aorta and without coronary artery stenosis, thus confirming has been described in guinea pigs with chronic pressure changes.

The fact that both our patients who developed progressive LV dysfunction were males is in accordance with a recent report from Carroll et al showing that there are sex-related differences in LV function response to AS. Furthermore, our patients showed a long mildly symptomatic phase when isolated LV diastolic dysfunction was present and a rapid clinical worsening until death when LV systolic dysfunction appeared. This supports recent suggestions that the natural history of symptomatic AS may differ also according to the level of cardiac performance, with obvious therapeutic consequences.

Serial evaluations of cardiac anatomy and function on larger series of patients are needed to evaluate further the LV remodeling phenomenon and its implication in AS.

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Sternal Osteomyelitis due to *Aspergillus fumigatus* After Cardiac Surgery*

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Sternal osteomyelitis due to *Aspergillus fumigatus* after cardiac surgery occurred in two nonimmunosuppressed patients. The clinical features of the infection were markedly different in the two cases. In the first patient, sepsis showed a late and insidious onset followed by slow progression. In the second case, fungi were isolated from wound swabs within a few days of surgery and the clinical picture showed acute onset and rapid progression. Only a few cases of sternal osteomyelitis due to *Aspergillus* have been described previously after cardiac surgery. *Aspergillus* infection should be considered in the differential diagnosis of mediastinitis after cardiac surgery, especially in a clinical setting of otherwise unexplained sepsis or nonhealing wound despite apparently adequate treatment.

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**Fungi** are increasingly identified as a cause of nosocomial disease. While there have been a variety of systemic and deep infections by *Aspergillus* species in the setting of opportunistic pathology, only a few cases have been reported in immunocompetent subjects.

We describe two cases of deep sternal wound infection due to *Aspergillus fumigatus* complicating cardiac surgery in nonimmunosuppressed patients.

**CASE REPORTS**

**Case 1**

In October 1985, a 60-year-old woman (New York Heart Association [NYHA] class 4) with a history of diet-controlled diabetes, was referred to the Cardiac Surgery Department because of a right atrial myxoma. Preoperative routine laboratory findings were normal. Perioperative antibiotic prophylaxis consisted of intravenous cephaltrile (4 g/d for 72 h). Surgery was uneventful and the patient was discharged from the hospital after 10 days.

In April 1986, she was readmitted to the hospital because of a fistula in the lower third of the sternal wound, associated with local tenderness and pain, in the absence of weight loss and fever. Cultures yielded no pathogens. Except for a moderate increase in erythrocyte sedimentation rate, routine laboratory test results were normal. Tuberculin skin test result was negative, while chest radiographs showed irregular erosion of the sternal bone. Intravenous cephaltrile (4 g/d for 24 days) was given before reoperation, which showed a small sequester of the xiphoid bone. Histopathologic study confirmed osteomyelitis of the sternum, while microbiology data revealed no abnormalities.

Staphylococcus epidermidis was cultured from wound swabs taken from a well demarcated eschar. The patient was treated with oral cephalexin (500 mg 4 qid) for 8 days, with a rapid improvement of local signs and positive wound cultures. After discharge at home, she was followed at the outpatient clinic where she remained asymptomatic.

**Case 2**

In April 1986, she was readmitted to the hospital because of a fistula in the lower third of the sternal wound, associated with local tenderness and pain, in the absence of weight loss and fever. Cultures yielded no pathogens. Except for a moderate increase in erythrocyte sedimentation rate, routine laboratory test results were normal. Tuberculin skin test result was negative, while chest radiographs showed irregular erosion of the sternal bone. Intravenous cephaltrile (4 g/d for 24 days) was given before reoperation, which showed a small sequester of the xiphoid bone. Histopathologic study confirmed osteomyelitis of the sternum, while microbiology data revealed no abnormalities.

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A NYHA class 4, 70-year-old man was admitted to the Cardiac Surgery Department for myocardial revascularization. His medical history was significant for a laryngeal neoplasm, surgically treated 10 years earlier and in complete remission. HIV serology and tuberculin tests were negative.

Intravenous cefazolin (4 g/d for 72 h) was given prophylactically. Two days after multiple coronary vessel bypass, sudden cardiorespiratory failure occurred and the patient underwent reoperation. Thereafter, multiple organ failure developed. No signs of sepsis were identified until 21 days later, when the patient had high fever. Twice weekly microbiology tests of urine, sputum, and sternal swabs had been negative, except for an isolate of *A. fumigatus* obtained from the sternal wound 8 days after surgery but dismissed as a colonizing agent. Infection was found to be caused by Enterococcus species isolated from blood and eradicated with IV piperacillin (16 g/d for 10 days).

