Diffusely Increased Uptake of Tc-99m MDP in the Wrist and Hand as a Result of Intraarterial Injection: Original Image

Arter İçine Enjeksiyona Bağlı Olarak El ve El Bileğinde Diffüz Artmış Tc-99m MDP Tutulumu

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ABSTRACT Inadvertently, intra-arterial injection of the bone scan agent causes a condition which is defined as glove phenomena. In the case presentation, a diffusely increased 99mTc-methylene diphosphonate (MDP) uptake in the left hand and wrist due to the distal ulnar artery injection was presented in the whole body bone scintigraphy in a 63-year-old man with lung cancer exposed to the radial artery removal for coronary artery bypass grafting. The scintigraphic appearance in the wrist and hand of our patient was different from the glove phenomena resulting from radiopharmaceutical injection into the brachial artery. Therefore, the scintigraphic appearance of our patient can be explained by the altered anatomic-physiologic blood flow due to removal of radial artery.

Key Words: Technetium Tc 99m medronate; injections, intra-arterial

ÖZET Kemik sintigrafisinde kullanılan görüntüleme ajanlarının yanlışlıkla arter içine enjekte edilmesi eldiven fenomeni olarak adlandırılan bir duruma sebep olabilir. Bu olgu sunumunda, 63 yaşında akciğer kanseri tanısıyla izlenen ve önceden yapılan koroner arter bypass'ı esnasında gerekli grefti sağlamak amacıyla radial arteri çıkarılmış erkek hastada, tüm vücut kemik sintigrafisi esnasında 99mTc-metilen difosfonat (MDP)'ın distal ulnar artere enjeksiyonundan dolayı hastanın sol el ve elbileğinde diffüz olarak artmış aktivite tutulumu izlendi. Hastamızın el ve el bileğinde izlenen sintigrafik görünüm kullanılan radyofarmasötiğin brakial artere enjeksiyonundan kaynaklanan eldiven fenomeninden farklıydı. Bundan dolayı bizim vakamızda izlenen bu görünüm radial arterin çıkarılmasına bağlı anatomik ve fizyolojik olarak kan akımının değişmesi ile açıklanabilir.

Anahtar Kelimeler: Teknesyum Tc 99m medronat; intraarteryel enjeksiyonlar

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Radiopharmaceuticals injected inadvertently into the arterial system have been described with renography, bone scintigraphy, myocardial perfusion scintigraphy, and ^{18}F-fluorodeoxyglucose (FDG) positron emission tomography (PET) scanning. Most often, the activity after intraarterial injection is seen as located to the forearm and hand and this condition is defined as glove phenomena or the hot forearm and hand sign.[1-3]

A 63-year-old man with lung cancer was referred to our hospital for bone scintigraphy as part of a work-up for metastatic disease. The patient received an injection of 740MBq ^{99m}Tc-methylene diphosphonate (MDP) into a blood vessel in the left wrist. Three hours later, an increased uptake of acti-

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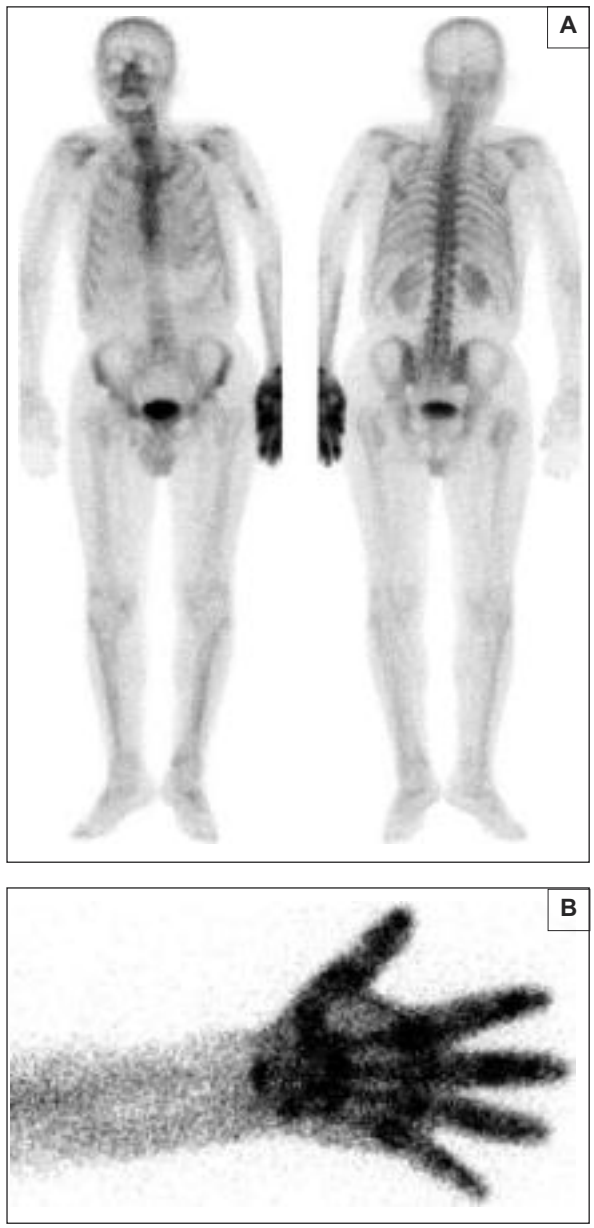


