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Plasma Cell Myeloma Initially Presenting as Lung Cancer

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Plasma cell myeloma (PCM) is a malignant hematologic disease characterized by the proliferation of neoplastic plasma cells, producing excessive amounts of monoclonal immunoglobulin (Ig) or light chain (LC) [1, 2]. Although plasma cells are widely distributed throughout the body, PCM is found most often within the bone and bone marrow (BM), while the dissemination of extramedullary plasmacytoma into the lung has been reported to be very rare [3]. Moreover, pleural effusion caused by myelomatous involvement such as myelomatous pleural effusion (MPE) occurs in less than 1% of PCM cases [4-6]. We report a case of PCM with a rare presentation of MPE and plasmacytoma mimicking lung cancer. This case is characterized by the presence of monoclonal Ig using electrophoresis and free light chain (FLC) assay in addition to cytologic examination of the pleural fluid [7].

A 59-yr-old Korean woman complaining of anorexia and weight loss for 6 weeks was referred to our hospital in order to evaluate an incidental finding of a lung mass during a routine check-up from a local clinic. The patient had no history of smoking and exposure to environmental asbestos. Results of routine blood tests were as follows: Hb, 8.9 g/dL; platelet count, 199×10^9/L; and white blood cell (WBC), 3.8×10^9/L (segmented neutrophil, 79%; lymphocyte, 18%; monocyte, 2%; and eosinophil, 1%); and approximately 1 nucleated red blood cell (RBC) per 100 WBCs. Results of biochemical tests were as follows: protein, 6.4 g/dL (reference range, 5.8-8.0 g/dL); albumin, 4.4 g/dL (reference range, 3.1-5.2 g/dL); creatinine, 0.4 mg/dL (reference range, 0.6-1.2 g/dL); and lactate dehydrogenase, 602 U/L (reference range, 218-472 U/L). The chest computed tomography (CT) examination presented a lung mass with a lobulated contour in the left lower lobe, a bony destructive soft tissue mass in the left ribs, and multifocal pre/paravertebral mass lesions, especially at the T9-L1 level, with pleural effusions (Fig. 1). Radiologic findings suggested lung cancer with pleural metastasis, or alternatively, a PCM. Positron emission tomography (PET)/CT and bone scintigraphy showed multiple hypermetabolic lesions in the lung adjacent to the left ribs, which suggested lung cancer with multiple bone metastases and a recommendation to rule out all metastases of unknown origin. Cytologic examination of the pleural fluid revealed a large number of plasma cells. In the FLC assay, serum lambda FLC increased to 183 mg/L (reference range, 5.71-26.3 mg/L), and the kappa/lambda FLC ratio (rFLC) was markedly reversed to 0.048 (reference range, 0.26-1.65). Capillary electrophoresis with serum and urine samples showed a discrete peak with a definite immunosubtraction in lambda LC, suggesting monoclonal gammopathy. In the pleural fluid, gel electrophoresis revealed a monoclonal band in lambda antisera and lambda FLC was measured at 14,000.0 mg/L. BM examination revealed 18.6% plasma cells with eccentric nuclei and basophilic cytoplasm, and biopsy sections showed a packed marrow (Fig. 2). Surgery was performed for excision of the pleural mass on the day after BM examination (Fig. 3). Immunohistochemical stains on sections from biopsy specimens from the left pleural mass were compatible with plasmacytoma as follows: cytokeratin (CK) (−),CD5 (−), CD45 (+), CD138 (+), kappa (−), and lambda (+). Based on these results, the patient was diagnosed as having PCM with extramedullary dissemination into the lung. The pa-

