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- 2 Panidis IP, Mintz GS, McAllister M. Hemodynamic consequences of left atrial myxomas as assessed by Doppler ultrasound. *Am Heart J* 1986; 111:927-31
- 3 Keren G, Sherez J, Megidish R, Levitt B, Laniado S. Pulmonary venous flow pattern—mits relationship to cardiac dynamics: a pulsed Doppler echocardiographic study. *Circulation* 1985; 71:1105-12
- 4 Keren G, Pades A, Miller III, Scherez J, Laniado S. Pulmonary venous flow determined by Doppler echocardiography in mitral stenosis. *Am J Cardiol* 1990; 65:246-49
- 5 Colucci WS, Braunwald E. Primary tumors of the heart. In: Braunwald E, ed. *Heart disease*. Philadelphia: WB Saunders Co, 1988; 43:1470-83
- 6 Yellin EL, Hori M, Yoran C, Sonnenblick EH, Gabbay S, Frater RWM. Left ventricular relaxation in the filling and nonfilling canine heart. *Am J Physiol* 1986; 250:H620-29
- 7 Castello R, Pearson AC, Lenzen PM, Labovitz AL. Effect of mitral regurgitation on pulmonary venous velocities derived from transesophageal echocardiography: color-guided pulsed Doppler imaging. *J Am Coll Cardiol* 1991; 7:1499-1506

Role of *Candida albicans* in Chronic Hypersensitivity Pneumonitis*

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An autopsy was performed on a patient who had chronic hypersensitivity pneumonitis that was observed for 9 years. The patient was a farmer who developed symptoms every March through July during the use of moist hay that was infected heavily with *Candida*. Precipitins and an inhalation challenge test to *C. albicans* were positive. We interpret the role of *C. albicans* in this case.

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HP=hypersensitivity pneumonitis

Candida is known to produce type 3 reactions in man and animal models,^{1,2} but we cannot find it listed as an antigen of hypersensitivity pneumonitis (HP) in any textbook. We herein present a case of chronic HP and discuss the role of *C. albicans* in this disease.

CASE REPORT

A 72-year-old nonsmoking female farmer first consulted with physicians at our hospital in 1982 for cough, dyspnea, and fever. She had a 10-year history of the same symptoms appearing seasonally from March through July when she used humid hay as cattle feed, but she had no history of bronchial asthma. She had bibasilar VELCRO rales. A chest radiograph showed diffuse bilateral reticulonodular shadowing. Transbronchial lung biopsy revealed granulomatous alveolitis. She showed marked improvement while she was away from home and work. The following March she returned home, but she could stay only 6 days because of recurrence of the symptoms. When she was seen on April 2, 1983,

she had a fever of 39.1°C and coarse and fine rales over both lung bases. Her erythrocyte sedimentation rate was 170 mm/h. C-reactive protein was markedly positive, and the IgG level was 3,712 mg/ml. Pulmonary function studies showed 50 percent of predicted vital capacity, 53.1 percent of FEV₁, and 55.5 percent of carbon monoxide diffusing capacity. The Pao₂ was 63.2 mm Hg.

Candida albicans was cultured from her sputum. The gel double diffusion test was performed on the culture-filtrate antigen of *C. albicans* and on ten HP-related and seven *Aspergillus*-related commercially available antigens (Hollister and Steir, Spokane, Wash). The precipitins were positive only to *C. albicans*, and the skin test for it showed dual reactions. Transbronchial lung biopsy revealed granulomatous alveolitis again. The inhalation challenge test was performed with 7.5 mg of the antigen; it provoked no symptoms in the control subject. Respiratory and systemic symptoms were reproduced, coming on at 4 h later, with maximum symptoms at 9 h later: WBC count, percent vital capacity, and Pao₂ data had worsened from 4,400/mm³, 60.5 percent, and 65 mm Hg to 10,200/mm³, 37 percent, and 52 mm Hg, respectively. She recovered and was discharged on December 13 on a regimen of prednisolone, 10 mg/d.

Though she retired from farming, her room remained located in front of the cattle barn. From March to July every year, she was readmitted for recurrent symptoms and progressive respiratory failure. In 1988, when her symptoms lost periodicity, a chest radiograph showed a decrease in lung volume and diffuse honeycomb shadowing. The Pao₂ level was 50 mm Hg with oxygen therapy. Her precipitins to *C. albicans* were positive. Steroid pulse therapy had little effect, and she died on Dec 7, 1990.

Autopsy revealed the usual interstitial pneumonia without granuloma, organized pneumonia, and ectatic bronchi (Fig 1). No eosinophilic pneumonia, bronchiolitis obliterans, or mucoid impaction of bronchi was seen. There were no saprophytic or invasive cells of *C. albicans* in the lungs or other organs.



FIGURE 1. Bilateral interstitial pneumonia with honeycomb appearance.

