

Primary Megaureter Unmasked by Imaging for Trivial Abdominal Trauma: A Case Report.

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ABSTRACT

Background: Occult preexisting renal lesions are often discovered incidentally during evaluation of patients for unrelated conditions. This case report aims to highlight how imaging for trauma can expose a silent organ-threatening congenital anomaly of the urinary tract. **Case Presentation:** A 13-year-old boy presented to the emergency department a week after being hit on his abdomen with a plywood during play. He reported left flank pain that has worsened over time. His past medical and surgical history was unremarkable. He was hemodynamically stable, and abdominal examination revealed mild left flank tenderness. An initial abdominal ultrasound scan revealed severe left hydroureteronephrosis. Dipstick urinalysis showed 3+ blood, while CT urogram revealed a markedly enlarged left kidney, measuring 18cm in its bipolar length, with cortical thinning and an ipsilateral tortuous hydroureter that tapered distally. Severe hydroureteronephrosis secondary to a primary obstructive megaureter was diagnosed. He underwent left distal ureteric exploration and ureteric reimplantation with intraoperative findings of a severely dilated and redundant left ureter with an area of narrowing at the distal end. He recovered uneventfully. **Conclusion:** The incidental discovery of a primary megaureter during trauma imaging is a reminder that acute presentations can unmask chronic, organ-threatening conditions. Therefore, this case report underscores the need for clinicians to comprehensively review trauma imaging beyond the immediate context of injury.

Key Words: Case report, Hydronephrosis, Hydroureteronephrosis, Megaureter, Renal Trauma, Ureteroneocystostomy.

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INTRODUCTION

Congenital defects of the urinary tract and the kidney are the leading cause of end-stage renal disease in children.¹ One such defect is the primary obstructive megaureter, caused by an intrinsic congenital defect of the lower ureteric segment at the ureterovesical junction.² This intrinsic congenital obstruction usually affects the lower 1 to 2 cm of the ureter before it enters the urinary bladder.³ Consequently, there is impairment of urine drainage into the bladder due to ineffective peristalsis, leading to progressive dilatation of the ureter proximally. The disease was first described by Caulk in 1923.^{3,4} It is commoner among males and often unilateral. However, it can be bilateral in 15 – 25% of cases.² The term megaureter is non-specific and includes a spectrum of abnormalities characterized by excessive ureteral diameter.⁵ Primary obstructive megaureter may remain asymptomatic and be detected incidentally during imaging evaluation for unrelated pathology. Most of the reported incidentally detected preexisting renal lesion during CT imaging for trauma is pelviureteric junction obstruction.⁶⁻⁸ Reports of primary obstructive megaureter detected following a CT imaging for trauma are rare. Therefore, this case report aims to highlight how imaging for trauma can expose a silent organ-threatening congenital anomaly of the urinary tract.

CASE PRESENTATION

A 13-year-old boy presented to the emergency department a week after being hit on his abdomen with a plywood during play. He reported left flank pain that was initially mild but worsened over time. There was no frank hematuria or lower urinary tract symptoms. His past medical and surgical history was unremarkable. On physical examination, he was hemodynamically stable, while abdominal examination revealed mild left flank tenderness with no obvious palpable swelling. An initial abdominal and pelvic ultrasonography revealed left severe hydroureteronephrosis with marked cortical thinning

corresponding to Onen's grade 4 hydronephrosis. The right kidney showed good corticomedullary

differentiation with no pelvicalyceal dilation. The urinary bladder contained clear urine with a bladder wall thickness of 4mm. Dipstick urinalysis showed 3+ blood, while his complete blood count and serum electrolytes, urea, and creatinine were within normal range. In view of the ultrasound scan and dipstick urinalysis findings, a CT urogram (Fig. 1) was performed, which showed a markedly enlarged left kidney, measuring 18cm in its bipolar length, with marked cortical thinning. The entire ipsilateral ureter was significantly dilated and tortuous, consistent with hydroureter, which extended to the distal end, tapering off. The right kidney and ureter were essentially normal. A tentative diagnosis of severe left hydroureteronephrosis secondary to primary obstructive megaureter was entertained with a differential of congenital distal ureteric stricture. He underwent left distal ureteric exploration through a Gibson's incision. The intraoperative findings, as shown in Fig. 2 were a severely dilated and redundant left ureter with a diameter of approximately 4cm. The distal end of the ureter, just before it inserts into the bladder, was narrow but patent. This diseased segment, together with the excess ureteral length, was excised, followed by ureteral reimplantation and DJ stenting using the modified Politano-Leadbetter technique. The Politano-Leadbetter was approached by extending Gibson's incision medially to have good access to the bladder. Two stay sutures were placed on the anterior bladder wall for traction. A vertical cystotomy was made and extended inferiorly towards the bladder neck, but stopping about 4cm before the bladder neck. A new muscular hiatus was created supero-laterally and proximally from the left ureteric orifice. This was done by the surgeon placing his finger at the intended site of the new hiatus, and from inside the bladder, a right-angle clamp was pushed through the bladder wall directly onto the guiding fingertip to ensure precise puncture. Using a right-angle Mixter clamp, a submucosal tunnel was created from the new hiatus towards the

