Endobronchial lesions involved in *Mycobacterium avium* infection

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**KEYWORDS**

*Mycobacterium avium*, Endobronchial lesion, Bronchoscopy, HIV-negative host

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**Introduction**

*Mycobacterium avium* (*M. avium*) has been described traditionally as an opportunistic organism that causes disseminated disease in the human immunodeficiency virus (HIV)-positive population and that acts as a pulmonary pathogen in patients with underlying lung disease such as chronic obstructive pulmonary disease (COPD) or previously diagnosed tuberculosis. Pulmonary involvement of *M. avium* may range from asymptomatic colonization of the airway to invasive parenchymal or cavitary disease. However, endobronchial lesions involved in *M. avium* infection are rare in either immunocompetent or immunosuppressed hosts. We report here endobronchial mycobacterial infection in a HIV-negative patient.

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**Case report**

A 57-year-old man underwent a total gastrectomy due to gastric cancer at 51 years, and subsequently was followed in the clinic of a regional hospital without any additional treatments for cancer including antineoplastic chemotherapy. From April 1998, he started to suffer from depression, and then became to have left anterior chest pain, low-grade fever, and productive cough in July. He was treated with antidepressants without any improvement at a regional hospital. In November, he was admitted to our hospital since chest X-ray and CT findings showed a huge mass in left upper lobe. On admission, the findings on physical examination were: absence of expression; height 163 cm; body weight 54 kg; body temperature 37.0 °C; blood pressure 102/62 mmHg; pulse 100 beats/min; respiratory frequency 12 breaths/min; movable and tender lymph node over right supraclavicular area, 1 cm in size; normal breathing sound; and operation scar in abdomen. There seemed to be no signs attributable to recurrence of gastric cancer. Laboratory findings revealed leukocytosis (white blood cell count, 12,500 cells/μl; 82% neutrophils, and 6% lymphocytes); hemoglobin was 11.4 g/dl; and the platelet count was 601,000 cells/μl. The erythrocyte sedimentation rate was 97 mm/h, and C-reactive protein was 11.8 mg/dl. No tumor marker associated with lung neoplasm was elevated. Skin reaction to purified protein derivative was positive. Enzyme immunoassays for antibody to HIV-1 and -2 were negative. Lymphocyte subsets determined by immunofluorescent flow-cytometry showed: 22.9% CD4 +; 10.6% CD8 +. CD4 + cell depletion (172 cells/μl) was demonstrated, although CD4+/CD8+ ratio (2.16) was within normal limit. The mitogen-stimulated proliferative responses of T-cells to concanavalin A, and...
phytohaemagglutinin (assayed by 3H-thymidine incorporation) was reduced. Findings on chest X-ray and CT scan showed a tumor mass in left upper lobe. Bronchoscopic findings demonstrated that the orifice of apical segment of the left upper lobe was completely occluded by a white-coated polypoid lesion. Histological findings revealed that a polypoid lesion consisted of granulomatous inflammation infiltrated by neutrophils, lymphocytes, macrophages, plasma cells, and numerous acid-fast bacilli (Fig. 1). No apparent changes indicative of malignancy were detected. Similar histological findings were obtained from a repeated bronchoscopic biopsy and percutaneous needle lung aspiration biopsy. M. avium was cultured and identified in sputum, bronchoscopic brushing specimen, and percutaneous aspiration fluid. The patient was diagnosed as pulmonary infection with M. avium based on the 1997 American Thoracic Society (ATS) criteria for diagnosis of disease caused by non-tuberculous mycobacteria. Bronchoscopic findings indicated that endobronchial lesions in apical segment of the left upper lobe resulted from infection with M. avium. Antimycobacterial chemotherapy was given: rifampicin, 450 mg; isoniazid, 400 mg; ethambutol hydrochloride, 750 mg; sparfloxacin, 200 mg and clarithromycin, 400 mg. Treatment with chemotherapy caused a symptomatic relief and diminution in a left hilar mass. The symptoms related to depression gradually improved with a symptomatic relief of M. avium infection. The patient was discharged from our hospital in May 1999, and then followed by the outpatient clinic. He completed at least one year of treatment. Follow-up bronchoscopy after 1 year of treatment revealed that endobronchial polypoid lesions had almost resolved with anthracosis at the orifice of apical segment of the left upper lobe.

