Letters to the Editor

Indium-111 Neutrophil Imaging in Ischemic Colitis

TO THE EDITOR: Indium-111 (^{111}In) autologous neutrophils are used for imaging the colon in inflammatory bowel disease (*1*) and clostridium difficile colitis (*2*) allowing noninvasive assessment of colonic involvement in these conditions but not differentiating between the different forms of colitis. We report a case where ^{111}In labeled neutrophil uptake in the colon of a patient with unsuspected ischemic colitis demonstrates the usefulness of the technique both in assessing the extent of colonic involvement and as an aid to diagnosis, but emphasise the importance of confirming the diagnosis of colitis by other techniques.

A 61-yr-old white female was referred for assessment by her family physician because of systemic hypertension resistant to therapy. Physical examination confirmed features of hypertension with elevated blood pressure at 230/115 mmHg, a grade 2/6 mid-systolic murmur at the left sternal edge and grade 2 hypertensive retinopathy.

Combination therapy with beta-blockers, diuretics, and vasodilators had failed to control the blood pressure adequately and therefore the patient was commenced on an angiotensin converting enzyme (ACE) inhibitor (captopril) and a diuretic (furosemide). This regimen caused an abrupt deterioration in renal function, blood urea rising to 22.7 mmol/l (136.2 mg/100 ml) and creatinine to 220 μmol/l (2.42 mg/100 ml). As ACE inhibition can cause reversible deterioration of renal function (*3*) in hypertensive patients with bilateral renal artery stenosis, noninvasive flow studies and aortography combined with bilateral renal angiography were undertaken and confirmed the presence of bilateral renal artery stenosis with almost total occlusion of the right renal artery. In addition, aortography demonstrated extensive atherosclerotic aneurysmal dilatation of the aorta. The patient was then referred to the Vascular Surgery Department and subsequently underwent a Dacron graft repair of the aortic aneurysm with bilateral saphenous vein grafting to the renal arteries.

Her postoperative course was complicated by the development of transient atrial fibrillation, hyponatremia, and right basal pneumonia requiring antibiotic therapy with ampicillin. On the tenth postoperative day, the patient developed profuse diarrhea, which was positive for occult blood, and the following day became septicaemic. Stool cultures at this time, yielded clostridium difficile and oral vancomycin therapy was instituted. Abdominal examination at this stage was unremarkable, but the severe diarrhea persisted and sigmoidoscopy revealed a nonspecific proctitis. To assess the degree of colonic involvement a [^{111}In]neutrophil scan was requested and ^{111}In autologous neutrophils were prepared as described elsewhere (*4*). Gamma camera images obtained 12 hr after reinjection of the cells demonstrated localized uptake in the distal and sigmoid colon with a cutoff at the level of splenic flexure in the distribution of the inferior mesenteric artery (Fig. 1). The patient's condition continued to deteriorate and she developed

FIGURE 1
Indium-111 neutrophil image (anterior) showing abnormal uptake in sigmoid and descending colon with no uptake beyond splenic flexure

clinical and radiological signs of bowel perforation which required emergency laparotomy. At laparotomy the descending and sigmoid colon were infarcted and a left hemicolectomy and colostomy was performed. The histologic features of the resected specimen were those of an ischemic colitis, with extensive mucosal ulceration associated with a superficial inflammatory exudate. In areas there was complete loss of mucosa, submucosa and muscle with replacement by granulation tissue. There was no evidence of massive intramural hemorrhage or pericolic abscess formation. Clostridium difficile toxin assay was later reported as negative. The patient made an uneventful recovery and has had a subsequent bowel re-anastomosis. Blood pressure remains normal on no therapy.

This case illustrates the difficulty in establishing a precise diagnosis in a patient with severe diarrhea and septicaemia after major abdominal surgery. The patient might have had clostridium difficile induced colitis in view of her antibiotic exposure, elevated blood urea and recent laparotomy. This diagnosis was initially supported by the finding of clostridium difficile in the stool but the clostridium difficile toxin assay was subsequently negative. Toxin assay results are not immediately available and a positive stool culture in isolation may be misleading. The [^{111}In]neutrophil scan was useful in showing the extent of the colonic disease and more importantly, in view of the anatomical distribution, suggesting a vascular etiology. The possibility of an ischemic colitis was thus raised which prompted an immediate review of the case by the surgeons prior to the progression of her abdominal symptoms. The histology of the resected specimen demon-

strated neutrophils in the inflammatory exudate and deeper granulation tissue. In the absence of pericolic abscess formation or extensive intramural hemorrhage, the localization of ^{111}In in the descending colon demonstrates uptake of neutrophils throughout the ischemic segment of bowel. This is compatible with an inflammatory response to ischemia.

