

(n=2) 6

1.5T (Signa, GE Medical Systems, Milwaukee, WI, U.S.A.)

(FSE) T2 (TR/TE; 4000/150 msec, ; 256x256, ; 3-5mm, ; 12 - 24 cm, ; 9

2) (SSFSE) T2 (TE; 90 - 150 msec, ; 256x128, ; 0.5)

Table 1

T1 가

(TR/TE; 400-650/5-15 msec)

SSFSE 5 3 , FSE 4 1 가 가

6 2 (Fig. 1A) , 3 4 가 가

1 2 1

T2 (FSE, SSFSE) 1 2

가 4

2

5 , 4 , 2

5)

Table 1. Clinical Features and Conventional Imaging Evaluation of 9 Patients with Single Ectopic Ureter

No/Sex/Age	Clinical features	Conventional Imaging Techniques	Imaging Findings
1.F/1mo	antenatally detected HN	US, DMSA, VCUG	HN, VUR; bilateral*
2.F/3mo	fever, discharge	US, DMSA, VCUG	Small kidney; right*
3.F/2yr	fever, urinary incontinence	US, IVP, DMSA, VCUG	Small kidney; right*
4.F/19yr	urinary incontinence	US, DMSA	Small kidney on DMSA; right*,‡
5.M/6mo	imperforate anus, HN	US, DTPA, VCUG	HN; right*
6.M/3yr	HN	US, IVP, DTPA, VCUG	HN; left*
7.F/6yr	urinary tract infection	US, IVP, DMSA, VCUG	NVK; left +
8.F/12yr	urinary incontinence	US, IVP	NVK; left +
9.M/1mo	fever, discharge	US, DMSA, VCUG	NVK; left

DMSA ; 99mTc-DMSA scan, DTPA ; 99mTc-DTPA scan, HN ; hydronephrosis, VUR ; vesicoureteral reflux, NVK ; non-visualized kidney, VCUG ; voiding cystourethrography, *; normal location, + ; ectopic location, ‡ ; NVK on US

Table 2. MRI, Urologic, and Pathologic Findings of 9 Patients with Single Ectopic Ureter

No/Sex/Age	MRI Findings		Urologic procedure †	Operation / Pathology
	Location /Status of kidney	Ureteral Opening		
1.F/1mo	Normal / HN	BN	Cyst, PCN, RGP	UNO
2.F/3mo	Normal / Dysplastic	Vagina	Vag*	NU / HDK
3.F/2yr	Normal / Dysplastic	Vagina	Vag, Ureterogram	NU / HDK
4.F/19yr	Normal / Dysplastic	Vagina	Vag +	NU / HDK
5.M/6mo	Normal / HN	BN	Cyst, Ureterogram	UNO
6.M/3yr	Normal / HN	BN	Cyst*	UNO
7.F/6yr	Ectopic / Dysplastic	BN	Cyst, Ureterogram	NU / HDK
8.F/12	Ectopic / Dysplastic	Vagina	Vag, Ureterogram	NU / HDK
9.M/1mo	Non-visualized	SV cyst	Cyst, Seminal vesiculogram	NU / No renal tissue

HN; hydronephrosis, BN; bladder neck, SV; seminal vesicle, Cyst; cystoscopy, PCN; percutaneous nephrostomy, RGP; retrograde pyelography, Vag; vaginotomy, UNO; ureteroneocystostomy, NU; nephroureterectomy, HDK; hypoplastic dysplastic kidney, *; fail to detect ureteral orifice,

† ; fail to catheterize, ‡ ; findings of urologic procedure is same as those of MRI except case 2 and 6

7 1

(Fig. 2A) 1

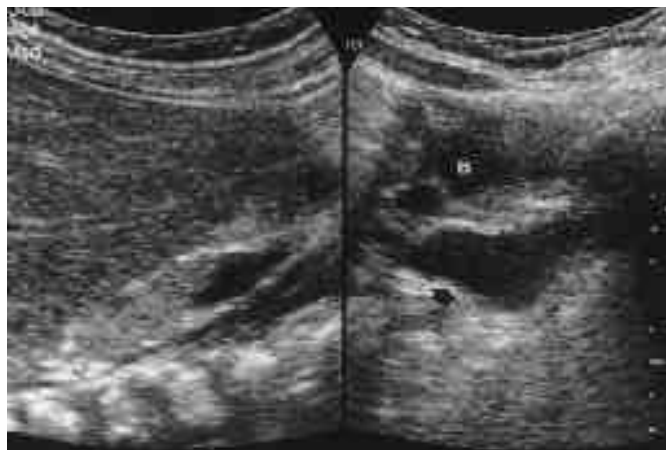
5

. 99mTc-DMSA (n=6)

4 3

1

2



A



B



C

Fig. 1. A 3-month-old female infant with fever and urinary discharge.

A. US (left image) shows a small, echogenic right kidney with poor corticomedullary differentiation. Oblique scan (right image) shows dilated right distal ureter (arrow) passing behind the posterolateral side of urinary bladder (B).

B. On coronal T2 WI, a small dysplastic kidney and dilated, ectopic ureter are seen.

C. On axial T2 WI, the distal end of right ureter (short arrow) inserts into the right lateral wall of the vagina (long arrow).



A



B

Fig. 2. An 1-month-old female infant with antenatally detected hydronephrosis.

A. VCUG shows bilateral vesicoureteral refluxes. The left ureter is ectopically inserted (arrow). On cystoscopy, both ureters opened to the bladder neck.