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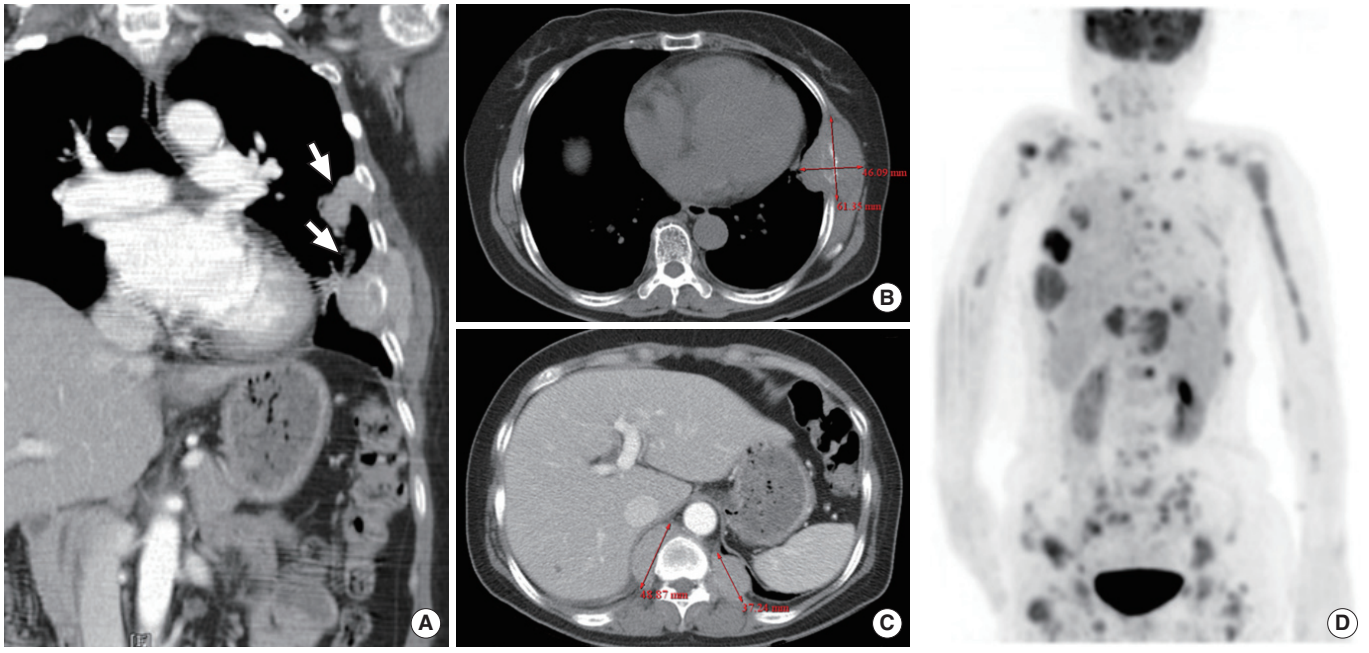

Fig. 1. Imaging studies. Computed tomography (CT) and positron emission tomography (PET)/CT findings showing the branching out lung mass (A), pleural nodules (B), and paraspinal lesions (C), which were initially interpreted to be suggestive of lung cancer with bone destruction and metastasis. PET/CT reveals multiple hypermetabolic bone lesions (D).

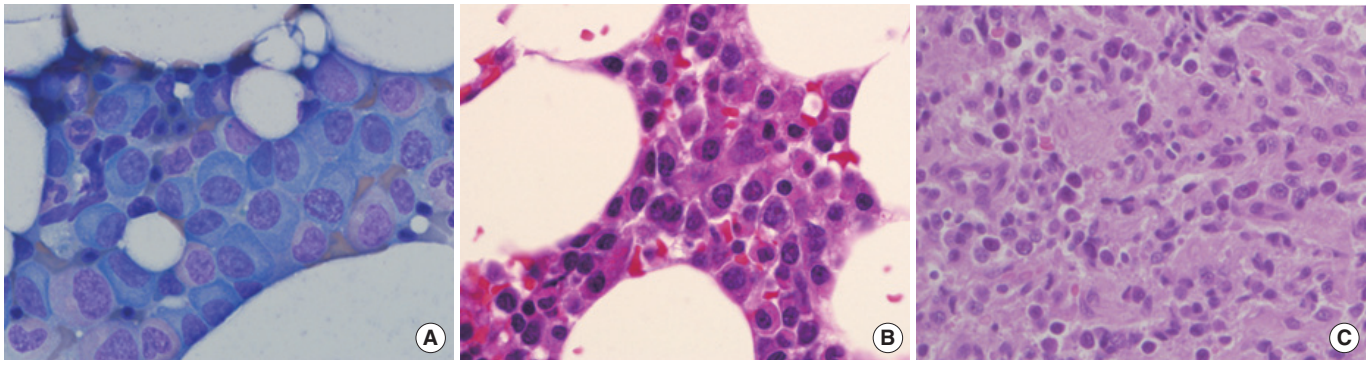

Fig. 2. Bone marrow findings. Plasma cells with eccentric nuclei and basophilic cytoplasm were predominantly observed in aspiration smears (A, Wright stain, ×1,000) and clot sections (B, H&E stain, ×1,000). The biopsy sections revealed massive infiltrations of plasma cells (B and C, H&E stain, ×400).

tient was referred to the hematology department for chemotherapy, and peripheral blood stem cells were collected for an autologous stem cell transplant thereafter.

Classically, PCM occurs mainly in BM-rich bone [8]. Therefore, primary clinical presentation includes bone pain, pathological fractures, and anemia [5, 9]. Extramedullary plasmacytomas have been reported in 15-20% of patients at diagnosis and in an additional 15% during the course of PCM, and these patients are often associated with high-risk diseases like MPE [4]. Although hematopoietic neoplasms may frequently colonize the pleural tissue, such as malignant lymphoma, especially in the end stage of the disease, extramedullary existence of plasmacytoma is not common and the incidence of thoracic cases is low, especially in patients presenting with pulmonary plasmacytoma and MPE to simulate a pleural mesothelioma or lung cancer [8, 10-12]. This study is limited in that IgD and IgE were not measured in further tests, because this was a retrospective case review.

