

## Obstructive Left Ureterovesical Junction Calculus Presenting With Left Loin and Groin Pain in a Male Child: The Ultrasonographic Findings and Case Report

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**Abstract:** Ureterovesical junction (UVJ) obstruction refers to a blockage to this area causing hindrance to flow of urine down to the bladder, leading to urine back up into and causing dilatation of the ureters and kidney (megaureter and hydronephrosis). This is a 5-year-old male child referred for abdominal, pelvic and scrotal ultrasonography on account of moderate to severe supra-pubic pain radiating to the left loin and scrotal region with associated vomiting, sweating, occasional hematuria, increased urinary frequency and urinary tract infection for almost a year duration. The abdominal and pelvic ultrasonogram showed an oval echogenic area with posterior acoustic shadow measuring about 10mm in mediolateral dimension impacted at the left UVJ with associated dilatation of the left ureter, left calyceal moieties and pelvis. There is associated enlargement of left kidney with a bipolar length of about 144mm. A diagnosis of an obstructed left UVJ by an impacted calculus with associated hydronephrosis was established. The patient had a successful cystoscopy with pneumatic lithotripsy for surgical removal of the calculus, he got better and discharged home afterwards. We present a case of UVJ obstruction in a 5-year-old child due to its peculiar presentation, and to review the ultrasonographic findings.

**Keywords:** UVJ, Calculus, Hydronephrosis, Megaureter, Ultrasonography.

### INTRODUCTION

Ureterovesical junction (UVJ) or ureterovesical meatus (UVM) may be obstructed by congenital causes such as primary megaureter and congenital stenosis of the distal ureter, and or non-congenital causes among which are calculi. There is dilatation which is often limited to the ureter, this may involve the collecting system to varying degrees [1].

The UVJ has three segments, these are: the juxtavesical, the intramural and submucosal segments. These segments are associated with the Waldeyers sheath and prevesical sphincter as described by Salvador Gil Vernet, alterations of the aforementioned sheath or sphincter by congenital or acquired anomalies may lead to urinary obstruction or vesicoureteral reflux [2-4].

Obstruction at the UVJ either from congenital or acquired causes like calculus often lead to obstructive nephropathy, this is defined as a hindrance of normal urine flow that eventually leads to renal dysfunction [5-7].

Urinary tract obstruction especially in childhood are often congenital, and may occur from the level of the calyces to the external urethral meatus, with UVJ obstruction from varying causes such as calculus been regarded as one of the most common cause of urinary obstruction [5, 8-10].

Ureterovesical junction obstruction from calculus or any cause often leads to obstruction in the normal urine flow, which subsequently leads to hydronephrosis, pyelonephritis, abdominal and flank pain, hematuria, nausea, vomiting, with chronicity however, the likelihood of sepsis and renal insufficiency presenting as failure to thrive, diarrhea and other nonspecific features becomes higher [5, 6, 8, 10, 11].

Ureterovesical junction obstruction from any cause may also lead to increased intra-ureteric pressure, these and the back pressure lead to hydronephrosis with thinning of the renal parenchyma. There is associated stasis of urine, these stasis within dilated urinary tract causes recurrent infections. The combination of increased intraluminal pressure, stasis with repeated infections causes renal parenchymal scarring and an

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impairment of the renal function, this impaired renal function may be the cause of hindrance to normal growth and development in childhood [6, 8, 10].

Imaging plays vital role in the diagnosis of urinary tract obstruction following UVJ on account of calculus, these are ultrasonography for demonstrating the calculus, affectation of the ureter and collecting systems with the kidneys. Plain radiograph may also detect presence of calculus in the pelvic region for radio-opaque calculus. Intravenous urography (IVU) may also demonstrate the calculus, the ureter and calyces with renal excretion, and renal scarring. Micturating cystourethrography (MCUG) may also be used to rule out the possibility of vesicoureteric reflux and other possible causes of UVJ obstruction [1-11].

The main treatment of obstructive pathology of the UVJ either due to congenital or acquired causes is by open surgery, ureteral reimplantation, or nephrectomy in situation associated with loss of renal function [2, 12, 13].

