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Case Report

Thymoma Metastasis to the Semimembranosus Muscle

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Keywords
Thymoma · Semimembranosus muscle · Extrathoracic metastasis

Abstract
Thymoma is the most common thymic epithelial tumor whose classification was first introduced in 1999. Type B2 thymoma is considered a moderate/high-risk tumor; however, extrathoracic metastases are extremely rare with limited reports to date. In this report, we present a rare thymoma metastasis to the semimembranosus muscle, which was resected with a wide margin after confirmation by open biopsy. At the final follow-up after 1 year, no local recurrence has been observed.

Introduction

Thymoma is a neoplasm usually arising in the mediastinum and exhibits differentiation towards the thymic epithelium. Thymoma metastases are usually confined to the thoracic organs and extrathoracic metastases are extremely rare. We present a case of thymoma metastasis to the skeletal muscle, a rare presentation with only one other case reported in published studies.

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Case Report

An 84-year-old male presented with a right posterior thigh mass that had persisted for 4 years. Due to the gradual growth of the mass, he was referred to our institute for further treatment. He had had no particular incidence of trauma, but had suffered from type B2 thymoma and received resection 14 years prior to the referral. A small nodule in the lung was found 5 years after the thymoma resection, but due to the lack of change in its size, it had been observed only with imaging modalities. On initial physical examination, the overlying skin was smooth and nonadherent without redness or hotness. On palpitation, there was a 3 × 3 cm painless mass in the posterior thigh. The range of motion of the right hip and knee was full without limitations. On the plain radiographs, there was no calcification or scalloping of the femur (Fig. 1). On the magnetic resonance imaging (MRI) scans, the lesion resided in the semimembranosus muscle and was depicted as low intensity on the T1-weighted image (T1WI) and as iso- to high intensity on the T2-weighted image (T2WI), which was enhanced after gadolinium-based contrast administration (Fig. 2). The blood examination results were all in the normal range. Differential diagnosis included neurogenic tumors and malignant soft tissue lesions such as myxofibrosarcoma and leiomyosarcoma; therefore, open biopsy was performed. On histopathologic examination, the lesion was composed of oval to polygonal neoplastic cells with small round-to-oval nuclei, admixed with variable amounts of lymphocytes compatible with type B2 thymoma metastasis (Fig. 3). Wide resection with a 1-cm margin was performed 3 weeks after biopsy and at the final follow-up after 1 year, no local recurrence was observed.

Discussion

Thymoma is the most common tumor of the mediastinum accounting for up to 40% of all mediastinal tumors [1]. It is categorized into type A, AB, B1, B2, and B3 according to the 2004 World Health Organization classification of thymic epithelial tumors [2]. In general, type A, AB, and B1 thymomas are considered no/low-risk tumors compared to type B2 and B3 which are considered moderate/high-risk tumors. It is an aggressive neoplasm characterized by its local invasiveness with a local recurrence and metastasis rate of approximately 30% [3]. Among the metastases, pleural involvement has been reported to be the most frequent site followed by the lung and thoracic lymph node [4].

Extrathoracic metastases are rare causing difficulty in diagnosis. The exact incidence of extrathoracic metastases from thymoma is still unclear because thymoma has been associated with an increased incidence of secondary malignancies and past reports lack histological confirmation of the suspected metastases. Additionally, thymic carcinoma was included in some studies, which has confounded the exact frequency of extrathoracic metastasis. In 1987, Lewis et al. [5] reported on 283 cases of thymoma with a 3% incidence of extrathoracic metastasis and others have reported on metastasis to the liver, kidney, bone, and lymph nodes [6, 7]. Altogether, the incidence of distant metastases has been estimated to be approximately 5% [8]. Distant metastasis to the skeletal muscle is extremely rare with only one previous report of a thymoma metastatic to the biceps brachii muscle [9].

MRI of thymoma is characterized by a smooth contour, round shape, distinct capsule and varying prevalence of low signal foci within the high-signal-intensity mass on T2WI. The increased frequency of heterogeneous intensity on T2WI has been associated with the aggressiveness of the tumor [10]. These characteristics were compatible with our case; how-

ever, other benign and malignant soft tissue tumors have similar features making a definitive diagnosis difficult. Recently, FDG-PET has been reported as a useful tool to detect lymph node metastasis and/or distant metastasis with the potential to distinguish low-risk thymoma from other carcinomas [11]. When there is a past history of thymoma and a combination of various imaging findings is compatible, thymoma should be included in the differential diagnosis even for lesions in the muscle.

