Excision of Extramedullary Plasmacytoma in a Hilar Lymph Node

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ABSTRACT —— ***Background***. Extramedullary plasmacytoma is a tumoral lesion not associated with osseous lesions of plasma cells in the final stage of B-lymphocyte differentiation. Extramedullary plasmacytoma generally occurs in the region of the upper aerodigestive tract; but rarely occurs in hilar lymph nodes. ***Case***. A 52-year-old man presented with a productive cough. Chest CT scan revealed a 40×30 mm tumor in the left pulmonary hilum. Tumor markers were within normal ranges, and there were no abnormal findings on bronchoscopy. The tuberculin skin test was positive. Because a malignant tumor could not be ruled out by preoperative examinations, the patient underwent thoracoscopic examination and biopsy. The biopsy specimen revealed extramedullary plasmacytoma with IgG and κ-chain monoclonality on immunohistochemical staining. ***Conclusion***. We report a very rare case of extramedullary plasmacytoma. (*JJLC*. 2006;46:723-726)

KEY WORDS —— Extramedullary plasmacytoma

CASE

Current history: A 52-year-old man employed as a factory workman (no exposure to a dusty environment) with a 32-year history of smoking 20 cigarettes per day (Brinkman Index 640) complained of chronic productive cough during the previous year. Chest roentogenography revealed an abnormal mass (Figure 1). Chest CT scan revealed a 40×30 mm tumor in the left pulmonary hilum (Figure 2). A thorough clinical examination failed to establish a definitive diagnosis. Although he had no bloody sputum, the probability of a malignant tumor could not be ruled out. Consequently, a biopsy was performed for diagnostic purposes.

Findings on first examination included a height of 156 cm and weight of 46.3 kg, body temperature of 36.5℃, and blood pressure of 132/90 mmHg with a pulse rate of 76 beats/min. Breath sounds were normal. No superficial lymphadenopathy was evident. Personal history was unremarkable. Laboratory studies for preoperative examinations on admission included a white blood cell count of 10,200/mm^3, serum protein of 7.4 g/dl, albumin of 4.3 g/dl, calcium of 8.7 mg/dl, phosphorus of 2.8 mg/dl, blood urea nitrogen of 18.2 mg/dl, creatinine of 1.0 mg/dl, and β-D glucan of 23.2 pg/ml. Urine analysis revealed the following: pH 6.5, protein (−), sugar (−), and red blood cell (−). Tumor markers of carcinoembryonic antigen, cytokeratin 19 fragment, and pro-gastrin-releasing peptide were within the reference ranges. Bone and Ga-scintigraphy showed no abnormal deposition. Serum immunoelectrophoresis was not performed. A tuberculin skin test showed double reddening (51×38 mm) and induration. Bacterial cultures (blood and sputum) were negative for general bacteria, tubercle bacillus, and other organisms. Sputum cytology was Class II. Bronchoscopy on brushing and lavage cytology was Class I. Chest roentogenography showed a tumor shadow noted in the left hilum (Figure 1). Chest CT imaging showed a tumor with a smooth border and poor contrast in the left pulmonary hilum; the tumor did not originate in the left main bronchus or the left pulmonary artery; there were no lesions in the lung field nor mediastinal lymphadenopathy (Figure 2).

We excised the tumor. Surgical findings indicated that the tumor in the left hilum was a mass neighboring to the left pulmonary artery and the left main bronchus. Frozen-section examination during surgery indicated plasma cell granuloma. In sections of the tumor, necrosis

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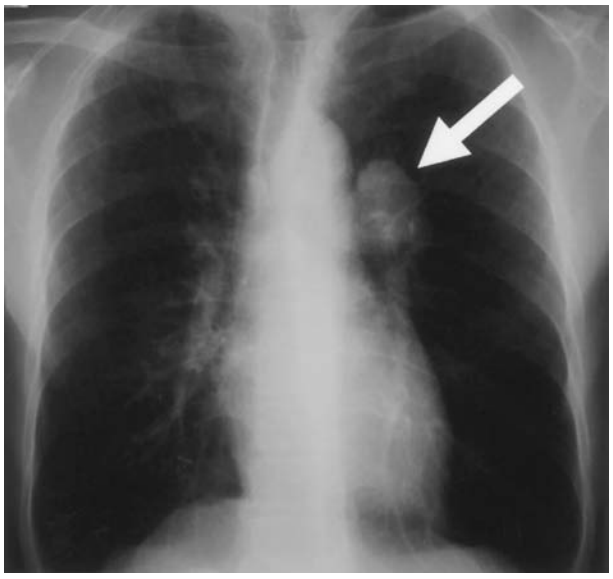

Figure 1. Chest X-ray. The tumor in the left hilar region (arrow).

