Case Report

Long Survival after Resection for Lung Metastasis of Malignant Peripheral Nerve Sheath Tumor in Neurofibromatosis 1

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A 31-year-old man with neurofibromatosis 1 (NF1) was admitted for the treatment of solitary lung tumor. Nine months earlier he had undergone a large resection for malignant peripheral nerve sheath tumors (MPNSTs) in his back. Surgical resection of the right lower lobe was performed, and the tumor was pathologically diagnosed as a metastasis of MPNST. The survival of patients with pulmonary metastasis of MPNST is extremely poor, especially of those with NF1, but this patient has survived 5 years without recurrence. Based on our knowledge of the literature, a 5-year survival is extremely rare, and select patients have benefited from a resection of pulmonary metastasis. (Ann Thorac Cardiovasc Surg 2008; 14: 322–324)

Key words: lung metastasis, malignant peripheral nerve sheath tumor, neurofibromatosis 1

Introduction

Malignant peripheral nerve sheath tumors (MPNSTs) are high-grade malignant neoplasms with a high risk for local and distant failures. They are rare tumors in the general population, occurring more commonly in patients with neurofibromatosis 1 (NF1) (von Recklinghausen's disease), with an incidence of 2%–5%. The survival duration of patients who have developed pulmonary metastasis is extremely poor. Based on our knowledge of the literature, a 5-year survival is rare. We report a case of MPNST in a patient with NF1 who survived 5 years without recurrence after a pulmonary resection for solitary lung metastasis.

Case Report

A 31-year-old man was admitted to our hospital with a solitary lung tumor. Nine months earlier, he had undergone a large resection in his back, chemotherapy (interferon, doxorubicin, and cyclophosphamide), and radiotherapy (Iridium-192 sources by brachytherapy, total 50 Gy) for MPNST. He had experienced no pain, cough, hemoptysis, or other respiratory symptoms through his clinical course. A chest X-ray showed a sharply demarcated mass shadow in the right lower lung field. A serial chest CT showed a sharply demarcated solitary tumor, which measured 3.5 × 3.5 cm on S8 of the right lung (Fig. 1). The patient underwent a surgical resection of the right lower lobe under video-assisted thoracic surgery with the diagnosis of metastasis from MPNST in March 2000.

Grossly, the tumor was solid and firm, measuring 2.7 × 2.7 × 2.5 cm. The cut surface showed a yellow-white solid tumor, without hemorrhage or necrosis (Fig. 2). Microscopically, the tumor consisted of spindle cells and epithelioid cells. The former cells showed a fascicular growth pattern. The latter cells showed glandular differentiation. The spindle-shaped cells had hyperchromatic nuclei with multiple mitosis (Fig. 3). Immunohistochemically, the tumor cells, including spindle-shaped cells and glandular epithelioid cells, showed high positivity for the S-100 protein, and rhabdomyoblast cells showed positivity for the desmin and myoglobin. These

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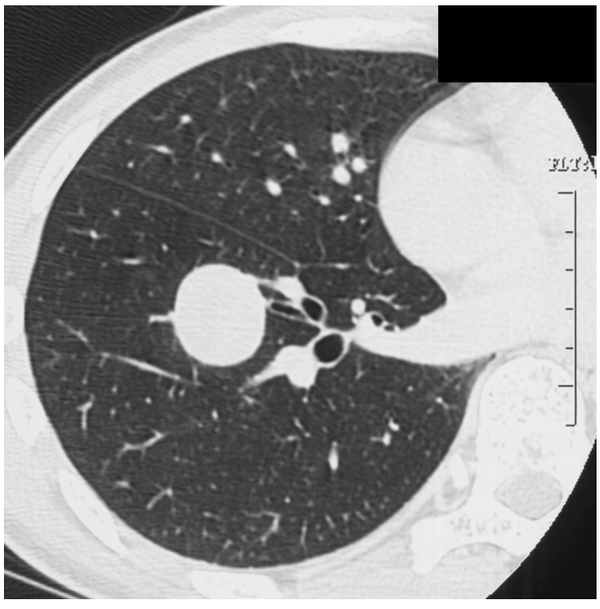

Fig. 1. Chest CT showing a sharply demarcated solitary mass.

