

Assessment of penile bone graft viability by bone scintigraphy: A case report

Murat Fani BOZKURT and Ömer UÇUR

Department of Nuclear Medicine, Hacettepe University Faculty of Medicine, Ankara, Turkey

A 20-year-old man, who had penile reconstruction surgery with an iliac bone graft a year ago due to malcircumcision at 6 years old underwent bone scintigraphy in order to detect bone graft viability. The accumulation of ^{99m}Tc -MDP in the penile region revealed the viability of the bone graft. This case report shows that bone scintigraphy can be used to assess the viability of a bone graft located inside the penis as well as bone grafts placed elsewhere in the extremities.

Key words: bone scintigraphy, bone graft, viability, penis

INTRODUCTION

BONE GRAFTS have been used for years in the repair of trauma, to replace bone infiltrated by tumor, in the repair of congenital defects and for various cosmetic purposes. Bone grafts may either be “allografts” which are banked human bones or “autografts” which are harvested from elsewhere in the patient’s own skeleton. Autografts are more common than allografts and they are characterized as “non-vascularized autografts,” which are transplanted free of their own vascular supply and as “vascularized autografts,” in which the bone is transferred with its own nutrient artery and anastomosed microsurgically to an artery at the recipient site. The main advantage of vascularized bone graft is the immediate restoration of the blood supply that enables rapid union and remodeling of the grafted bone.¹

Postoperative evaluation of the bone graft viability is a very important and difficult task for surgeons. Bone scintigraphy is a useful method to assess the bone graft viability since the accumulation of bone tracers depends on both an adequate vascular delivery system and a living network of osteoblasts.² Viable bone grafts demonstrate intact blood flow and increased uptake within the grafted bone on delayed images.³ Bone scintigraphy can predict

the failure of the graft 3–6 weeks prior to skeletal radiography.⁴

In this report, a case is presented in which bone scintigraphy was used to assess the viability of the bone graft located inside the penis, as an unusual bone graft localization.

CASE PRESENTATION

A 20-year-old male patient was referred from the Plastic and Reconstructive Surgery Department for bone scintigraphy in order to detect bone graft viability. He had a malcircumcision history at age 6 which caused the loss of almost the entire penile shaft. For this reason his penis was reconstructed with a vascularized iliac bone autograft a year ago. The iliac autograft was prepared from the right iliac bone and placed inside the penile shaft. Within a one year postoperative period, the clinical findings and the physical examination of the penis suggested graft viability but bone scintigraphy was needed for confirmation.

740 MBq ^{99m}Tc -MDP was injected and planar images of the pelvis were obtained three hours after the injection. The accumulation of ^{99m}Tc -MDP in the penile region revealed the bone graft viability. Also focally increased activity surrounding a slightly photopenic region in the right iliac bone, where the autograft had been prepared, was detected and this contributed to reactive osteoblastic activity of the donor site (Fig. 1).

This case report demonstrates that bone scintigraphy can be used to assess the viability of bone grafts located inside the penis as a rather unusual localization, as well as

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For reprint contact: Murat Fani Bozkurt, M.D., Hacettepe University Faculty of Medicine, Department of Nuclear Medicine, TR-06100, Sıhhiye, Ankara, TURKEY.

E-mail: fani@mail.koc.net

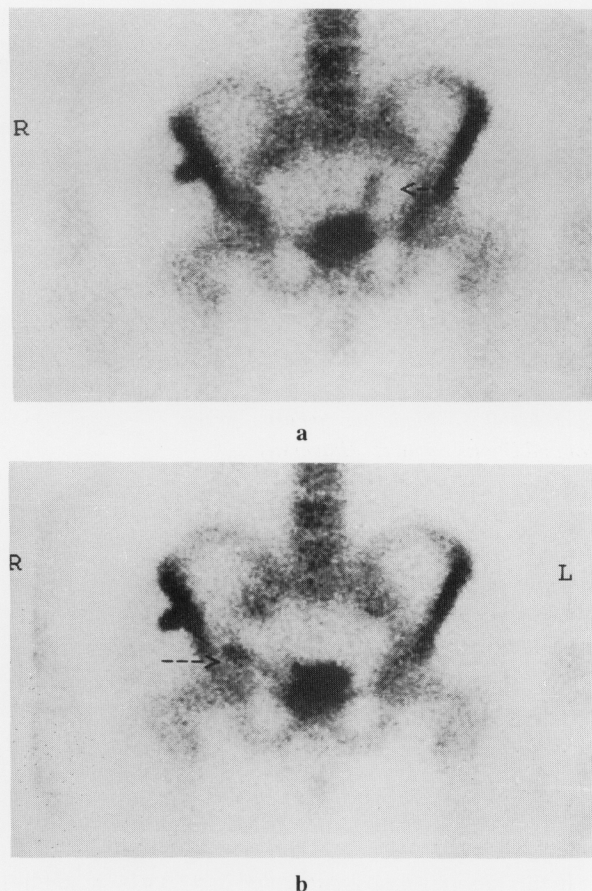


Fig. 1 Scintigraphic images showed ^{99m}Tc -MDP uptake in the penile bone graft. (a) Penis on the left and (b) on the right side of the body (arrows). Also focally increased activity surrounding a slightly photopenic region in the right iliac bone (the region where the bone graft was taken from) was seen.

bone grafts located elsewhere in the body.

DISCUSSION

The viability of bone grafts has always been a matter of question for surgeons. Clinical and radiological assessment of viability cannot provide satisfactory information about the graft's present status and its outcome.⁵ Conventional angiography and MRI have been reported to evaluate vascular supply of the bone grafts successfully, but the patency of arterial supply to the bone graft cannot always indicate graft viability at the cellular level.^{6,7} Bone scintigraphy with ^{99m}Tc labeled diphosphonates such as ^{99m}Tc

MDP can successfully assess the vascularity and the viability of bone grafts in an earlier period, since accumulation of the radiopharmaceutical depends on both an adequate vascular delivery system and a living network of osteoblasts.

For graft viability studies, planar bone scintigraphy is sufficient in most cases, especially for grafts located in the extremities. But SPECT imaging has been reported to be more useful, particularly for the viability assessment of mandibular grafts, because of the overlying tissues.⁸

The case presented in this report is considered to be of interest due to the rather unusual site of graft localization, the penis, since most bone grafts are placed in extremities or mandibula. Planar bone scintigraphy with ^{99m}Tc MDP was preferred for viability assessment of the iliac bone graft located inside the penis and SPECT imaging was not needed since planar images provided intense and clear visualization of the penile graft region.

In conclusion, bone scintigraphy can successfully be used to assess the viability of penile bone grafts, as well as bone grafts located elsewhere in the body.

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