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**Dr. Parth Vadher**

Residents, Department of General  
Surgery, CUSMCH, Gujarat, India

**Dr. Akash Agrawal**

Residents, Department of General  
Surgery, CUSMCH, Gujarat, India

**Dr. Kamlesh Galani**

Associate Professor, Department of  
General Surgery, C U Shah Medical  
College and Hospital  
Surendranagar, Gujarat, India

## A rare case of ureteropelvic junction obstruction by an aberrant renal vessels

**Dr. Parth Vadher, Dr. Akash Agrawal and Dr. Kamlesh Galani**

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### Abstract

Ureteropelvic junction obstruction results in functionally significant impairment of urinary transport from the renal pelvis to ureter, that may because of intrinsic or extrinsic causes. Abberent renal vessels is the most common cause of pelviureteric junction obstruction in children. Aberrant renal vessels one of the most important cause of ureteropelvic junction obstruction present in about 20-40% of individuals.

**Keywords:** Ureteropelvic junction obstruction, abberent renal vessels, hydronephrosis, Endoluminal ultrasonography, pyeloplasty

### Introduction

Ureteropelvic junction obstruction is most common form of upper urinary tract obstruction in children obstruction may be intrinsic or extrinsic. In some patients the lower pole vessels cross the ureter posteriorly and truly have an aberrant course, recent studies using three dimensional multidetector row composed tomography demonstrated that the precise location of crossing vessels did not correspond to the obstructive transition point in patient with ureteropelvic junction obstruction in contrast one group found improvement in patients undergoing only ligation of crossing vessels. The presence of crossing vessels most certainly has a detrimental effects on success rates of minimally invasive procedures of ureteropelvic junction obstruction in particular endopylotomy.

### Case Report

A 9 years female patient was admitted in our hospital with intermittent left flank pain for 6 months, relived when on medication, the pain was mild to moderate ache confined to left upper quadrant anteriorly and posteriorly.

Physical examination revealed pulse and temperature within normal limits, routine blood investigation within normal limits (WBC-6800, S.Creatinine-0.7)

Urine Analysis shows urine with acidic reaction, pus cells-occasional, rbc-nil/hpf, endothelial cells-1-2/hpf.

Usg abdomen-pelvis shows Gross hydronephrosis on left side with dilated renal pelvis and thinned parenchyma with Left sided ureteropelvic junction obstruction.

Kidney intravenous pylogram shows progressive & constant dilataion of the left renal pelvis without excretion into the ureter even after 24 hour of ingestion of contrast. Left sided pelviureteric junction obstruction and right sided normally functioning & normally excreting kidney. On Tc -99m DTPA scan was suggestive of delayed excretion of left kidney.

### Discussion

Aberrant or accessory arteries have been of interest to the clinicians for some years, mainly because of the possible part the vessel may play in the causation of obstruction of pelviureteric junction.

There is no established criterion for aberrance; the term has been applied equally to an additional artery in the renal pedicle, or to a vessel entering the kidney at either pole, whether derived from the main renal artery, from the aorta or from a branch of the aorta<sup>[1]</sup>.

Embryology of abberent renal vessel is nessesory to understand the frequent anomalies that may occur. Embryological development of the kidneys, there are three stages of pronephros,

**Corresponding Author:**

**Dr. Kamlesh Galani**

Associate Professor, Department of  
General Surgery, C U Shah Medical  
College and Hospital  
Surendranagar, Gujarat, India

mesonephros and metanephros, and the migration of the definitive kidney (metanephros) from the pelvic region to the region of the posterior abdominal wall (in the lumbar area), the renal blood supply undergoes successive changes in its upward migration. Since arterial degeneration begins at the cephalic pole of the metanephros, the segmental branch to the lower renal pole is the one most likely to remain as an accessory artery [2].

The association between lower polar aberrant vessels and a dilated renal pelvis was appreciated and this, acting in the nature of a physical obstruction to the urine flow, seemed to provide a logical explanation for the condition. However, it has been suggested that the obstruction may result from a neuromuscular incoordination of the ureteropelvic junction and the vascular obstruction is a secondary rather than a primary event. However, the work of Johnson who studied the manometric pressures in such cases, and the electron microscopic evidence presented by Notley appear to favor mechanical obstruction [3].

The symptom of vascular ureteropelvic junction obstruction may include colicky mid-abdominal pain, nausea and vomiting. Also, the patient may have significant weight loss and palpable ptotic kidney. However, our patient did not present such symptoms or signs, except an abdominal pain.

