

# Legg - Calve - Perthes

# Gadolinium

1

2

: Legg - Calve - Perthes(LCP)

: LCP

12

14

:

LCP

. 9

5

2 T1, T2

5 ,

가 4 ,

가 3

2

LCP

LCP

Legg - Calve - Perthes(LCP)

가

LCP

(1 - 3). LCP

(infarct)

12

14

(

2 ).

3

9

6.2

가

11:1

가

(1). LCP

(frog leg)

1.5

가

Tesla Magnetom Vision Vision Plus(Siemens, Erlangen Germany)

(4, 5).

가

T1 (TR/TE=450/14 msec) T2

(TR/TE=3800/99 msec)

0.2 cc

gadopentetate dimeglumine(Magnevist, Shering, Berlin, Germany)

(6 - 8).

T1

가 (9, 10).

LCP

T1

T1

3 mm, 0.3 mm

가  
2

Waldenstrom

. 2 가

2007 11 13

2008 2 13

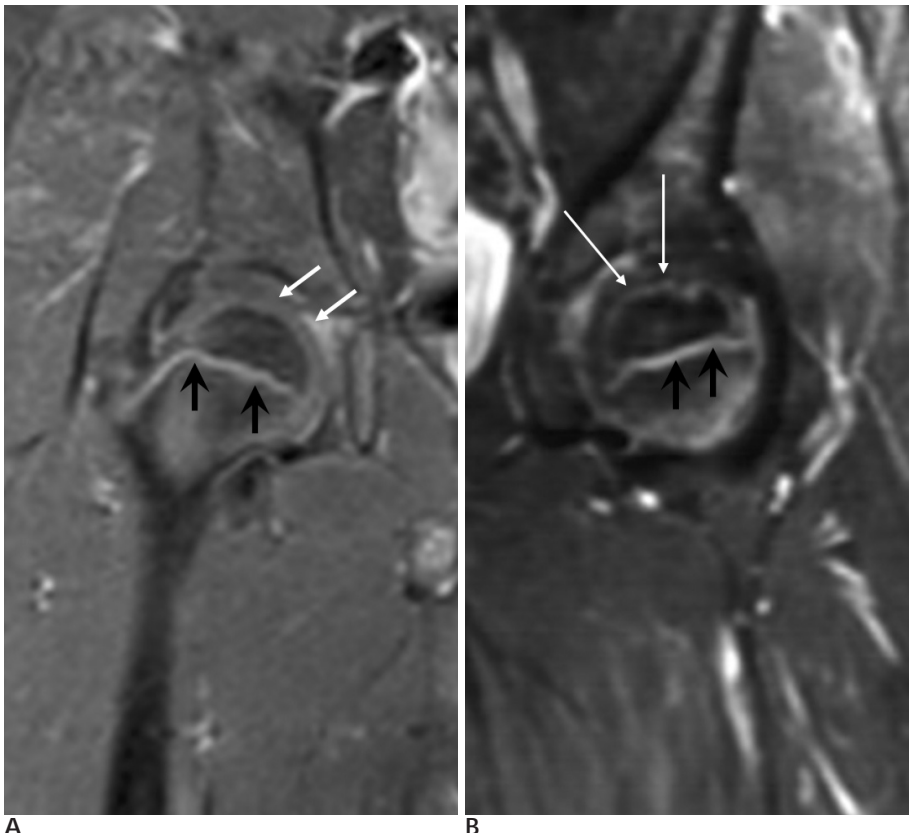
1 ( :

), 10

가 2 ( : 가,  
, ), 2 가 3 ( :  
) 4 ( : , . 6  
)  
(extent of necrosis),  
(epiphyseal revascularization pathway)  
(metaphyseal change)  
3 , ,  
(transphyseal revascularization)가  
(physis)  
(Fig. 1).

