

가 1

(MRI)

가

: 96 5 98 2 MRI
120 (: 58 , : 62)
6 , 20

10 60

T1

1

가

: MRI

가

(99%) 10%-49% , 50%

가 4

, 40

: MRI

가

, 40

50%

가

MRI

89

21

89

가
Breger

가

3, 4, 5
1, 2

1

120

(MRI)

가 20 % - 100 % 가 (1).

가 (bone marrow conversion)

(:7, :13), 20-29 (:13, :7), 30-39
(:11, :9), 40-49 (:11, :9), 50-59 (:8,
:12), 60 (:8, :11) 6

가
가 (2).

가

20

1.5T (Magnetom vision, Siemens,
Erlangen, Germany) MRI

T1 (TR 642 / TE 12msec)
Gadolini-um-tetraazacyclododecane(Gd-DOTA, Dotarem;
Guerbet, Aulnay-sous-Bois, France) 0.1mmole/kg

5

T1

1996 5 1998 2 MRI
120 (58 ,

가 가 (L1) ,

1/3

62)

(Fig. 1).

가
 Percentage increase in SI = (SI post-SI pre) × 100/SI pre
 (SI pre=Signal Intensity before Gd-DOTA administration,
 SI post=Signal Intensity after Gd-DOTA administration)

MRI 가
 , 19 26±
 12 %, 20-29 26±11 %, 30-39 29±14 %, 40-49
 21±7 %, 50-59 23±9 % , 60
 24±7 % (Fig. 2).
 18.9±4%, 17.4±4%

39 40
 (p=0.024).
 (99 %) 10-49 % 가 . 50 %
 가 , 30-39 3 , 20-29
 120 4 , 40
 (Fig. 3).

(5-8).
 (hematopoietically active, red or cellular type)
 (hematopoietically inactive, yellow or
 fatty type) 40 % 40 %
 , 20 % 15

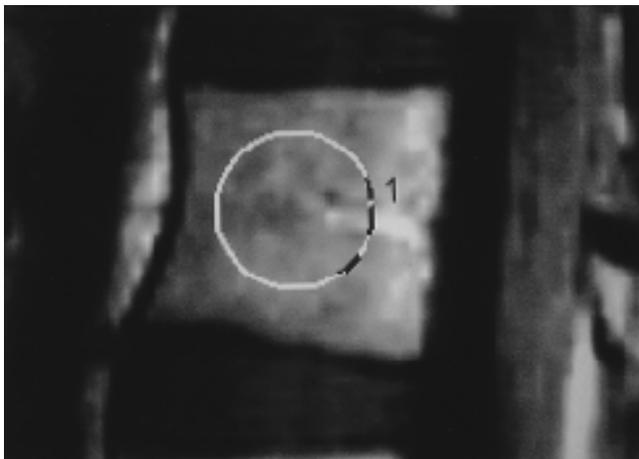


Fig. 1. Measurement of bone marrow of L1 body. Region of interest(circle) of bone marrow was drawn within the L1 mid-body in the midsagittal plane.

가
 % 80 % , 5 % (9).
 TR/TE T1
 가 (10).
 가
 (red to yellow marrow conversion) T1

. Ricci , 가
 가
 가
 가
 가 (10).

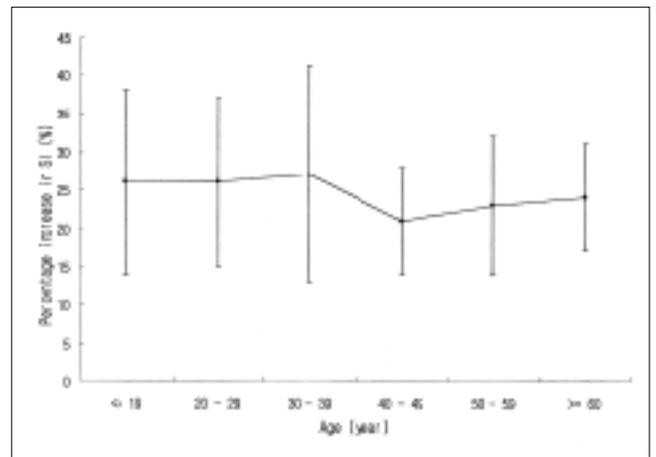


Fig. 2. Distribution of percentage increase in signal intensity relating to age. Percentage increase in SI was not statistically significant in each age group.

