Case Report

Duplicated ectopic ureter with vaginal insertion: 3D CT urography

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Abstract

We present the case of a female child with duplicated ectopic ureter with vaginal insertion. Excretory urography, sonography and voiding cystourethrography (VCUG) had failed in visualization of the anatomic course and insertion of the nonfunctioning ectopic ureter. Percutaneous injection of iodinated contrast medium into the dilated collecting system and IV contrast administration was performed during CT examination of the abdomen and pelvis. Volume-rendered and maximum-intensity-projection reformatted 3D images clearly showed the entire ectopic ureter in various planes. In addition to data about the exact location of the extravesical drainage of the ureter, the study provided information about the anatomic relations between the two ureters and their tortuous intimate course.

Key Words: Congenital malformations, CT, genitourinary tract imaging, kidney, urinary tract, vcug.

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INTRODUCTION

Duplication of the ureters is a common congenital anomaly frequently encountered in children. Complete duplication is most often associated with vesicoureteral reflux, ectopic ureterocele, and ectopic ureteral insertion. Because of poor function and anatomic variations, these anomalies are sometimes difficult to detect on excretory urography, sonography, and voiding cystourethrography (VCUG).

CASE REPORT

A 04-year-old child was admitted to the department of urology with fever, left flank pain, urgency, and continuous urine dribbling with incontinence since birth. She had a history of recurrent urinary tract infections since birth. During that episode, renal sonographic findings were normal, and VCUG showed no vesicoureteral reflux. On Feb 2016 CT Urography on the same patient was performed which showed: Complete duplication of left pelvicalyceal system and left ureter. The left lower moiety inserts normally into left VUJ and shows mild dilatation with prominence of lower moiety collecting system . No calculus is seen. The left upper moiety collecting system and upper moiety ureter show marked dilatation with tortuosity of ureter. The ureter moiety renal parenchyma is thinned out with poor and delayed excretory function. The left upper moiety ureter appears to drain into the left side of vaginal canal. Right kidney is normal in size. Pelvicalyceal system on right side is not dilated. No calculus or any obstructive lesion is seen in right PCS and ureters. Urinary bladder is normal in outline, capacity and wall thickness. No evidence of calculus seen. Both adrenals are normal in size.

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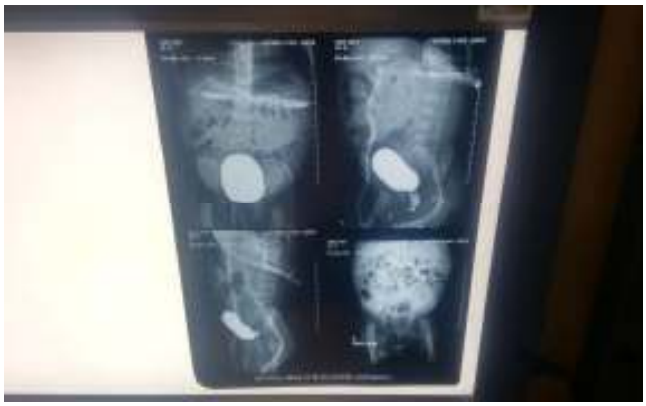

Figure 1: Normal MCU. No vesicoureteric reflux is seen

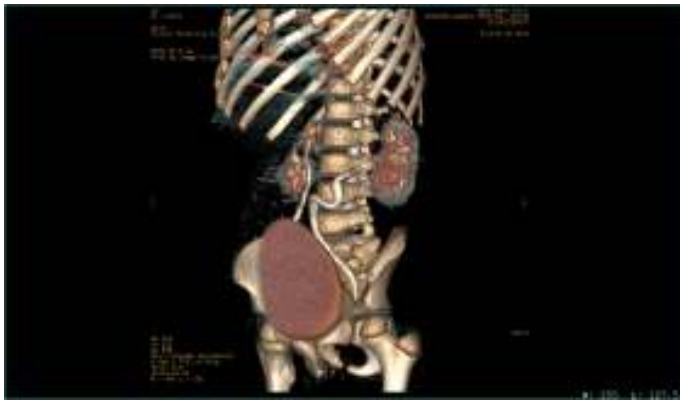

Figure 2: Reformatted 3D CT urogram after IV and percutaneous introduction of contrast medium. Dilated obstructed ectopic ureter is in close anatomic relation to tortuous normal ureter on left

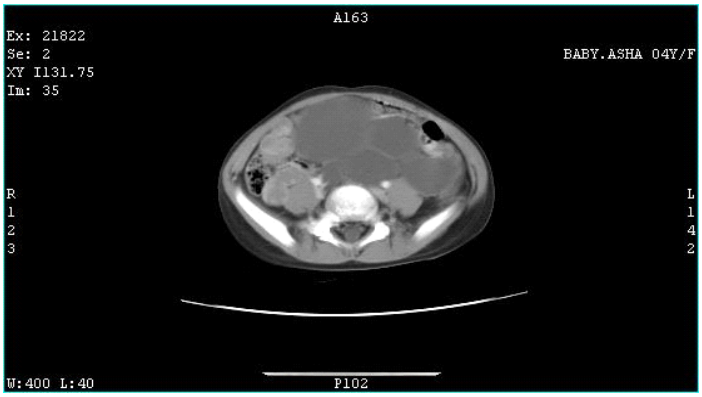

Figure 3: Axial image showing grossly dilated and tortuous left upper moiety ureter

