

1

2

:
 .
 : 2 60 (; 9 , ; 5 -2) 119 -
 2 . Spot
 . cycle
 가 . cycle
 .
 : 60 13 (21.7%) , 119 - 21 (17.6%)
 가 . cycle 가 9 (15.0%)
 15 (12.6%) cycle 51 , 104 -
 cycle 4 (7.8%) , 6 (5.8%) cycle 가
 1 cycle cycle
 가 5 (9.8%) , 7 (6.7%) -
 4 (57%) 2
 cycle 28 cc (; 5 - 100 cc), cycle 39 cc (; 10 - 100 cc)
 147 (; 59 - 338)
 : 2

(vesicoureteral reflux)

23%

가

cycle

19.5%

cycle

가

. 2
 가 2

(1).

(Voiding cystourethrography)

가

2

60

(; 9 , ; 5 -2)

119 -

41 , 가

(2 - 4).

19

47

가

, 9

(

(5 - 8). Papdopoulos (8)

,

,

), 4

가
 2

2

가

2004 3 9

2004 8 17

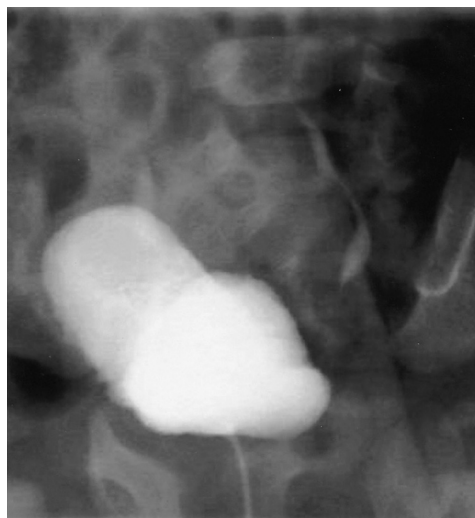
5 - 8 F infant feeding tube

1 m 15% spot
 Iohexol (Omnipaque; Amersham Health, Cork, Ireland)
 (9, 10) 2 cycle (11) cycle
 cycle paired t - test
 cycle
 2 가
 (fluoroscopic - image capture) 60 , 119 - 13 (21.7%) ,
 spot cycle 21 (17.6%) 가
 1. (early filling view of bladder), 2. cycle 9 (15.0%) , 15 (12.6%)
 (full bladder both oblique views) 1 cycle
 (ureterovesical junction) (Fig. 1). cycle 51
 3. (voiding urethra view) , 104 - cycle
 (right or left anterior oblique position) 가 4 (7.8%) , 6 (5.8%)] (Table 1).
 4. cycle 가
 (renal fossa view), 5. (postvoiding bladder view) 5 (9.8%) , 7 (6.7%) -
 cycle cycle 가 가
 3, 4 spot 1 3 (43%) - , 2
 가 가 1 (14%), 3 1 (14%) 4 2
 10 - 12 spot (29%)
 spot 4 - 6 cycle 28 cc (; 5 - 100
 cc), cycle 39 cc (; 10 - 100 cc)
 PACS DR(digital cycle
 radiography) ($p < 0.0001$). cycle 7
 10 cc (; 9.3 cc) 가
 store image key 가
 PACS cycle (; 17.9 cc)
 spot
 가 가 147 (; 59 - 338)

Table 1. Results of Cyclic VCUG in Detection and Grade of VUR

Sex/Age (months)	Reflux Grade		Amount of Contrast (ml)		Duration of Fluoroscopy (seconds)
	1st Cycle	2nd Cycle	1st Cycle	2nd Cycle	
1. F/24	R-	R-	80	100	111
2. M/1	R- /L-	R- /L-	60	60	230
3. F/24	R- /L-	R- /L-	100	100	151
4. F/12	R- /L-	R- /L-	30	50	136
5. M/4	R-	R-	20	40	80
6. M/9	R- /L-	R- /L-	40	40	75
7. M/24	R- /L-	R- /L-	100	80	93
8. M/5	L-	L-	20	40	221
9. M/12	-	R-	30	70	338
10. M/12	-	R- /L-	10	30	149
11. F/7	-	R-	20	40	216
12. F/24	-	R- /L-	10	100	157
13. M/3	R- /L -	R- /L-	20	20	90

R : right, L: left, F: female, M: male,
 - : absent



A



B



C

Fig. 1. Cyclic VCUG of a 3-month-old boy with upgrade of VUR during the second cycle.

VCUG shows bilateral VUR with grade (A) and no additional VUR is observed during the first cycle. Voiding urethra view (B) and renal fossa view (C) demonstrate grade reflux of the left KUU during the second cycle.

(14). 가

(7, 15).

(5, 6).

가

. Greenfield (2)

가

1

가 27%

2

. Kogan (3)

가 10

가 1.8 - 1.9 가 가 cycle 가 (5 - 8). 가 (1, 12, 가 4 - 14% (5, 6) 7.8% cycle 가 . Michel (7) 가 5 (1). 2 9%, 24% cycle 가 .

:

cycle
Papadopoulos (8)
19.5% cycle 가
275 가
가
(
)가 가
1 cycle 가
cycle 5 (9.8%) , 7 (6.7%)
2 57%
2
cycle
12.5% 15.5% (8, 16).
1
가
cycle 28 cc, cycle
39 cc cycle
7 10 cc (; 9.3 cc)
가 가
cycle
(; 17.9 cc)
cycle 가
가 cycle
가 가 가
(trigon)
(cooling reflex) 가
(17) 가 가
(detrusor tone) 가
(18).
가 가 (18, 19).
(intermittent fluoroscopy)
spot 4 - 6

spot
90 10 - 30
4 spot
가
57% (20).
cycle 가
(6, 8).
10 - 30 가
cycle 147
(20 - 24). ALALA (as low a
radiation dose as possible)
2
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Efficacy of Cyclic Voiding Cystourethrography in Detection of Vesicoureteral Reflux in Young Children¹

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Purpose: To evaluate the efficacy of cyclic voiding cystourethrography (VCUG) for the detection of vesicoureteral reflux (VUR) in young children.

Materials and Methods: Two cycles of cyclic VCUG were performed in 119 kidney-ureter units (KUUs) of 60 children (mean age; 9 months, range; 5 days-2 years). Spot radiographs and fluoroscopic-image captures were obtained. We analyzed the presence of VUR and the grade of VUR according to the standards of the international grading system. We recorded the amount of total contrast material on each cycle and the total fluoroscopic time.

Results: VUR was present in 21 (17.6%) KUUs of 13 (21.7%) children. On the first and second cycle, the reflux occurred in 9 (15.0%) children and 13 (12.6%) KUUs. In one hundred-four KUUs of 51 children whose VCUG results were negative on the first cycle, the reflux occurred in 4 (7.8%) children and 6 (5.8%) KUUs during the second cycle. The grading of the reflux was upgraded during a second cycle in one case. A new detection and upgrade of VUR by the second cycle was observed in 5 (9.8%) children and 7 (6.7%) KUUs. In 4 KUUs (53%) of these 7 KUUs, the VUR was higher than grade . The mean amounts of contrast solution were 28 cc (range; 5 - 100 cc) on the first cycle and 39 cc (range; 10 - 100 cc) on the second cycle. The mean of the total fluoroscopic time was 147 seconds (range; 59 - 338 seconds).

Conclusion: Cyclic VCUG can enhance the ability of the method to detect and grade VUR in children under 2 years of age.

Index words : Infant, newborn, genitourinary system

Ureter, reflux

Kidney, radiography

Voiding cystourethrography

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