Case Report

Intravenous blood pool activity masquerading as gastrointestinal hemorrhage

ABSTRACT

Radiolabeled red blood cell (RBC) scintigraphy is a common study to detect and localize gastrointestinal hemorrhage. There are many potential entities that may result in false-positive RBC scintigraphy. Here, we present a case of enlarged feeding vessels of omental carcinomatosis which scintigraphically might be mistaken as intraluminal bowel activity and thus active hemorrhage. This case highlights the importance of reviewing correlative imaging in patients with a large neoplastic burden.

Keywords: Altered blood pool anatomy, false-positive bleed, omental carcinomatosis, red blood cell scintigraphy

INTRODUCTION

Effective therapy for acute gastrointestinal (GI) bleed requires precise localization of the hemorrhage site. Red blood cell (RBC)-labeled scintigraphy is a common imaging modality for detecting the location of a lower GI bleed. Its increased sensitivity for low flow bleeds compared to fluoroscopic and computed tomography (CT) angiography (CTA) make it an important part of the lower GI bleed treatment algorithm. This report describes a vascular abnormality secondary to omental carcinomatosis, which could lead to a false-positive interpretation if not corroborated with other anatomic imaging.

CASE REPORT

A 71-year-old male with biopsy-proven metastatic renal cell carcinoma and current warfarin therapy for recurrent pulmonary embolism was admitted to the intensive care unit after presenting with suspected intra-abdominal blood loss. CTA was performed but failed to show a definitive source of hemorrhage; however, complex peritoneal fluid was identified and appeared denser near the prior partial nephrectomy site. Endoscopy was not performed. After intravenous administration of 1.017 GBq (27.5 mCi) of ^{99m}Tc-radiolabeled autologous erythrocytes, the patient underwent dynamic anterior planar imaging for 90 min. RBC scintigraphy demonstrated serpiginous areas of increased activity which did not move or change in intensity [Figure 1a]. Comparison with three-dimensional rendering of CTA acquired earlier showed enlarged gastroepiploic and splenic arteries supplying omental carcinomatosis [Figure 1b] corresponding to abnormal activity seen on scintigraphy. Recent ^{18}F-fluorodeoxyglucose-positron emission tomography/CT demonstrated a large metastatic burden, particularly to the omentum [Figure 1c and d].

DISCUSSION

The serpiginous activity on scintigraphy could be misconstrued for intraluminal activity and hemorrhage, although the activity failed to move or change in intensity. Scintigraphic criteria for active GI bleeding include radiotracer outside expected blood pool structures, increasing intensity over

Access this article online	
Website: www.wjnm.org	Quick Response Code
DOI: 10.4103/wjnm.WJNM_28_19	

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Submitted: 01-Apr-2019, **Accepted:** 18-Jul-2019, **Published:** 07-Nov-2019

How to cite this article: Fleming SA, Keenan AM. Intravenous blood pool activity masquerading as gastrointestinal hemorrhage. World J Nucl Med 2020;19:59-60.

