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Abdominal wall hematomata and colonic tumor detected on labeled red blood cell scintigraphy: case report

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Gastrointestinal (GI) bleeding is not uncommon and responsible for considerable morbidity and mortality. Radionuclide red blood cell scintigraphy (RBCS) is a well established imaging modality for identifying patients with ongoing active GI bleeding. However, false positive RBCS are known to occur. The authors report the findings of a RBCS in an elderly female, who developed GI bleeding following the commencement of anticoagulant therapy. Although active GI bleeding was not identified, two abdominal wall hematomata and a cecal adenocarcinoma were detected. Distinguishing features of these lesions are described.

Key words: radio-labeled RBC scintigraphy, hematoma, tumor

INTRODUCTION

MOST CASES of GI bleeding are self-limiting and associated with a favorable outcome.[1–3] However, where GI bleeding is unremitting, the morbidity and mortality rates are substantial. Delays and difficulties in establishing the cause and the site of bleeding are major contributing factors for the adverse outcomes. Active GI bleeding is effectively detected by RBCS.[4,5] However, as the scan appearances are often indistinguishable from other pathological conditions such as tumors, false positive studies do occur, which can hamper the prompt and efficacious implementation of therapy.[6,7] As the population ages and the use of anticoagulants becomes more widespread, both GI bleeding and false-positive studies will also become more prevalent.[3] The authors describe the findings of a RBCS performed in an elderly female who had developed GI bleeding. Two abdominal wall hematomata and a cecal adenocarcinoma were noted. These scan appearances were differentiated from sites of active GI bleeding by the lack of movement (peristalsis) of tracer at the site of tracer accumulation.

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CASE REPORT

A 71-year-old female presented following a syncopal episode which occurred within minutes of disembarkation following long-haul air travel. She described lethargy and functional class II dyspnea over the previous few months. There was no history of overt gastrointestinal or other bleeding, abdominal pain, anorexia, weight loss or change in bowel habit. There was no previous or family history of thromboembolism. Physical examination revealed pale conjunctivae consistent with anemia. The blood pressure was 130/75 mmHg with no postural change. The resting heart rate was 100 beats per minute and regular. There were no clinical features of pulmonary hypertension or heart failure. There was no calf tenderness or peripheral edema. Examination of the respiratory system was unremarkable. Abdominal examination revealed no masses or tenderness.

Apart from a low hemoglobin level (7.4 g/d*l*; normal range 11.5–16.5 g/d*l*) with hypochromic, microcytic red cells, the initial full blood count was normal. The D-dimer level was 0.40 mg/*l* (normal range <0.19 mg/*l*). The arterial oxygen tension while breathing room air was 89 mmHg, while the CO_2 tension was 36 mmHg. The alveolar-arterial oxygenation gradient was normal. No abnormality was apparent on chest X-ray. A radionuclide perfusion and ventilation study demonstrated numerous unmatched subsegmental perfusion defects in the left lung, suggesting a high probability of pulmonary embolism.

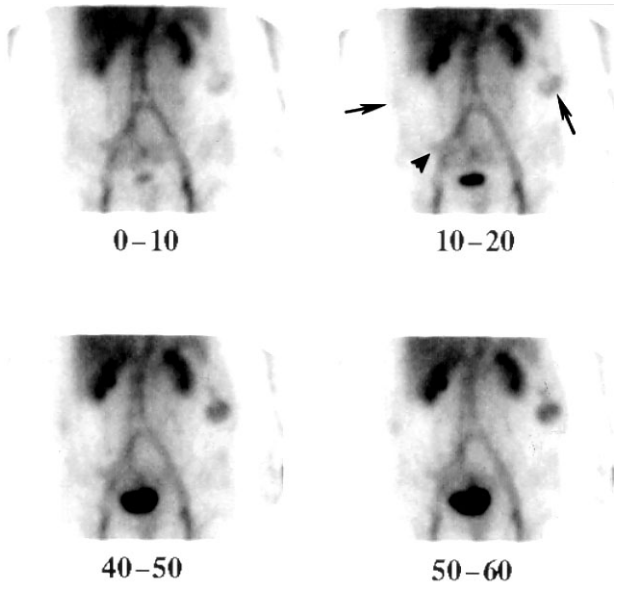

Fig. 1 Tc-99m-labeled red blood cell gastrointestinal bleeding scintigraphy demonstrating abnormal accumulation of radio-labeled RBC at the sites of abdominal wall hematomata (*arrows*) in the left and in the right flanks, and a cecal adenocarcinoma in the right iliac fossa adjacent to the right common/external iliac veins (*arrowhead*). The time frame (in minutes) during which scans were acquired following the administration of radio-labeled RBC is indicated by the corresponding numbers shown below each image.

