Aspergillus Mural Endocarditis*
Clinical and Echocardiographic Diagnosis
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Fungal mural endocarditis is a rare entity in which the antemortem diagnosis is seldom made. This case presentation describes a patient in whom the clinical diagnosis of Aspergillus mural endocarditis was made by echocardiography and by biopsy of a peripheral embolic lesion. This led to a combined medical and surgical approach to therapy.

Aspergillus endocarditis can be classified as valvular and nonvalvular. Little is known about nonvalvular or mural Aspergillus endocarditis, the diagnosis of which previously has only been established by autopsy. This is the first reported case of Aspergillus mural endocarditis which was clinically and echocardiographically diagnosed and which was treated with combined medical and surgical intervention. This patient is presented to illustrate the diagnostic and therapeutic aspects of nonvalvular fungal endocarditis.

CASE REPORT

A 29-year-old black woman with a history of alcoholism and intravenous (IV) heroin abuse was treated with prednisolone, 40 mg daily, for progressive alcoholic liver disease. One month after prednisolone had been instituted, she was seen in Union Memorial Hospital (UMH) Emergency Room for an episode of weakness and clumsiness of the left arm and twitching of the left forearm and neck. An unenhanced computerized tomographic (CT) scan of the head showed only diffuse cerebral atrophy. Two weeks later, while continuing on prednisolone, she was again seen in the outpatient clinic with a complaint of persistent left arm weakness and a sore on her left thumb consisting of an area of central necrosis and surrounding erythema. At this time, result of an echocardiogram and electroencephalogram were normal.

One week later, the patient was admitted to UMH with complaints of headache, fever, chills, and anorexia. Her temperature was 38.5°C. Erythematous lesions were seen on the left fifth toe, the right fifth toe, and the left thumb. There were no cardiac murmurs. Neurologic examination showed weakness of the left upper extremity. White blood cell count was 30,000/cu mm (70 percent segmented neutrophils, 15 percent band cells). Cerebrospinal fluid total white cell count was 1,310/cu mm (18 percent polymorphonuclear cells, 82 percent mononuclear cells). (Glucose value was 53 mg/dl and protein level, 130 mg/dl. Chest roentgenogram showed no infiltrates. A CT scan of the head with and without contrast revealed multiple intracerebral ring-enhancing lesions. Nafcillin, chloramphenicol, and gentamicin were instituted intravenously, and prednisolone, 40 mg QD, was continued.

A second echocardiogram was normal. Since Candida albicans was found in the sputum and urine on the third hospital day, amphotericin B, 20 mg/day IV, was added. A CT-directed brain biopsy of an abscess showed interstitial hemorrhage and gliosis. On the 18th hospital day, a new tender papule developed on the left foot. Biopsy demonstrated organisms histopathologically compatible with Aspergillus.

A third echocardiogram showed a new pedunculated mass involving the posterior papillary muscle compared to the previous echocardiogram performed 18 days earlier (Fig 1). The patient was then transferred to The Johns Hopkins Hospital for resection of the left ventricular mural endocardial mass and continued medical management. Amphotericin B was increased to 50 mg/day IV, and flucytosine, 175 mg 6h, po, was started.

The patient was taken to the operating room, where the left atrium
was opened to the mitral valve orifice. A pendulous mass measuring 4 × 2 cm was interposed between the papillary muscles and intertwined within the left ventricular trabeculae. The mass was resected with adjacent trabecular myocardium. The left ventricle was irrigated, and no other lesions were seen along the mural endocardial surface. Histopathologic findings of the mural vegetation are demonstrated in Figure 2.

While corticosteroids were being slowly tapered, the patient lost consciousness coinciding with the appearance of more cerebral abscesses. She died 30 days postoperatively due apparently to progressive cerebrovascular aspergillosis. Permission for a postmortem examination was not granted.

**DISCUSSION**

Mural endocarditis may be caused by *Staphylococcus aureus*, *Streptococcus pneumoniae*, Proteus species, and Candida, all of which may be grown from blood cultures.1 Aspergillus mural endocarditis in our patient presented as culture-negative endocarditis with septic embolic events including strokes, focal seizures, and new cutaneous maculopapular lesions from which the organism was identified. Due probably to the nonvalvular location of the mural endocardial Aspergillus lesions, pathologic murmurs were not evident.