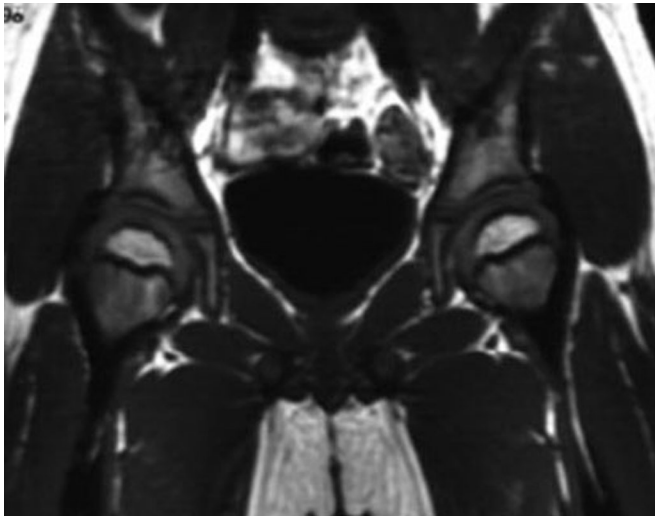
LCP  
T1  
(Fig. 2).  
7 Waldenstrom 2 T1  
, T2 4 , 3  
(Fig. 3).  
5 T1 , T2  
Waldenstrom 1 2 12  
가  
T2  
가 5 ,  
가 4 (Fig. 3).  
가 3 (Fig. 4).  
2 T1  
, T2  
(Fig. 4) (Table 1).

14  
9 LCP  
5  
Waldenstrom 1 2  
T1, T2 4 12 6-8 (11, 12).

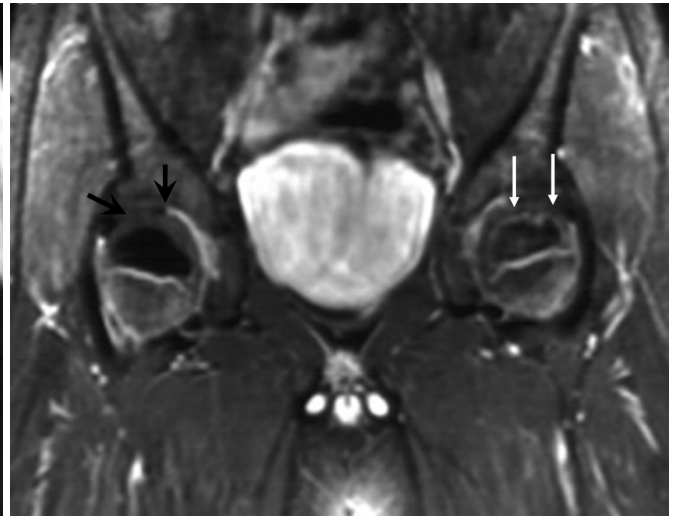


**Fig. 1.** Normal femoral head enhancement pattern  
A, B. Coronal T1-weighted enhanced MR image shows rim-like epiphyseal (white arrows) and thin linear physeal (black arrows) enhancement of the normal femoral head.

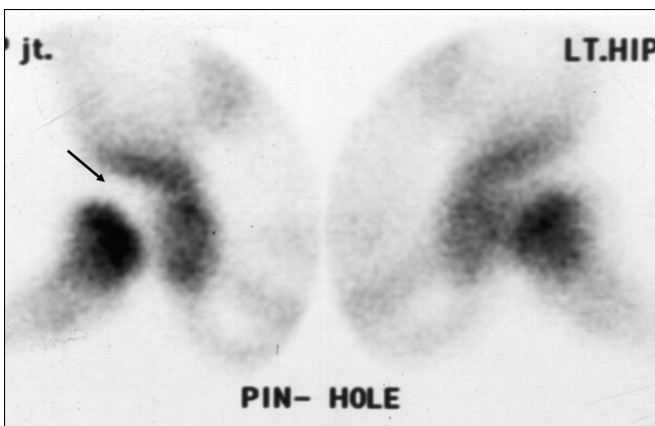
10 - 12% (1). (mummified)  
 LCP 가 T1  
 가 (13 - 15) (6).  
 , , , 가 (17).  
 (quality of containment) 가  
 (5, 14). , ,  
 (fibrocyte and bone repair) 가 (9, 10).  
 (16). LCP  
 (false negative) (acetabulum) (0 - 2 )  
 (6 - 8). Vande Berg 2 - 5 .



