

2 2

(MRA) 29
가 6, 14, 15, 18, 59, 46, 가 8,
MRA Gadolinium 15, 9, MRA, 6, MRA 10
shoulder coil, 14, phased-array pelvic coil, 1, T1
Czerny, T1, T2,
5, Czerny, IA가 3,
IB가 1, IIA가 8, IIB가 1, IIIA가 4, IIIB
7 (41%), 7 (41%), 3 (18%),
10 (59%), 4 (24%), 3 (18%),
92%, 75%, 92%,
75%, 88%.

gradient echo image (5-7).
가 (1). 가
(2). 가 가 가
(8-10).
(3,4). (11,12).
CT 가 (13-18).
(4). (mag-
netic resonance arthrography, MRA) MRA

1

2

1996 4 1998 4 666, TE 11-18) T1 T2 (TR 600-2
29 , 3000-4000, TE 80-102) 가 MRA Czerny (4).
MRA 14 , ,
, 15 (Table 1).
18-59 46 , 가 8 가 6
15 . 15 9 MRA , Czerny Stage I
6 MRA MRA 2mmol/L Stage II
Gadolinium 10-20 mL Stage III
, Gadolinium II,
1-2mL III
MRA Gadolinium 10 5
. MRI 1.5-T (Signa, General
Electric Medical Systems, Milwaukee) , 14

Table 1. Clinical Data, Imaging Findings, and Surgery in 15 Hips with Acetabular Labral Tear

Patient No./Sex/ Age(y)	Hip	Relevant History	Direct /Indirect MRA	MR Arthrographic Appearance	Arthroscopic Findings	Surgery
1/F/42	R	None	D	CM extension to S(T)	Tear without detachment at AS	Arthroscopy
2*/M/45	R	None	D	CM extension to S(T)	Tear without detachment at S	Arthrotomy
3*/M/45	L	None	ID	Contour bulging and increased intrasubstance SI within S(Dg)	Degeneration and flarring at S	Arthroscopy
4/F/49	R	None	D	CM tracking within AS(T)	Tear without detachment at AS	Arthrotomy
5/M/40	L	Fracture#	ID	Increased SI within S(T)	Labral detachment from the acetabulum at S	Arthrotomy
6/M/47	L	Fracture#	D	CM tracking within AS(T)	Tear without detachment at AS	Arthrotomy
7/F/40	R	slip down	D	Intermediate intrasubstance SI in S(Dg)	Tear without detachment at AS	Arthrotomy
8/M/59	R	Driver injury	ID	Intermediated intrasubstance SI in S(Dg)	Degeneration and fibrillation in S	Open resection
				Increased SI extension to acetabular-labral junction in PI(Dt)	Detachment from the acetabulum at PI	
9/M/59	R	None	ID	Increased SI extension to acetabular-labral junction in AS(Dt)	Detachment from the acetabulum at AS	Arthrotomy & open resection
10/M/48	L	None	D	CM tracking within AS(T)	Tear without detachment at AS	Arthrotomy & open resection
11/M/58	R	None	ID	Intermediate intrasubstance SI in AS(T)	Degeneration at AS	Arthrotomy
12/F/52	R	None	D	Increased intrasubstance SI in AS(Dg)	Fibrillation at AS	Arthrotomy
13/F/44	L	Slip down	D	CM tracking within S(T) Cystic lesion in the S	Tear without detachment at AS, Transparent jell like material tagged in the AS	Arthrotomy & open resection
14/M/18	R	Transientsy novitis	D	CM tracking within PI(T)	Tear without detachment at PI	Arthrotomy
15/F/56	R	None	ID	Increased SI extension to acetabular-labral junction in AS and PI(Dt)	Detachment from the acetabulum at AS and PI	Arthrotomy

Note.-D= direct MRA, ID= indirect MRA, CM= contrast material, SI= signal intensity, AS= anterosuperior labrum, S= superior labrum, PI= posteroinferior labrum, Dg= degeneration, T= tear without detachment, Dt= detachment

