of the patient's Type II bilateral ureteral triplication (variant).

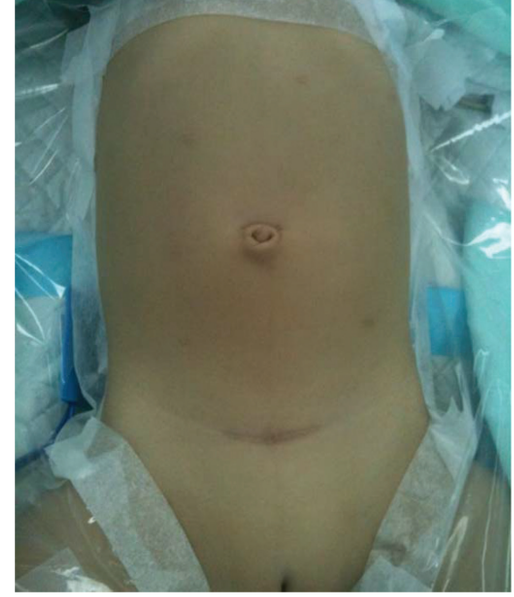

Figure 6: The scars post laparoscopic bilateral upper nephro-ureterectomies are hardly noticeable whereas the small pfannentiel scar for the ureteric reimplantation is easily seen.

In conclusion, the authors believe that laparoscopic surgery has enabled them to diagnose this rare condition with ease. Here, the authors chose laparoscopic excision as the method of choice to excise the non functioning upper moieties.

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