The prognosis of thymic tumor has been reported to be affected by its histological subtype and presence of extrathoracic metastasis [12]; therefore, treatment for its extrathoracic extension is important. The treatment strategy for distant metastasis is still controversial, but complete resection for local recurrence or even metastasis has been demonstrated to provide survival advantage compared to nonsurgery cases [13]. Incomplete re-resection of recurrent disease has also shown survival advantage compared to nonsurgery case, which suggests potential efficacy of debulking in thymoma cases [14], but its application for extrathoracic extension is still unclear. Hamaji and Burt [15] recently compared treatment outcome of surgery to nonsurgery cases of stage IV thymoma and showed that overall survival was significantly better in the surgery groups. Furthermore, there was no significant difference in overall survival between complete resection and incomplete resection, which suggests that the same idea of debulking surgery might apply for distant metastasis cases. Nevertheless, a different distribution and burden of disease among individuals should be taken into account, and further clinical studies are needed to clarify the efficacy of surgery in treating stage IV thymoma patients.

Conclusion

We have reported a rare case of thymoma metastasis to the semimembranosus muscle. Although uncommon, thymoma metastasis should be considered in the differential diagnosis of soft tissue tumor in the elderly with a past history of thymoma treatment. The rarity of this tumor metastasizing to the skeletal muscle has not enabled prediction of the outcome; therefore, an additional follow-up is warranted.

Statement of Ethics

The authors have no ethical conflicts to disclose. Informed consent was obtained from the patient for this case report and any accompanying images.

Disclosure Statement

The authors have no conflicts of interest to declare.

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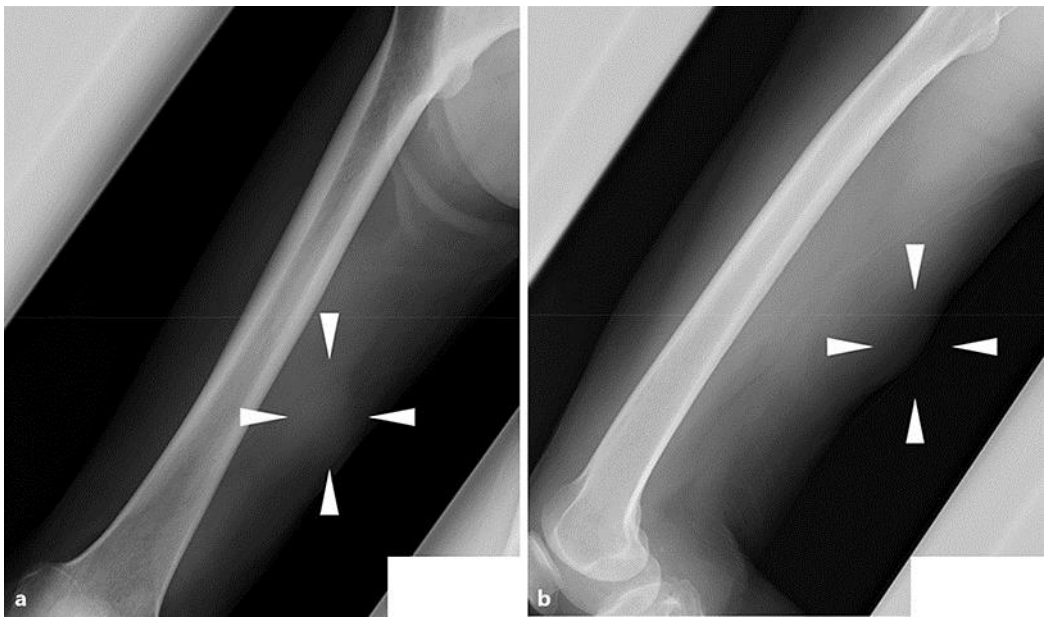

Fig. 1. Radiographs of the thigh at the initial presentation. **a** Anteroposterior view. **b** Lateral view. Abnormal opacity without calcification can be seen in the posteromedial thigh (white arrowheads).