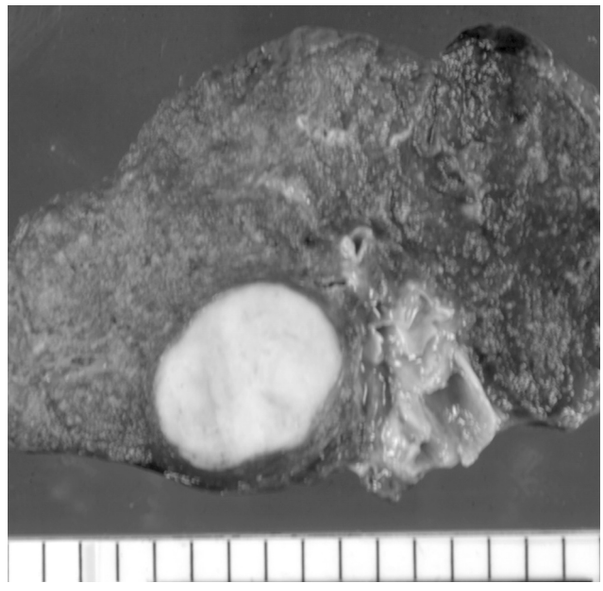

Fig. 2. Macroscopic view of the tumor showing yellow-white solid tumor, without hemorrhage or necrosis.

microscopic findings are consistent with the metastasis of MPNST with glandular differentiation. The glandular differentiation was not observed in the primary lesion (back tumor).

The patient had an uneventful postoperative course and was discharged on day 14 after surgery. At his request, he had no adjuvant chemotherapy and is alive without recurrence 5 years after the pulmonary resection.

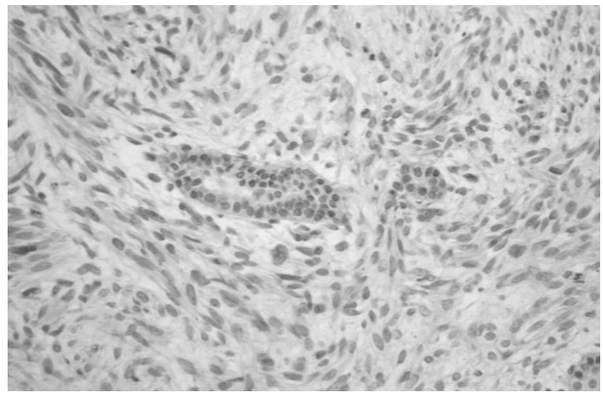

Fig. 3. Microscopic view of the tumor, showing the spindle-shaped cells with hyperchromatic nuclei with multiple mitosis and glandular epithelioid cells. (HE stain: ×200)

Discussion

NF1 is a common autosomal dominant disorder in which affected individuals may develop benign and malignant tumors. Typically, patients with NF1 have pigmentary abnormalities (cafe-au-lait macules, skinfold freckling, and Lisch nodules) and benign tumors (neurofibromas). They also have an increased risk of malignancy, including MPNSTs.[1)]

Sarcoma arising within a peripheral nerve has been termed neurofibrosarcoma, malignant schwannoma, and MPNST. Criteria for the diagnosis of MPNST were as follows: (1) tumor origin from a nerve, demonstrated either by surgery or by gross or microscopic examination; (2) association with a contiguous neurofibroma. The estimated incidence of MPNST in patients with NF1 ranges from 2% to 5% compared with only 0.0001% for the general population. More than 50% of patients with MPNSTs also have NF1.[1,2)] MPNSTs arising in patients with NF1 are usually diagnosed at an earlier age and have been reported to have a worse prognosis than those arising in patients without NF1.[2)] The most important features adversely influencing prognosis are the presence of NF1, tumor size > 5 cm, and extent of resection. The overall survival rate is 16% for the group with NF1 and 53% for the group without it.[3)]

Regardless of treatment, recurrence significantly reduces survival time. The most common metastatic sites are in the lung, followed in decreasing order of

frequency by soft tissue, bone, liver, intra-abdominal cavity, adrenal glands, diaphragm, mediastinum, brain, ovaries, kidneys, and retroperitoneum.[3] The survival of patients after having developed pulmonary metastasis is extremely poor. Sordillo et al. reported only 3 of 71 patients survived more than 2 years after metastasis was discovered.[5] Wanebo et al. reported that those with pulmonary metastasis survived an average of 3 months, though 2 patients receiving pulmonary resection lived an additional 9 to 27 months.[6] Several criteria have been proposed to select patients who will benefit from a resection of pulmonary metastasis. There is general agreement that the postoperative survival time of metastatic soft tissue sarcoma depends on the number of metastatic nodules, the disease-free interval, and tumor doubling time.[4] Hruban et al. also observed long-term survival for MPNST patients with 6 or fewer nodules in the lung.[2] Recently, Rehders et al. described the benefits of surgical treatment of lung metastasis in soft tissue sarcoma.[7] But the only patients at an increased risk of early tumor recurrence and worse prognosis were those with a predisposing disease for soft tissue sarcoma, such as NF1. In fact, the 5-year survival was 25% in patients without sarcoma predisposition, but 0% in patients with sarcoma predisposition.[7]

In conclusion, we have reported a rare case of MPNST in a patient with NF1 who survived 5 years without recurrence after pulmonary resection for solitary lung metastasis. This patient with NF1 must be followed up for MPNST development after a short interval.

References

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