

1 kg 2% (Xylazine HCl, Rumpun) 5 mg (Ketamine HCl, 10mg/ml) 10 mg

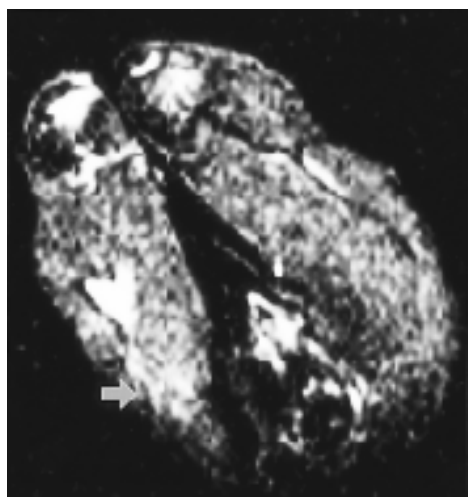
1 T2
(5), 30 , 2
, 24 , 48
4 II 1
1.5 T (Magnetom Vision, Siemens, Erlagen, Germany)
(CP head coil, Siemens, Erlagen, Germany)
(steady state free precession)
T2
100 × 200 mm, 154 × 256, 7 mm
7 mm
4 , T2 1 ,
1 15 , T2 1 13
T2 TR/TE 3000/96 msec,
(echo train length) 7

Fisher's exact test

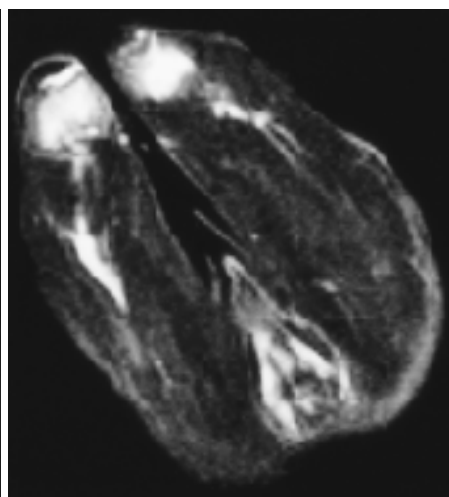
T2
paired Student's t test
5%

Table 1. Number of Lesion Detection on Diffusion-weighted (DWI) and T2-weighted MR Image (T2WI) in Two Groups.

| | Group I | | Group II | |
|--------|---------|-------|----------|-------|
| | DWI | T2WI | DWI | T2WI |
| 5 min | 15/15 | 12/15 | 15/15 | 14/15 |
| 30 min | 15/15 | 12/15 | 15/15 | 15/15 |
| 2 hr | 15/15 | 15/15 | 15/15 | 15/15 |
| 24 hr | 15/15 | 15/15 | 15/15 | 15/15 |
| 48 hr | 15/15 | 15/15 | 15/15 | 15/15 |



A



B

Fig. 1. Five-minute delayed MR images of rabbit (group I) at thigh level. Axial diffusion-weighted image (A) shows focal ill-defined increased signal intensity at the site of injury (arrow), but no signal intensity change is noted on T2-weighted image (B).

(Table 1).

5
T2 I 100 %, (1).
80%, II 100%, 60% T2
II (p = 0.0169).
30 가 (p > 0.05).
I 5 T2
가 (p > 0.05). 30
T2
(p < 0.05).
II 5 30
T2
(p > 0.05), 2
T2 (p < 0.05)
(Fig. 2).
T2 24
가 가
48
(Fig. 2).
I, II
I II T2 30
I II
30 24 I
(p < 0.05).

가
,
가 (1).
T2
, T1
T2
가
(tendon)
가 (1, 2, 10, 11). Niko-
laou (12)
-
24
,
,
T2 T2
T2
가 5 30
가
T2
,
,
T1
(2,10), (STIR) (3),

(strain)
(6).
가
가
(7).
X
가 가
(8, 9).