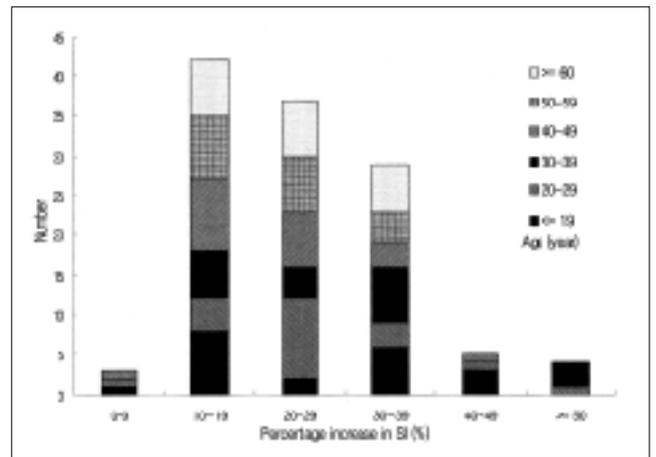


Fig. 3. Cumulative distribution of percentage increase in signal intensity relating to age. More than 99 % of the persons revealed the percentage increase in signal intensity less than 49 %. In the group of above 40 years old, nobody had more than 50 % increment of SI.

가 23.4 ± 4.5 % (14).
 (99 %) 10 % - 49 %
 , 50 % 가 4
 , 40
 (5,11).
 가
 가 가
 , 40
 가 50 %
 , 25
 (8,12,13).
 가
 (yellow to red marrow conversion)
 (reconversion)
 (, , T2)
 TR/TE T2
 (fatty marrow)
 가 (5).
 가
 가
 가 5
 T1 Bollow T1
 가 1
 3
 가
 (14).
 Saifuddin
 23 84 (46.4)
 , 가 15.3 % (23
 - 55.7 %)
 (2). , Breger
 (MRI) 가 20 % - 100 % 가
 (1). Bollow (in-phase)
 (out-phase)
 , 60

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Age - Related Contrast Enhancement Study of Normal Bone Marrow in Lumbar Spinal MR Imaging¹

Young A Kim, M.D., Doo Hoe Ha, M.D.

¹Department of Diagnostic Radiology, Pundang CHA General Hospital College of Medicine, Pochon CHA University

Purpose : The purpose of this study was to evaluate the degree of contrast enhancement of normal bone marrow in L-spine relating to aging and to determine the range of contrast enhancement in normal bone marrow.

Material and Methods : We analyzed a total of 120 patients (20 per decade) who had undergone lumbar spinal MRI and who ranged in age from the 2nd decade to more than the 7th. Bone marrow revealed no abnormal pathology. Sagittal T1-weighted spin echo sequences were obtained before and after gadolinium administration. For each sequence, a region of interest was drawn within the L1 vertebral body from the midsagittal slice. Signal intensity (SI) values of each sequence were ascertained and the percentage increase in SI was calculated.

Results : After contrast enhancement, lumbar MRI revealed no statistically significant in the percentage increase in SI of normal bone marrow in relation to aging. Most patients (99 %) however showed an SI increase of between 10 % and 49 %. In only four, none of whom were aged over 40, was this increase above 50%.

Conclusion : Lumbar MRI, revealed no statistically significant difference in percentage increase in SI in normal bone marrow relating to aging, but when the increase is above 50 % in a patient aged over 40, bone marrow pathology should be further investigated.

Index words : Bone Marrow, MR
Spine, MR

Address reprint requests to : Doo Hoe Ha, M.D., Department of Diagnostic Radiology, Pundang CHA General Hospital
#351 Yatap-dong, Pundang-gu, Sungnam, Kyonggi-do, 463-070, Korea
Tel. 82-342-780-5681 Fax. 82-342-780-5381 E-mail. dhha@medikorea.net