*Another hip of same patient # Operation state of left subtrochanter fracture

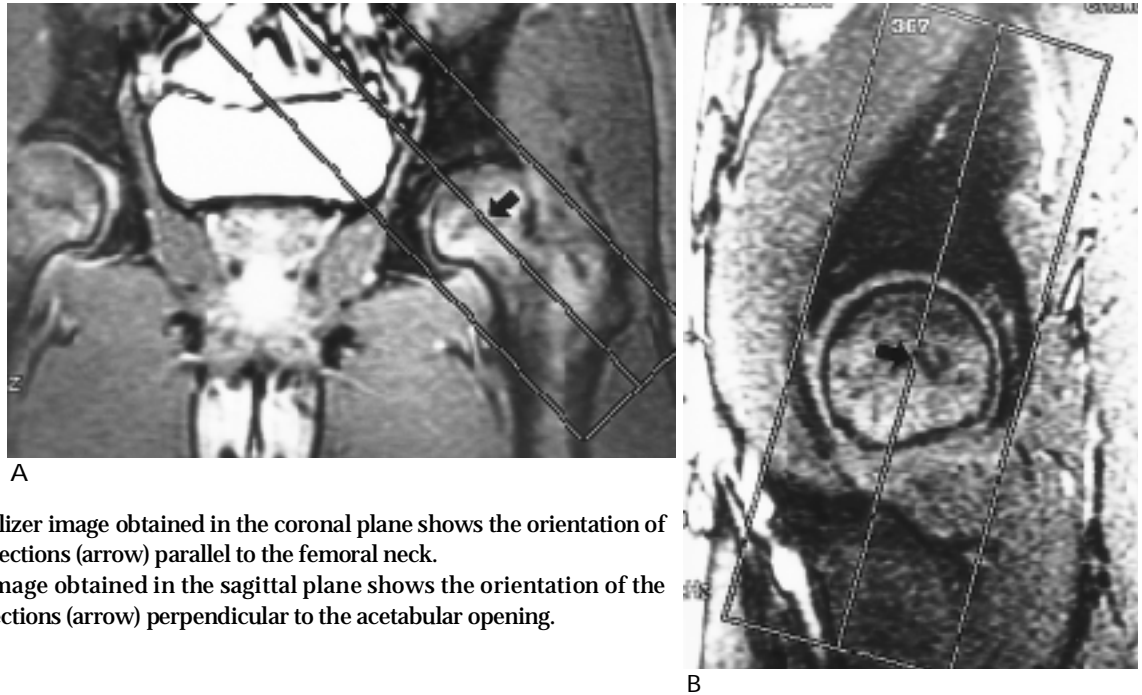


Fig. 1. A. MR localizer image obtained in the coronal plane shows the orientation of the axial oblique sections (arrow) parallel to the femoral neck.
B. MR localizer image obtained in the sagittal plane shows the orientation of the coronal oblique sections (arrow) perpendicular to the acetabular opening.

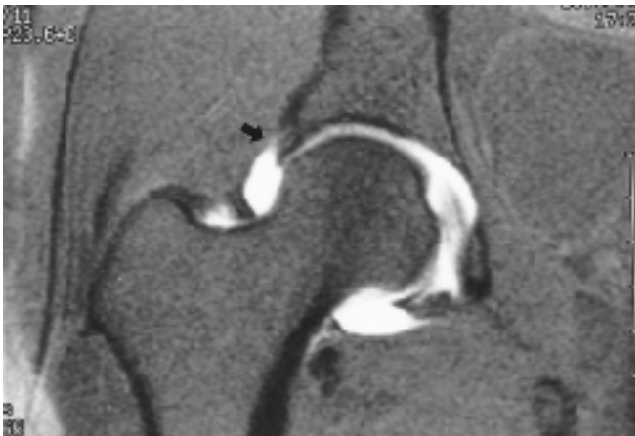


Fig. 2. A 52-year-old female patient with chronic right hip pain. Coronal fat suppressed T1-weighted (666/16) image (direct MR arthrogram) shows triangular labrum with slightly increased signal intensity and intact labral recess at anterosuperior portion of the right hip (arrow). This case was proved stage IA at arthroscopically.

Table 2. Staging of the Acetabular Labral Lesions with MRA Compared with Arthroscopy

Stage	MRA	Arthroscopy
IA	3 (17%)	4 (24%)
B	1 (6%)	
IIA	8 (47%)	8 (47%)
B	1 (6%)	
IIIA	4 (24%)	5 (29%)
B	0 (0%)	
Total	17	17

Note.-MRA = Magnetic Resonance Arthrography.