Aberrant vessels usually cause intermittent ureteropelvic junction. These cases have a normal perinatal history, followed by the subsequent onset of clinical signs and symptoms, often influenced by the child's hydration status, and characterized by intermittent hydronephrosis on imaging and normal kidney function. The aberrant vessels typically cross over the ureteropelvic junction to perfuse the lower pole of the affected kidney. Currently, there are no definitive imaging techniques or intraoperative procedures available to confirm the aetiology of ureteropelvic junction obstruction. As noted by Schneider, frequently one encounters anatomic variability in the relationship between the renal pelvis and the lower pole vessels. Therefore, we included intraoperative diuretic-test (DT) after polar CV-dissection in all our cases. In pure extrinsic-ureteropelvic junction obstruction the pelvis drains rapidly, whereas inadequate drainage points toward intrinsic causes of obstruction.

Older modalities, such as intravenous urography and angiography, have essentially been replaced by endoluminal ultrasonography and CTA for evaluating crossing vessels at pelvi ureteric junction. Endoluminal ultrasonography is invasive and time-consuming. A significant advantage of the technique is that it can quantify the number and location of vessels and aid in directing an incision away from vessels [4].

CTA is much less invasive in comparison with angiography. The image can be reconstructed three-dimensionally in longitudinal fashion, providing accurate information about vessels as small as 1 mm in diameter [5]. MR imaging, including MR urography and angiography, is an effective diagnostic method to evaluate various renal diseases. MR angiography can rapidly and accurately depict renovascular diseases without using contrast medium and ionizing radiation [6]. A source image of MRA shows renal parenchyme as well as a dilated pelvocalyceal system. In the present case, the source image of MRA clearly displayed the relationship between hydronephrosis and an aberrant renal artery. On the other hand, the number, location, morphology and size of the aberrant renal vessels were accurately depicted by CTA. Therefore, CTA and MRA are considered to be more non-invasive and more powerful diagnostic methods to evaluate an aberrant renal artery than conventional angiography or CT. magnetic resonance angiography can be used to diagnose Ureteropelvic junction

obstruction in patients who are allergic to iodinated contrast material [7].

Several methods of surgical treatment have been reported. Since the first reconstruction of an obstructed kidney in the late 1800s by trendelenburg, surgery for PUJ obstruction has evolved significantly. In 1936, foley describe the results of 20 pyeloplasties using the so called YV plasty repaire [8]. In 1946, Anderson and hynes published their experience with an operation that included complete transaction of the upper uteter, subsequent spatulation of the distal ureter, and trimming of the redundant pelvis [9]. Currently, the most widely accepted surgical procedure is dismembered pyeloplasty, with the anastomosis performed anterior to the obstructing vessel [10]. The success rate of pyeloplasty is over 90 percent.

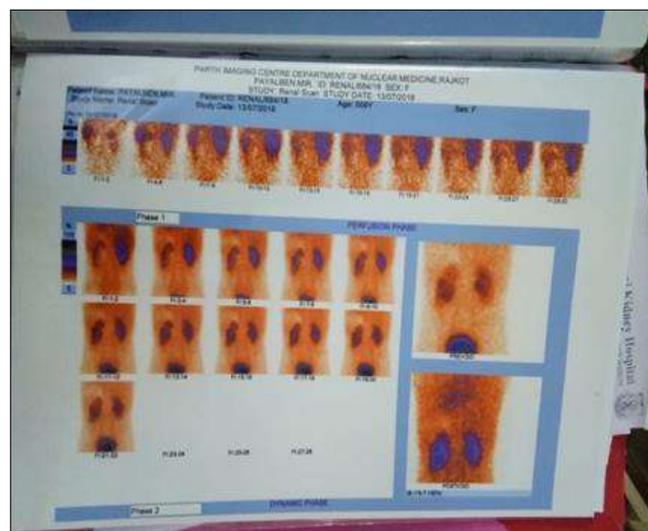


Fig 1.



Fig 2.

## Conclusion

This case report details an 9 year young child suffering from a case of new onset ureteropelvic obstruction due to an accessory renal artery. Although accessory arteries are common, it is unusual for them to be a sole cause of obstruction and hydronephrosis. This patient's condition improved with placement of a ureteric stent. Outpatient urology consultation is the next appropriate step to determine a more definitive solution for this condition. This case highlights how a common anatomical variant can cause unexpected medical complications.

**Declarations**

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**Conflict of interest:** None

**Ethical approval:** Taken.

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