## CASE REPORT

This is a five-year-old male child that was referred for an abdominal, pelvic and scrotal ultrasonography on account of recurrent left loin pain, supra-pubic pain and left testicular pain, vomiting, occasional hematuria, increased frequency of urination and urinary tract infection for almost a year duration of onset.

The patient had the pain most instances arising from the supra-pubic region and radiating to the left lumbar and testicular regions and colicky in nature. The pain is often associated with vomiting and increased urinary frequency, sweating and restlessness.

The child is conscious and oriented, not pale, not dehydrated, not jaundiced, not in any form of distress; respiratory or painful, no finger clubbing, no any area of skin discoloration or pigmentation noted.

The patient had normal pulse rate (75beats per minute), normal blood pressure (95/60mmHg), and normal respiratory rate of about 24 breaths per minute.

The urine analysis done showed pus cells, traces of red blood cells, white cells and also trace amount of protein, no urine sugar was demonstrated. The urine microscopy and culture showed the growth of *Escherichia coli*.

Blood electrolytes were normal, blood urea nitrogen (8.5mg/dL), and blood creatine level (0.6mg/dL) were also normal for the patients age range.

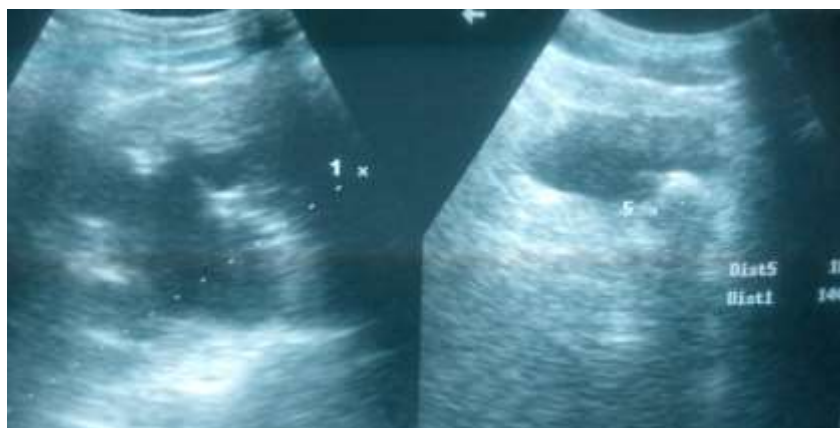
The patient had the ultrasonography of the abdominopelvic and scrotal regions respectively, the scrotal ultrasound showed normal scrotal sacs, with normal testicles, epididymis and normal peri-testicular fluid., with no features of hydrocele, scrotal or intratesticular mass or collection.

The abdominopelvic scan showed an impacted echogenic oval structure casting posterior shadow within the left ureterovesical junction, this measures about 10mm in mediolateral dimension (Figures 1 & 2). There is associated enlargement of the left kidney having a bipolar measurement of about 144mm (Figures 1 & 3). The demonstrated calyceal system show moderate to severe dilatation with irregular margins causing thinning of the cortical mantle (Figures 1 & 3). There is associated moderate to severe dilatation of the renal pelvis (Figures 1 & 3) with dilatation of the entire left ureter from the pelvi-ureteric region to the UVJ.

The patient had no intravenous urography or micturating cystourethrography during the course of the management.

The patient was treated in the referring health care facility, had course of antimicrobial agents; nitrofurantoin and cotrimoxazole with subsequent successful ureteroscopy and pneumatic lithotripsy with a tent insitu and placed in the bladder for six-weeks for edema following impacted calculus at the UVJ. The stent was removed following cystoscopy after six-weeks of its placement in the left UVJ.

The patient had a good outcome, got better and relieved of all symptoms and came later for follow-up in two weeks after which he was discharged from the clinic.