trigone in the direction of the original orifice site. Before mobilizing the ureter through the submucosal tunnel, a suture was placed by taking a bite of the detrusor muscle at the edge of the new hiatus and a bite of the ureteral adventitia just as it enters the bladder. This is to prevent the ureter from retracting and ensure a smooth curve into the tunnel. The ureter was then brought through the muscular hiatus and threaded down through the submucosal tunnel. The

distal end of the ureter was spatulated and anastomosed to the newly created opening at the end of the tunnel using Vicryl 4-0 over a double-J stent. The bladder was closed in layers with a Foley urethral catheter in place. He recovered uneventfully and was discharged home to continue with follow-up visits. He reported no complaint during subsequent short-term follow-up visits.

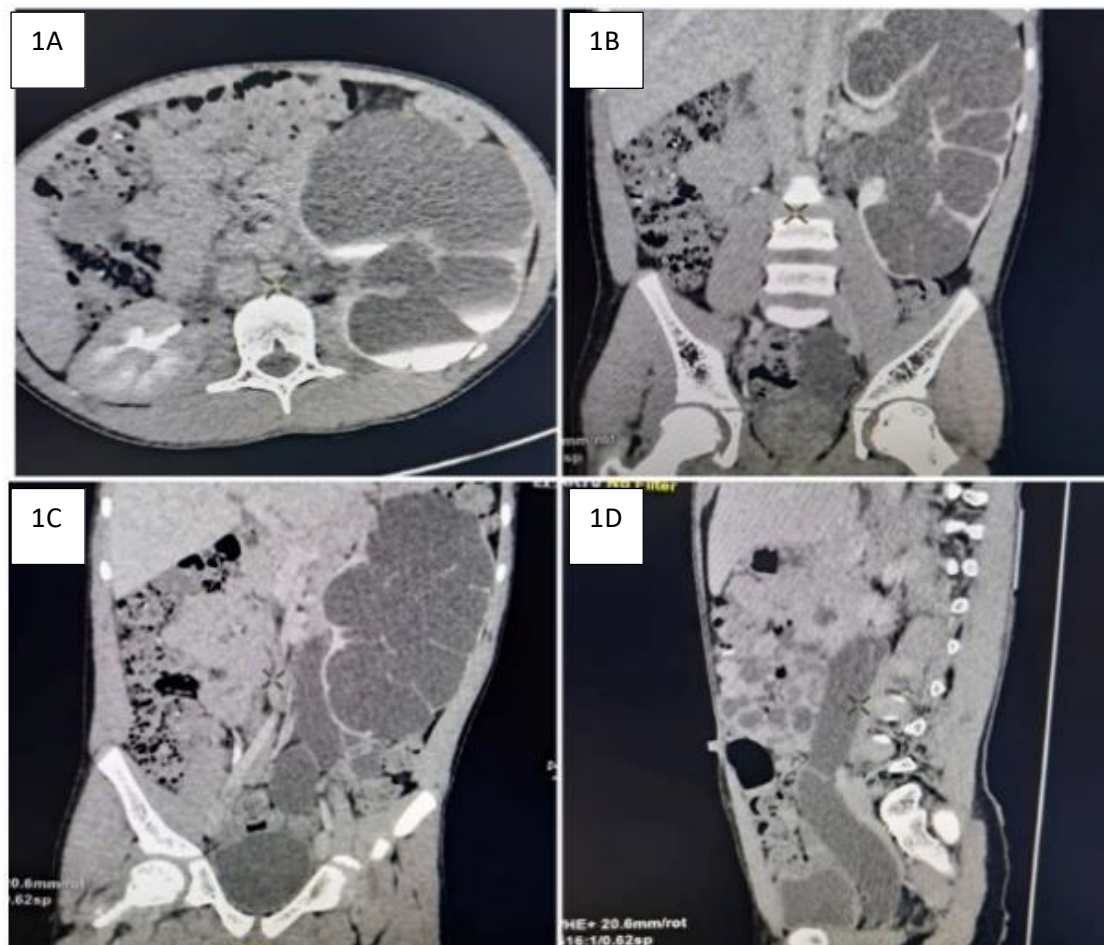


Figure 1: (A) Axial view showing left severe hydronephrosis with cortical thinning and an apparently normal right kidney (B) Coronal view showing marked hydronephrosis and cortical thinning of the left kidney (C) Coronal view showing severe hydroureteronephrosis with tortuous ureter. (D) Sagittal view showing the megaureter with a distal tapered segment (red arrow).

