

## Pulmonary Involvement of Kaposi Sarcoma in an AIDS Patient: Radiologic and Pathologic Findings<sup>1</sup>

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Kaposi sarcoma is the most common malignancy in acquired immunodeficiency syndrome (AIDS), and when disseminated may involve any organ system. Pulmonary involvement of Kaposi sarcoma in AIDS patients has not been previously reported in Korea and we report one such case, confirmed pathologically at autopsy.

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Acquired immunodeficiency syndrome (AIDS)

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Acquired immunodeficiency syndrome (AIDS) is a life threatening condition which is distributed worldwide. Kaposi sarcoma is the most common malignancy in AIDS patients, and cutaneous Kaposi sarcoma is frequently the initial manifestation of the disease (1). Kaposi sarcoma associated with human immunodeficiency virus (HIV) is usually widely distributed on the skin and may also be widely disseminated internally, frequently with pulmonary involvement (2). Although Kaposi sarcoma of the skin has been described in the Korean literature (3), the radiologic and pathologic findings of Kaposi sarcoma involving the lung has not, to our knowledge, been reported. We describe the case of an AIDS patient in whom Kaposi sarcoma had affected the lung.

### Case

A 42-year-old man presented with abdominal pain,

first experienced six months earlier. A homosexual, he was known to have been HIV-positive since 1998. He had small, raised reddish-purple skin nodules, and skin biopsy revealed cutaneous Kaposi sarcoma. He suffered from dysphagia and melena, presumed fungal esophagitis, and upper gastrointestinal bleeding. On admission, his CD4 level was 10 cells/mm<sup>3</sup>, and extensive strawberry-like mucosal elevation was noted at gastroscopy. Colonoscopy revealed the presence of hyperemic, lobulated, sessile mucosal elevation in the terminal ileum. Endoscopic biopsy of this region demonstrated Kaposi sarcoma. During hospitalization, dyspnea developed and worsened, and was accompanied by coughing. There was, however, no hemoptysis. The findings of arterial blood gas analysis were 7.5 - 30 mmHg-84 mmHg-24 mmol/L (pH-pCO<sub>2</sub>-pO<sub>2</sub>-HCO<sub>3</sub>) when the oxygen supply was 5 L/min via a nasal prong.

Chest radiography revealed nodular and linear infiltrates, with perihilar and basal distribution (Fig. 1A). Contrast-enhanced and high-resolution CT (HRCT) demonstrated irregular and ill-defined peribronchovascular nodules and interstitial thickening, interlobular septal thickening, enlargement of the subcarinal lymph nodes, and bilateral pleural effusion (Figs. 1B, 1C).

Severe dyspnea persisted, and there was respiratory failure. No microorganism was isolated from a sputum

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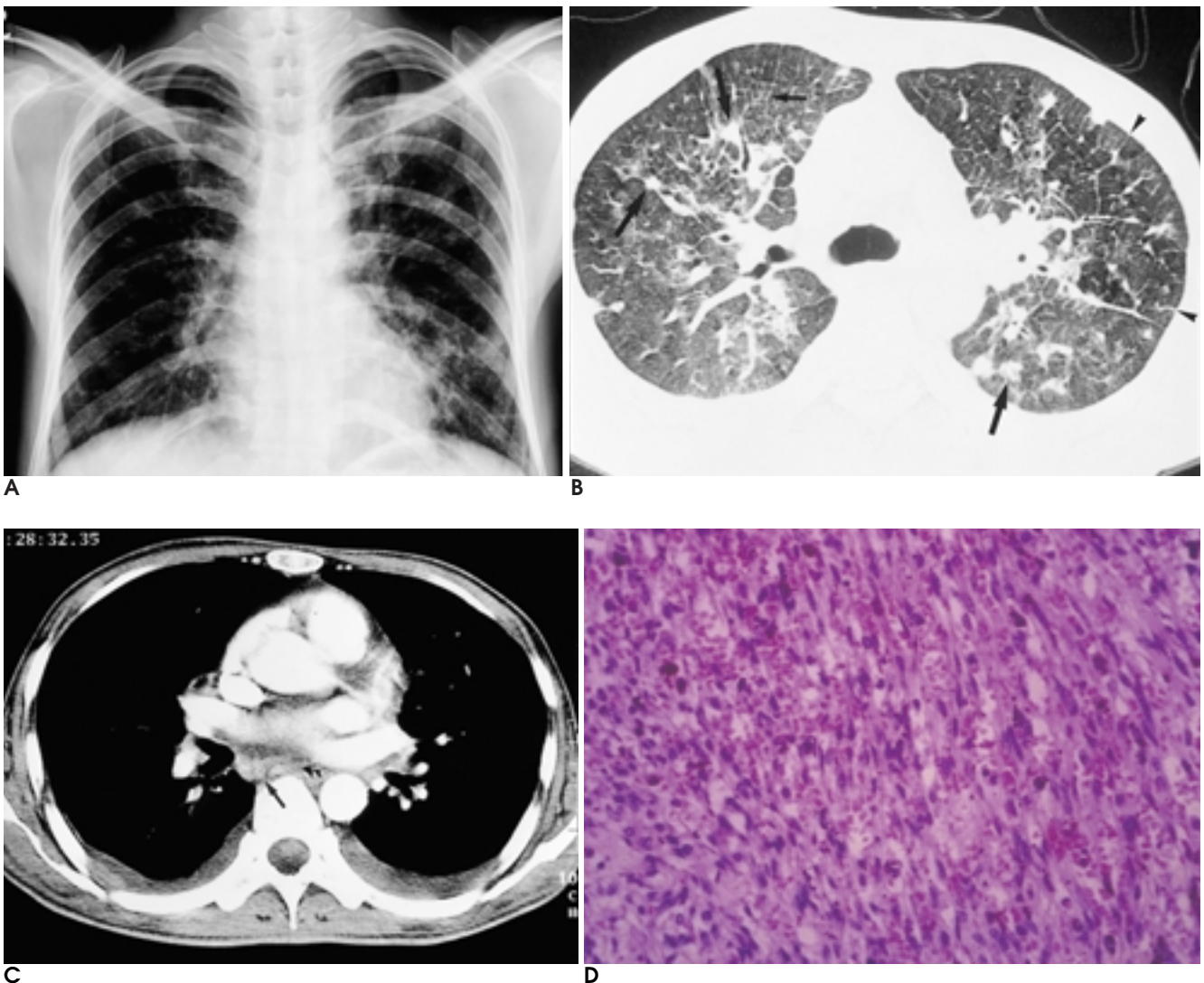
smear and culture, however, and serum was positive only for cytomegalovirus-IgG. Cocktail therapy was begun, leading to transient improvement of dyspnea. This became severe, however, and was accompanied by coughing, and there was also massive melena.