MRA

가 2 ,

가 9 ,

Smith-Petersen

가 4 (19)

92%, 75%, 92%, 75%,

8%, 25%, 88%

7 (41%), 7 (41%), 3 (18%) ,

10 (59%), 4 (24%),

3 (18%)

15 17

MRA Czerny

375

IA가 3 (Fig. 2), IB가 1, IIA가 8 (Fig. 3, 4), IIB가 1, IIIA가 4 (Fig. 5), IIIB가 0 (Table 2).

I 4 (24%), II가 8 (47%), III가 5 (29%),

가 3, 가, 가
3 2 MRA III IIA
, I IIA 1 MRA
II IA
MRA
89% 88% .

가 30%, 36%

가 . Czerny (4) 57
MRA

M-

RA

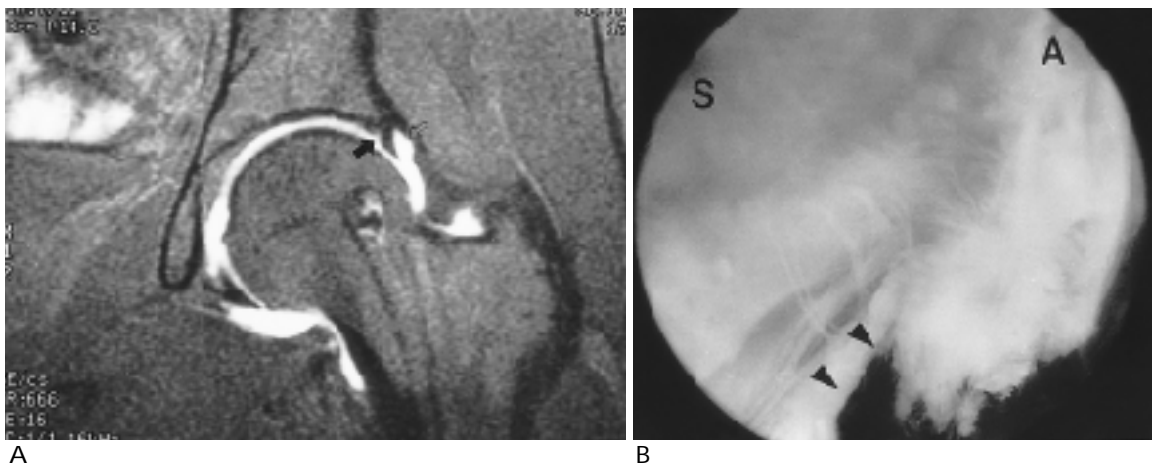


Fig. 3. A 47-year-old male with a history of fall down injury and femur operation.

A. Oblique coronal T1-weighted (666/16) image (direct MR arthrogram) of the left hip shows triangular shaped labrum with extension of contrast material into the labrum without detachment from the anterosuperior portion of the acetabulum (arrow). Note that the labral recess is clearly visible (open arrow).

B. Arthroscopic finding shows a tear at the base of the labrum that is compatible with the finding of a stage IIA labrum of figure(a) (arrowheads). Note.-S = superior aspect in arthroscopy, A = anterior aspect in arthroscopy