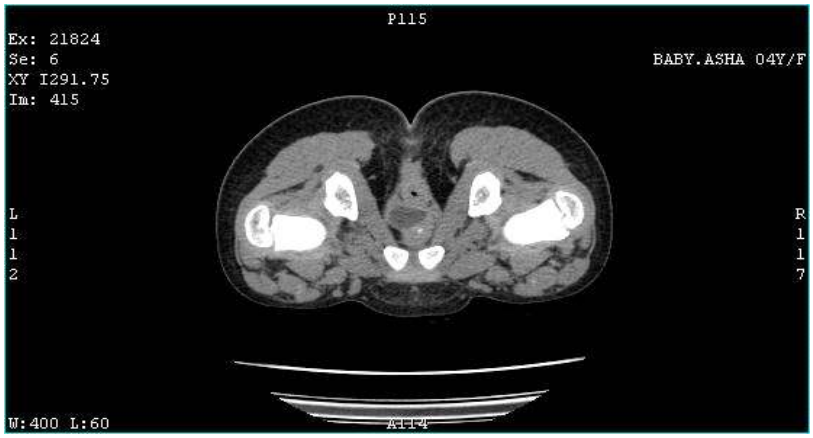

Figure 4: Axial image (prone) showing dilated ectopic left ureter entering into vagina

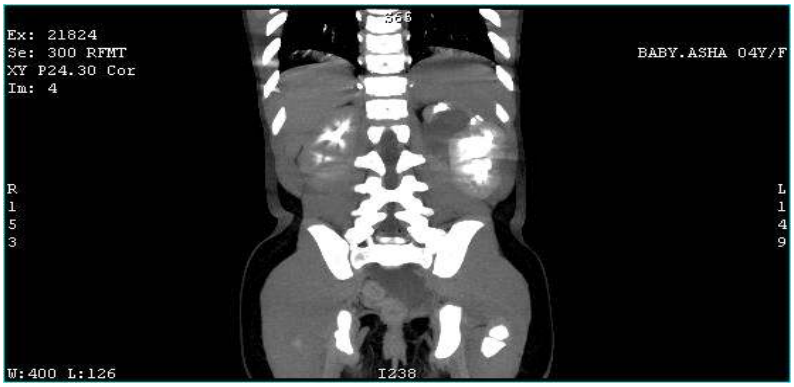

Figure 5: Coronal image showing gross hydronephrosis in upper moiety with mild hydroephrosis in lower moiety. There is also ectopic insertion of left upper moiety in vagina

DISCUSSION

Duplication of the ureters is the most common anomaly of the urinary tract, commonly diagnosed in infancy and childhood. Ectopic ureters, however, are rare, and 70% are associated with complete ureteral duplication[1]. These anomalies can be asymptomatic or be diagnosed when complications such as obstruction and infection occur. In women, ectopic ureters can terminate at a level distal to the bladder neck and external sphincter, resulting in incontinence[2,3]. When the ureter has an ectopic orifice in the vagina or urethra, fibrosis gradually prevents urine from flowing freely; stasis occurs and infection follows. In pediatric patients, ectopic ureters have an incidence of 1 case per 2,000–4,000 autopsies[4]. Detection in adulthood is far less common. The diagnosis of ureteral duplication is usually made with sonography and VCUG. When it drains outside the urinary system, an ectopic ureter may not be detected on excretory urography, despite acquisition of delayed images. Sonography may show the nonfunctioning upper pole moiety that has to be differentiated from complex renal cysts and calyceal diverticula. When the proximal ureter is not dilated, sonographic differentiation can be difficult. Sonography also is not effective for visualization of the entire dilated tortuous ureter and its ectopic orifice. The ectopic insertion also may not be visible on VCUG and cystoscopy. MRI urography has proved capable of displaying dilated collecting systems, ectopic ureters, and ureteroceles and has been described in the diagnosis of duplicated ectopic ureters[5,6]. This method is useful mainly in the evaluation of associated anomalies of the spine[1]. CT provides superb anatomic detail and diagnostic specificity[7,8]. The introduction of MDCT has allowed fast scanning technique of the abdomen and pelvis with 3D evaluation of the urinary tract[9]. The advantages of MDCT include short scanning time, thin collimation, and improved resolution of the z axis, resulting in multiplanar and 3D reformatted images of high quality. CT also can depict the dilated upper pole moiety. When surgical intervention is required, however, detailed information about the exact course of the ectopic and normal ureter and visualization of the ectopic ureteral orifice are necessary. These features are not clearly depicted in the axial plane because of the craniocaudal insertion. Contrast injection into a dilated nonfunctioning system and the use of multiplanar reformatting, as in this case,

allow acquisition of images of the deep pelvic structures and depiction of the anatomic detail in various planes. Direct contrast administration was indicated because both excretory urography and axial CT failed to depict the duplicated, obstructed kidney. Only enhanced 3D CT combined with transrenal injection of contrast medium into the upper renal moiety provided information about the anatomic course of both ureters. The use of this method allows opacification of a nonfunctioning system. The method is excellent for visualizing the anatomic relations between the lower part ureter and the dilated nonfunctioning ectopic ureter. In summary, we present a case in which a procedure combining invasive and 3D CT led to complete visualization of a ectopic ureter. The use of contrast-enhanced MDCT with simultaneous percutaneous injection of contrast material into the obstructed system can provide morphologic data about the course of the ureters and the location of the ectopic insertion. These data are of utmost importance for planning surgery and are not readily acquired with sonography, excretory urography, or VCUG.

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