

CT MR 1

: CT MR .
 : 13
 2 , 11 . 10
 CT(CT 6 , CT 9) 6 MRI
 : 84.6% (11/13) 2-6
 6 CT (5/9) (5/6)
 (7/9) , CT (4/9) 7
 (2/6) , T2 T1 (4/6)
 T1 T1 (6/6)
 4 (4/6) , T2 69.2% (9/13)
 61.5% (8/13) , 53.8% (7/13)

: CT MR , ,

2,147
 1.44%

- (1). 7,000 13
 8 (0.11%) . CT 10 (CT 1 ,
- (2). CT 4 , CT 5) MR 6
 (8-79) . 7 9:4 , 42.0
 , 5
- (3). , 1 (Table 1, 10)
 가 .

CT MR (4-7). (non-Hodgkin lymphoma)
 12 (Hodgkin's lymphoma) 1
 CT MR (Table 1).

1 2000 4 4 2000 8 4 . 13 2 I 1 , IE 5 , IV 7
 , 11

11 3 가 7 가 , 5
 , 1
 , 2
 7 CT 6 Somatom (II, Plus, Plus-S, Plus 40; Siemens Medical System, Erlangen, Germany), 3
 TCT 80A (Toshiba, Tokyo, Japan), 1 GE8800 (GE Medical System, Milwaukee, U.S.A.) MR
 1 3 1.5T Magnetom 63SP, 1 1.5T
 (Table 1, 5) Magnetom Vision plus (Siemens, Erlangen, Germany), 2
 CT 가 0.2T MRP 20-2 (Hitachi, Tokyo, Japan)가
 , 가 MR T1 (TR = 480 - 750 msec, TE = 17 - 38 msec) T2 (TR = 1500 - 2100 msec, TE = 70 - 90 msec) , T1