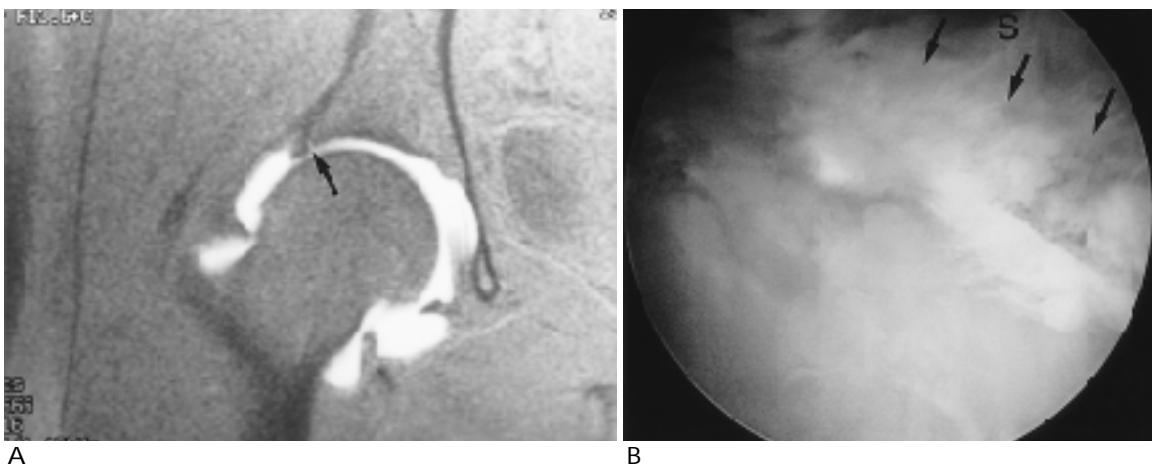


Fig. 4. An 42-year-old female with chronic right hip pain for 9 months.

A. Oblique coronal T1-weighted (633/16) image (direct MR arthrogram) of the right hip shows triangular labrum with partial detachment from the anterosuperior portion of the acetabulum and cleft of contrast filling (arrow).

B. Arthroscopic finding shows a tear with degeneration and fraying at the anterosuperior portion of the labrum that is compatible with the finding of a stage IIA labrum of figure(a) (arrows). Note.-S = superior aspect in arthroscopy

1. Fitzgerald RH. Acetabular labrum tears. *Clin Orthop Rel Res* 1995 ; 311 : 60-68
2. McCarthy JC, Day B, Busconi B. Hip arthroscopy : application and technique. *J Am Acad Orthop Surg* 1995 ; 3 : 115-122
3. Alterberg AR. Acetabular labrum tears : a cause of hip pain and degenerative arthritis. *South Med J* 1977 ; 70 : 174-5
4. Czerny C, Hofmann S, Neuhold A. et al. Lesions of the acetabular labrum : accuracy of MR Imaging and MR Arthrography in detection and staging. *Radiology* 1996 ; 200 : 225-230
5. Chandnani VP, Yeager TD, DeBernadino T, et al. Glenoid labral tears : prospective evaluation with MR imaging, MR arthrography, and CT arthrography. *AJR* 1993 ; 161 : 1229-1235
6. Hayes CW, Conway WF. Evaluation of articular cartilage : radiographic and cross-sectional imaging techniques. *RadioGraphics* 1992 ; 12 : 409-428
7. McCauley TR, Pope CF, Jokl P. Normal and abnormal glenoid labrum : assessment with multiplanar gradient-echo MR imaging. *Radiology* 1992 ; 183 : 35-37
8. Kramer J, Recht MP, Imhof H, Stiglbauer R, Eigel A. Postcontrast MR arthrography in assessment of cartilage lesions. *J Comput Assist Tomogr* 1994 ; 18 : 218-224
9. Flannigan B, Kursunoglu-Brahme S, Synder S, Karzel R, Delpizzo W, Resnick D. MR arthrography of the shoulder : comparison with conventional MR imaging. *AJR* 1990 ; 155 : 829-832
10. Eigel A. Magnetic resonance knee arthrography : enhanced contrast by gadolinium complex in the rabbit and in humans. *Acta Orthop Scand* 1990 ; 61(suppl) : 240
11. Winalski CS, Alibadi P, Wright RJ, Shortkroff S, Sledge CB, Weisman BN. Enhancement of joint fluid with intravenously administered gadopentetate dimeglumine : technique, rationale, and implications. *Radiology* 1993 ; 187 : 179-185
12. Drape J-L, Thelen P, Gay-Depassier P, Silbermann O, Denacerraf R. Intraarticular diffusion of Gd-DOTA after intravenous injection in the knee : MR imaging evaluation. *Radiology* 1993 ; 188 : 227-234
13. Dorrell JH, Catterall A. The torn acetabular labrum. *J Bone Joint Surg Br* 1986 ; 68 : 400-403
14. Edwards DJ, Lomas D and Villar RN. Diagnosis of the painful hip by magnetic resonance imaging and arthroscopy. *J Bone Joint Surg Br* 1995 ; 77-B : 374-376
15. Glick JM, Sampso TG, Gordon RB, Behr JT and Schmidt E. Hip arthroscopy by the lateral approach. *Arthroscopy* 1987 ; 3 : 4-12
16. Ide T, Akamatsu N and Nakajima I. Arthroscopic surgery of the hip joint. *Arthroscopy* 1991 ; 7 : 204-211
17. Parisien JS. Arthroscopy of the hip : present status. *Bull Hosp JT Dis Orthop Inst* 1985 ; 45 : 127-132
18. Suzuki S, Awaya G and Okada Y. Arthroscopic diagnosis of ruptured acetabular labrum. *Acta Orthop Scand* 1986 ; 57 : 513-515.
19. Andrew H. *Surgical techniques and approaches*. In Frederick M, James H, Peter G et al. *Campbell's Operative orthopaedics*. St. Louis : Mosby, 1998 ; 82-85
20. Hodler J, Yu JS, Goodwin D, Haghigi P, Trudell D, Resnick D. MR arthrography of the hip : improved imaging of the acetabular labrum with histologic correlation in cadavers. *AJR* 1995 ; 165 : 887-891
21. Hodler J, Berthiaume M-J, Schweizer ME, Resnick D. Knee joint hyaline cartilage defects : A comparative study of MR and anatomic sections. *J Comput Assist Tomogr* 1992 ; 16 : 597-603
22. Peterfy CG, Majumdar S, Lang P, van Dijke CF, Sack K, Genant HK. MR imaging of the arthritic knee : improved discrimination of cartilage, synovium, and effusion with pulsed saturation transfer and fat-suppressed T1-weighted sequences. *Radiology* 1994 ; 191 : 413-419
23. Kim YT : The Nerve Endings of the acetabular Labrum. *Clin Orthop Rel Res* 1995 ; 320: 176-181
24. Ueo T and Hamabuchi M. Hip pain caused by cystic deformation of the labrum acetabulare. *Arthritis Rheum* 1984 ; 27 : 947-950
25. Takechi H, Nagashima H and Ito S. Intra-articular pressure of the hip joint outside and inside the labrum. *J Jpn Orthop Ass* 1982 ; 56 :p 529-536

