Successful Treatment of Sarcoidosis-Associated Pulmonary Hypertension with Corticosteroids

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We report a case of sarcoidosis presenting with cor pulmonale of a greater severity than would be expected from the degree of hypoxia and pulmonary fibrosis. Right heart catheterization revealed that mean pulmonary artery pressure was markedly increased (42 mm Hg), was not reduced by supplemental oxygen, but was reduced significantly (25 mm Hg) after 16 weeks of therapy with corticosteroids. Improvement in symptoms and pulmonary function was maintained for an 18-month period of observation after cessation of corticosteroid therapy. (Chest 1990; 97:500-02)

Pulmonary hypertension is a rare presenting manifestation of sarcoidosis. While it has been proposed that the pulmonary vascular disease associated with sarcoidosis may be amenable to corticosteroid therapy, there is only one published report of resolution of pulmonary hypertension in a patient with sarcoidosis. The present case is unusual both in its initial mode of presentation as concomitant severe pulmonary hypertension and biventricular cardiomyopathy, and in the documentation of successful therapy and sustained remission of pulmonary hypertension with corticosteroid treatment.

Case Report

A 30-year-old black woman was referred for evaluation of dyspnea and leg edema. At the time of her initial presentation, physical findings of biventricular congestive heart failure and chest roentgenogram findings of left ventricular failure were appreciated (Fig 1). Her past, family, occupational, and exposure histories were unremarkable, and she had been taking no medications. Treatment with diuretics, digoxin, angiotensin converting enzyme inhibitor, and anticoagulant was initiated.

One year after her initial presentation, she was referred for evaluation of worsening dyspnea and edema. Review of her chest roentgenogram suggested the possibility of hilar adenopathy (Fig 1). At that time, pulmonary function studies revealed a restrictive defect and decreased diffusing capacity (Table 1), gallium lung scan revealed bilateral hilar uptake, and ventilation-perfusion lung scan revealed matched subsegmental defects, not suggestive of pulmonary emboli. Angiotensin converting enzyme level was 20 IU (normal 10 to 30). Electrocardiogram showed sinus rhythm with frequent premature ventricular contractions and right axis deviation. A MUGA scan showed a left ventricular ejection fraction (LVEF) of 36 percent, with evidence of diffuse left ventricular hypokinesis and severe right ventricular hypokinesis. Cardiac ultrasound confirmed biventricular hypokinesis as well as biventricular hypertrophy and right ventricular dilatation. Right heart catheterization revealed a normal pulmonary capillary wedge pressure and severe pulmonary hypertension (Table 1) which did not improve with supplemental oxygen. Endomyocardial biopsy of the septum revealed focal myocardial necrosis, and endobronchial biopsy revealed multiple submucosal non-caseating granulomata (Fig 2). Fungal and mycobacterial stains and cultures were negative.

Therapy with supplemental oxygen and intensive diuresis were initiated. Despite a 13.6 kg (30-pound) weight loss over a 14-day period, there was no clearing of interstitial and alveolar infiltrates on chest roentgenogram, and no improvement in her dyspnea. Oral prednisone, 60 mg per day, was started. Symptomatic improvement ensued within six weeks. Chest roentgenogram obtained four months after initiation of therapy showed a marked decrease in cardiac size and clearing of interstitial infiltrates (Fig 1). Right-heart catheterization was repeated at that time and demonstrated improved (although still abnormal) pulmonary hemodynamics (Table 1). Over the subsequent three months, prednisone was tapered to 20 mg every other day, and discontinued after 18 months. Supplemental oxygen was discontinued after two years. Pulmonary function studies have demonstrated maintenance of improvement for the three-year period of observation, including the final 12 months.

Figure 1. Chest roentgenogram, a. (left) on presentation showing cardiomegally, alveolar and interstitial infiltrates, bilateral pleural effusions and bilateral hilar adenopathy; and b. (right) after four months of oral prednisone therapy showing decreased cardiac silhouette, and partial resolution of alveolar and interstitial infiltrates.
and pulmonary artery pressure, improved gas exchange, and improved pulmonary mechanics were documented to occur within 16 weeks of the initiation of therapy. In the earlier report, corticosteroid therapy was discontinued after eight months, while in the present case, therapy with every-other-day corticosteroids was continued for an additional eight months. In both cases, the remission was well maintained after discontinuation of therapy. These reports suggest that in cases of sarcoidosis-associated pulmonary hypertension, aggressive corticosteroid therapy can have a beneficial effect on pulmonary hemodynamics and that long-term remission can be achieved. It is also possible that in both cases, supplemental oxygen therapy aided in the resolution of the pulmonary hypertension. However, the lack of an acute salutary effect of oxygen on pulmonary hemodynamics and the reported rapidly fatal outcome in such patients treated with supplemental oxygen alone suggests that the major therapeutic intervention in these cases was oral corticosteroid.