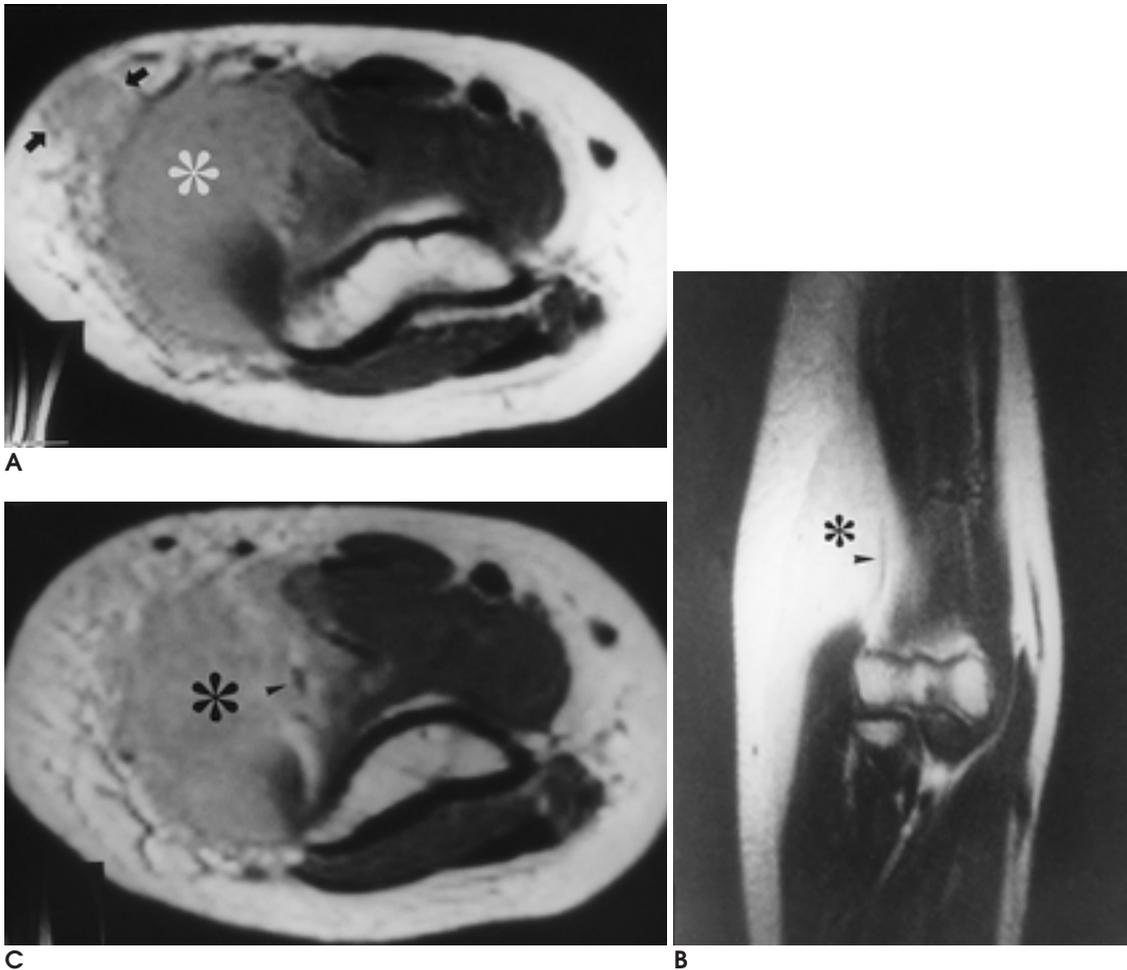


Fig. 1. Primary muscle lymphoma (Stage IE, case 2).

A. Axial T1-weighted spin-echo (TR = 750, TE = 38 msec) MR image shows diffusely thickened brachioradialis muscle (asterisk) without definite focal mass lesion. The signal intensity of the involved muscle is homogeneously higher than that of adjacent normal muscles. Infiltration into adjacent subcutaneous fat tissue is well demonstrated (arrows).

B. On coronal T2-weighted spin-echo (TR = 1500, TE = 90 msec) MR image, the brachioradialis muscle (asterisk) shows homogeneous high signal intensity and vascular encasement (arrowhead).

C. After Gadolinium-DTPA injection, the involved muscle (asterisk) shows moderate enhancement and vascular encasement (arrowhead). The lesion in adjacent subcutaneous fat-tissue is also enhanced.

8 가 (strand) 1 (Fig. 1). (Fig. 1, 5) 8 (8/13, 61.5%) (Fig. 1, 2) 7 (7/13, 53.8%) (Table

Table 3. MR Findings of Muscular Involvement in Lymphoma

Patient *	SI / Homogeneity			Bone change	Fat stranding	Neurovascular encasement
	T1	T2	Gd-T1			
2	MH / +	MH / +	ME / +	-	+	+
5	SH / +	MH / -	ME / -	+	+	+
6	SH / +	MH / -	ME / -	+	+	-
7	I / +	SH / +	SE / +	-	-	+
11	I / +	MH / +	ME / +	+	+	-
12	SH / +	MH / +	SE / +	-	+	+

* Patient numbers are the same as those in table 1 and 2.
 SI: The signal intensity of muscle lymphoma comparing to that of normal muscle
 T1: T1 weighted image
 T2: T2 weighted image
 Gd-T1: Gadolinium enhanced T1 weighted image
 MH: Moderately high
 SH: Slightly high
 I: Iso signal
 ME: Moderate enhancement
 SE: Slight enhancement

