

## CASE REPORT: PITFALL IN BLADDER DIVERTICULUM BONE SCENSING MIMICING BONE UPTAKE

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## INTRODUCTION

Bone scintigraphy with (99m) Tc-MDP is one of the most performed nuclear medicine studies and helps in the diagnosis of several pathologies related to the musculoskeletal system. Its usefulness in clinical practice, especially in oncological studies, makes it important to know the various limitations of this imaging modality to avoid false interpretations. It is essential to bear in mind the uptake in benign lesions, which may resemble malignant pathologies. The present case report shows a hyperconcentration of the radiopharmaceutical in the topography of the right ileopubic eminence, which proved to be a bladder diverticulum after the fusion of SPECT images performed in nuclear medicine with computed tomography performed in the same service.

Vesical diverticula are evaginations of the mucous and submucosal layer of the bladder through the fibers of the detrusor muscle through areas of weakness, congenital or acquired, most commonly present in the topography of the ureterovesical junction (UVJ). Diagnostic confirmation is usually performed by bladder ultrasonography or voiding cystourethrography. Large diverticula can be symptomatic, leading to urinary retention and stasis. The treatment is predominantly surgical, however, small asymptomatic diverticula can be followed clinically.

The objective of this work is to contribute to the knowledge of image artifacts ("pitfalls") present in bone scintigraphy.

## REPORT

A 39-year-old female patient underwent a full-body bone scintigraphy with methylenediphosphonate labeled with 99m-technetium (99mTc-MDP) for staging breast cancer diagnosed in December 2020 at a large hospital located in the

municipality from Belo Horizonte-MG. Whole-body images acquired 3 hours after intravenous administration of 99mTc-MDP showed hyperconcentration of the radiopharmaceutical in the topography of the right ileopubic eminence. Additional images were acquired with the SPECT technique (single photon emission computed tomography) of the region of interest which suggested soft tissue uptake in the pubic region. The fusion of SPECT images from nuclear medicine with anatomical images from computed tomography performed at the same service confirmed that it was radiopharmaceutical uptake in the topography of the bladder, more specifically in a bladder diverticulum, a rare diagnosis, in most cases asymptomatic and diagnosed incidentally. Plane bone scintigraphy, especially in sites with complex anatomy, is limited by the lack of accurate anatomical information. The use of the SPECT / CT (single photon emission tomography/computed tomography) technique is significantly useful in these cases.

## DISCUSSION

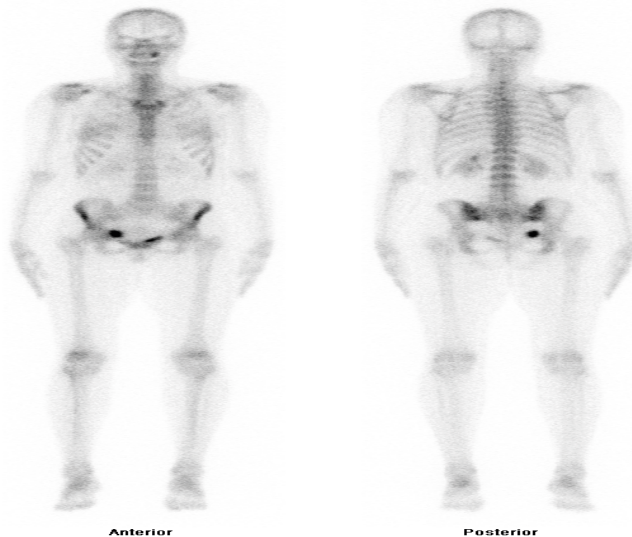
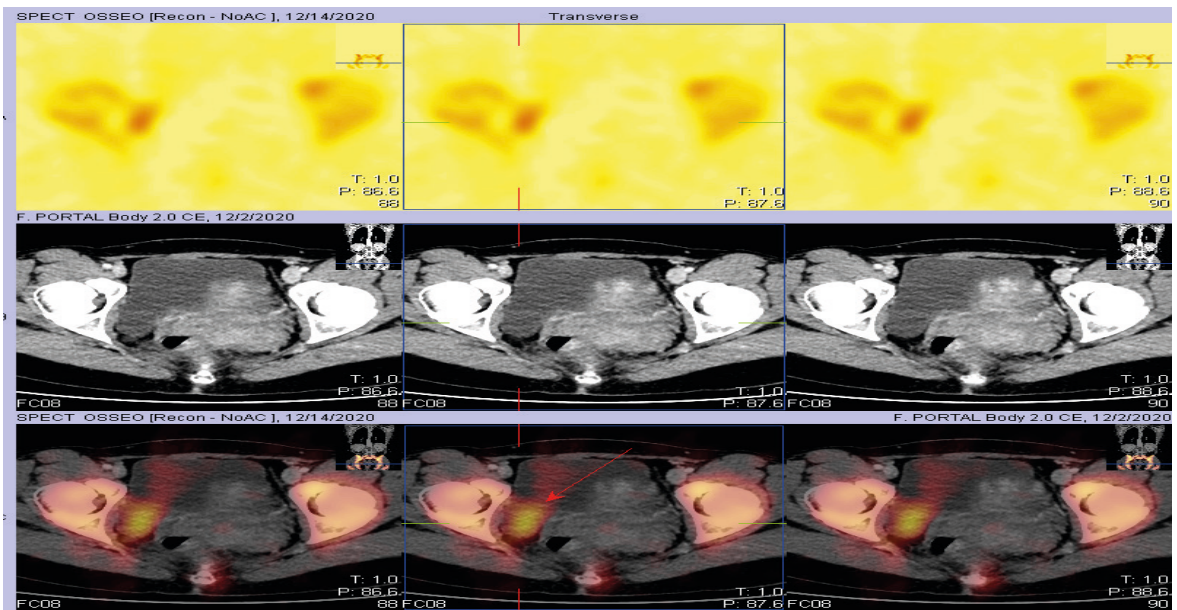
The 99mTc-MDP tracer is the most widely used bone agent, providing excellent contrast between normal and diseased bone. Excretion of 99mTc-MDP is mainly renal and 70% of the administered dose is eliminated within 6 hours. The limited specificity of radionuclide bone scintigraphy is partly due to the accumulation of 99mTc-MDP in normal structures or benign processes.

Bone scintigraphy with 99mTc-MDP is frequently performed for the oncological follow-up of patients with malignant neoplasms, due to its high sensitivity (62 to 100%) for detecting bone metastases, its ability to assess the whole body, its availability and low cost.

Several types of artifacts may be present in studies of Nuclear Medicine and are often categorized into: instrumental, technical, related to the radiopharmaceutical, related to the patient's clinical condition and related to previous medical intervention. Extraosseous radiotracer uptake must be carefully evaluated to avoid false positive interpretation of the test. Bladder diverticula, contamination with urine, ascites, pyeloplasty catheter, urinary calculus, among other conditions, often present radiotracer uptake that can be falsely interpreted as abnormal bone uptake.

## FINAL CONSIDERATIONS

Knowledge of the artifacts most commonly found in bone scintigraphy contributes to greater diagnostic accuracy and improves the ability to interpret the exam, increasing its accuracy and usefulness for the patient. The multimodal fusion of images such as SPECT and CT is significantly useful, especially in places with complex anatomy and must be performed, even in equipment without a tomograph attached, as in the reported case.



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