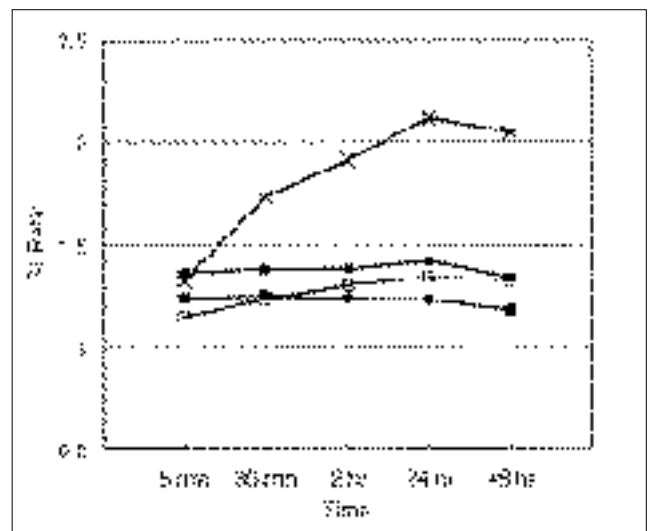


Fig. 2. Mean Lesion to Normal Site Signal Intensity (SI) Ratio Curve of Muscle Injury with Time in Two Groups.

- diffusion-weighted image, group
- x --- T2-weighted image, group I
- diffusion-weighted image, group II
- T2-weighted image, group II

(4)

가 T2

Yoshioka (13)

가 T2

가 T2

가 T2

가 T2

(5),

(15)

(14).

(14)

(16)

가

T2

T2

(5)

T2

5 30

II 5

T2

(p = 0.0169).

I 가 II

가

T2

가

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MR Imaging of Skeletal Muscle Injury in Rabbit : Comparison between Diffusion and T2-weighted MR Images¹

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Purpose : The purpose of this study was to apply the diffusion-weighted MR imaging technique to the early detection of skeletal muscle injury and to evaluate the usefulness of this imaging sequence.

Materials and Methods : Thirty rabbits, divided into two groups, were included in this study. Skeletal muscle injury was experimentally induced in the right thigh muscles of each rabbit by clamping with a hemostat for one minute. Four-stage clamping was applied to the rabbits in group I, but for group II there was only one stage. Diffusion and T2-weighted MR images were obtained using a 1.5T MR unit. Serial 5- and 30-minute, and 2-, 24-, and 48- hour delayed images were obtained after injury. The initial time of signal intensity change was recorded and the signal intensities of the injured sites and corresponding normal sites were measured and compared.

Results : On 5-minute delayed images in group I, diffusion-weighted MR images showed signal intensity changes in injured muscle in all 15 cases, but on T2-weighted images, change was not detected in three cases. In group II, 5-minute delayed T2-weighted images failed to depict the lesion in six cases, but on diffusion-weighted images, all lesions were detected. In addition, one lesion was not detected on 30-minute delayed T2-weighted images. In group II, the sensitivity of lesion detection was significantly higher on diffusion-weighted than on T2-weighted images ($p = 0.0169$).

Conclusion : Diffusion-weighted MR imaging was shown to be more sensitive than T2-weighted imaging for the detection of signal intensity changes immediately after artificial injury, especially when this was of a lesser degree. These results suggest that diffusion-weighted MR imaging may be useful for the detection of early stage skeletal muscle injury.

Index words : MR, diffusion study
Muscles, injuries
Muscles, MR

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contact: Janice Ford Benner, Univ. of PA Medical Center,
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(2000 3 12-15)

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E-mail: Webmaster@Ryalsmeet.com)

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PRACTICAL TRAINING IN INTERVENTIONAL RADIOLOGY COURSE (2000 3 13-17)

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contact: Ken Wright, Phd, M.D. Anderson Cancer Center,
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E-mail: kwright@di.mdacc.tmc.edu)

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