Incidental Detection of Perinephric Urinary Leak on Bone Scintigraphy in a Patient with Urinary Bladder Carcinoma

Abstract

A 71-year-old male patient with urothelial carcinoma of the bladder was referred for ^{99m}Tc-methylene diphosphonate bone scintigraphy to assess for skeletal metastasis. While the bone scan showed no abnormal skeletal uptake, tracer activity was detected in the extrarenal region of the left renal fossa on the planar image; single photon emission computed tomography-computed tomography (CT) demonstrated tracer pooling in the perirenal collection. In addition, the CT detected nontracer-avid parenchymal lung nodules and hypodense liver lesions consistent with metastatic disease. The perinephric urinary leak was drained by percutaneous drainage, confirmed by diuretic renography the following day.

Keywords: *Bladder carcinoma, bone scintigraphy, diuretic renography, single photon emission computed tomography-computed tomography, urinary leak*

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A 71-year-old male was diagnosed as a case of high-grade urothelial carcinoma of the bladder 2 years ago. He underwent six cycles of intravesical Bacille Calmette-Guerin and was on clinical follow-up. Now, he presented with hematuria and dysuria for the past 2 months. A contrast-enhanced computed tomography (CT) done 10 days earlier showed a residual/recurrent lesion in the bladder. Transurethral resection showed muscle invasive recurrent urothelial carcinoma. ^{99m}Tc-methylene diphosphonate bone scintigraphy was performed for the assessment of skeletal metastasis but showed no abnormal skeletal tracer uptake. However, planar images showed extrarenal pooling of tracer in the left perirenal region [Figure 1].

Single photon emission computed tomography-CT (SPECT-CT) performed to localize the abnormal tracer activity demonstrated abnormal tracer pooling in the perirenal collection extending over to the left iliac fossa consistent with a urinary leak [Figure 2]. On re-evaluation, a history of mild abdominal pain in the left flank was elicited. In addition, SPECT-CT also identified hypodense liver lesions and parenchymal nodules in the visualized lung segments. In the present clinical context, these findings were consistent with metastatic disease. The patient was managed with immediate percutaneous drainage of the urinary collection. ^{99m}Tc-ethylene dicysteine (EC) diuretic renography done the following day showed slow pooling of tracer activity in the region of lower pole of the left kidney in the initial dynamic study [Figure 3]. The subsequent prevoid, postvoid, and delayed images at 3 h also showed abnormal tracer activity in the perinephric and lower polar region of the left kidney. A whole body (vertex to midthigh) positron emission tomography-CT performed 2 days after

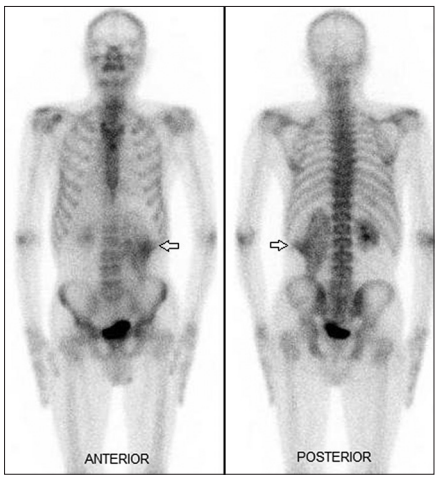

Figure 1: Whole body ^{99m}Tc-methylene diphosphonate bone scintigraphy shows diffuse abnormal tracer activity (arrow) in the left perirenal region. There is no evidence of any osteoblastic skeletal lesions

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the bone scan also showed tracer-avid lesions in the liver and lungs, further characterizing the malignant/metastatic nature of these lesions. The patient is currently undergoing chemotherapy.

