Article published online: 2022-04-19

Interesting Image

Inferior vena cava syndrome on skeletal scintigraphy secondary to metastatic prostate cancer

ABSTRACT

This interesting image illustrates an unusual case of inferior vena cava (IVC) syndrome from prostate cancer retroperitoneal adenopathy initially identified with skeletal scintigraphy. IVC syndrome is an infrequent occurrence resulting from extrinsic compression or intraluminal occlusion of the vessel. Whole-body planar skeletal scintigraphy showed a stable left sacroiliac metastasis and increased soft tissue uptake throughout the lower hemibody up to the lower chest level. Computed tomography (CT) demonstrated extrinsic compression of the IVC from metastatic retroperitoneal adenopathy. This represents a rare presentation of IVC syndrome in prostate cancer with characteristic appearance on skeletal scintigraphy of Fisherman's Wader's sign, that should prompt confirmatory anatomic imaging.

Keywords: Fisherman's Waders, prostate adenocarcinoma, IVC syndrome, soft tissue uptake on bone scintigraphy, osseous metastatic disease

This interesting image illustrates an unusual case of inferior vena cava (IVC) syndrome from prostate cancer retroperitoneal adenopathy initially identified on skeletal scintigraphy. IVC syndrome is an infrequent occurrence resulting from extrinsic compression or intraluminal occlusion of the vessel. Whole-body planar skeletal scintigraphy showed a stable left sacroiliac metastasis and increased soft-tissue uptake throughout the lower hemibody up to the lower chest level. Computed tomography (CT) demonstrated extrinsic compression of the IVC from metastatic retroperitoneal adenopathy. This represents a rare presentation of IVC syndrome in prostate cancer with characteristic appearance on skeletal scintigraphy of Fisherman's Wader's sign that should prompt confirmatory anatomic imaging.

A 66-year-old male with metastatic prostate cancer in the retroperitoneal nodes and left iliac bone on investigational immunotherapy presented to the hospital with progressively worsening disease despite optimal therapy. Whole-body planar bone scintigraphy with 832.5 MBq of methylene diphosphonate [Figure 1a] demonstrated a stable left sacroiliac region metastasis (white arrow). In addition, an unusual differential diffuse soft-tissue uptake, greater in the lower hemibody than upper hemibody (black arrow highlighting the line of demarcation in the lower chest), was noted. CT scan performed [Figure 1b] confirmed that this unusual scintigraphic appearance was secondary to IVC syndrome caused by conglomerate metastatic retroperitoneal nodal disease (black arrow). Diffuse stranding throughout the subcutaneous fat on CT (white arrow) correlated well with the distribution of abnormal uptake on skeletal scintigraphy. Bone scintigraphy [Figure 2a] and contrast-enhanced CT imaging [Figure 2b] demonstrated that the lower hemibody uptake and subcutaneous fat stranding were not present 5 months prior in the setting of an adequately patent IVC (black circle) with less extensive retroperitoneal

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Submission: 14-Jul-19, **Accepted:** 06-Oct-19, **Published:** 02-Jul-20

Access this article online	
Website: www.wjnm.org	Quick Response Code
DOI: 10.4103/wjnm.WJNM_53_19	

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How to cite this article: Makusha LP, Kulon M, Pucar D, Young CR. Inferior vena cava syndrome on skeletal scintigraphy secondary to metastatic prostate cancer. World J Nucl Med 2020;19:324-6.

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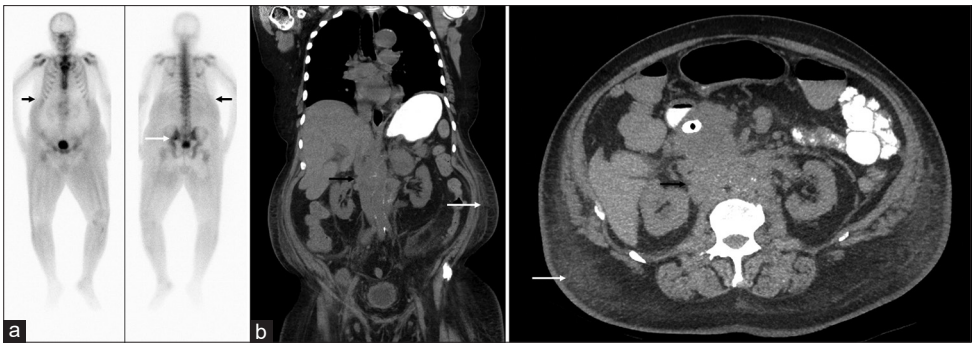

Figure 1: (a) Inferior vena cava syndrome on anterior and posterior whole-body skeletal scintigraphy. Black arrows highlight the line of demarcation with increased activity throughout the lower hemibody and white arrow demonstrates a known left sacroiliac metastasis. (b) Axial and coronal computed tomography images demonstrating inferior vena cava syndrome. Black arrows demonstrate retroperitoneal adenopathy compressing the inferior vena cava, while white arrows demonstrate subcutaneous fat stranding