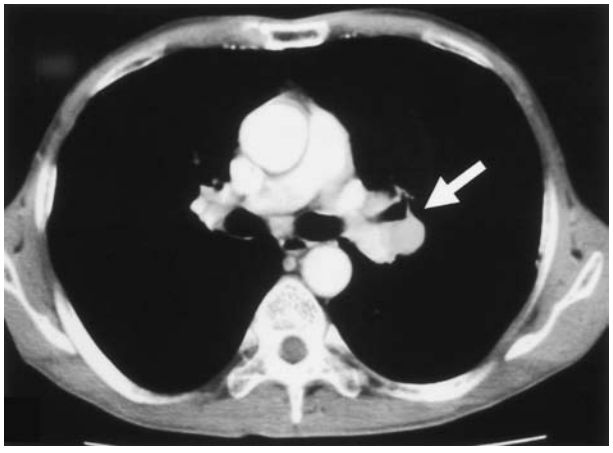

Figure 2. CT image of the chest (contrast-enhanced). The tumor (arrow) has a regular, smooth, and poorly enhanced margin. The tumor compresses the left primary bronchus and left pulmonary artery but has not invaded. No lesions nor mediastinal lymphadenopathy were observed in the lung field.

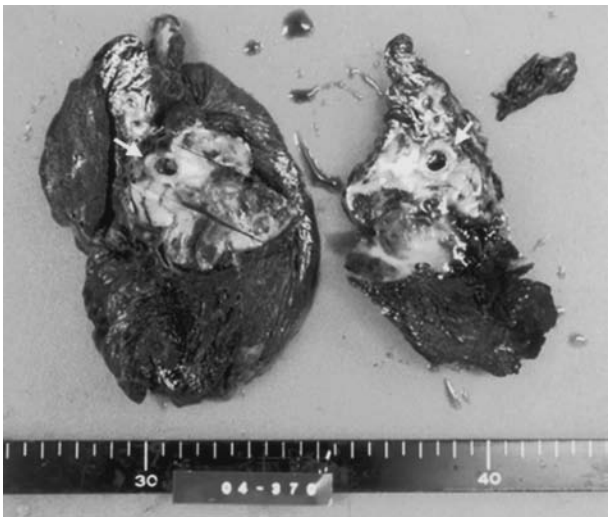

Figure 3. The removed specimen. The tumor surrounded the left pulmonary artery and left primary bronchus (arrows). The cut surface of the tumor reveals partial necrosis.

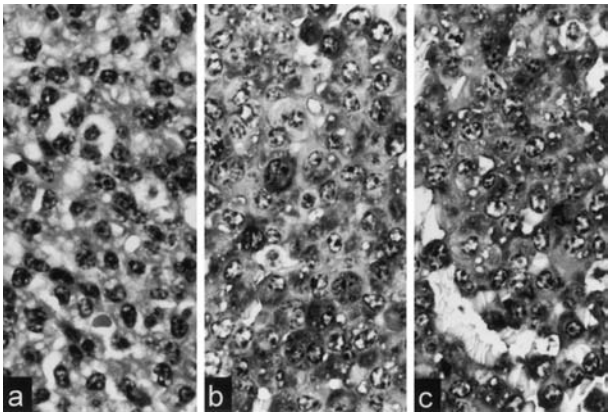

Figure 4. **a**) Hematoxylin and eosin staining. The tumor consists of mature plasma cells, but there are no Russell bodies. **b**) IgG staining and **c**) κ-chain staining are diffusely positive.

was partially noted on the cut surface (Figure 3). Because the tumor was located in the pulmonary hilum, total left pneumonectomy was performed to avoid recurrence.

Histopathological findings showed the tumor comprised mature plasma cells. Based on the findings of immunohistochemical staining, which revealed monoclonal proliferation of plasma cells positive for anti-IgG and anti-κ-chain, the tumor was judged to be a plasmacytoma. Normal lymph node structure remained in the peripheral epithelial tissue of the tumor (Figure 4). There were no lesions suggesting tuberculosis in the lung tissue.

One year post-surgery, signs and symptoms suggestive of recurrence were not observed. A tuberculin skin test six months after the surgery was negative. Extramedullary plasmacytoma sometimes progresses to multiple myeloma, indicating the need for careful follow-up.