The pathogenesis of Aspergillus mural endocarditis may be related to implantation of circulating hyphal fragments or conidia on a preexisting mural thrombus or development of a subendocardial or myocardial nidus which can expand into the ventricular cavity.4

A clinicopathologic study indicated that the Aspergillus mural endocardial lesions may be missed by echocardiography.4 Four years later, a case of Aspergillus mural endocarditis with a negative echocardiogram was reported.3 Development of a mural vegetation in the 18 days between the second and third echocardiograms in our patient suggests that serial echocardiograms may detect the mural endocardial lesion as it enlarges.

Treatment of Aspergillus mural endocarditis requires both systemic antifungal therapy and surgical intervention. The presence of CNS lesions, in our opinion, should warrant the addition of flucytosine to amphotericin B. Since amphotericin B does not penetrate fungal vegetations well, surgical resection of the vegetation and any involved myocardium is warranted. Patients with Aspergillus prosthetic valve endocarditis, even with contiguous myocardial invasion, can survive their infection.6 However, our patient did not survive apparently due to progressive CNS aspergillosis. Finally, essential to the favorable outcome of invasive aspergillosis, is the reversal of any immunologic deficits incurred by corticosteroids or cytotoxic drugs.

**REFERENCES**

1 Buchbinder NA, Roberts WC. Active infective endocarditis confined to the mural endocardium. Arch Pathol 1972; 93:435-40

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**Bronchoalveolar Lavage in Recurrent Aspirin-induced Adult Respiratory Distress Syndrome**

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Aspirin has been reported to induce the adult respiratory distress syndrome (ARDS) in humans. The mechanism of injury appears to be similar to other forms of experimentally induced high-permeability edema in which leukocytes play an important role. In a patient who suffered two episodes of aspirin-related ARDS, bronchoalveolar lavage showed a significant influx of leukocytes. This represents the first reported bronchoalveolar lavage in aspirin-related ARDS, as well as the first documentation of the nonhydrostatic nature of the edema in a patient with recurrence of this entity.

Aspirin is a nonsteroidal anti-inflammatory drug with analgesic, antipyretic, and anti-inflammatory properties. It has a number of metabolic actions, including the inhibition of cyclooxygenase, thus blocking production of both thromboxane and prostacyclin.1 Because of its wide availability in many pharmaceutical preparations, aspirin is commonly overused. Its therapeutic and toxic side effects are well known and include the relatively rare occurrence of the adult respiratory distress syndrome (ARDS).3,4 Recent experimental interest has implicated both the leukocyte and the prostaglandin system in the induction and perpetuation of nonhydrostatic pulmonary injury. Bowers et al7 showed that aspirin could cause a high-permeability pulmonary injury when infused into sheep, thus providing an experimental model for aspirin-induced ARDS. Indeed, a high colloid osmotic pressure was documented in the "edema fluid" from one patient with an overdose of aspirin.8 In this report, we describe a patient with aspirin-induced ARDS which recurred two months after initial recovery when the patient was unknowingly rechallenged with aspirin. Bronchoalveolar lavage was performed during the initial presentation of ARDS and was consistent with a state of high-permeability pulmonary edema. These findings provide clinical support to the proposed mechanism of aspirin-induced ARDS.

**CASE REPORT**

A 55-year-old Hispanic nonsmoking ex-physician presented to the emergency room for decreasing mental status and respiratory distress. No further history was available at that time. On physical examination the patient was awake and afebrile, with a respiratory rate of 50 breaths per minute and blood pressure of 120/70 mm Hg. His chest examination showed diffuse inspiratory crackles; findings from the cardiac and abdominal examinations were normal. A chest roentgenogram showed diffuse bilateral Ruffy infiltrates with normal heart size (Fig 1). Other pertinent data included determination of arterial blood gas levels after intubation (fractional concentration of oxygen in the inspired gas, 1.0), with a pH of 7.26, arterial carbon dioxide tension of 33 mm Hg, and arterial oxygen pressure of 72 mm

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