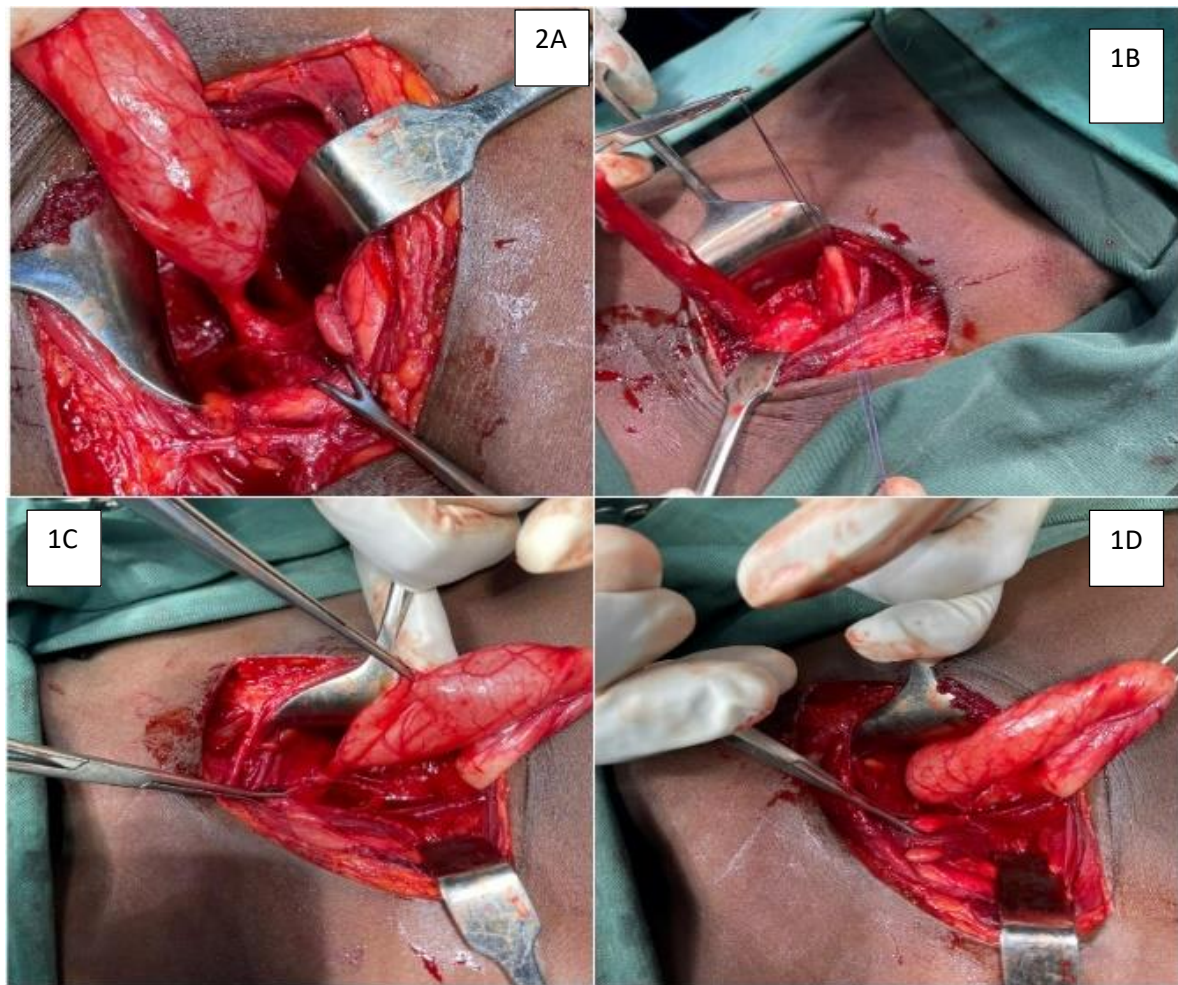


Figure 2: (A) Distal narrowed end of the ureter (yellow arrow). (B) Dilated ureter that tapers distally. (C) The redundant ureter (blue arrow) after resecting the diseased segment and the bladder (green arrow) with 2 stay sutures before ureteric reimplantation. (D) The excess dilated ureter.

