Detection of a Prosthetic Aortic Valvular Abscess with Indium-111-Labeled Leukocytes

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An unsuspected annular abscess at the base of a prosthetic aortic valve in a patient with endocarditis was identified by indium-111-labeled leukocyte scintigraphy alone. This highly sensitive and specific technique expediently demonstrated the surgically proven inflammatory focus. (Chest 1988; 94:572-4)

Evaluation of endocardial inflammatory disease with nuclear techniques has met with limited success.1,2 A recent report3 described the combined use of gallium-67 citrate scintigraphy and magnetic resonance imaging in demonstrating a serious complication of infective endocarditis, namely, an aortic root abscess. We present a related case in which a surgically proven annular abscess at the base of a prosthetic valve, a recognized infection affecting valvular prostheses,4 was accurately and expediently detected by indium-111-labeled leukocyte scintigraphy alone.

CASE REPORT

A 63-year-old man with a history of rheumatic heart disease, prior myocardial infarction, coronary artery bypass graft surgery, aortic and mitral valvular replacements, and two previously treated episodes of Staphylococcus epidermidis endocarditis presented with fever, fatigue, anorexia, and night sweats.

Cultures of blood drawn on admission grew S epidermidis compatible with persistent endocarditis. Two-dimensional echocardiography revealed left ventricular dilatation with an akinetic anterolateral wall and paradox interventricular septal motion. Mild aortic insufficiency was evident. No vegetations were seen on either valve.

Because of recurrent episodes of S epidermidis endocarditis, the patient was believed to have a failure of medical therapy and was scheduled for valvular replacements. Before surgery an 111In-labeled leukocyte scan was performed to exclude other sites of infection. The preparation contained mixed autologous leukocytes and small quantities of platelets and erythrocytes labeled with indium-111-oxine (Amersham). Labeling was done using a modification of the method described by Thakur et al.5 The scan (Fig 1) showed accumulation of leukocytes along the left sternal border (Fig 1A). The left anterior oblique view (Fig 1B) clarified that the activity was located within the heart in the region of the aortic valve.

The patient subsequently underwent cardiac surgery to explore and replace the bioprostheses. The mitral valvular prosthesis appeared unremarkable and was replaced uneventfully with another mitral valve (Carpentier-Edwards). The prosthetic aortic valve also appeared normal, but after its removal, granulation tissue was seen in the aortic annulus on the noncoronary cusp side. Probing of the granulation tissue unroofed a 1-cm pus-filled abscess cavity. The abscess tracked around the aortic annulus to the left side and extended into and almost through the aortic wall but did not involve the left main coronary artery. The cavity was debrided, and another aortic device (Ionescu-Shiley) was inserted. No organisms were seen on Gram stain, and cultures remained sterile. After surgery

REFERENCES


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the patient had an extremely unstable course and died five days following the surgery.

**DISCUSSION**

The evaluation of patients with recurrent sepsis and suspected endocardial foci of infection has included the use of many noninvasive methods, including echocardiography, nuclear scintigraphy employing $^{67}$Ga citrate\(^1\) and $^{111}$In-labeled leukocytes,\(^6\) and, most recently, magnetic resonance imaging in conjunction with $^{67}$Ga citrate imaging.\(^3\)

Echocardiography has had success in demonstrating vegetative lesions in infective endocarditis. In fact, echocardiography may visualize vegetations in 80 percent of the cases of endocarditis.\(^2\) Two-dimensional echocardiography has also been used to demonstrate aortic valvular ring abscesses, a not infrequent sequela to infective endocarditis;\(^4\) however, the success of echocardiography in demonstrating cardiac inflammatory disease may be limited, due to its inability to distinguish small foci of infection from valvular calcifications and its limited ability to evaluate other mediastinal structures which may also be involved with inflammatory processes.\(^3\)

In the heart, $^{67}$Ga citrate has been used with some success in demonstrating infective endocarditis, although imaging over several days may be needed to demonstrate the lesion.\(^1\) Gallium-67 has also demonstrated myocardial abscess\(^8\) and infected pacemaker electrodes.\(^1\) Gallium-67 citrate scintigraphy has been combined with magnetic resonance imaging to image aortic root abscess.\(^3\)

