started, using the SCLC protocol ACE (doxorubicin, 50 mg per m² day 1; cyclophosphamide, 1 g per m² day 1; and etoposide, 120 mg per m² days 1,2,3; repeated every three weeks). She completed six cycles with an excellent clinical response, remaining well nine months after re-presenting. The scalp metastasis was no longer palpable and the plasma calcium which was beginning to rise after stopping the plicamycin remained within the normal range (Fig 4).

**DISCUSSION**

The management and prognosis of atypical bronchial carcinoid tumors is not well established, due in part to the relative rarity of the tumor. Diagnosis is usually made at resection, when almost half (range 28 to 70 percent) of the patients will have peribronchial or hilar metastasis.6,7 Despite this, inthoracic tumor recurrence following resection is uncommon and lobectomy appears the correct surgical approach. Following surgery alone, between one third and one half of patients die over a period of 21 to 27 months.2,8,9 In one study in which details are given, six out of eight patients had evidence of metastases at diagnosis (extrathoracic in three), and four died within 21 months despite “curative” surgery.8 The role of adjuvant therapy is unknown, but in seven patients who received chemotherapy and/or radiotherapy after surgery, all were alive after a 23 to 127 month follow-up period.8 In a subsequent study, three patients who received adjuvant chemotherapy were alive and well between eight and 101 months with only one having evidence of tumor recurrence.7

We describe two patients who presented with atypical bronchial carcinoid tumors and hilar metastasis who represented with hypercalcemia within six months. Although both patients had osteolytic metastases, we do not know whether the hypercalcemia was due to the bone metastases or to one of the other tumor-associated causes.10 Chemotherapy was used in the second patient in view of the widespread disease and our choice of drugs was based on the assumption that atypical bronchial carcinoids may be biologically related to small cell lung cancer and may behave in a similar fashion. This treatment was very effective with symptomatic improvement, regression of the scalp metastasis, reduction of the serum calcium which was beginning to rise after the plicamycin, and clinically disease-free survival up to nine months.

Until a large series objectively studying therapy is published, treatment of atypical bronchial carcinoid tumors, especially those which have disseminated, will remain empirical. Chemotherapy as first line treatment of atypical bronchial carcinoid tumors is unsuccessful,7 but appears the treatment of choice in patients with widespread disease, and since dissemination occurs after apparently curative resection, adjuvant therapy may well be indicated following surgery.

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**Hypertrophic Osteoarthropathy Associated with Pneumocystis carinii Pneumonia in AIDS**

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Hypertrophic osteoarthropathy (HOA) is a systemic disorder primarily affecting the bones, joints, and soft tissues and developing in association with another disease process. Acute pyogenic pulmonary processes (empyema, lung abscess) are occasionally accompanied by transient HOA, but reversible HOA has not previously been reported in the setting of PCP in AIDS. (Chest 1989; 96:1206-09)

**HOA = hypertrophic osteoarthropathy; PCP = Pneumocystis carinii pneumonia; HIV = human immunodeficiency virus; BAL = bronchoalveolar lavage**

Hypertrophic osteoarthropathy (digital clubbing, periarticular soft tissue involvement with subperiosteal proliferative changes, nonpitting edema, arthralgia, etc) is most frequently associated with pulmonary neoplasm, occasionally with pyogenic infection (empyema, lung abscess), and rarely with extrapulmonary processes. Reversible HOA in association with acute nonpyogenic pulmonary infection, Pneumocystis carinii pneumonia (PCP), has not previously been reported, to our knowledge.

**CASE REPORT**

A 37-year-old man was admitted with a one-month history of...
cough, fever, weight loss, shortness of breath, diarrhea, and painful swelling of the hands, feet, and legs. He had been an IV drug abuser for 15 years and was known to have positive antibody titers to HIV.

Physical examination revealed a temperature of 38.9°C, generalized lymphadenopathy, bilateral rales, clubbing of the digits, erythema and tender swelling of forearms, hands, legs, and feet. Extensive bilateral alveolar and interstitial infiltrates were noted on chest roentgenogram. Arterial blood gas levels (FiO2, 0.21) were pH, 7.48; PCO2, 28 mm Hg; PO2, 86 mm Hg; and P(A-a)O2, 29 mm Hg. Bone radiographs of upper and lower limbs revealed periosteal elevation and subperiosteal new bone formation. Radioisotopic bone scan using 21 mCi 99mTc MDP showed increased uptake in the periosteal regions of all long bones, confirming HOA (Fig 1).

The patient underwent fiberoptic bronchoscopy. Gomori methenamine silver stain of cytocentrifuge preparations of BAL fluid revealed P carinii. Bacterial, mycobacterial, viral and fungal cultures of sputum and BAL were negative. The patient was initially treated with IV trimethoprim-sulfamethoxazole (5 mg/kg every 6 h). As he did not respond to this regimen, he was subsequently treated with parenteral pentamidine. With resolution of the PCP, the erythema, pain, and swelling of the hands, legs, and feet also subsided completely. A repeat bone scan done three months later revealed no residual evidence of HOA. Despite residual radiographic abnormalities on this patient’s chest roentgenogram, 67Ga citrate scan at three months following pentamidine therapy no longer revealed significant diffuse increase in pulmonary parenchymal activity typical of active PCP.

**DISCUSSION**

Hypertrophic osteoarthropathy is a systemic disorder characterized by several (or all) of the following: (1) clubbing of digits; (2) persistent new bone formation, particularly involving long bones of the distal extremities; (3) symmetric arthritis-like changes in the joints and periarticular tissues, most commonly the ankles, knees, wrists, and elbows; (4) increased thickness of the subcutaneous soft tissues in the distal one-third of the arms and legs; and (5) neurovascular changes of the hands and feet, including chronic erythema, paresthesias, and increased sweating.

The most common cause of HOA is intrathoracic neoplasm (primary or metastatic). Other frequent causes include mesothelioma, cystic fibrosis, bronchiectasis, chronic empyema, lung abscess, mediastinal lymphoma, tuberculosis, and pulmonary interstitial fibrosis. Nonpulmonary causes include infected abdominal aortic prosthesis, amebiasis, ulcerative colitis, sprue, esophageal carcinoma, chronic mountain sickness, pregnancy, hepatic disorders, chronic methemoglobinemia, and chronic sulfhemoglobinemia.

The pathogenesis of HOA remains unclear. Immunologic, hormonal, neural, and neurohumoral factors have been implicated. HOA is sometimes discovered in asymptomatic persons by the incidental finding of periostitis on bone radiographs and scintigrams.

Patients usually come to medical attention because of severe pain in the extremities (which, in fact, was the chief complaint of the patient reported herein). Involvement of synovial membranes frequently gives rise to pain, stiffness, and swelling around the knees, ankles, wrists, and elbows. The skin over affected areas has a glistening appearance and may feel warm and edematous. Bony tenderness can often be elicited over distal ends of long bones. Clubbing of digits appears frequently in association with HOA and may persist indefinitely.

Radiographs of long bones reveal evidence of periostitis and subperiosteal new bone formation. Bone scans using 99mTc pyrophosphate show increased uptake along the periosteal surfaces of affected bones. The most effective treatment for HOA is removal or cure of the underlying condition. A variety of analgesics, steroids and nonsteroidal anti-inflammatory drugs have been tried. Surgical or chemical vagotomy or radiation therapy can occasionally relieve bone pain.

Hypertrophic osteoarthropathy has not previously been reported in association with PCP in AIDS patients. The absence of bacterial, mycobacterial, and fungal infection and complete resolution of HOA on remission from PCP indicates that this patient had HOA in association with PCP.

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