DISCUSSION

The diameter of a normal ureter is often not more than 5mm, and when it exceeds 7mm, a diagnosis of megaureter is established.^{4,9} The condition can be primary (idiopathic) or secondary to several conditions, such as neurogenic bladder, vesicoureteral reflux (VUR), posterior urethral valves (PUVs), and other forms of bladder outlet obstruction, among others.⁹ It is important to distinguish a primary megaureter from a congenital ureteral stricture, which is a mechanical obstruction resulting from a structural defect in the wall of the ureter.¹

Primary obstructive megaureter is commonly diagnosed in children, and the majority can be seen in utero through prenatal ultrasonography.³ More than half of the megaureters resolve with time, perhaps due to the maturation of the vesicoureteral junction.³ Clinical presentation of patients with primary obstructive megaureter includes abdominal pain, urinary tract infections, pyuria, fever, and hematuria. Hematuria is often microscopic and can occur in the absence of infection. It is thought to be caused by disruptions of ureteral mucosal vessels due to ureteric distention, but it may also be a pointer to the presence of a calculus secondary to urinary stasis.⁵ However, about half of patients with primary obstructive megaureter are asymptomatic. Some of

these asymptomatic cases are diagnosed much later in life, incidentally through imaging while evaluating for an unrelated complaint, such as seen in our index patient.⁵

Our index patient presented a week after sustaining blunt abdominal trauma. He had no past history of abdominal or renal complaints and no history of lower urinary tract symptoms. Being the first imaging modality for the evaluation of abdominal trauma, an abdominal ultrasonography was performed, which revealed a severe Onen's grade 4 hydronephrosis. Ultrasound scan is an investigation that is readily available, non-invasive, inexpensive, fast, and with no exposure to ionizing radiation. It is reliable in assessing the size of the kidneys, thickness, corticomedullary differentiation, and severity of hydronephrosis. It can also identify cystic renal lesions, ureteral dilation, and bladder anatomy.¹⁰ The presence of hydronephrosis suggests a significant pathology, warranting a more precise diagnosis and estimation of severity. A significant correlation exists between the severity of hydronephrosis on ultrasound scan and prognosis.¹¹ Onen grading system was introduced in 2006 to grade the severity of hydronephrosis on ultrasound scan. In grade 0, there is no hydronephrosis, while in grade 1, the dilatation is limited to the renal pelvis. In grade 2, there is dilatation of the renal pelvis and calyces. In grade 3, the dilatation is associated with <50% parenchymal loss, while in grade 4, there is more than 50% renal parenchymal loss.¹¹ Our index patient had grade 4 hydronephrosis based on the Onen grading system.

Due to the presence of severe hydroureteronephrosis and microscopic hematuria, a CT urogram of the abdomen and pelvis was performed to make a precise diagnosis. The megaureter and severe hydronephrosis that threatened the left kidney were confirmed. Based on the CT findings, the child's parents were counselled on the need for left ureteric exploration with definitive treatment options based on the intraoperative findings. Upon open exploration of the ureter through a Gibson's incision, we found a markedly dilated and redundant ureter resembling a bowel loop with an area of narrowing

of about 3cm long in the juxtavesical ureter. Over 1 litre of amber coloured urine was drained at the first instance. The narrowed ureteral segment was patent and could be probed. Because the kidney has some residual function and due to the non-availability of renal scintigraphy to assess the differential renal function, we opted to reimplant the ureter using the modified Politano-lead better technique rather than perform a simple nephrectomy.

The post-operative recovery was satisfactory, and the patient was discharged home in good condition to continue with follow-up visits. The DJ stent was removed 3 weeks post-surgery, and the patient reported no urological complaints in subsequent follow-up visits.

CONCLUSION

Incidental discovery of primary megaureter during trauma imaging is a powerful reminder that chronic, organ-threatening conditions can be unmasked by acute presentations. Clinicians must be adept at recognizing the distinct radiological signs of congenital uropathy and initiate appropriate urological work-up to prevent progressive renal damage. This case report underscores the need for clinicians to comprehensively review trauma imaging beyond the immediate context of injury.

Declarations

Study Limitation

There is no long-term follow-up to assess for renal recovery following the surgery. Similarly, the histology of the resected specimen could not be obtained as the parents discarded the specimen.

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Conflict of Interest: We declare no conflict of interest.

Ethical Approval: Ethical approval was waived as it is not required for publishing a case report in our institution.

Informed Consent: Written informed consent was obtained from the subject's guardian to publish the case report.

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