We report here a unique presentation of PCM overlapping massive pleural effusion to include monoclonal components and pleural plasmacytoma as initially mistaken for lung cancer. When MPE and pleural involvement are concomitantly ob-

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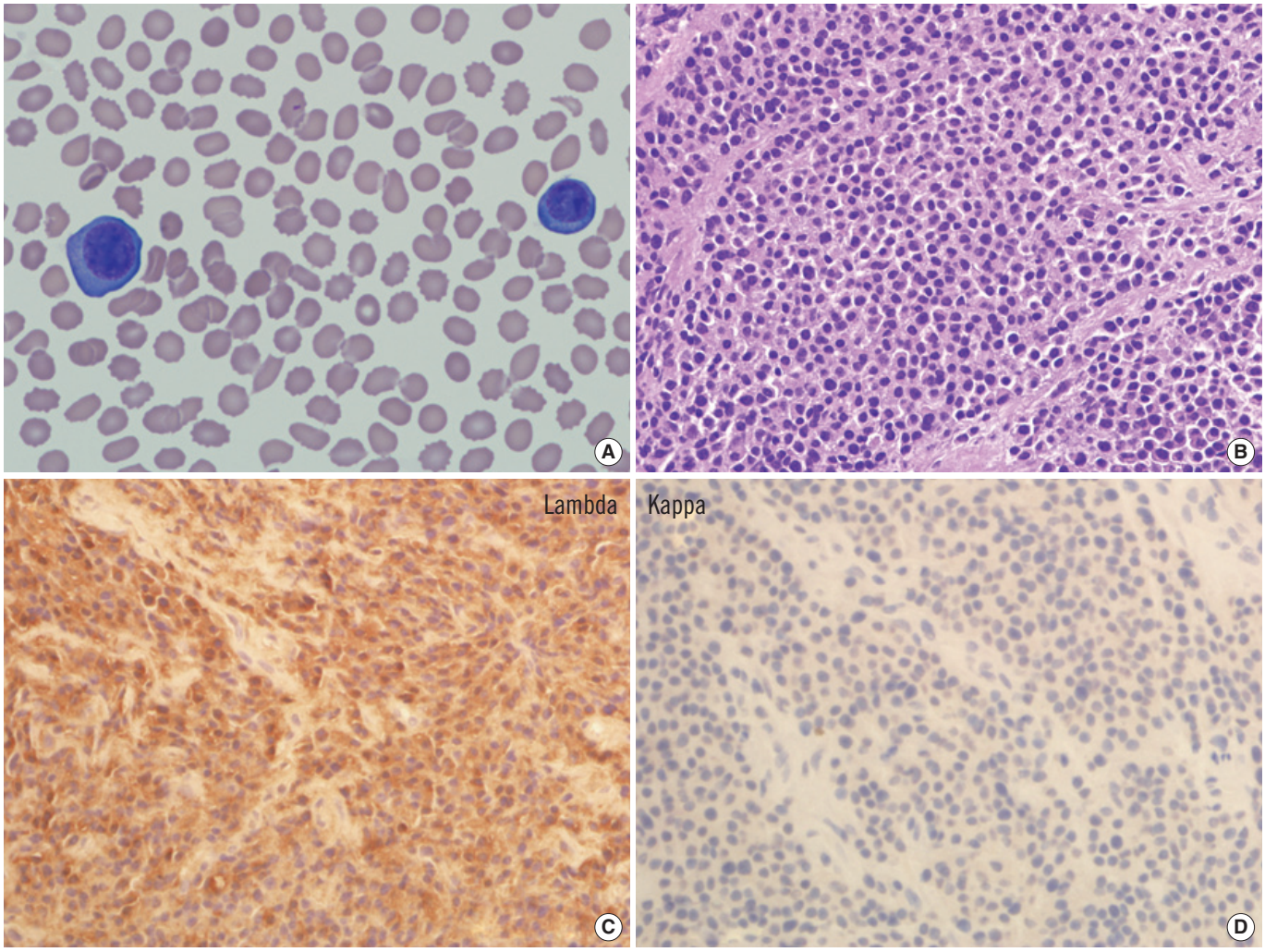

Fig. 3. Examinations of the pleural fluid and biopsy. In the cytospin of pleural fluid, plasma cells characterized by basophilic cytoplasm, eccentric nucleus and perinuclear halo were predominantly observed (A, Wright stain, ×1,000). In the pleural biopsy, homogenous infiltrations of plasma cells were identified (B, H&E stain, ×400). Lambda restriction was confirmed (C, immunohistochemical stain, ×400), while kappa was negative (D, immunohistochemical stain, ×400) in the pleural specimen.

served, as in this case, a precise diagnosis of PCM is difficult when only clinical and imaging studies are conducted. In order to discriminate extramedullary PCM from other malignancies, biochemical assays such as electrophoresis or FLC assay in body fluid are very helpful to confirm the presence of monoclonal components when performed along with cytologic examinations of the pleural fluid.

Authors' Disclosures of Potential Conflicts of Interest

No potential conflicts of interest relevant to this article were reported.

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