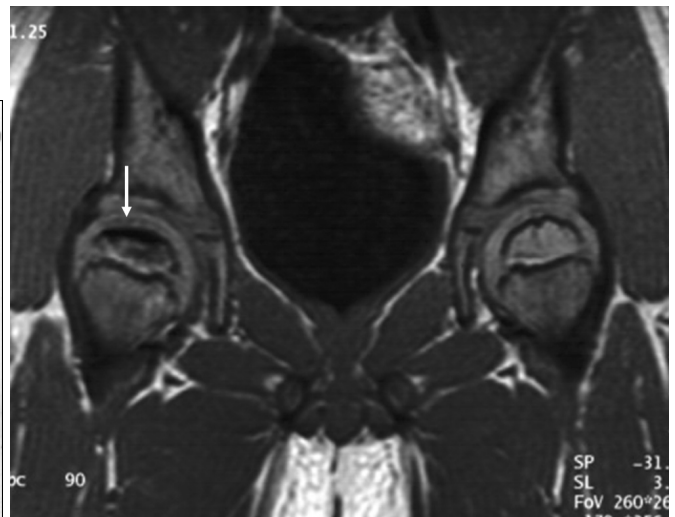
A



B



C



D

**Fig. 2.** Right side early LCP in a 4-year-old boy with right hip pain  
**A.** Coronal T1-weighted image shows normal homogeneous fatty marrow signal of both femoral heads without any abnormality.  
**B.** Complete absence of enhancement of right femoral epiphysis (black arrows) is only shown on the enhanced fat suppressed T1-weighted image. Normal rim-like epiphyseal (white arrows) and thin linear physeal enhancement of the normal contralateral hip is shown for comparison.  
**C.** Pinhole scan shows cold defect of right femoral epiphysis (arrow) and normal perfusion of the left femoral epiphysis.  
**D.** Follow up T1-weighted MR image (after 6 months) shows the linear hypointensity of subchondral fracture and decreased height of the right femoral epiphysis (arrow).

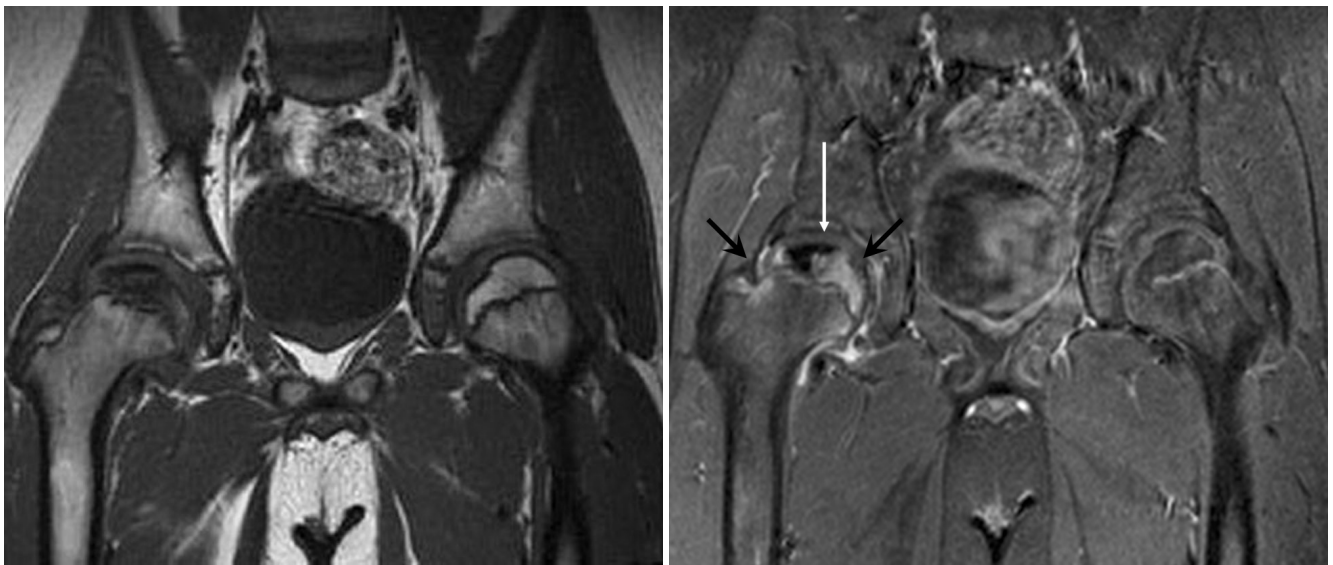
(physis) 가 LCP 가 가  
 (10). (recanalization of the existing vessels) 가 (18,  
 19).  
 LCP 가 (19).