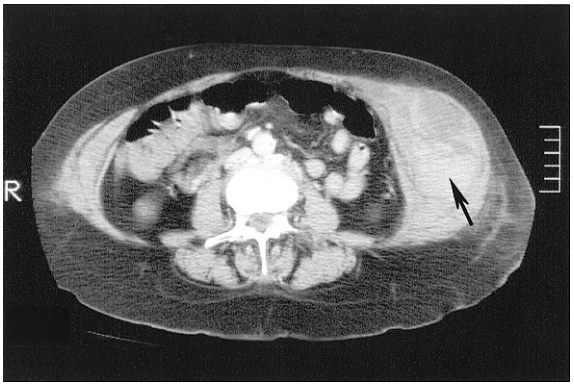

Fig. 2 Abdominal CT scan demonstrating a large hematoma in the left abdominal wall (*arrow*) corresponding to the scintigraphic finding in the same region.

Blood transfusion was commenced. Upper gastrointestinal endoscopy was performed as a matter of urgency to exclude any lesion with the potential to bleed, prior to commencement of anticoagulation with heparin. This study proved negative. Arrangements were made for colonoscopy to be performed following appropriate bowel preparation. A heparin infusion was commenced. Forty-eight hours after admission, the activated partial thromboplastin time was supra-therapeutic at 130 seconds. The patient developed left flank pain and profuse maroon-colored gastrointestinal bleeding with hemodynamic compromise. Heparin infusion was ceased and the patient resuscitated with further blood transfusion.

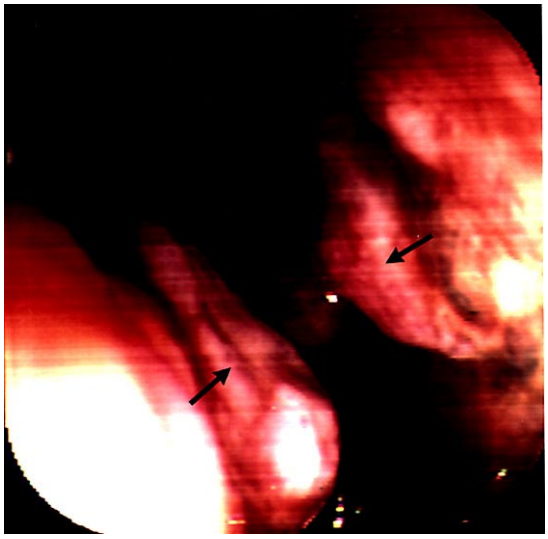

Fig. 3 The cecal adenocarcinoma (*arrow*) as seen at colonoscopy.

A scintigraphic gastrointestinal (GI) blood loss study using ^{99m}Tc-labeled erythrocytes was performed urgently (Fig. 1). An *in vitro* radio-labeling technique was used, as described previously.[8] Anterior and posterior scans of the abdomen and pelvis were acquired using a two-headed gamma camera (Picker 2000, Koninklijke Philips Electronics N.V. Ohio), and commencing with a 60 second radionuclide acquisition at the time of administration of the radio-labeled RBC. This was followed by a 90 minute dynamic image sequence using 90 images of 60 second each. Finally, lateral views (5 minutes) of this region were acquired. Scans were reviewed in a cinematic mode on a computer display screen, and as static images, each a composite of 5 minutes of sequential imaging.

There was a moderate sized area of abnormal accumulation of radio-labeled RBC detected in the left flank region, with a smaler such focus identified in the right flank, while a third focus was identified in the right iliac fossa adjacent to the right common/external iliac veins on the scan acquired over the initial five minutes of the study. Further accumulation of radio-labeled RBC in the former two sites was noted over the ensuing course of the study, while the third focus remained essentially unchanged. No definite movement of tracer was noted at any of these sites. There were no other scan abnormalities identified. As these scan findings did not fulfil the necessary criteria for active GIT bleeding, it was suggested that they could represent alternative vascular lesions, such as tumors and/or active bleeding into hematomata.

Physical examination immediately following the completion of this study did not detect any hematomata involving the abdominal wall. However, over the next few

hours her left flank pain worsened, especially with movement, and a tender left flank mass became apparent. A CT scan of the abdomen was performed, demonstrating a left-sided abdominal wall muscle hematoma (Fig. 2). A small right-sided abdominal wall hematoma was also detected on subsequent physical examination. Gastrointestinal bleeding ceased and colonoscopy was performed after full bowel preparation. A large, proliferative mass was found in the caecum (Fig. 3) and a diagnosis of adenocarcinoma was established by colonoscopic biopsy. There was no left-sided or other colonic lesion.

DISCUSSION

The incidence of GI bleeding is in the order of 100 episodes per 1,000,000 persons annually.[1] Although acute GI bleeding will cease spontaneously in the vast majority (approximately 85%) of cases, re-bleeding is not uncommon and morbidity and mortality rates remain unacceptably high, especially in high-risk groups such as the elderly.[1,2] The ageing of the population makes the evaluation and management of GI bleeding in the elderly an increasingly common and challenging clinical problem. Early identification of the source of bleeding and implementation of measures to control it are mandatory if survival rates in high-risk patients are to be improved.