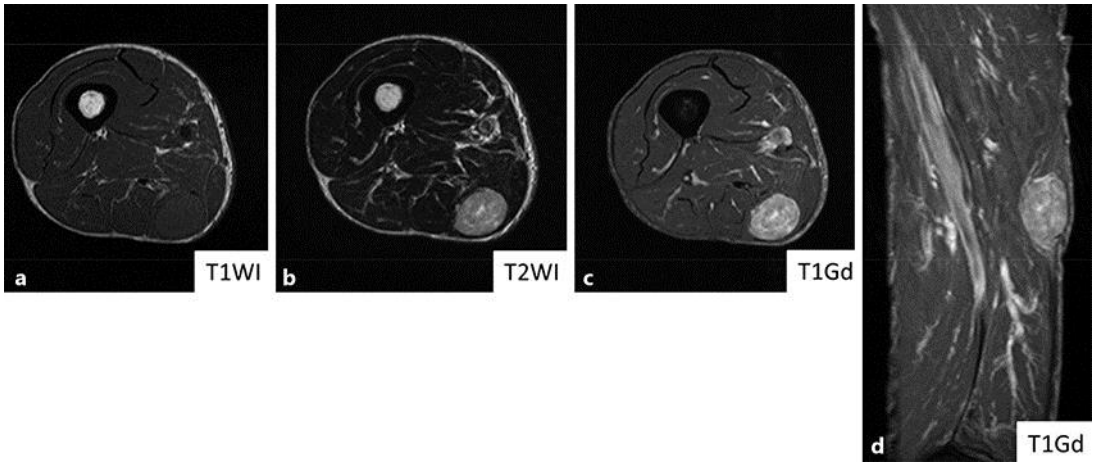

Fig. 2. On MRI, the lesion was depicted as a low-intensity lesion on T1WI (**a**) and as a high-intensity lesion on T2WI (**b**) in the semimembranosus muscle. The lesion was enhanced after gadolinium-based contrast administration (**c**, **d**).

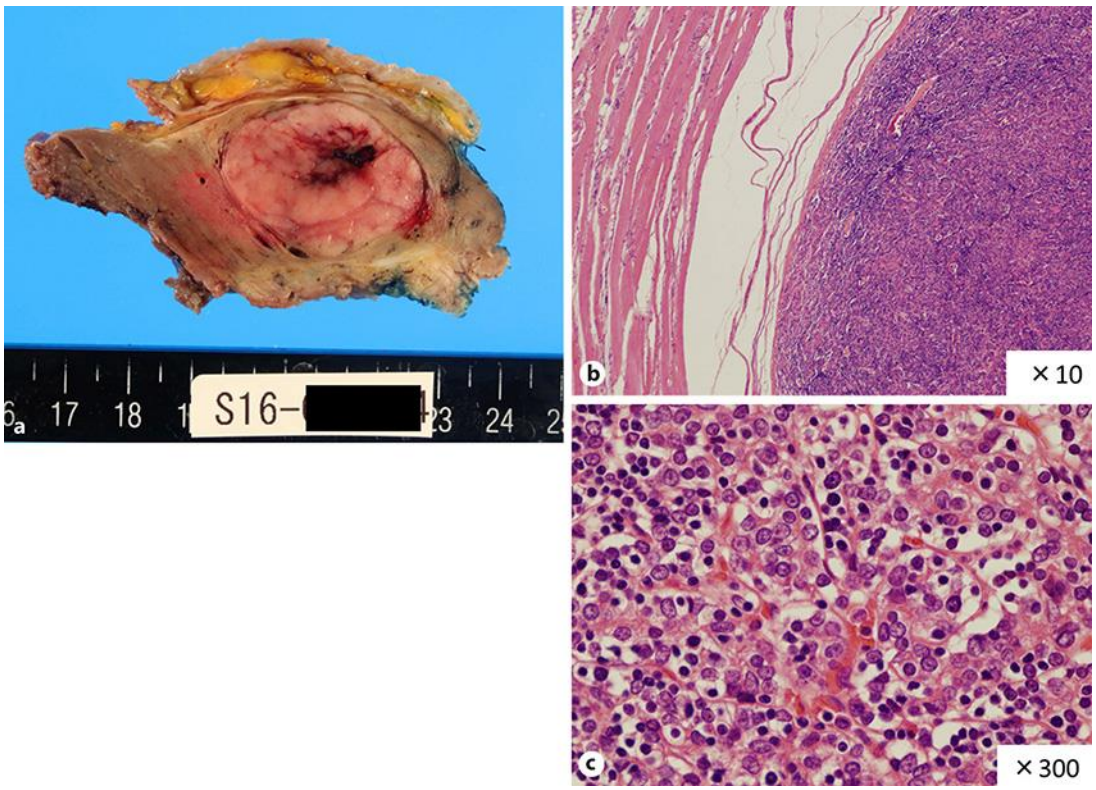

Fig. 3. The cut surface of the tumor showed a white to tan red solid mass encapsulated in the muscle (**a**). Under hematoxylin and eosin staining, the tumor showed expansive growth inside the muscle (**b**), and was composed of oval to polygonal neoplastic cells with small round-to-oval nuclei admixed with variable amounts of lymphocytes, compatible with type B2 thymoma (**c**).