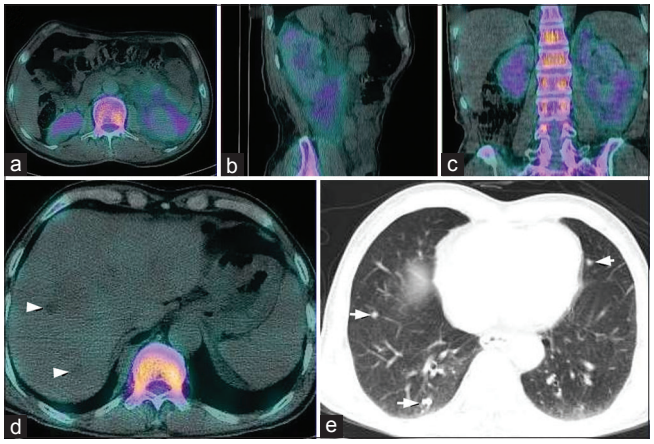

Figure 2: Single photon emission computed tomography-computed tomography of the abdomen shows perirenal collection of tracer activity in orthogonal views (a -axial, b - sagittal, c - coronal) consistent with perirenal leak. In addition, non tracer-avid hepatic (d) and pulmonary lesions (e) are detected on computed tomography

Urinary leak although common after abdominal trauma may also result from transmitted backpressure from a ureteral stone, pelvic mass, pregnancy, retroperitoneal fibrosis, or ureteropelvic junction obstruction. Ureteric obstruction by neoplasm is a rare cause of spontaneous urinary leak.[1] Urinoma resulting from bladder malignancy is rare and usually associated with vesicoureteric junction involvement.[2,3] Although bone scan is not used for evaluation of urinary leak *per se*, the accumulation of radiotracer outside the urinary system can be detected with SPECT-CT. Although there are reports of urinary leak diagnosed from other tracers,[4-7] the diagnosis of unsuspected urinary leak from bone scan is rare.[8,9] In this patient, hybrid scintigraphic imaging diagnosed an unsuspected urinary leak and also detected nonskeletal distant metastases, thereby aiding in clinical management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not

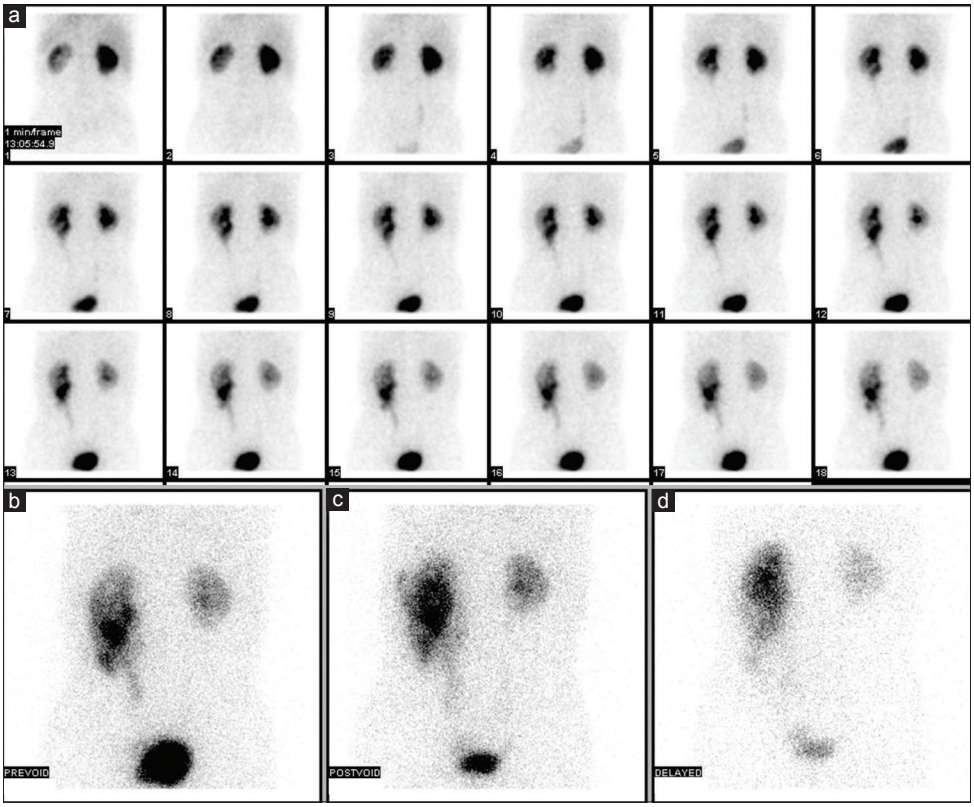

Figure 3: ^{99m}Tc-ethylene dicysteine renal scintigraphy shows pooling of tracer in the region of the lower pole of the left kidney in dynamic (a), prevoid (b), postvoid (c), and delayed (d) static images

be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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