B. On coronal T2 WI, hydronephrosis and dilated ureters (arrows) that can be traced to the bladder neck are seen on both sides.

Table 2

(1)

(Fig. 1B), 4

2

(Fig. 2B)

(Fig. 2B)

1C).

1

6

7

2

(Fig. 3A).

4

(Fig. 2

1

5

3

1

4

1

1



A



B

Fig. 3. A 6-year-old girl with urinary tract infection.

A. Coronal T2 WI shows an ectopic, small left kidney (arrow) anterior to the left common iliac artery.

B. An ectopic left kidney (arrow) associated with ectopic insertion of the ureter (arrowheads) is well visualized on oblique coronal MR urography, although the exact location of ureteral insertion can not be determined.



A

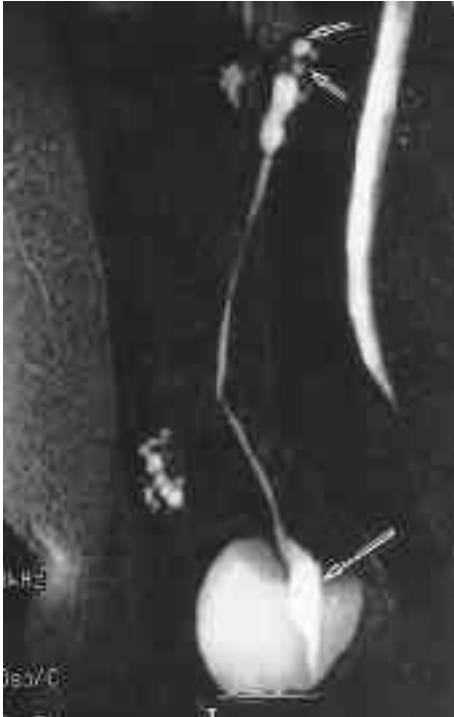


B

Fig. 4. A 10-month-old male infant with fever and urinary discharge.

A. Sagittal T2 WI shows dilated left ureter (arrows) passing behind the urinary bladder. No renal parenchyma or cysts are seen in the proximal end of ureter. Pathology confirmed renal agenesis.

B. Midline sagittal T2 WI shows left seminal vesicle cyst (arrow) that is connected to the left ureter.



B

Fig. 5. A 19-year-old female patient with urinary incontinence.

A. Oblique coronal MR urography shows normally positioned dysplastic right kidney (short arrows). The right ureter is connected to a fusiform shaped structure that is diagnosed as Gartner 's duct cyst (long arrow).

B. Uterus duplex bicollis is incidentally detected on axial image.

A

2
3
가 3
2
(hypoplastic dysplastic kidney)
1
2
가
가
가
(12-15).
4 2
2 1 가
1
(7,8,10).
10-30%
Gibbons(11)
가
(hemitrigone)
가
SA
가
가
6 3
2
99mTc-DM-
1221

99mTc-DMSA

(4,16,17). 99mTc-DMSA

(18). 가

가
T2
(10,18).

T2

T2

가

2

(17,19).
가

Borer (20)

1

1. Grossman H, Winchester PH, Mueke EC. Solitary ectopic ureter. *Radiology* 1967; 89: 1069-1072
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MRI for the Detection of Ureteral Opening and Ipsilateral Kidney in Children with Single Ectopic Ureter¹

Myung Joon Kim, M.D., Joon Seok Lim, M.D., Choon Sik Yoon, M.D., Sang Won Han, M.D.²

¹Department of Diagnostic Radiology, Yonsei University College of Medicine, Research Institute of Radiological Science, Yonsei University

²Department of Urology, Yonsei University College of Medicine

Purpose : To assess the usefulness of MRI in the detection of a single ectopic ureteral opening and the location and dysplastic change of ipsilateral kidney.

Materials and Methods : Nine patients (mean age; 4.8 years, M:F= 3:6) in whom a single ectopic ureter was suspected clinically and sonographically underwent conventional radiologic studies (IVP, VCUG, 99mTc-DM-SA scan, as well as US) and MRI. We evaluated images of the point of the ectopic ureteral opening and the location and dysplastic or hydronephrotic change of the ipsilateral kidney, and compared those findings with the endoscopic, surgical, and pathological findings.

Results : Eight patients had a unilateral single ectopic ureter and one had bilateral lesions. Seven normally positioned kidneys in six patients showed dysplastic (n= 3) or hydronephrotic (n= 4) change. In two patients an ectopic dysplastic kidney was located in the pelvis and one had ipsilateral renal agenesis. Conventional radiologic studies failed to reveal two ectopic dysplastic kidneys, one renal agenesis, and eight ectopic ureteral openings. In all patients, MRI clearly demonstrated the location of the kidney and ectopic ureteral opening, and dysplastic or hydronephrotic change of the kidney, and in one patient, uterine duplication. Except in two patients whose ectopic ureteral opening was not found on endoscopy, MRI findings were concordant with endoscopic and surgical findings.

Conclusion : MRI was useful for the detection of a single ectopic ureteral opening and for demonstrating the location and dysplastic change of ipsilateral kidney.

Index words : Children, genitourinary system,
Genitourinary system, abnormalities,
Magnetic resonance(MR), in infants and children

Address reprint requests to : Myung Joon Kim, M.D., Department of Diagnostic Radiology, Yonsei University College of Medicine
#134 Shinchon-dong Seodaemun-ku, Seoul, Korea.
Tel. 82-2-361-5837 FAX. 82-2-393-3035