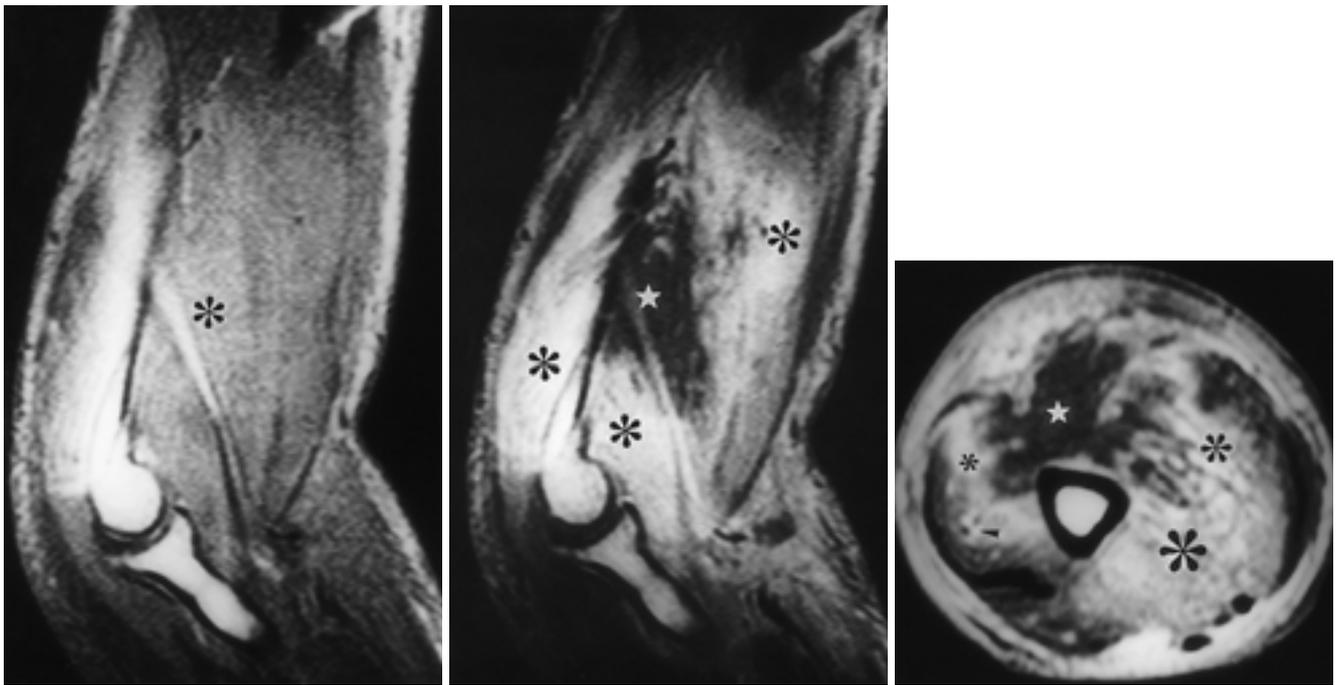


Fig. 2. Primary muscle lymphoma with heterogeneous enhancement (Stage IE, case 5).
A. Sagittal T1-weighted spin-echo (TR = 500, TE = 25 msec) MR image shows ill-defined signal changes in biceps brachii, brachialis and triceps brachii muscles (asterisk) around the distal humerus.
B, C. On sagittal (B) and axial (C) T1-weighted spin-echo (TR = 500, TE = 25 msec) MR images after contrast enhancement, the outer portion of involved muscles are moderately enhanced and more well-defined (asterisk). However, the central portion of lesion shows irregularly-marginated low signal intensity (star). Extensive necrosis of tumor was demonstrated on histopathologic examination (not shown). Encasement of brachial artery and vein (arrowhead) is shown.

2, 3).

가 (2,

8, 9).

가

(1, 2,

10),

50%

가

(11, 12)가

15

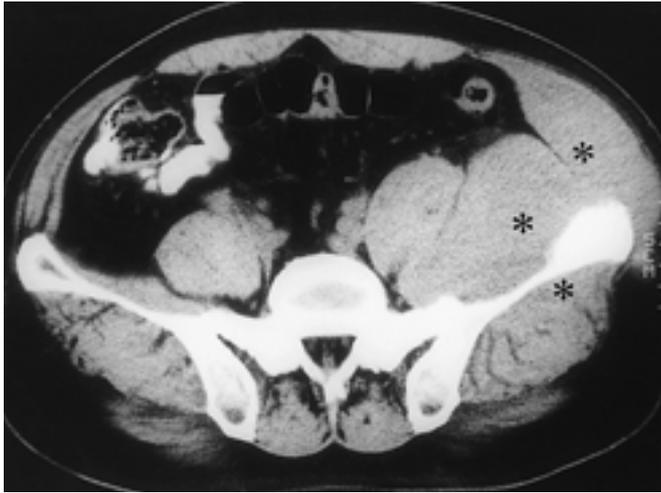


Fig. 3. Bone lymphoma extending into adjacent muscles (Stage IE, case 3).
A. Non-contrast enhanced CT scan shows marked enlargement of iliacus, abdominal wall and gluteus minimus muscles (asterisk) in left side. The density of involved muscles is isodense to that of normal muscles.
B. Contrast enhanced CT scan shows slightly hyperdense muscles (asterisk) involved by lymphoma. Permeative bone destruction and cortical disruption are noted at the left ilium.