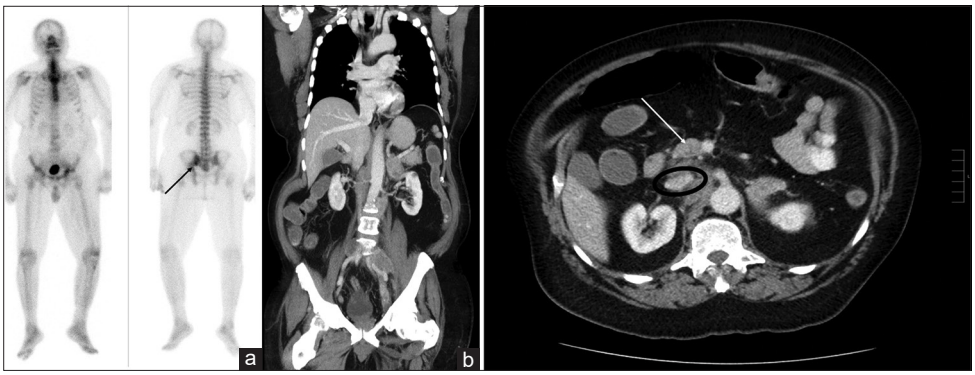

Figure 2: (a) Five months prior. Anterior and posterior whole-body skeletal scintigraphy without evidence of inferior vena cava syndrome. Left sacroiliac metastasis was visible at this time point (black arrow). (b) Five months prior. Axial and coronal computed tomography images without evidence of inferior vena cava syndrome. White arrows demonstrate less extensive retroperitoneal adenopathy, with black oval demonstrating patent inferior vena cava as evidenced by contrast opacification

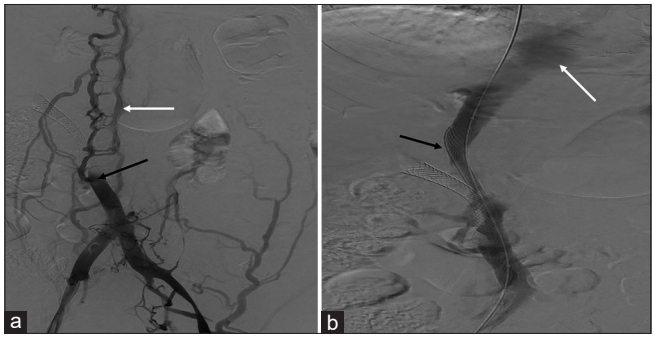

Figure 3: (a) Subtraction venography with black arrow demonstrating abrupt filling defect in the mid inferior vena cava and white arrow highlighting extensive collateralization. (b) Postprocedure subtraction venography with black arrow demonstrating stent in the inferior vena cava which is now patent, with white arrow demonstrating contrast flowing into the right atrium

adenopathy (white arrow). Subtraction venography [Figure 3a] demonstrated an abrupt filling defect in the mid IVC with extensive collateralization, while imaging following stent placement [Figure 3b] demonstrates contrast flowing through a patent IVC into the right atrium. The patient responded favorably with near-complete resolution of clinical symptoms after stenting of the obstructed IVC.

IVC syndrome is an infrequent occurrence resulting from extrinsic compression or intraluminal occlusion of the vessel. Extrinsic compression may result from retroperitoneal adenopathy or fibrosis, aneurysms, and pregnancy, whereas intraluminal occlusion may result from malignant intracaval thrombi from malignancies (e.g., gastric or renal cancer).[1-3] Clinical signs include hepatic congestion, ascites, lower body anasarca, pooling in the lower extremities from elevated pressure in the IVC, and tachycardia; this results from reduced preload due to decreased venous return. Optimal medical treatment is not well defined and depends on mitigating the underlying cause (e.g. radiation and chemotherapy for extrinsic masses or anticoagulation for thrombi),[4] while invasive surgical alternatives include endovascular stenting and bypass grafting.[5]

Only a few cases of IVC syndrome on skeletal scintigraphy have been demonstrated in literature. Rodman *et al.* reported the first case of IVC syndrome on skeletal scintigraphy secondary to tumor thrombus from renal cell carcinoma.[6] In a report of a 61-year-old male with nephrotic syndrome causing hypercoagulability resulting in IVC thrombosis, Chu and Hu

coined the term "Fisherman's Waders" sign for the finding of increased uptake of radiotracer in soft-tissue uptake below the level of the lower thorax on bone scan.[7] Another study reported Fisherman's Waders' sign in a lymphoma patient complicated by IVC obstruction seen on CT and bone scans and in nonthrombotic portal hypertension.[8] This represents a rare report of Wader's sign from IVC syndrome in metastatic prostate cancer highlighting its characteristic imaging appearance that should prompt confirmatory anatomic imaging.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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