



CASE REPORT

ECTOPIC URETER DRAINING A POORLY FUNCTIONING RENAL MOIETY CAN BE MISSED BY IVP BUT NOT BY MRU

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ABSTRACT

Ectopic ureter draining a poorly functioning renal moiety can be missed by classical radiological methods such as ultrasonography, voiding cystourethrogram and intravenous pyelogram. In such conditions, use of computerized tomography and magnetic resonance imaging have been advocated to diagnose poorly functioning, abnormal duplex collecting system and ectopic ureter. A case of a 16-year old girl with continuous dribbling incontinence and normal IVP and cystoscopy findings whose ectopic ureter and duplicated system could only be diagnosed by MRU is presented in this case report.

Keywords: Ectopic ureter, IVP, MRU, urinary incontinence/physiopathology

IVP İLE SAPTANAMAYAN AZ FONKSİYONLU VE EKTOPIK ÜRETERE DRENE OLAN ÜST POL BÖBREĞİN MRU İLE SAPTANMASI

ÖZET

Kötü fonksiyonlu ve ektopik üretere drene olan böbrek üst polü bazen klasik radyolojik yöntemler olan intravenöz pyelogram, ultrasonografi ve işeme sistoüretrogramı gibi tetkiklerle görüntülenemeyebilir. Bu durumlarda bilgisayarlı tomografi ve magnetik rezonans görüntüleme yöntemleri kötü fonksiyonlu, anormal çift toplayıcı sistemleri ve ektopik üreterleri saptamada kullanılabilir. Bu olguda, devamlı, damlama tarzında inkontinans şikayetiyle başvuran, intravenöz pyelogramı ve sistoskopi bulguları normal olan ancak magnetic rezonans ürografi ile ektopik üreteri ve çift toplayıcı sistemi saptanabilen 16 yaşında kız çocuğunun tanısı ve tedavisi sunuldu.

Anahtar Kelimeler: Ektopik üreter, IVP, MRU, idrar inkontinansı/fizyopatoloji

INTRODUCTION

Approximately one-half of the girls with ectopic ureter suffer from continuous dribbling incontinence despite a normal voiding pattern ¹. Classical radiological methods such as ultrasonography (US), voiding cystourethrogram (VCUG) and intravenous pyelogram (IVP) are usually performed to determine abnormal duplex kidneys and ectopic ureter ². However, the anatomical assessment may be incomplete if one moiety is markedly dilated or if there is little parenchyma which is poorly functioning ². Recently, Magnetic Resonance Urography (MRU) has been used for this aim ². Fred et

al. showed that MRU correctly differentiated between upper and lower poles, demonstrating related parenchyma and collecting system in their patients. In fact, the demonstration of upper pole moiety and ectopic ureteral termination by conventional radiological methods is not always easy. Here, we present a case of a 16-year old girl with continuous dribbling incontinence and normal IVP and cystoscopy findings whose ectopic ureter and duplicated system could only be diagnosed by MRU.

CASE REPORT

A 16-year old girl presented with the complaint of slightly wetting her underwear

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since early childhood. The physical examination was normal except for a moist genital area. IVP suggested complete ureteral duplication at the left side and a single collecting system at the right side (Figure 1). Voiding cystourethrography revealed a normal urinary bladder and urethra without vesicoureteral reflux. On cystoscopy, a single right ureteral orifice and two left ureteral orifices were visualized. The urodynamic examination was found to be normal. Suspecting an ectopic system which was not yet visible, the patient underwent MRU showing a bilateral ureteral duplication and a right ectopic ureter and opening into the posterior vaginal fornix (Figure 2).



Figure 1: IVP revealed a single collecting system on the right kidney and a duplex collecting system on the left kidney.