Discussion

Recently, a new clinical presentation of M. avium pulmonary disease was reported by Prince et al. in 21 patients with no predisposing factors. Patients were characterized as older, otherwise healthy, nonsmoking women, and they accounted for 25% of the total number of HIV-negative cases in this report. Subsequent studies have demonstrated that this population accounts for 24–59% of the patients with M. avium pulmonary diseases. Huang et al. retrospectively reviewed the experience of an outpatient pulmonary clinic with M. avium pulmonary disease in the HIV-negative population without preexisting lung disease. This retrospective review highlighted the tendency of M. avium to cause nodular bronchiectasis in this group of patients. Although isolated pulmonary involvement by M. avium is common in immunocompetent hosts, it is uncommon in patients with the acquired immunodeficiency syndrome (AIDS). Pulmonary and disseminated infections with M. avium are common in patients with AIDS. Previously described radiographic patterns with AIDS and M. avium infections have included mediastinal adenopathy, patchy bilateral alveolar infiltrates, nodular infiltrates, and normal findings on chest roentgenograms. Despite the extensive use of bronchoscopy in the investigation of respiratory
diseases, endobronchial lesions involved in M. avium infection are rare in either immunocompetent or immunosuppressed hosts.2-6 We have reported here unusual endobronchial lesions involved in M. avium infection in a HIV-negative patient without preexisting lung disease. On admission, this patient was strongly suspected as having a malignant tumor of the lung, because chest X-ray and CT findings showed a huge mass in the left lobe. However, the diagnosis of pulmonary infection with M. avium was made from bronchoscopy, percutaneous needle aspiration lung biopsy, and a repeated sputum examination. Bronchoscopic findings indicated that endobronchial polypoid lesions in the orifice of apical segment of the left upper lobe resulted from infection with M. avium. To date, including the present case, there is only three case reports in the English literature of endobronchial polypoid tumors caused by M. avium infection in HIV-negative hosts.4,5 Shih et al.4 reported the case of a 34-year-old woman who developed disseminated M. avium infection with generalized lymphadenopathy, hepatosplenomegaly, pulmonary infiltration, pleural effusion, and endobronchial polypoid lesions; neodymium yttrium aluminium garnet (Nd-YAG) laser and antmycobacterial therapy were used effectively to relieve the airway obstruction. Litman et al.5 reported a 10-month-old boy who had isolated pulmonary involvement and presented with endobronchial obstruction. The endobronchial granuloma tissue due to M. avium infection, obstructing the left main bronchus, was removed with surgical forceps, and responded to antmycobacterial therapy. In the present patient, antmycobacterial chemotherapy alone caused a symptomatic relief and resolution of the endobronchial polypoid lesions, which were different from previous reports. Although previously reported two cases were suggested to be immunocompetent hosts,4,5 the present case might be considered as an immunosuppressed patient, because laboratory findings on admission showed that CD4+ T lymphocytes decreased and T-cell proliferative responses to mitogens were suppressed. There is one possibility that the reduction of T-cell-mediated immune response may be responsible for these unusual manifestations of mycobacterial infection. However, it is unlikely that the suppression of immune response was associated with a past history of gastric cancer, since the patient had no signs indicative of recurrence, and received no immunosuppressive treatment including antineoplastic chemotherapy. Recent studies have provided evidence that depression is associated with altered immune and hormonal systems, such as an overall leukocytosis, manifesting as a relative neutrophilia and lymphocytopenia; a suppression of mitogen-induced lymphocyte proliferation; and a reduction of NK-cell activity.12-14 In this case report, the patient suffered from depression before the onset of symptoms caused by M. avium infection, and laboratory findings on admission demonstrated to be lymphocytopenia and a suppression of mitogen-induced lymphocyte proliferation. These findings led us to speculate that depressive state was related to the reduction of T-cell mediated immune response in this patient. Further studies are required to elucidate the clinical significance of altered immune responses in patients with depression.

Conclusion

We report a unique case of endobronchial mycobacterial infection in a HIV-negative patient without preexisting lung disease. Bronchoscopy, percutaneous needle aspiration lung biopsy, and a repeated sputum examination are useful to make a diagnosis of pulmonary infection with M. avium. Antimycobacterial chemotherapy caused a symptomatic relief and resolution of the endobronchial lesions. The reduction of T-cell-mediated immune response may be responsible for these unusual manifestations of mycobacterial infection.

References