The patient died due to sustained respiratory failure, and histologic examination of the tissue obtained at lung necropsy revealed the involvement of Kaposi sarcoma (Fig. 1D).

## Discussion

The prevalence of HIV infection in South Korea has been estimated at 0.01% (presumed total number of HIV-infected individuals: 3100). The major mode of transmission is sexual, heterosexual contact accounting for 67% of all HIV cases, and homosexual contact, 12% (4).

In patients with known disseminated Kaposi sarcoma, pulmonary involvement has been found in 20 - 40% of



**Fig. 1.** A 42-year-old man with disseminated Kaposi sarcoma .

**A.** Chest radiograph shows diffuse nodular opacities and linear interstitial infiltration.

**B.** Thin-section CT scan obtained with lung window setting demonstrates irregular and ill-defined peribronchovascular nodules (long arrows), peribronchovascular interstitial thickening (short arrow) and interlobular septal thickening (arrowheads).

**C.** Bilateral pleural effusion and enlargement of subcarinal lymph nodes (arrow) are noted on contrast-enhanced CT scan obtained with mediastinal window setting.

**D.** Light microscopic examination of the lung (H-E stain,  $\times 400$ ) shows elongated spindle cells are separated by slits containing red blood cells, which is consistent with microscopic appearance of Kaposi sarcoma.

cases diagnosed during life, but the incidence at autopsy may be as high as 50% (5).

Disseminated Kaposi sarcoma may involve any organ system, including the lung, but the gastrointestinal tract and lymph nodes are most frequently affected. It appears that pulmonary Kaposi sarcoma in the absence of cutaneous involvement is rare. Because involvement of the tracheobronchial tree is relatively frequent, and the lesions are highly vascular, hemoptysis is common (2).

The plain radiographic findings in pulmonary Kaposi sarcoma are nonspecific. A complicating factor is that the condition often coexists with opportunistic infections, though the severity of pulmonary infiltration by Kaposi sarcoma is not subject to significant day-to-day fluctuation, as may be the case with pulmonary edema or pulmonary opportunistic infections, and the plain radiographic findings may be normal even in the presence of diffuse parenchymal disease seen at biopsy or autopsy (6).

Focal segmental or lobar infiltrates usually represent parenchymal Kaposi sarcoma, but if endobronchial, the condition may result in atelectasis or postobstructive pneumonia (7). Diffuse linear interstitial opacity and diffuse nodular shadowing with perihilar predominance may also be present, and the changes which occur show considerable overlap and coalescence (8).

Chest CT scans may be sufficiently characteristic to strongly suggest a diagnosis of pulmonary Kaposi sarcoma (7). The typical CT features, described in a study by Hartman et al. (9), include irregular and ill-defined peribronchovascular nodules (seen in 85% of cases), consolidation (35%) or ground glass opacity (23%), interlobular septal thickening (38%), pleural effusion (35%), and lymphadenopathy (50%). Thus, an AIDS patient with cutaneous Kaposi sarcoma as well as diffuse pulmonary infiltration, pleural effusion, or hilar and mediastinal lymphadenopathy, or a combination of these, may have intrathoracic Kaposi sarcoma, the probability of which increase if other organ systems such as the gastrointestinal tract are involved (2). In AIDS patients, however, a number of other diseases may be associated with the presence of pulmonary nodules, including lymphoma, bronchogenic carcinoma, *Pneumocystis carinii* pneumonia, tuberculosis, nontuberculous mycobacterial infection, and bacterial, fungal or viral infections (9). In pa-

tients with AIDS in whom multiple pulmonary nodules are revealed by CT, nodule size and distribution are useful in the differentiation of potential causes. Nodules smaller than 1 cm, especially those whose distribution is centrilobular, are typically infectious, and those larger than 1 cm are often neoplastic. Peribronchovascular distribution is suggestive of Kaposi sarcoma (10).

In conclusion, although the plain radiographic findings of pulmonary Kaposi sarcoma are nonspecific, pulmonary involvement of the condition should be included in the differential diagnosis of AIDS patients with diffuse pulmonary infiltration. If supplementary CT or HRCT reveals characteristic features such as the peribronchovascular distribution of nodules larger than 1 cm, with bilateral pleural effusion or hilar and mediastinal lymphadenopathy, there is sufficient to indicate the most likely differential diagnosis. Evidence of cutaneous Kaposi sarcoma, or its presence in the gastrointestinal tract, increase the likelihood of its diagnosis, as does the exclusion of microorganisms by culture of respiratory specimens.

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