**Table 1.** Data of 14 Affected Hips in Twelve Patients with LCP disease

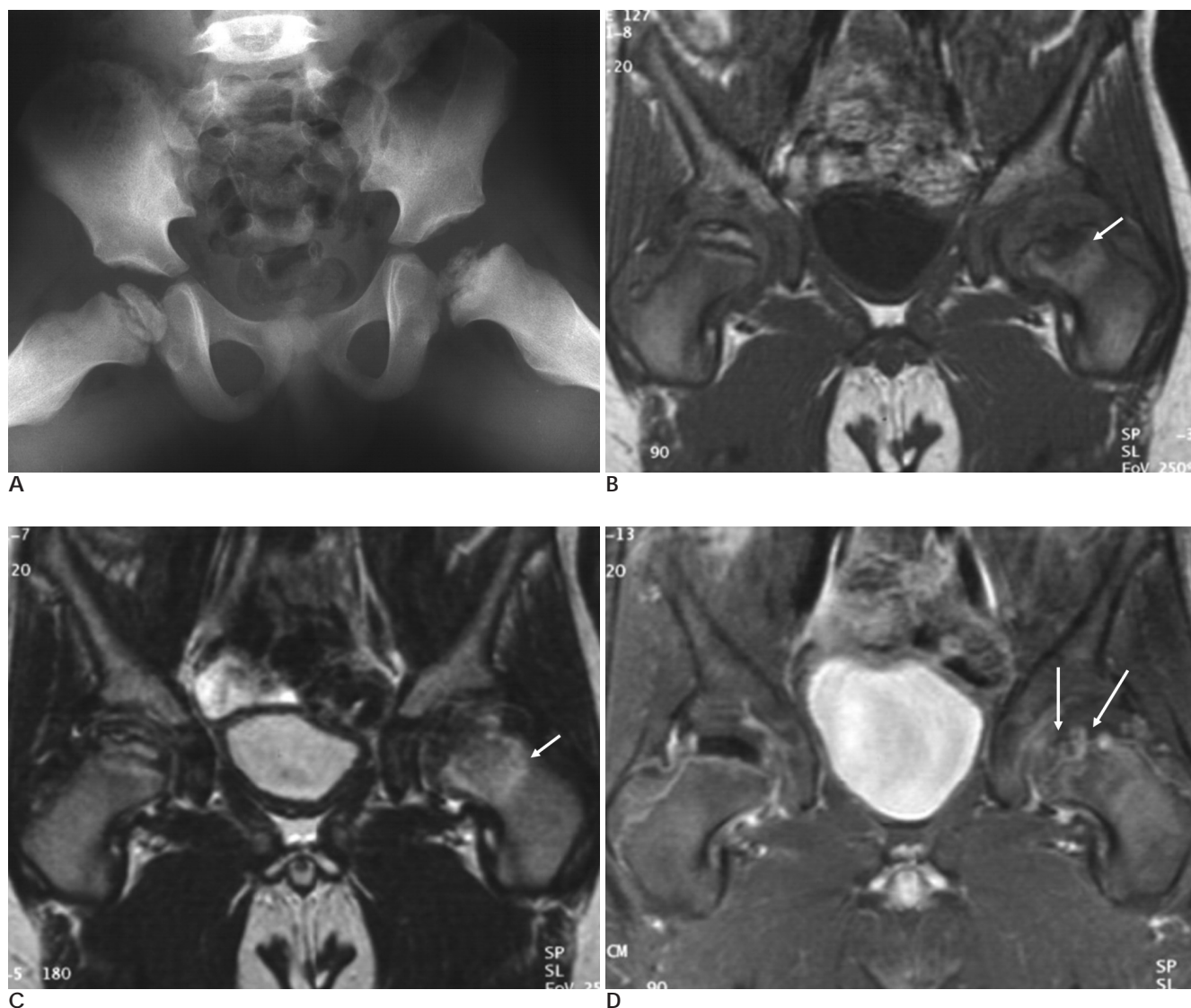
Patient(No)/ Sex/Age (years)	Site	Waldenstrom Classification	MR Findings			Revascularization Pattern	Metaphyseal Change
			T1WI	T2WI	Absence of CE		
1/M/4	R	1	Normal	Normal	Diffuse	-	-
2/M/5	R	1	Normal	Normal	Diffuse	-	-
	L	2	Hetero low	High	Partial	Lateral & Medial	-
3/M/6	R	2	Low	Low	Diffuse	Lateral	-
	L	3	Low	Hetero high	Partial	Transphyseal	+
4/M/6	R	2	Low	Low	Diffuse	Transphyseal	+
5/M/8	L	2	Low	Low	Diffuse	Lateral	-
6/M/7	L	2	Low	Hetero high	Diffuse	Lateral	-
7/M/8	L	2	Low	Hetero high	Diffuse	Lateral	-
8/M/7	R	2	Low	Hetero high	Diffuse	Transphyseal	-
9/F/6	L	2	Hetero low	Low	Diffuse	Lateral	-
10/M/5	L	2	Low	Hetero high	Partial	Lateral & Medial	-
11/M/9	R	2	Low	Hetero high	Partial	Lateral & Medial	-
12/M/3	R	3	Low	Hetero high	Partial	Lateral & Medial	-

