Laparoscopic management of double moiety: A case report with review of literature

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ABSTRACT

Duplication of the ureter is one of the most common anomalies of the urinary tract. Ureterocele is a developmental anomaly with cystic dilation of the distal aspect of the ureter and is often associated with some urological anomaly, such as a duplicated system or stenotic ureteric orifice. Early detection of these anomalies during the antenatal period has dramatically increased due to advances in imaging technology. However, a few undiagnosed adults also exist. It may remain asymptomatic but may cause repeated urinary tract infections or calculi. This is a case report of a 47-year-old female who had bilateral duplex collecting systems with right ureterocele. The patient had a recurrent urinary tract infection. She underwent cystoscopic deroofing and a laparoscopic right total nephrectomy. Congenital anomalies of the urogenital system should be considered in patients with chronic or recurrent infections. Multimodal imaging techniques such as ultrasonography, computed tomography, or magnetic resonance imaging should be used to confirm the diagnosis, especially before surgical management. The rationale for reporting this case is to highlight this rare condition and the feasibility of its minimally invasive therapy.

Key words: Congenital anomaly, Duplex collecting system, Laparoscopic nephrectomy, Ureterocele, Urinary tract infection

CASE REPORT

A 47-year-old female presented with chief complaints of right-sided flank pain with dysuria, burning micturition, and fever for 7 days, for which she was being treated by her family physician with tablet nitrofurantoin 100 mg twice a day. However, she did not respond and came to the emergency ward with worsening right-sided dull aching continuous flank pain with 3–4 spikes of fever daily associated with anorexia, dysuria, and myalgia. She gave a history of recurrent urinary tract infections.

On examination, she appeared dehydrated and was febrile. Her pulse was 96 beats/min, and her blood pressure was 90/60 mmHg. On abdomen examination, she had right-sided lumbar region tenderness and right renal angle tenderness.

She was admitted to the intensive care unit under the general physician. Her white blood cell count was 18,000/mm³, C-reactive protein was 175.5 mg/dL, and Serum Creatinine was 1.3 mg/dL. The urine was turbid, with 20–24 red blood cells/hpf and 40–45 pus cells/hpf. The urine culture study grew Escherichia coli. Bedside ultrasonography evaluation was suggestive of the right hydronephrotic kidney with a dilated ureter filled with debris. The specialist in urology was then called in and he advised to get computed tomography (CT) urography done. After stabilizing the patient, CT urography was done. It was suggestive of a 12×8.4 cm enlarged right kidney with gross hydronephrosis and parenchymal thinning with duplication of the right pelvicalyceal system with dilatation of the upper moiety with internal echoes suggestive of pyonephrosis of the upper moiety with hydroureter
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Figure 1: (a) CT urography coronal section shows left kidney with minimally functional lower moiety (black asterisk), non-functional upper moiety (white asterisks), hydro-ureter of upper moiety (white arrows), and ureterocele (black arrow), (b) CT urography coronal section shows normal caliber 2nd right ureter of lower moiety (white arrows), (c and d) CT urography 3D reconstruction showing hydronephrotic upper moiety (white arrow), bladder (yellow arrow), and the 2 ureters: hydroureter (yellow asterisks) and normal ureter (blue asterisks). CT: Computed tomography

and ureterocele at the right ureterovesical junction (Fig. 1a-d). Then, a renal nuclear scan was performed, which was suggestive of <10% of the functional right kidney. Following this, it was decided to take her up for surgical intervention.

A cystoscopic de-roofing of the ureterocele was performed by the specialist endo-urologist (Fig. 2a and b). Subsequently, the patient’s position was changed to lateral, and laparoscopic intervention was initiated with the intention to excise only the upper non-functioning moiety. However, during the intraoperative assessment, the remnant right lower moiety appeared to be too thinned out with a very small volume and paper-thin parenchyma. Hence, an “on-table” decision to perform a total nephrectomy was made. The patient and her family were pre-operatively informed and counseled about the possibility. She then underwent a laparoscopic total right nephrectomy (Figs. 2c-f, 3a-f, 4a, and b). The same was performed through 4 trocars (Fig. 4c). The lowermost trocar was widened to retrieve the specimen (Fig. 4d).

On post-operative day 3 (POD), the drain was removed, and she was discharged on POD 5. On her POD 10 outpatient department visit, all her wounds had healed well.