Twelve days after stopping antibiotic treatment, the patient became hypothermic (33.5°C), confused, hypotensive, dyspneic, and hypoxic. Spontaneous diuresis decreased, with reversal of the normal urinary Na/K ratio. The WBC count was 8,200 cells per cubic millimeter. No bacteria were cultured from sputum, urine, and blood. Oozing of serous fluid was noted on digital pressure of the wound edges, all specimens being positive for *A. fumigatus*, which was also isolated from a sternal bone biopsy specimen on the following day. Although fungal hyphae were not demonstrated in the biopsy material and serologic tests were negative, deep mediastinitis by *A. fumigatus* was considered because no evidence of infection was found elsewhere. Oral itraconazole (400 mg/d) was given. Four days later the patient underwent partial sternectomy and chondrectomy. Sternal osteomyelitis was confirmed at histopathologic study. Again, no fungal hyphae were found, while cultures yielded *A. fumigatus* colonies. The patient recovered completely from sepsis in a few days, although aspergilli were found on two further occasions in a deep swab and in the wound washing fluid, 16 and 24 days after starting antifungal therapy.

Twelve days after reoperation, a methicillin-resistant coagulase-negative Staphylococcus was identified in the surgical wound and treated with IV teicoplanin (400 mg/d for 24 days). No signs of systemic or local wound infection were identified and all specimens collected 72 h after stopping teicoplanin therapy were negative.

One month later the patient died of *S. aureus* sepsis with bacteremia. Aspergillus was never isolated from wound swabs obtained during the last month, when he was still receiving itraconazole.

**Discussion**

Sternal osteomyelitis due to Aspergillus is uncommon in nonimmunosuppressed patients; only five cases have been reported previously in the world literature. Primary infection, not related to preceding sternotomy, has been described in three patients with a history of IV drug abuse. In the remaining two cases, sternal osteomyelitis occurred in apparently normal hosts after sternotomy for cardiac surgical procedures. Our patients were not occupationally prone to develop invasive aspergillosis (IA) and the absence of a localized hospital source of *Aspergillus* together with the absence of a reported previously in the world literature.

In both cases, Aspergillus was likely to be the primary pathogen. In the first patient, staphylococcal wound infection occurred about 70 days before Aspergillus isolation, but fungi were never identified when the bacterial infection occurred. In the second patient, it was clearly a secondary...
Features of the fungal infection were markedly the same in both patients. In the first subject, sepsis had an onset, showed a chronic course, and (apart from fever) only local signs of infection were detected. In this respect, clinical presentation and microbiologic findings were similar to those reported by Cerruti and colleagues. Our case showed several features that make it unique. First, the patient showed an abrupt onset with a refractory course associated with marked hypothermia, but also with modifications in WBC count. Secondly, fungal infection became clinically apparent only after amphotericin B was not given because of the risk of renal failure as a consequence of the low output syndrome. In the second patient, who presented with a septicemia and MOF, the hypothesis of a secondary focal infection may help explain the delayed onset and presentation of IA. The diagnosis of IA may be difficult, as new findings do not exclude infection. Aspergilli isolation from blood cultures and pleural fluid does not conclusively confirm the diagnosis. Invasive aspergillosis: review of 2,121 published cases. Rev Infect Dis 1990; 12:1147-1201.

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Chest Wall Echinococcosis*

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The chest wall is an uncommon localization for hydatid cyst. In this article, six patients were operated on because of chest wall hydatid cysts between the years 1989 to 1991 have been reported. Four of them had previously undergone surgery for pulmonary or hepatic hydatidosis; the chest wall was the primary site in two patients. Operative procedures for chest wall echinococcosis were cystectomy (four patients), cystotomy and evacuation (one patient), and chest wall resection (one patient). There was no mortality. Mean follow-up was 26 months (range, 14 to 36 months). No recurrence has occurred yet.

H}ydatid cyst infection or echinococcosis, one of the oldest diseases known to man, has been described as a disease that can be seen in almost every part of the body. The chest wall is an uncommon site for the disease; in a study of 8,000 cysts, the chest wall site, including pleural hydatidosis, was found in 3.4 percent of all cases. In 6,500 patients who underwent 7,995 operations because of hydatid disease in our department, thoracic wall involvement was seen in six patients (0.09 percent). Nevertheless, in countries where echinococcosis is a common disease, such as Turkey, the chest wall is a frequent site of infection.

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