Thereafter, the patient underwent upper kidney pole nephrectomy (Figure 3) and her continuous incontinence resolved immediately after the operation. In the resected segment, the ureter and the calyces were dilated but corticomedullary differentiation of the kidney was retained. Small nodular masses were presented adjacent to the pelvis. Microscopically, the nodules in the medulla of the kidney were composed of abundant primitive mesenchyme and scanty tubules lined by cuboidal cells. These dysplastic tubules were surrounded by layers of loose and immature connective tissue and

prominent bundles of smooth muscle (Figure 4). There were no immature glomeruli. Cyst formation was not evident. The dysplastic segments were separated by areas of normally developed renal tissue with focal chronic pyelonephritis. Inflammation was present in one dysplastic area adjacent to focal chronic pyelonephritis. Dysplastic segments involved 24 % of renal parenchyma. Findings were compatible with focal solid (non-cystic) renal dysplasia.



Figure 2: Ectopic upper pole kidney (straight arrow) and termination of the ectopic ureter (curve arrow) were shown by MRU.

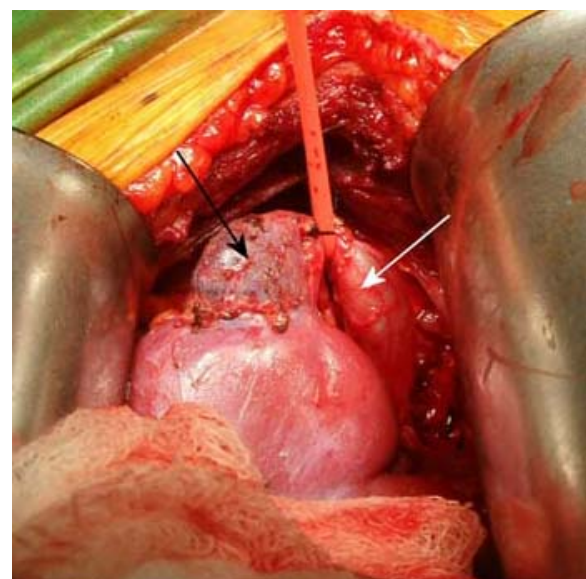


Figure 3: Upper pole kidney and ureter (black and white arrows, respectively) are shown after the artery and the veins of the upper pole were ligated.

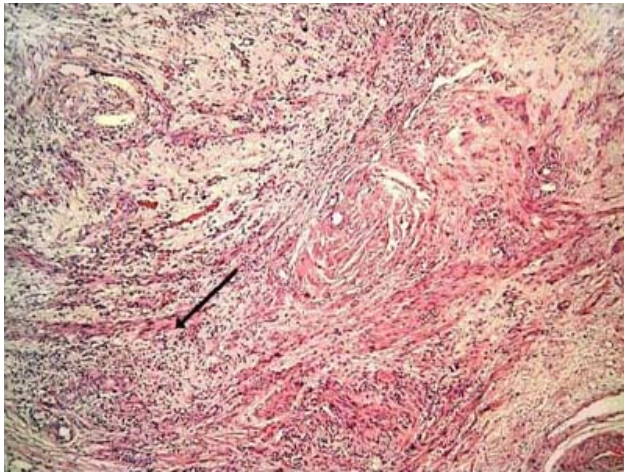


Figure 4: One of the dysplastic nodules with small collections of tubules surrounded by a myxoid fibrous tissue and smooth muscle. Mild focal lymphocytic infiltration can be seen in the lower left corner only, in the area adjacent to chronic pyelonephritis (arrow). Haematoxylin and eosin x 100

DISCUSSION

This report presents a case of ectopic ureter of a duplex system opening to the vagina and leading to continuous incontinence that could be demonstrated only by MRU, but not by IVP. Although, 84% of ectopic ureters are diagnosed by IVP during childhood³, the upper moiety in some cases may not be detected by IVP because of the absence of upper pole calyx or a poorly functioning very thin dysplastic and/or pyelonephritic parenchyma⁴. In our case, upper moiety could not be demonstrated by IVP due to a dysplastic and pyelonephritic upper pole parenchyma as revealed in pathological examination. However, MRU with fat sat T2-weighted may reveal an ectopic ureter in spite of a dysplastic and pyelonephritic upper pole kidney with little urine secretion (Figure 2).