**Fig-1:** Ultrasonograms of the abdominopelvic region, showing an enlarged left kidney with moderate dilatation of the calyceal moieties and left pelvis on the left image and an impacted near oval area of echogenicity casting posterior acoustic shadow in the left UVJ; this calculus measures about 10mm in mediolateral dimension on the right image



**Fig-2:** Ultrasonogram of the pelvis showing a distended urinary bladder with an impacted calculus at the left ureterovesical junction (UVJ) or ureterovesical meatus (UVM); this calculus appears as an oval echogenicity with posterior acoustic shadowing measuring about 10mm in mediolateral dimension



**Fig-3:** An abdominal sonogram of the left kidney showing an enlarged kidney, measuring about 144mm in bipolar length, moderate to severe dilatation of the calyceal moieties and left pelvis

## DISCUSSION

Ureterovesical junction (UVJ) or ureterovesical meatus (UVM) may be obstructed by varying causes, some of which are congenital while some are acquired like calculus, there is dilatation which is often limited to the ureter, this may involve the collecting system to varying degrees<sup>1</sup>. The index case presented with a UVJ obstruction from an acquired cause; impacted calculus, and presented with dilatation of the left ureter and collecting system, thereby conforming to this literature.

Obstruction at the UVJ either from congenital or acquired causes like calculus often lead to obstructive nephropathy, this is defined as a hindrance of normal urine flow that eventually leads to renal dysfunction<sup>5-7</sup>, the case under review had an impacted calculus at the UVJ, with associated hindrance to urine flow but no obvious evidence of renal dysfunction following normal blood electrolyte, blood urea and creatinine levels.

Urinary tract obstruction especially in childhood are often congenital, and may occur from the level of the calyces to the external urethral meatus, with UVJ obstruction from varying causes such as calculus been regarded as one of the most common cause of urinary obstruction<sup>5,8,9,10</sup>. The index case had obvious left urinary tract obstruction from an acquired; impacted calculus at the UVJ causing obstruction and this was demonstrated to involve the collecting system, pelvis and left ureter conforming to the aforementioned literatures.

Ureterovesical junction obstruction from calculus or any cause often leads to obstruction in the normal urine flow, this may present as hydronephrosis, pyelonephritis, abdominal and flank pain, hematuria, nausea, vomiting, with chronicity however, the likelihood of sepsis and renal insufficiency presenting as failure to thrive, diarrhea and other nonspecific features becomes higher [5, 6, 8, 10, 11]. The case under review had left obstructive uropathy, and presented with hydronephrosis, loin and groin pain, vomiting, occasional hematuria, and repeated urinary tract infection conforming to these literatures. The patient however had no features of failure to thrive and renal insufficiency invariance to the aforementioned literatures.

Ureterovesical junction obstruction is often associated with increased intraluminal pressure leading to hydronephrosis with thinning of the renal parenchyma. There is also associated stasis of urine, these stasis within dilated urinary tract causes recurrent infections. The combination of increased intraluminal pressure, stasis with repeated infections causes renal parenchymal scarring and an impairment of the renal function, this impaired renal function may be the cause

of hindrance to normal growth and development in childhood [6, 8, 10]. The index case had hydronephrosis, stasis of urine flow with repeated urinary tract infections in conformity to these literatures, but no evidence of impaired renal function or hindrance to the child's growth and development invariance to these literatures.

Radiological imaging plays vital role in the diagnosis of urinary tract obstruction following UVJ on account of calculus, these are ultrasonography, plain radiography, IVU and MCUG for demonstrating the calculus, affection of the ureter and collecting systems within the kidneys and to rule out the possibility of vesicoureteric reflux [1-11]. The case under review had abdominal ultrasonography which showed the presence of a calculus causing obstruction at the UVJ, dilated left ureter, and dilated left calyceal system and pelvis with associated renal enlargement, thereby conforming to these literatures.

The main treatment of obstructive pathology of the UVJ either due to congenital or acquired causes is by open surgery, ureteral reimplantation, or nephrectomy in situation associated with loss of renal function [2, 12, 13]. The index case had no impaired renal function and also about five-years of age, he had courses of antimicrobial agents with surgical extraction of the calculus following cystoscopy with pneumatic lithotripsy.

## CONCLUSION

Recurrent loin and groin pain in children should arouse suspicion of UVJ obstruction by calculus, this can be confirmed following basic ultrasonography to alleviate the patient's symptoms and prevent consequent renal dysfunction and impairment.

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