Indium-111-labeled leukocyte scintigraphy, with its higher specificity and comparable sensitivity relative to $^{67}$Ga citrate scanning, has been widely used to evaluate inflammatory conditions, particularly pyogenic abscesses in which there is polymorphonuclear leukocyte infiltration. In fact, $^{111}$In-labeled leukocytes have been used extensively to image abscesses in diverse locations, including the abdomen, chest, and soft tissues.\(^9\) Imaging usually is performed 24 hours following reinjection of a mixed population of autologous labeled leukocytes, thereby affording a more expedient diagnosis than $^{67}$Ga scanning.

In the heart, $^{111}$In-labeled leukocytes have detected occult purulent pericarditis,\(^11\) myocarditis,\(^2\) active rheumatic carditis,\(^12\) and myocardial abscess;\(^13\) however, the success of $^{111}$In-labeled leukocyte scintigraphy in detecting infective endocarditis has been reported as limited or nonexistent. Typically, too few leukocytes localize at the site of endocarditis for detection by imaging.\(^8,9\) If focal uptake is indeed seen in the region of the heart, as in this case, the more serious problem of annular abscess should be strongly considered.

The demonstration of an aortic annular abscess at the base of a prosthetic aortic valve by $^{111}$In-labeled leukocytes alone represents the first reported case of its kind. This case is important, as it shows that this noninvasive highly specific method can image clinically inapparent aortic root abscess, a known and not infrequent sequela to infective endocarditis, particularly in the presence of bioprosthetic devices.

**REFERENCES**

Bronchopleurobiliary Fistula
A Complication of Intrahepatic Biliary Stent Migation

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We describe the management of bronchopleurobiliary fistula in a 56-year-old woman who underwent a (L) mastectomy with postoperative radio- and chemotherapy for advanced breast carcinoma and required insertion of inibiliary Silastic stents for the relief of severe obstructive jaundice. During restaging of her carcinoma for further chemotherapy, she complained of dyspnea, right chest pain and productive cough with yellow sputum. Her chest x-ray film and thoraco-abdominal CT scan demonstrated right pleural effusion with a stent protruding through the right hemidiaphragm. The objective evidence of bile in the pleural aspirate with history of bile-stained sputum established the diagnosis of bronchopleurobiliary fistula resulting from biliary stent migration. (Chest 1985; 94:574-75)

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Fistula communications between biliary tract and bronchopleural space are rare, but have been reported in thoracoabdominal trauma,1,2 hepatic and subphrenic abscess,3,4 diseases of the biliary tract,5,6 or congenital malformations.7 Because of the danger of massive aspirations of bile, they present a complex problem and are usually associated with high morbidity and mortality. Herein we report a case of a bronchopleurobiliary fistula resulting from migration of a biliary stent through the diaphragm.

Case Report

A 56-year-old woman was admitted to the Royal Marsden Hospital, (London, England) on September 4, 1985 for restaging and further chemotherapy for advanced carcinoma of her left breast when she complained of dyspnea, right chest pain and productive cough with yellowish sputum. Previously, she had undergone a left mastectomy with postoperative radiotherapy in 1980 for a T2a N1a carcinoma of the breast followed by several courses of chemotherapy in 1983. In March 1985, she required insertion of Silastic stents into her bile ducts to relieve severe obstructive jaundice due to large metastases at the portahepati. Subjectively she improved dramatically with marked amelioration of jaundice.

On admission, she had right chest dullness and hepatomegaly. The hematologic and biochemical examinations showed Hb = 101 g/ L; white blood cell count, 15.9 x 10^9/L; platelets, 98 x 10^9/L; alkaline phosphatase, S20 IU/L (30-180) (numbers in parentheses indicate normal range); GammaGT, 929 IU/L (0-55); LDH, 47 IU/L (0-60); bilirubin, 22 U mol/L (2-17); albumin, 34 g/L (35-50); total protein, 59 g/L (60-80); and glucose, 8.4 mmol/L (3-6).

Her chest x-ray film (Fig 1) showed a large right pleural effusion with a stent protruding through the right hemidiaphragm. A CT