In addition to severe pulmonary hypertension, our patient presented with biventricular cardiomyopathy. Myocardial involvement is a well recognized manifestation of sarcoidosis, present clinically in up to 5 percent of cases and at necropsy in an additional 20 to 25 percent of cases. While this patient presented with signs of both left and right sided heart failure, the right sided failure was much more severe, presumably due to the combination of underlying cardiomyopathy and pulmonary hypertension. Since therapy with corticosteroids, this patient's LVEF has been unchanged, while her heart failure has been easily controlled with digoxin and small doses of furosemide. This clinical improvement is likely due to resolution of right ventricular dysfunction secondary to pulmonary hypertension.

In summary, this case supplements one previous report that severe sarcoidosis-associated pulmonary hypertension can be reversed and remain quiescent with corticosteroid therapy. Clinical response to therapy occurred within six weeks, was sustained during an additional 18 months of therapy with administration of every-day and every-other-day corticosteroids and during a 18-month period of observation after therapy was discontinued. We recommend that in cases of sarcoidosis presenting with signs of significant pulmonary hypertension, pulmonary hemodynamics be measured and used as an index of severity of disease and followed as an indicator of therapeutic efficacy.

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Reconstruction of Superior Vena Cava in Invasive Thymoma*

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Aggressive en-bloc resection of the superior vena cava was performed in a 50-year-old man who had superior vena caval syndrome caused by invasive thymoma. After the superior vena cava was resected, a Gore-Tex vascular graft was used to reconstruct the lower end of the right innominate vein and lower end of the superior vena cava. The patient was treated with postoperative radiotherapy to the mediastinum and has been asymptomatic for 14 months following surgery. (Chest 1990; 97:502-03)

Thymic tumors are uncommon but may be seen relatively often in the Far East and particularly in China.14 Survival of patients with thymoma and invasive tumors is fairly good, if properly managed.56 Cases of noninvasive thymoma may be cured by surgery. Those with invasive lesions can be treated with additional radiotherapy. In cases with either unresectable lesions or metastatic disease, chemotherapy may be useful.56

We have seen one patient with invasive thymoma which invaded the right upper lung and the superior vena cava. We treated him with en-bloc resection of the tumor and superior vena cava followed by Gore-Tex vascular grafting and obtained good results. This report describes the treatment and results of this surgery.

CASE REPORT

This 50-year-old man was hospitalized for assessment of progressive dyspnea and pressure sensation over his head and neck of three months' duration. Pertinent findings showed venous distension over the neck and upper chest, swelling of his face, and a mass in the upper anterior mediastinum (Fig 1). Computerized tomography of the chest and a superior vena cavaogram revealed a mediastinal tumor with superior vena caval obstruction. A thoracotomy was performed and the mediastinum was explored through a median sternotomy. A hard but movable tumor, measuring 8 × 10 cm in size and with irregular margins, was found to occupy the superior anterior mediastinum and abut the anterior segment of the right upper lung and the pericardium. The tumor invaded the superior vena cava and left innominate vein, causing obstruction of these vessels. The left innominate vein was ligated. The right lung was separated from the tumor by sharp and blunt dissection. Both the tumor and the superior vena cava from the bifurcation of the right and left innominate vein were resected. A segment of Gore-Tex vascular graft, 12 cm long by 14 mm wide, was bridged between the lower end of the right innominate vein and lower end of the superior vena cava with an end-to-end anastomosis to reconstruct the resected cava (Fig 2). Microscopic examination of the tumor showed a thymoma with prominent epithelial cells and lymphocytes with capsular invasion. He was treated with radiotherapy to the mediastinum and is asymptomatic and free of disease 14 months after surgery.

DISCUSSION

Thymic tumors are uncommon, constituting about 20

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FIGURE 1. Chest x-ray film in posterior-anterior view showed widening and prominence of superior mediastinum.

FIGURE 2. Schematic drawing of the location of invasive thymoma and reconstruction of the superior vena cava with Gore-Tex graft.