Indeed, MRU and computerized tomography (CT) are seen as ideal methods for detecting a suspicious upper pole moiety and ectopic termination of the ureter. For example, Fred et al. showed that IVP and US were significantly inferior to MRU in diagnosing ectopic ureteric insertion results of analyzing children with ectopic ureter ($p < 0,05$)². In another study, Pantuck et al have proposed the use of CT in order to demonstrate the upper pole moiety and ectopic ureter⁵. However, since

children are exposed to radiation and iodine-containing contrast medium by CT we believe that MRU is the preferable method for detection of a poorly functioning upper pole moiety. Demonstration of the termination of an ectopic ureter by radiological methods is also not easy. Some ectopic ureters terminate out of the urinary system, such as in the vestibule, vagina and cervix, in 34%, 25%, 5% of cases, respectively⁶. Endoscopy of the vagina and urinary bladder are advocated to detect ectopic ureter termination. For example, Plaire et al⁸ demonstrated that 58% of ectopic ureters were identified endoscopically in the vagina, vestibule or bladder neck.

Different possibilities exist for the surgical management of an ectopic ureter of a duplex system. For example, Sen et al. advocated that heminephrectomy should only be performed when the upper pole appears grossly unhealthy at operation⁷. In their series, dysplasia was established in only 2 of 19 specimens. In the latter study, upper pole moiety was preserved in combination with ureteropyelostomy in the presence of a good function.

Removing the distal part of the ectopic ureter during heminephrectomy is also debated. Plaire et al. showed that a secondary removal of the ureteral stump was necessary in only 12% of patients who underwent heminephrectomy⁸. However, no patient with urinary incontinence without urinary infection underwent stump removal in their series⁸. In our case, the distal part of the ectopic ureter was not removed since the patient did not have any previous urinary tract infection.

In conclusion, if an ectopic ureter is suspected in a patient with dribbling incontinence, MRU appears to be the best diagnostic modality because of its low morbidity and high accuracy. It should be kept in mind that IVP can miss a poorly functioning upper pole moiety and its ectopic ureter.

REFERENCES

1. Fernbach SK, Feinstein KA, Spencer K, Lindstrom CA. Ureteral duplication and its complications. *Radio Graphics* 1997; 17:109-117.



2. Fred E.A, Nicaise N, Hall M, et al. The role of MR imaging for the assessment of complicated duplex kidneys in children: preliminary report. *Pediatr Radiol* 2001; 31:215-223.
3. Kaneko K, Ohtsuka Y, Suzuki Y, Yabuta K, Yamataka A, Miyano T. Masked ureteral duplication with ectopic ureter detected by magnetic resonance imaging. *Acta Paediatr Jpn* 1996;38: 291.
4. Berrocal T, Lo'pez-Pereira P, Arjonilla A, Gutie'rrez J. Anomalies of the distal ureter, bladder, and urethra in children: Embryologic, radiologic, and pathologic features. *Radio Graphics* 2002;22:1144-1145.
5. Pantuck AJ, Barone JG, Rosenfeld DL, et al. Occult bilateral ectopic vaginal causing urinary incontinence: diagnosis by CT. *Abdom Imaging*. 1996;21:78-80.
6. Ellerker AG. The extravescical ectopic ureter. *Br. J. Surg* 1958;45:344.
7. Sen S, Ahmed S, Borghol M. Surgical management of complete ureteric duplication abnormalities. *Pediatr Surg Int*. 1998;13: 61-64 .
8. Plaire JC, Pope John C. IV, Kropp B P, et al. Management of ectopic ureters: experience with the upper tract approach. *J Urol* 1997;158:1245-1247.