DISCUSSION

The patient had an extremely rare extramedullary plasmacytoma (EMP) in the hilum of the left lung. After surgical removal of the tumor with the left lung, EMP was diagnosed immunohistochemically. Seven cases with EMP at the hilum of the lung have been reported in the literature. Plasmacytomas derive from plasma cells that are in the final stage of B-lymphocyte differentiation. The cells divide into two types, medullary and extramedullary types. The medullary type is associated with bone lesions; however, the extramedullary plasmacytoma (EMP) is not. In addition, the medullary type can be further divided into two subtypes, solitary plasmacytoma of bone (SPB) and multiple myeloma (MM). The former tends to form tumors, and the latter consists of undifferentiated cells.[1-4] An analysis of 943 patients with plasmacytoma revealed that 880 (93.3%) of 943 patients had multiple myeloma (MM) and 22 (2.3%) had extramedullary plasmacytoma (EMP). Specifically, the frequency of MM was approximately 40 times higher than that of EMP.[5] EMP frequently occurs (in 74% to 82% of cases) in the nasal cavity, paranasal cavity, larynx, and pharynx, the region of the upper aerodigestive tract (UAD),[3,6] lymph nodes are well-developed in the UAD region and are susceptible to external stimulation. The occurrence of EMP in a hilar lymph node, as in the present case, is very rare. Wiltshaw[3] reported that the incidence of EMP in the respiratory system outside the UAD was 1.5%. In 2001, Wise et al.[7] summarized 45 cases of EMP in the lung or pulmonary hilum, which included 24 cases of EMP identified by immunohistochemical staining and serological examination, 7 of the cases were discovered in the pulmonary hilum.

Diagnosis of EMP requires exclusion of MM. In the present case, electrophoresis was not performed to investigate M-protein or Bence-Jones protein. However, immunohistochemical examination of resected specimens revealed the presence of monoclonal immunoglobulin, thereby excluding the possibility of MM. Rosai[8] reported that M-protein and Bence-Jones protein were found in 50% of patients with MM, and Salmon[9] reported that electrophoresis failed to detect abnormal proteins in the blood when the number of tumor cells was less than 2×10^{10}/ml. In view of these findings, it is necessary to immunohistochemically demonstrate the absence of polyclonal antibodies in the tumor to exclude the diagnosis of MM, particularly in patients for whom electrophoresis is not performed. Bone marrow aspiration and whole-body bone radiography focusing on the cranial and long bones may also be needed in patients who do not undergo excision.

Immunohistochemical staining is essential in differentiating plasmacytoma from plasma cell granuloma. In the present case, frozen-section examination during the operation indicated plasma cell granuloma. In plasma cell granuloma, polyclonal immunoglobulins were immunohistochemically observed, but in the present case monoclonarity IgG and κ-chain staining was observed leading to the diagnosis of plasmacytoma. For treatment of EMP, radiotherapy and chemotherapy have been provided as supplemental therapy in addition to surgical excision. Chemotherapy includes melphalan prednisolone (MP), and previously, immunotherapy included picibanil, Maruyama-vaccine, or krestine. Wiltshaw[3] and Alexiou et al.[6] reported that these supplemental treatments did not improve the survival rate after surgical excision. In the present case, infiltration and progression of the tumor were not observed, and complete excision of the tumor was performed; therefore, no supplemental therapy was provided. However, metastasis to the bones, lymph nodes, and soft tissues has been observed in 40% of cases of EPM[3]; many cases of recurrence have been reported and conversion to MM was observed in 14% to 36% of EPM cases.[6,10,11] Alexiou et al.[6] reported that the 10-year survival rate of patients with EPM after surgical excision alone was 50%. Postoperative recurrence or conversion to MM was not observed in this patient, though careful continued follow-up is necessary.

In the present patient, an intracutaneous tuberculin test was positive before the surgery but subsequently was negative. The intracutaneous tuberculin test employs an immune response mediated by T lymphocytes. However, EMP, a B-lymphoid tumor, may have affected the T lymphocytes, possibly resulting in the negative intracutaneous tuberculin test result. This mechanism is uncertain and highly speculative. However, the phenomenon is still interesting, since many of the biological properties of EMP remain unclear.

The incidence of EMP is low, and the mode of proliferation and progression of EMP vary, with different clinical features depending on the primary site of occurrence. The biological characteristics of EMP remain to

be clarified, and no established methods of confirmation of diagnosis or therapy are available. Thus, EMP is considered a disease of unknown pathogenesis for which further research is necessary.

CONCLUSION

We encountered a case of extramedullary plasmacytoma that occurred in a hilar lymph node. This was a very rare case, and since no established methods exist for diagnosis or treatment, we report the case here with a discussion of the literature.

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