Efficacy of MR Arthrography in the Diagnosis of the Acetabular Labral Tear¹

Kwang Jin Chun, M.D., Soon Tae Kwon, M.D., Deuk Soo Hwang, M.D.², Yon Su Chung, M.D.,
Chung Ho Paek, M.D., Young Min Kim, M.D., Won Sok Lee, M.D.²

¹Department of Diagnostic Radiology, Chungnam National University College of Medicine

²Department of Orthopaedic Surgery, Chungnam National University College of Medicine

Purpose : To determine the accuracy of magnetic resonance (MR) arthrography in the detection and staging of lesions of the acetabular labrum.

Materials and Methods : Fifteen hips of 14 patients with chronic hip pain and clinical suspicion of labral lesions were examined with direct or indirect MR arthrography and underwent subsequent arthroscopic evaluation. The study population consisted of six women and eight men aged between 40 and 59 years. Nine arthrograms were obtained intra-articular administration of gadolinium solution, and six involved articular motion exercise after intravenous administration of gadolinium solution. In 14 cases a phased-array pelvic coil was used, and a shoulder coil in one. Fat-suppressed T1-weighted images were obtained in the coronal, oblique coronal and oblique axial planes, and T1-and T2-weighted images were obtained in the axial plane. Labral lesions were graded according to the Czerny classification and evaluated on the basis of presence or absence of a tear and location (anteroinferior, anterosuperior, superior, posterosuperior, posteroinferior). The findings were then correlated with the arthroscopic findings.

Results : After direct and indirect MR arthrography, the findings-based on the Czerny classification -were as follows : stage IA:3; IB:1; IIA:8; IIB:1; IIIA:4; IIIB:0. MR arthrography also showed that seven cases were located in the anterosuperior portion of the labrum, seven in the superior portion, and three in the posteroinferior portion. The sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of MR arthrography for diagnosis of the labral tear was 92 %, 75 %, 92 %, 75 %, and 88 %, respectively.

Conclusion : In this preliminary study, MR arthrography appears to be a promising imaging modality for accurate diagnosis and useful for screening patients with chronic hip pain.

Index words : Hip, MR

Hip, injuries

Joints, MR

Magnetic resonance (MR), arthrography

Acetabulum, injuries

Address reprint requests to : Soon Tae Kwon, Department of Diagnostic Radiology, Chungnam National University Hospital.
#640, Daesa-Dong, Jung-Gu, Taejeon 301-040, Korea.
Tel. 82-42-220-7333 Fax. 82-42-253-0061