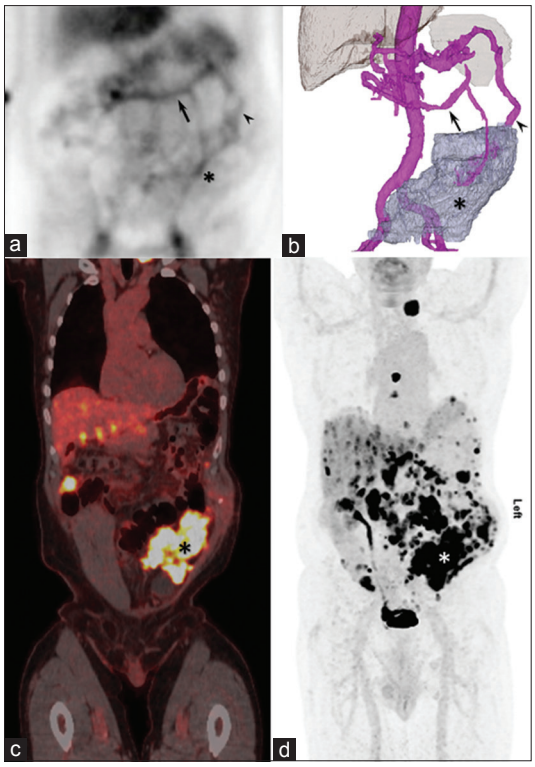

Figure 1: Anterior static scintigraphic image of ^{99m}Tc-radiolabeled autologous erythrocytes (a), along with a color-labeled three-dimensional reconstruction of the patient's recent computed tomography angiography of the abdomen and pelvis. Serpiginous-shaped activity on scintigraphy (b)corresponds to the enlarged gastroepiploic (arrows) and splenic (arrowheads) arteries supplying the omental carcinomatosis (asterisks). A single-slice coronal ^{18}F-fluorodeoxyglucose-positron emission tomography/computed tomography fusion image (c) and the maximal intensity projection from the same study (d) highlight the fluorodeoxyglucose avid metastatic burden in the left lower quadrant (asterisks)

time, and anterograde or retrograde movement conforming to the bowel.[1-3] However, movement consistent with bowel would not be required for diagnosing peritoneal or retroperitoneal hemorrhage.[4-6] In this case, the patient's prior CTA demonstrated that the cause of the abnormal scintigraphic findings was due to enlarged feeding vessels of the omental carcinomatosis.

Other potential entities that have been reported to cause false-positive RBC scintigraphy include varices, hematomas, aneurysms, and hemangiomas.[7-10] If no correlative imaging is available, single-photon emission computed tomography (SPECT)/CT could be performed to aid in defining the abnormal distribution and confirm the findings. Unfortunately, the patient was unable to undergo SPECT/CT due to his critical condition.

This case highlights the importance of reviewing correlative imaging prior to scintigraphy in patients with large neoplastic burdens where blood pool anatomy can be significantly altered. In our patient, we were able to anticipate how the abnormal vasculature and large masses might alter the scintigraphic appearance. It is recommended to review recent CT and magnetic resonance imaging beforehand to understand the patient's anatomy and any abnormal variants or pathology which might hinder correct interpretation of the study.[1]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Dam HQ, Brandon DC, Grantham VV, Hilson AJ, Howarth DM, Maurer AH, *et al*. The SNMMI procedure standard/EANM practice guideline for gastrointestinal bleeding scintigraphy 2.0. J Nucl Med Technol 2014;42:308-17.
2. Uliel L, Mellnick VM, Menias CO, Holz AL, McConathy J. Nuclear medicine in the acute clinical setting: Indications, imaging findings, and potential pitfalls. Radiographics 2013;33:375-96.
3. Zuckier LS. Acute gastrointestinal bleeding. Semin Nucl Med 2003;33:297-311.
4. Ben-Haim S, Rezai K. Intraperitoneal bleeding demonstrated by Tc-99m labeled red blood cell scintigraphy. Clin Nucl Med 1992;17:789-90.
5. Czarnecki DJ. Intraperitoneal hemorrhage diagnosed by technetium-99m labeled RBC imaging. Clin Nucl Med 1986;11:617-8.
6. Ring DH, Silverman ED. Scintigraphic detection of an occult bleed into a retroperitoneal mass using tc-99m labeled red blood cells. Clin Nucl Med 1997;22:765-7.
7. Angelides S, Gibson MG, Kurtovic J, Riordan S. Abdominal wall hematomata and colonic tumor detected on labeled red blood cell scintigraphy: Case report. Ann Nucl Med 2003;17:399-402.
8. Duarte PS, Zhuang H, Aldighieri F, Ghesani N, Alavi A. Incidental detection of an abdominal aortic aneurysm during evaluation of gastrointestinal bleeding with tc-99m-tagged erythrocytes. Clin Nucl Med 2002;27:824.
9. Gandhi SJ. Umbilical varices: A potential pitfall in gastrointestinal bleed scintigraphy interpretation. Indian J Nucl Med 2018;33:245-7.
10. Taylor RE. Tc-99m-labeled red blood cell scan showing gastrointestinal bleeding point, and also showing an incidental hepatic hemangioma. Clin Nucl Med 2004;29:211-3.