This case confirms that [^{111}In]leucocyte imaging is useful in demonstrating noninvasively the anatomical extent of colonic disease, which may also suggest alternative diagnoses such as ischemic colitis. In cases of ischemic colitis, it may provide information as to the site and extent of the disease preoperatively. This technique does not give a pathological diagnosis and it is, therefore, important to pursue this with further appropriate investigations such as colonoscopy, barium enema, or even exploratory laparotomy.

References

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Chylothorax on Technetium-99m Antimony Sulfide Colloid Scan

TO THE EDITOR: Interstitial injection of a radiolabeled colloid will allow visualization of regional lymph nodes. We have performed lymphoscintigraphy in two patients with chylous pleural effusions. The studies were performed with technetium-99m (^{99m}Tc) antimony sulfide colloid and satisfactorily demonstrated the abnormal thoracic localization.

The first patient, a male infant, was born prematurely at 26 wk gestation. He required surgery for necrotizing enterocolitis, and received hyperalimentation for five months. This process was complicated by bilateral subclavian vein thrombosis related to subclavian venous line placement. At the age of 9 mo he was readmitted to hospital with increasing respiratory distress. He was found to have a right-sided pleural effusion that was tapped repeatedly but which continued to reaccumulate. It was noted to be chylous in appearance, and in an attempt to better characterize the mechanism of abnormal fluid accumulation, a radionuclide scintigram was performed.

After obtaining informed consent 100 μCi of [^{99m}Tc]antimony trisulfide was injected subcutaneously into the web space between the first and second toes of each foot. Using a low-energy, all-purpose collimator, 10-min images were obtained at 2, 4, 6, and 24 hr after injection. Overlapping images allowed visualization of activity in the lower limbs, abdomen, and thorax. Lateral and oblique views helped to localize abnormal foci of activity. By 2 hr activity was noted within the right hemithorax. This was more evident by 4 hr, at which time it was mainly at the right base in the supine position (Fig. 1). The patient subsequently died from respiratory failure complicated by bilateral pneumothoraces. There were fibrous adhesions involving the distal one-fourth of the thoracic duct and the great veins at autopsy.

The second case, a 7-yr-old girl, was initially seen with staphylococcal pericarditis. Treatment at that time included stripping of the pericardium on two occasions. During surgery, the thoracic duct was damaged, and was tied off in the upper mediastinum. She then presented because of persistent coughing. Chest x-ray showed bilateral pleural effusions and prominent vascular markings. Pulmonary function tests indicated a severe restrictive defect.

Symptomatically the patient deteriorated, with persistent pleural effusion and marked engorgement of pulmonary lymphatics. She slowly became hypoxemic and was prone to

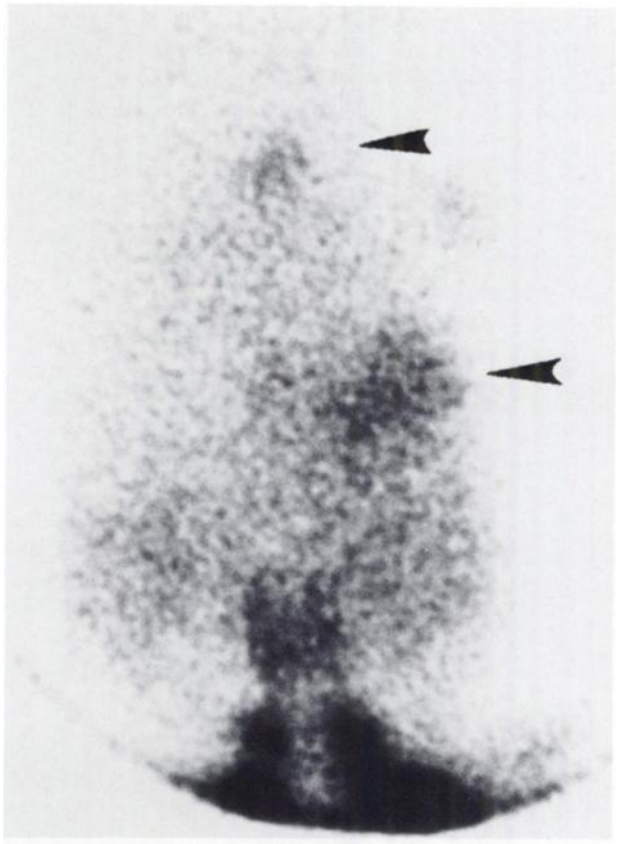

FIGURE 1
Posterior image obtained at 4 hr in 9-mo-old boy shows abnormal accumulation of activity in right lung, mainly at base (arrowheads). Activity is also noted in abdominal lymphatics and in liver and spleen