FIGURE 1: Whole body (A) and spot images (B) with 99mTc- MDP showed diffusely increased uptake in the left wrist-hand.

vity was observed on the left humerus and left wrist-hand in the whole body and spot images (Figure 1 A, B). Increased tracer uptake, which is result of trauma, was revealed in the left humerus. Also, the pattern of the left wrist and hand images had given rise to the suspicion of reflex sympathetic dystrophy. The patient has not complained of significant pain and numbness in the left wrist-hand and has had no reflex sympathetic dystrophy history but had the radial artery removal for coronary artery bypass grafting. The repeated three phase bone scintigraphy with an injection on the dorsum of the foot was normal (Figure 2 A, B). Therefore the increased ^{99m}Tc-MDP uptake, which is seen on the first scintigraphy, was attributed to intraarterial injection of the radiotracer.

The blood supply to the hand depends on the ulnar artery, the radial artery and the interosseous

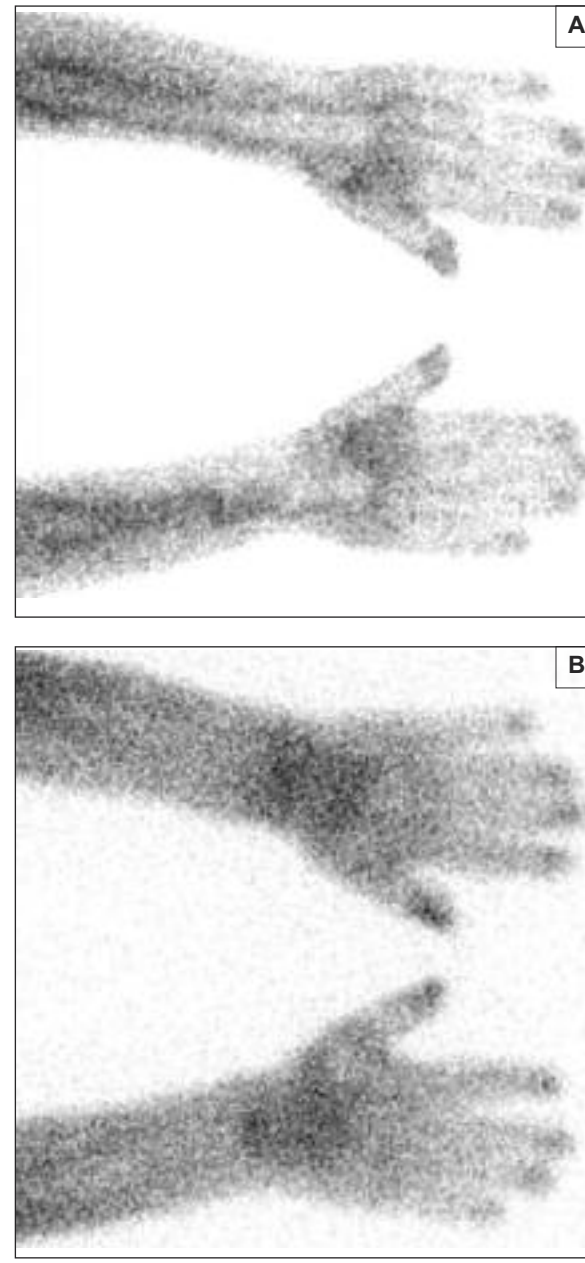


FIGURE 2: A three phase bone scintigraphy was performed with injection to the dorsum of the foot. The blood pool (A) and delayed images (B) were normal.

artery. While the radial artery nourishes to the first and partly second metacarpals and fingers, the blood of the ulnar and interosseous arteries are distributed to the fifth, fourth, third metacarpals, and part of the second metacarpal. The blood passing from the radial, ulnar, and interosseous arteries is mixed in the dorsal carpal rete and deep palmar arch. The superficial palmar arch which is the continuation of the ulnar artery is responsible for the blood supply to the second, third, fourth, and fifth fingers through the digital arteries. The normal vascular anatomic and physiologic dynamics constitute the mixture and dilution effects after radiopharmaceutical injection to the distal radial artery that resulted in a hot palm and thumb but without hot areas in the second, third, fourth, fifth fingers. If the injection had been in the distal ulnar artery, hot areas would have been occurred in the second, third, fourth, fifth fingers, but there would have been normal activity in the thumbs. When the radial artery is removed with any reason, the blood supply to the hand is provided by the ulnar artery through arch. In this situation, diffusely increased activity in the left wrist and hand is observed as similar to the presented case. The hot hand-wrist appearance of our patient is different from the glove phenomena, which also results from injection of ^{99m}Tc-MDP into the brachial artery in the antecubital fossa. As a result of the injection, ^{99m}Tc-MDP is distributed through the radial, ulnar, and interosseous arteries to the bones of the forearm, wrist, hands, and soft tissue, creating the appearance of a glove. However, reflex sympathetic dystrophy, which mimics findings, should be excluded for differential diagnosis.[3-5]

In conclusion, a diffusely increased uptake over the wrist and hand of bone imaging agent injected to distal ulnar artery may be observed in loss of the radial artery with any reason and should come to mind especially in the painless hot hand sign.

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