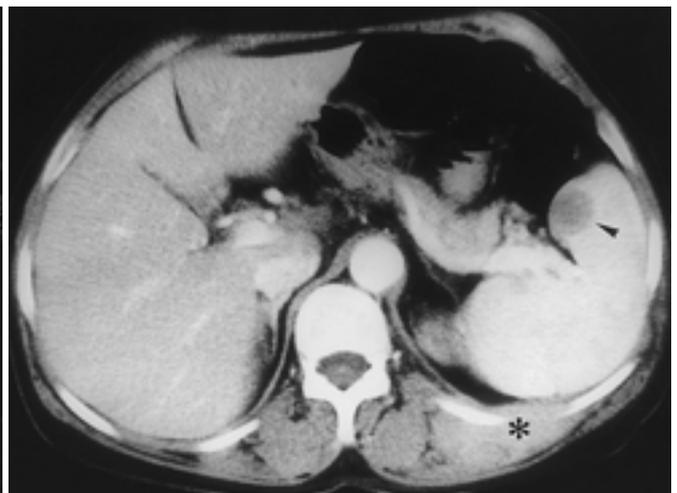
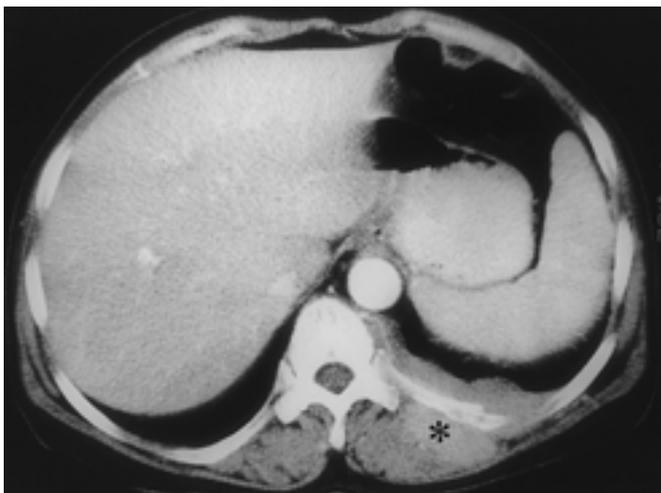
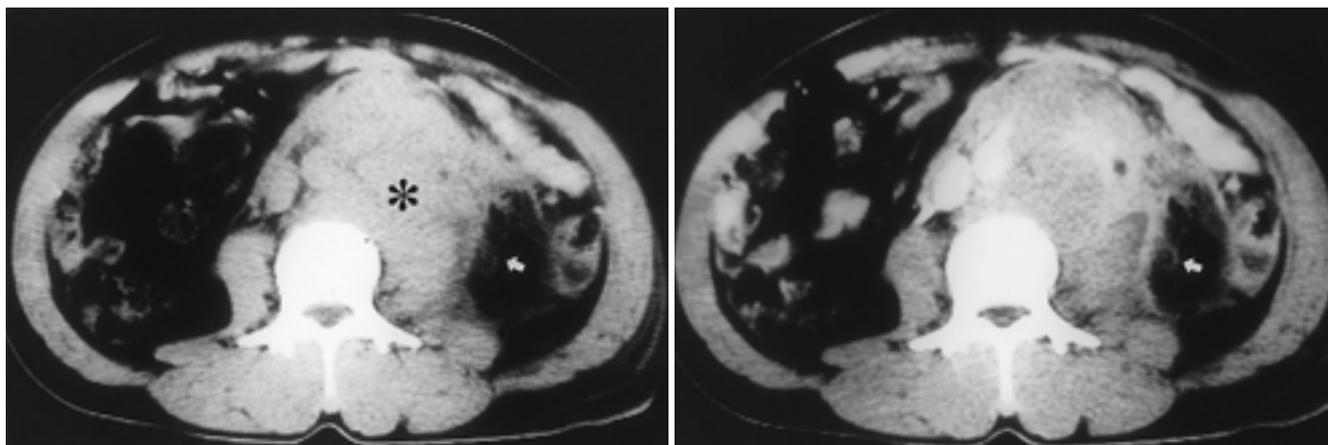
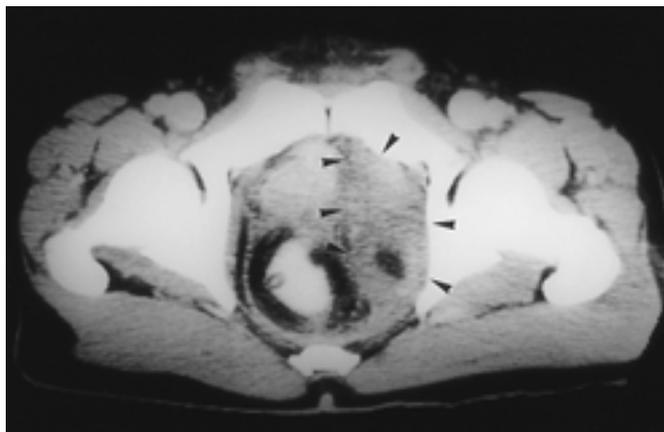


