^{99m}Tc-(V) DMSA uptake in systemic AL amyloidosis and normal bone scintigraphy

To the Editor: Systemic AL amyloidosis is a rare disease the second most common type of amyloidosis after AA amylosidosis characterized by deposition of amyloid fibrils arising from immunoglobulin light chains [1]. Diagnosis can only be made by histochemical analysis of biopsy specimens. Amyloidosis AL may involve multiple organs (like kidneys, heart, bone marrow and other) and evaluation of the extent of amyloid deposition is often difficult [2].

A 53 years old man, who had been operated for spontaneous hepatic haemorrhage secondary to AL amyloidosis, was referred to us for pentavalent technetium-99m dimercaptosuccinic acid (^{99m}Tc (V)-DMSA) scintigraphy for evaluation of the extent of amyloid deposition. In the ^{99m}Tc (V)-DMSA scintigraphy, there was diffuse increased uptake in the liver, spleen, and bone marrow (Fig. 1). Bone scintigraphy with ^{99m}Tc-methylene diphosphonate (^{99m}Tc-MDP) showed normal uptake in the same areas (Fig. 2). The liver and bone marrow biopsies showed the massive deposition of AL type amyloid protein (Fig. 3).

The deposition of amyloid protein may lead to malnutrition of many organs such as liver, heart, and kidney [3]. The iodinated serum amyloid P component and ^{99m}Tc labelled aprotinin scintigraphy are recently used amyloid imaging [4-6]. Uptake of ^{99m}Tc-MDP and ^{99m}Tc (V)-DMSA have been reported in the liver, spleen, heart, thyroid and the intestinal tract of patients with systemic amyloidosis [7-11]. The precise mechanism of amyloid affinity for ^{99m}Tc-MDP and ^{99m}Tc (V)-DMSA is not been fully elucidated. Several factors including expanded interstitial volume, the affinity of amyloid to calcium, increased blood flow and phosphate metabolism are suggested to play a role in the process [12-14]. While we have observed the increased uptake with ^{99m}Tc (V)-DMSA in effected organs, ^{99m}Tc-MDP bone scintigraphy was normal.

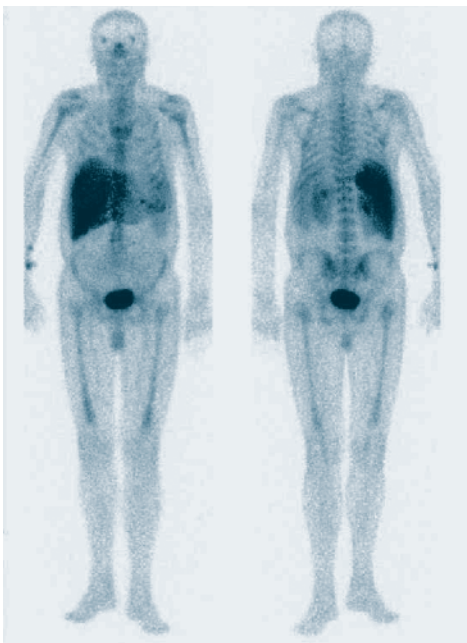

Figure 1. A whole body scan obtained 4h after intravenous administration of 740MBq freshly prepared ^{99m}Tc (V)-DMSA reveals the high accumulation in liver, spleen, sternum, ribs, vertebrae, pelvis, bilateral humeri and femurs.

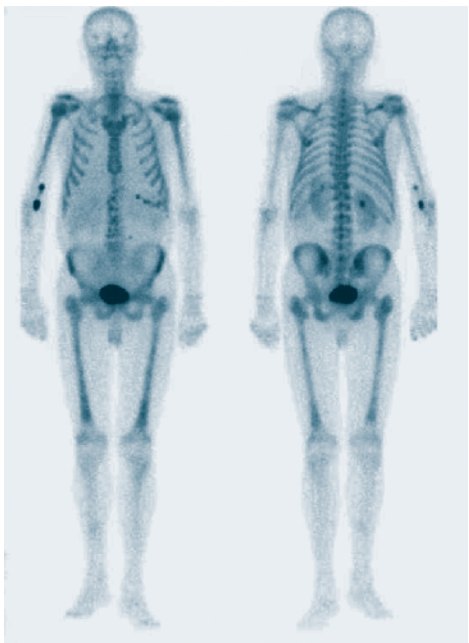

Figure 2. A whole body scan obtained 3-4h after intravenous administration of 740MBq ^{99m}Tc-MDP scan showed focal uptake in the left ninth costachondral region and irregular uptake in the anterior abdominal wall due to the operation. Uptake in the other areas was normal.