Hetero; heterogeneously, CE; enhancement

- ; negative finding, + ; positive finding



**Fig. 3.** Right sided LCP disease in a 9-year-old boy presented with right hip pain.  
**A.** Coronal T1-weighted image shows diffuse low signal intensity area of the right femoral epiphysis.  
**B.** Coronal enhanced T1-weighted image shows central focal absence of enhancement (white arrow) and reperfusion with the medial and lateral columns of increased enhancement (black arrows).



**Fig. 4. Bilateral LCP disease in a 6-year-old boy**

**A.** Radiography shows stage 2 subchondral fracture in the right femoral head and stage 3 fragmentation in the left side.

**B, C.** Metaphyseal change shows heterogeneous low signal intensity on T1-weighted image and increased signal intensity on T2-weighted image (arrow).

D. Coronal enhanced T1-weighted image shows absence of enhancement and reperfusion with lateral column on the right side and transphyseal revascularization on the left side (arrows) is indicative of a poor prognosis.

가

가, 가

LCP      가

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## Efficacy of Gadolinium Enhanced MR Imaging for the Diagnosis of Legg-Calve-Perthes Disease<sup>1</sup>

Jee-Eun Kim, M.D., Ji Hye Kim, M.D.<sup>2</sup>, Hyung Sik Kim, M.D.

<sup>1</sup>Department of Radiology, Gachon University of Medicine and Science, Gil Medical Center

<sup>2</sup>Samsung Medical Center, Sungkyunkwan University School of Medicine

**Purpose:** The purpose of this study was to evaluate the efficacy of gadolinium enhanced MR imaging for making the diagnosis of Legg-Calve-Perthes (LCP) disease.

**Materials and Methods:** We studied the gadolinium enhanced MR images of 14 hips in 12 children who had the diagnosis of LCP disease. We retrospectively analyzed the extent of necrosis, the epiphyseal revascularization pathways and the metaphyseal changes.

**Results:** The absence of enhancement on gadolinium enhanced MRI was noted in all cases of LCP disease. Diffuse absence of enhancement was observed in 9 femoral epiphyses. Two of them showed normal bone marrow signal intensity on the T1 and T2-weighted images. Focal absence of enhancement was observed in 5 femoral epiphyses. Enhanced MRI showed better epiphyseal revascularization in the lateral column (five cases), in the lateral and medial columns (four cases) and in the transphyseal pathway (three cases). Metaphyseal change was observed in two cases.

**Conclusion:** Gadolinium enhanced MRI allows detection of LCP disease and an accurate analysis of the different revascularization patterns, and this helpful for predicting the prognosis.

**Index words :** Child

Hip

Legg-Perthes disease

Magnetic resonance (MR)

Femur head necrosis

Address reprint requests to : Jee-Eun Kim, M.D., Department of radiology, Gachon University of Medicine and Science, Gil Medical center, 1198 Kuwol-dong, Namdong-gu, Incheon 405-220, Korea.

Tel. 82-32-460-3060 Fax. 82-32-460-3065 E-mail: boram107@gilhospital.com