For patients with major lower GI bleeding, diagnostic modalities to determine the site of bleeding include urgent colonoscopy, mesenteric angiography and nuclear scintigraphy. Apart from the latter, these options also offer the prospect of therapeutic intervention. Surgery is generally indicated in the acute setting in patients in whom attempts to control the bleeding by other means have failed or when blood transfusion requirements exceed 4 units in a 24 hour period.[3] Accurate pre-operative localization of the bleeding site is important if re-bleeding, other morbidity, and mortality rates are to be minimized.[3]

Urgent colonoscopy following modified colonic preparation with an oral purge accurately localizes the site of bleeding in only 12–27% of cases. Active bleeding at the time of the procedure and inadequate bowel preparation limit the efficacy of this procedure in the setting of acute GI bleeding.[3] Angiography following selective catheterization of the mesenteric vessels detects bleeding rates as low as 0.5 m*l*/min and the site of bleeding is localized in 28–77% of cases.[3,9] Once a bleeding site has been identified, therapy may be administered via the catheter in the form of an infusion of a vasoconstrictive agent such as vasopressin, embolization or both.[9–11] Initial hemostasis is achieved in 62–100% of cases, while re-bleeding will occur in 16–20%.

Radionuclide GI scintigraphy using ^{99m}Tc-sulfur colloid or ^{99m}Tc-labeled erythrocytes is relatively non-invasive, easy to perform and requires no patient preparation.[4,12] Active hemorrhage is defined scintigraphically as a focus of radioactivity which is identified outside of the normal areas of blood pool activity, increases in intensity over time, conforms to the small or large bowel anatomy, and demonstrates antegrade or retrograde peristalsis.[2] High sensitivity (93%) and specificity (95%) for GI bleeding have been reported.[2] Bleeding rates as slow as 0.1 m*l*/min can be detected.[5] Repeated assessment over an extended period of time is possible, in contrast to angiography, in which bleeding must be occurring at the time of injection of the contrast agent if a positive result is to be obtained. This factor is particularly pertinent given the intermittent nature of GI bleeds. Furthermore, scintigraphy provides prognostic information in that patients with positive scans are more likely to require surgery than those in whom the study is negative.[2]

The scintigraphic findings of this case report do not strictly concur with the criteria for active GI bleeding and are more consistent with other types of vascular lesions. All of the three scintigraphic abnormalities were apparent on the initial 5 minute image (though the focus in the right flank was very faint), and there was no discernible movement (peristalsis) of radioactivity demonstrated during the study. Although there was a mild increase in radiolabeled RBC accumulation during the acquisition of the scans identifiable at two of the three sites, the size and shape of these foci remained essentially unchanged over the entire course of the study.

However, none of these criteria, particularly when viewed in isolation, can definitively exclude active GI bleeding. For example, abnormal accumulation of radiolabeled RBC at the site of active GI bleeding may be evident from the onset of the study. Absence of movement of radio-labeled RBC may occur at the site of active GI bleeding in the presence of a paralytic ileus, which is not uncommon with severe cases of GI bleeding. In this latter scenario however, the size of the focus of abnormal tracer accumulation would be expected to increase over the course of the study. Thus, while these features do not definitively exclude active GI bleeding, at the very least they raise the suspicion that alternative lesions are present.

Apart from active GI bleeding, an increase in radiolabeled RBC accumulation over the duration of the study signifies either active non-GI bleeding such as a hematoma, or a vascular tumor. In this case, this scan feature was more suggestive of hematomata, as the progressive increase in radio-labeled RBC accumulation continued for a prolonged period (90 minutes), appeared to be into a confined space and there was a considerable change in the relative intensity of radioactivity at these sites compared with that of background over the course of the study. In contrast, the cecal adenocarcinoma demonstrated an essentially constant intensity of radioactivity throughout the course of the study, which was similar to that of the adjoining major veins.

Thus, while the scan findings were unusual, they helped determine the site and cause of the patient's GI bleed, detected additional sources of blood loss, and raised the

suspicion that lesions other than active GI bleeding were present.

The detection of either a gastro-intestinal malignancy[6,7] or a hematoma[13–15] on a radio-labeled RBCS has been reported, albeit rarely. However, this case report is the first to describe both pathologies in a single patient study. Review of this study and those previously reported, indicates that the criteria for assessing scintigraphic features outlined above are appropriate, but not definitive, for differentiating active GI bleeding from other vascular lesions.

Hemorrhage is a common complication of anticoagulant therapy. GI malignancy and the use of anticoagulants are two well-recognized risk-factors for GI bleeding.[3] Both these factors are more frequently encountered in the elderly and their prevalence will continue to rise as the average age of the general population increases. The need to accurately localize the site of GI bleeding as a matter of urgency will continue to increase, highlighting the importance of our observation.

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