Fig. 4. Metastatic lymphoma from the tongue (Stage IV, case 8).
A. The left 10th rib shows pathologic fracture. Extension into adjacent muscles is demonstrated by enlargement and mild contrast enhancement (asterisk).
B. At the CT scan 4cm below to A, the left 11th rib and adjacent muscles (asterisk) are involved by lymphoma. Metastatic lesions are also found in the spleen (arrowhead) and left kidney (not shown).



A **B**

Fig. 5. Nodal lymphoma extending to muscles (Stage I, case 1).
A. Non-contrast CT scan shows a large mass (asterisk) composed of conglomerated lymphadenopathies and enlarged left psoas muscle.
B. Contrast enhanced CT scan shows heterogeneous enhancement of the mass and encasement of the aorta, inferior mesenteric artery and left ureter. Invasion into adjacent fat tissue (white arrow) is seen in left side of the mass. This mass extended into the pelvis.
C. Contrast enhanced CT scan at the level of the symphysis pubis shows extension of the large mass. The left obturator internus muscle (arrowheads) is markedly enlarged and shows heterogeneous density. The prostate and rectum are displaced to right side.



C

Jeffery (13) 가 , 1 2 (2/13, 15.4%) ,
 15 8 , 11 (11/13, 84.6%) ()
 (thigh)가 가 (calf),
 (psoas), (deltoid), (paraspinal muscle)
 9:4 , 13 CT MR
 5 3 (5, 6, 16),
 가 9 (4, 6). CT Grunshaw (5)
 (Table 1) Jeffery 2
 (axial skele - Hosono (4) Panicek (6)
 ton) CT 가
 (14, 15). Lee (16) (Table 2). MR
 가 가 , T1
 (4, 5, 16, 17). 가 가 , T2 (4) T1
 MR , Hosono (4) T2
 1 , T2

Muscular involvement by Malignant Lymphoma: CT and MR Findings¹

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Purpose: To investigate the CT and MR findings of muscular involvement by malignant lymphoma.

Materials and Methods: Thirteen patients with biopsy-proved muscular involvement by malignant lymphoma were included in this study. Two patients were primary muscle lymphoma and 11 patients were muscle lymphoma by secondary involvement of malignant lymphoma. CT of 10 patients (6 pre-contrast CT and 9 post-contrast CT) and MRI of 6 patients (all with pre- and post-contrast studies) were retrospectively analyzed.

Results: In the majority of patients (84.6%, 11/13), the appearance of muscular involvement was the diffuse enlargement of several muscles as like as a group. The muscles involved by malignant lymphoma showed iso-attenuation (5/6) and homogeneity (6/6) on pre-contrast CT scan, and high attenuation (5/9) or iso-attenuation (4/9) and homogeneity (7/9) on post-contrast CT scan. The signal intensity of involved muscle showed slightly hyper- (4/6) or iso-intense (2/6) and homogeneous (6/6) on T1-weighted images, and hyper-intense (6/6) and homogeneous (4/6) on T2- and Gadolinium-enhanced T1-weighted images. Adjacent bone change was demonstrated in 69.2% (9/13), subcutaneous fat change in 61.5% (8/13), and neurovascular encasement within involved muscle in 53.8% (7/13).

Conclusion: The CT and MR findings of muscular involvement by malignant lymphoma were diffuse enlargement of several muscles with homogeneous attenuation or signal intensity, and frequent changes in adjacent bones and subcutaneous fat, or neurovascular encasement.

Index words : Muscles, CT
Muscles, MR
Muscles, neoplasms
Lymphoma

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