DISCUSSION

The duplex collecting system is one of the most common urological anomalies. The incidence of duplex renal collecting systems is in the range of 0.5–3%, with females being more affected than males (2:1) [1]. The kidney is divided into various segments, each supplied by a single “end” arterial branch that arises from one of the main renal arteries. Three groups of primitive vasculature
A variety of symptoms might manifest according to the associated distortions and the case severity. The vast majority of cases are diagnosed in early childhood. However, a larger percentage of patients are asymptomatic and diagnosed incidentally. The primary and most common symptoms are those related to VUR and urinary tract infections [8]. One of the major complications associated with duplication is that of an obstruction, which could be calculus (anywhere along the ureter) or non-calculus obstruction at a confluence of the ureter or bladder insertion [9]. As per the Meyer-Weigert rule, the upper pole is generally seen as ectopic and therefore dysplastic due to obstruction, whereas the lower pole is related to VUR [10]. In our case, the patient had a right complete duplicated kidney with a lower draining ureter and left upper hydronephrotic segment and a right ureterocele causing a dilatation in the proximal part of the right kidney. Amis et al. analyzed 11 cases of obstruction involving the lower pole moiety of the kidneys. There were complete duplications in seven cases. The various pathological causes were due to UPJO in 2 cases, bladder tumor in 2 cases, ectopic upper pole ureterocele compressing and obstructing the ureteral orifice to the lower pole in 1 case, and ureteral stones in 2 cases (located at the mid and ureterovesical junction) [11]. Similarly, our patient had a right ureterocele, which caused prolonged obstruction that went unnoticed for an extended period.

The first modality used was ultrasound, which showed our patient’s multicystic mid- and upper-pole segments. Later, other imaging modalities used to confirm or rule out conditions must be conducted. To rule out reflux, a voiding cystourethrography can be conducted. Intravenous urography (IVP) and CT urography confirm the duplex system and other obstruction causes, and nuclear imaging is done to realize the split function and level of obstruction [11]. Another option for clarifying the anatomy of duplication anomalies is pre-operative cystoscopy combined with a retrograde ureteropyelogram before surgical correction [12].

Management depends on the cause of obstruction and the cortical loss in the renal moiety [11]. The majority of cases can be managed endoscopically, laparoscopically, and through open surgery in resource-limited facilities [13]. The role of treatment is to relieve the obstruction cause or relieve the pain by removing part of the kidney (partial nephrectomy) [11]. In cases where the upper renal moiety function is poor, upper pole heminephrectomy is a standard surgical treatment [13]. The ureterocele management should be individualized based on clinical presentation, type of ureterocele, patient’s age, and other clinical variables that may contribute to the management’s best choice [14]. The advantages of endoscopic treatment are simplicity and minimal invasiveness, but there is no consensus on its effectiveness for treating ectopic ureterocele. It has been reported that 50–80% of cases after initial endoscopic treatment need secondary surgery for ectopic ureterocele [15]. If the diagnosis had been made sooner, our patient would have benefited from a simple endoscopic procedure. However, her delayed presentation to appropriate care resulted in this unfortunate complete renal moiety parenchymal loss. A similar result was reported by Anyimba et al. [9]. A review of literature on other cases of double moiety with concurrent ipsilateral ureterocele is summarized (Table 1) and reveals that this is only the third such reported case in world literature [16,17]. It is the only such reported case in world literature that was managed in the same sitting by minimal access surgery (cystoscopy and laparoscopy).
CONCLUSION

As seen in this report, the previously asymptomatic duplex renal system may develop symptoms later in life. When identified without symptoms or evidence of renal function compromise, the integrity of the renal moieties may have to be closely monitored for the rest of their lives. A thorough evaluation with a high index of suspicion is required in individuals presenting with flank pains to quickly identify missed duplex renal systems and duplex system-associated disorders quickly and thus prevent the attendant renal moiety parenchymal loss. Furthermore, as seen here, laparoscopic management of double moiety, where indicated, is feasible in an advanced setup coupled with the concurrent availability of the requisite expertise.

REFERENCES


Table 1: Review of literature

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Journal/year of publication</th>
<th>Author/s</th>
<th>Age/sex/presentation</th>
<th>Radiological diagnosis</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>International Journal of Surgery Case Reports/2021</td>
<td>Prahara and Eldo [16]</td>
<td>25 y/F, right flank pain</td>
<td>Right complete duplex collecting system with giant right ureterocele</td>
<td>Cystoscopic deroofing and staged laparoscopic partial nephrectomy</td>
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<tr>
<td>2</td>
<td>BMJ case reports/2017</td>
<td>Ruchir et al. [17]</td>
<td>36 y/F, large abdominal lump</td>
<td>Right complete duplicated collecting system with ureterocele with giant right hydronephrosis</td>
<td>Cystoscopic deroofing and open total nephrectomy</td>
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