

Ureteral obstruction by an aberrant renal artery: A case report

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ABSTRACT

The ureter is a muscular tubular structure that carries urine from the kidney to the urinary bladder. It is usually about 20–25 cm in length and 3–5 mm diameter. The upper half lies in the belly and the lower half in the pelvic area. A ureteral obstruction is a blockage of either unilateral or bilateral ureters that carry urine from the kidneys to the urinary bladder. Ureteral obstruction can be curable. However, if it is not treated, symptoms can quickly move from mild pain, fever, and infection to severe including loss of kidney function, sepsis, and death. Here, we report the case of an upper ureteral obstruction by an aberrant artery. The artery was originating from the right renal artery, supplying the right psoas muscle, and causing gross proximal hydroureteronephrosis in a 24-year-old male patient. The patient was diagnosed using contrast-enhanced computed tomography through the abdomen examination.

Key words: *Aberrant artery, Hydroureteronephrosis, Percutaneous nephrostomy, Vascular compression*

A ureteral obstruction is a blockage of either unilateral or bilateral ureters and is a common cause of obstructive uropathy. Ureteral obstruction can be curable. However, if it is not treated, symptoms can quickly move from mild pain, fever, and infection to severe including loss of kidney function, sepsis, and death [1]. Epidemiologically, obstructive uropathy accounts for 10% of the causes of acute renal failure and 4% of the cases of chronic end-stage renal failure [2].

Obstructive uropathy is a condition in which the flow of urine is blocked. A blocked ureter can cause urine to go back up into the kidney, which causes swelling and injury in one or both kidneys. It can occur suddenly or caused due to a long-term problem. Obstructive uropathy has multiple etiologies including congenital and acquired ones. The common causes are bladder or kidney stones, enlarged prostate, retroperitoneal fibrosis, bladder or ureteral cancer, and any other type of cancer that spreads [3]. Vascular compression of the ureter also makes a small percentage of obstructive uropathy.

Although the aberrant renal vessel is a common entity, arterial vascular anomalies rarely cause extrinsic ureteral obstruction and only about 15 cases have been reported so far. Out of them, one case was due to the umbilical ligament, two were due to ureterocele, and three were due to retroperitoneal fibrosis. In this article, we describe the case of a ureteral obstruction which was caused by an aberrant artery originating from the right renal artery, supplying the right psoas muscle, and causing gross proximal hydroureteronephrosis in a 24-year-old male patient.

CASE REPORT

A 24-year-old male patient presented to the urology outpatient department with a complaint of pain in the right loin region for the past 6 months. The pain was dull, non-continuous and experienced after consumption of large amounts of fluid. She had been treated at a local hospital in the past for urinary tract infection. The physical examination revealed no abnormality. Blood pressure was 112/78 mmHg and rest of the vitals were normal.

A biochemical analysis revealed blood urea nitrogen level of 36.0 mg/dL and serum creatinine level of 1.5 mg/dL. Urinalysis was within normal limits. Delayed contrast computed tomography (CT) scan showed severe hydroureteronephrosis with a sudden cutoff of the dilated right ureter in its upper part, about 4–5 cm distal to a pelviureteric junction. No calculus was found in the ureter. Plain and contrast-enhanced CT (CECT) scan was done. CECT showed an aberrant artery originating from the right renal artery which was involved to supplying the right psoas muscle, flowing anteriorly, and compressing the right ureter in its upper part worked as cause to gross proximal hydroureteronephrosis (Fig. 1a and b).

Based on the above findings, a final diagnosis of ureteral obstruction caused by an aberrant renal artery was made. The patient was managed by percutaneous nephrostomy. A 10-Fr Malecot catheter was inserted under the ultrasound and fluoroscopic guidance. After 3 days, the patient was discharged and the catheter was removed. The patient was advised for double J stent for 1 month. Unfortunately, the patient did not turn up for follow-up.

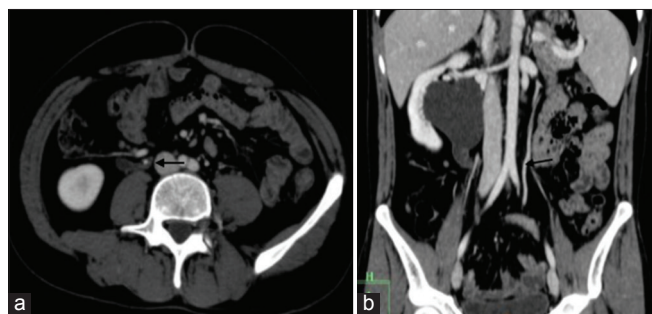


Figure 1: (a and b) Contrast-enhanced computed tomography (a - axial and b - coronal) showed an aberrant artery originating from the right renal artery, supplying the right psoas muscle, compressing the right ureter in its upper part (arrows), and causing gross proximal hydroureteronephrosis

DISCUSSION

In recent times due to the widespread use of newer modalities such as color Doppler imaging, CT angiography (CTA), magnetic resonance angiography (MRA), and digital subtraction angiography, the frequency of aberrant vessels detection has been increased [4]. The origin of aberrant renal vessels could be attributed to complex renal development. The renal development goes through a series of changes from pronephros, mesonephros, and metanephros with an ascent from pelvis to the lumbar region. Psoas muscle is primarily supplied by iliac artery branches and in a very small percentage of cases, it is also supplied by aberrant renal artery branches. The aberrant vessels usually course posteriorly to the ureter [5].

Aberrant blood vessels are a rare cause of ureteral obstruction [5,6]. Seven proved cases and one probable instance of vascular ureteral obstruction in juveniles are reported so far. By specific example, these cases serve to emphasize the great importance and necessity of the employment of modern urological methods in the diagnosis and treatment of persistent urinary tract disease in young patients [7]. It was also hypothesized that pulsations of arteries inhibit ureteral peristalsis at the level where vessels cross the ureter, either by rhythmic mechanical irritation or by abnormal currents of action, initially causing a permanent localized spasm (stage of functional or dynamic dysectasia), and subsequently trophic alterations consecutive to persistent spasm (edema and sclerosis) [8].

The usual symptoms of ureteral obstruction are an intermittent, colicky abdominal pain in the lumbar region referred to groin along with nausea and vomiting. The presence of an arterial aneurysm might lead to compression effects and various symptoms [9]. There are few reports in the literature describing iliac artery aneurysms of great dimensions having a compressive effect on the urinary tract [10]. In the case of congenital obstruction of the lower ureter, an aberrant blood vessel, obliterated vessels (obliterated umbilical artery), or fibrous tissue bands can be the cause of it infrequently [11].

Conventional modalities such as intravenous pyelography and angiography have been replaced by newer modalities such as CT and MRA which can detect these aberrant vessels with higher sensitivity and less invasively. These newer modalities also allow for greater anatomical delineation such as the course of an artery, relation with adjacent structures, and any vascular complication. It also gives an opportunity to look for renal function in urography phases if the obstruction is severe and longstanding which helps to assess surgical feasibility in such cases. Conservative surgery, chiefly vessel resection or urethroplasty, is urged; nephrectomy is demanded with far-advanced renal destruction, infection, or calculus disease [7].

CONCLUSION

Aberrant blood vessels should be considered in the differential diagnosis of extrinsic ureteral obstruction. To the best of our knowledge, this is the first case of an aberrant artery originating from the right renal artery, supplying the right psoas muscle, and causing compression on upper ureter.

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