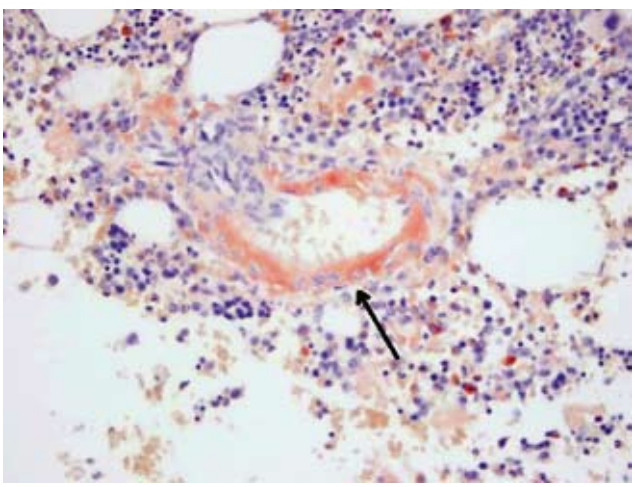

Figure 3. Amyloid deposition in the bone marrow. Congo-red stain.

Bibliography

1. Jacobson DR, Seldin DC, Buxbaum JN. The amyloidoses. In: Lichtman MA, Beutler E, Kipps T et al. Eds. *Williams Hematology.* 7th edn. McGraw-Hill Medical, London and N.Y. 2006:1535-1548.

2. Rajkumar SV, Kyle RA. Primer amyloidosis. In: Goldman L, Ausiello DA. *Cecil's Textbook of Medicine*. 23rd edn. Pa: Saunders Elseiver, Philedelphia. 2008: 2083-2087.
3. Sanchorawala V. Light-chain (AL) amyloidosis: diagnosis and treatment. *Clin J Am Soc Nephrol* 2006; 1: 1331-1341.
4. Schaadt BK, Hendel HW, Gimsing P et al. ^{99m}Tc-aprotinin scintigraphy in amyloidosis. *J Nucl Med* 2003; 44: 177-183.
5. Hawkins PN. Serum amyloid P component scintigraphy for diagnosis and monitoring amyloidosis. *Curr Opin Nephrol Hypertens* 2002; 11: 649-655.
6. Hazenberg BP, Van Rijswijk MH, Lub-de Hooge MN et al. Diagnostic performance and prognostic value of extravascular retention of ^{123}I-labeled serum amyloid P component in systemic amyloidosis. *J Nucl Med* 2007; 48: 865-872.
7. Yukihiro M, Tateno M, Hirano T et al. Pentavalent technetium-99m dimercaptosuccinic acid uptake in primary amyloidosis: comparison with autopsy findings. *Radiat Med* 1997; 15: 317-320.
8. Bhatnagar A, Sahoo M, Nijhawan VS et al. ^{99m}Tc-DMSA (V) uptake in multiorgan amyloidosis. *Clin Nucl Med* 1996; 21: 733-734.
9. Ohta H, Endo K, Kanoh T et al. Technetium-99m (V)-DMSA uptake in amyloidosis. *J Nucl Med* 1989; 30: 2049-2052.
10. Kulhanek J, Movahed A. Uptake of technetium 99m-HDP in cardiac amyloidosis. *Int J Cardiovasc Imaging* 2003; 19: 225-227.
11. MacDonald J. Idiopathic hepatic uptake of ^{99m}Tc methylene diphosphonate: a case report. *J Nucl Med Technol* 2001; 29: 32-36.
12. Lomeña F, Roselló R, Pons F et al. Abnormal scintigraphic evolution in AA hepatic amyloidosis. *Clin Nucl Med* 1988; 13:194-196.
13. Lee VW, Caldarone AG, Falk RH et al. Amyloidosis of heart and liver: comparison of ^{99m}Tc-pyrophosphate and ^{99m}Tc-methylene diphosphonate for detection. *Radiology* 1983; 148:239-242.
14. Basu S, Nair N, Awasare S et al. ^{99m}Tc(V)DMSA scintigraphy in skeletal metastases and superscans arising from various malignancies: diagnosis, treatment monitoring and therapeutic implications. *Br J Radiol* 2004; 77: 347-361.

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