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DISCUSSION

"Tea factory cough" (Castellani, 1927), "June epidemic pneumonia" (Oliver, 1932), and "thresher's lung" (Tornell, 1946) were understood to be syndromes of allergy to inhaled dust and infection by *Monilia* (*Candida*).³⁻⁵ Later, Pepys¹ stated that *C albicans* was unlikely to be a common inhalant allergen.¹ But he also suggested that the antigens of *C albicans*, and probably the precipitating antibodies against them, were pathogenetically important in type 3 reactions.¹

In our subject, *C albicans* was cultured from her sputa several times, but the autopsy did not disclose bronchocandidiasis. Precipitins and an inhalation challenge test to *C albicans* were positive, but the isolate from the environment (by direct culture from house dust and hay, and by swab culture from her room and the barn) was *C guilliermondii*, which reacted to her serum at a titer of 1:516 in an indirect fluorescent antibody test. *C guilliermondii*, a pathogen of debilitated patients, is isolated from cattle-related materials, and the antigen closely shows cross-reactivity to *C albicans*.⁶ Since we could not examine the isolate further, it is obscure whether the true antigen was *C albicans* or *C guilliermondii*. To say the least, however, the antigens of *Candida* were pathogenic in a case of chronic HP with progressive respiratory failure.

In addition, in her town we also found two more cases of farmer's lung with precipitins to *C albicans* but not to other farmer's lung-related antigens. The rate of people positive for precipitins to *C albicans* was 38.4 percent (14.9 percent of 101 smokers, 33.3 percent of 21 ex-smokers, and 47.4 percent of 274 nonsmokers) of 396 residents from her town which lies in a warm, misty valley and whose main industry is stock raising. This figure was significantly higher than 3.3 percent of 271 rural and 6.9 percent of 131 urban residents (A Ueda, M.D.; 1979) in the same geographical region (unpublished data, Y Sugihara, M.D.; Kashida, A Ueda M.D.; et al.).

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REFERENCES

- 1 Pepys J. Pulmonary aspergillosis. *Monogr Allergy* 1969; 4:59-68
- 2 Kabe J, Aoki Y, Miyamoto T. Antigenicity of fractions from extracts of *Candida albicans*: the immediate and delayed-type respiratory responses in guinea pigs. *J Allergy* 1971; 47:59-75
- 3 Tornell E. Thresher's lung: a fungoid disease resembling tuberculosis or morbus Schaumann. *Acta Med Scand* 1946; 125:191-219
- 4 Zettergren L. Thresher's lung (pulmonary moniliasis): an experimental investigation. *Upsala Kalaref Forth* 1950; 40:257-313
- 5 Wuhrmann F. Zur Frage der sog: Drescherkrankheit. *Helvetica Med Acta* 1948; 15:524-27
- 6 Suzuki H, Nakamura A, Taguchi H, Nishimura K, Miyaji M. Detection of serum *Candida* antigen by an enzyme-linked immunosorbent assay with avidin-biotin system: 1. Method and basic studies. *The Journal of the Japanese Association for Infectious Diseases* 1986; 60:336-44

Endoscopic Classification of Tracheobronchial Tuberculosis With Healing Processes*

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We established an endoscopic classification of tracheobronchial tuberculosis with healing processes. According to this classification, the period of time needed for healing was found to be shorter in patients who were treated by aerosolized streptomycin than in those treated with the conventional triple-drug oral regimen.

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The clinical features of tracheobronchial tuberculosis are distinct from those of pulmonary tuberculosis in some aspects. Some investigators have described endobronchoscopic classifications of tracheobronchial tuberculosis.¹ Those classifications are suitable for the patient who had not yet been treated; nevertheless, it is difficult to verify and to differentiate a healing lesion of endobronchial tuberculosis according to them. Recently, fiberoptic bronchoscopic examination can be performed easily. As a result, endobronchial tuberculosis with healing has been found more frequently. Therefore, we need a new classification by which we can describe the lesion exactly.

CASE REPORT

A 60-year-old man was referred to our hospital because of cough and sputum. The smear and culture of sputum were positive for acid-fast bacilli. Chest roentgenograms demonstrated slight abnormality with old inflammation. Bronchoscopic examination performed on admission showed a white necrotic coat with bleeding at the orifice of the left upper-division bronchus. We made a diagnosis of bronchial tuberculosis based on the fiberoptic bronchoscopic findings and the bacteriologic results. Before and during the antituberculosis chemotherapy with isoniazid, rifampin, and streptomycin, we observed ulcerous lesions due to bronchial tuberculosis at various stages as seen on FOB. As a result, we classified the lesions as follows: active stage before therapy; ulcer formation without regenerating epithelium (Fig 1), changed to scarring stage; no ulcer formation without polypoid lesion, through healing stage; ulcer formation with regenerating epithelium and polypoid stage; and no ulcer formation with polypoid lesion (Fig 2).

DISCUSSION

Out of 404 patients with pulmonary or tracheobronchial tuberculosis (or both) who had been treated during the last 10 years at Kurume University Hospital and St. Mary Hospital, 41 patients were histopathologically or bacteriologically diagnosed as having active tracheobronchial tuberculosis. Tracheobronchial lesions in these patients were examined successively by use of the fiberoptic bronchoscope. Most of the patients were treated by the combination of three antituberculosis agents (isoniazid, rifampin, and streptomycin or ethambutol). In 31 out of the 41 patients, fiberoptic bronchoscopic examinations were performed twice or more.

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