A case of medial pterygoid muscle metastasis of lung cancer presenting with trismus

Takumi Oshima^{1,2} · Hirofumi Kuno¹ · Kotaro Sekiya¹ · Hayato Tomita^{1,3} · Tatsushi Kobayashi¹ · Masahiko Kusumoto^{1,4}

Received: 5 March 2019 / Accepted: 24 April 2019 / Published online: 4 May 2019
© The Japan Society of Clinical Oncology 2019

Abstract

A man in his 60s with severe trismus was referred to our hospital. Based on computed tomography (CT), positron emission tomography/computed tomography (PET/CT), and biopsy, his initial diagnosis at another hospital was oropharyngeal cancer with cervical lymph node and distant metastases. After the review of the contrast-enhanced CT and reevaluated PET/CT images, we updated his diagnosis to left primary lung cancer that had metastasized to the cervical lymph nodes, bones, and skeletal muscles including the right medial pterygoid muscle. Since metastasis from primary lung cancer to the contralateral cervical lymph node is relatively rare, cervical lymph node metastases were thought to have originated from the metastatic lesion in the right medial pterygoid muscle. As metastases in the masticator muscles from lung cancer are rare, it is sometimes necessary to differentiate from primary head and neck lesions. Here, we report a rare case of lung cancer with the onset of trismus due to metastasis to the masticator muscle and perineural spread along the mandibular nerve.

Keywords Lung cancer · Skeletal muscle metastasis · Medial pterygoid muscle · Trismus

Introduction

When a malignant tumor and metastatic lesions are found, an accurate diagnosis of the primary lesion location is important. However, this can be difficult when multiple lesions are found at the same time. Moreover, the main symptom of the disease is not always caused by the primary site; sometimes it is due to the metastatic lesions. When unusual imaging features are found, careful diagnosis of the origin of the disease is important, as lung cancer can often cause distant

metastasis to other organs such as the brain, bone, liver, and adrenal glands. The most common sites of metastasis to skeletal muscles (which, incidentally, are less common sites for metastasis) from lung cancer are the lower limbs, upper limbs, abdominal wall, and chest wall, while lung cancer metastases to masticator muscles are extremely rare.

In this report, we present a case of lung cancer with trismus onset due to metastasis to the medial pterygoid muscle and mandibular nerve involvement.

Case report

A man in his 60s with a smoking history of 46 pack-years presented to the emergency room of a local hospital for severe trismus. Several weeks prior, he was diagnosed with and treated for temporomandibular joint disorder but showed no improvement. As his condition worsened, neck computed tomography (CT) and fluorodeoxyglucose-positron emission tomography (FDG-PET)/CT were performed at the local hospital. Neck CT revealed a huge mass in the right oropharyngeal region with associated enlargement of the right cervical lymph nodes. PET/CT showed increased FDG uptake in the neck mass, cervical lymph nodes as well as

✉ Hirofumi Kuno
hkuno@east.ncc.go.jp

¹ Department of Diagnostic Radiology, National Cancer Center Hospital East, 6-5-1, Kashiwanoha, Kashiwa, Chiba 277-8577, Japan

² Division of Diagnostic Radiology, Tokyo Medical and Dental University, 1-5-45 Yushima, Bunkyo-ku, Tokyo 113-8510, Japan

³ Department of Radiology, St. Marianna University School of Medicine, 2-16-1, Sugao, Miyamae-ku, Kawasaki, Kanagawa 216-8511, Japan

⁴ Department of Diagnostic Radiology, National Cancer Center Hospital, 5-1-1, Tsukiji, Chuo-ku, Tokyo 104-0045, Japan

lung and multiple skeletal muscles. Subsequent fine needle biopsy of his right cervical lymph nodes was performed, and the Papanicolaou stained smear showed sheet-like cluster with stratification, nuclear atypia, and increase of nuclear chromatin. Based on these findings, the tumor was cytologically diagnosed as squamous cell carcinoma (SqCC). Given the initial suspicions of oropharyngeal cancer, he was referred to our hospital for further workup and management. We performed contrast-enhanced CT examination from his head to chest at our hospital (Fig. 1), and radiologists reevaluated the PET/CT. Contrast-enhanced CT demonstrated an invasive mass located mainly in the right medial pterygoid muscle without extending to the oropharyngeal mucosa. In addition, continuous soft tissue mass showing enhancement was observed in the right mandibular nerve into the foramen ovale, which suggested perineural spread along the third division of the trigeminal nerve from the medial pterygoid muscle metastasis. Chest CT showed pulmonary emphysema and a 3-cm mass in the lower lobe of the left lung, which showed spiculation, bronchus and vascular involvement, and pleural indentation. Left hilar lymph node and subaortic mediastinal lymph node were swollen, and the lymph nodes were diagnosed as metastasis. Several nodules less than 1 cm in size were also found in both the lungs. In the multidisciplinary tumor board discussion, these CT findings are more consistent with lung cancer with multiple lung and skeletal muscle metastases, rather than primary oropharyngeal cancer. Based on this decision, the final diagnosis was changed to left primary lung cancer with metastases to lymph nodes, bones, and skeletal muscles including the right medial pterygoid muscle (T2aN3M1c Stage IVB). Pulmonary physicians were consulted and were prepared to treat the patient, but the treatment strategy was soon changed to best supportive care. Following a few rounds of palliative radiation therapy, the patient died of gastrointestinal hemorrhage, which was assumed to have been caused by disseminating intravascular coagulation 148 days after the diagnosis.

Discussion

Compared to other organs, soft tissue is not a common site of lung cancer metastasis. A retrospective autopsy study revealed that soft tissue metastases in lung cancer patients occurred in only 3.3% of the cases [1]. Furthermore, lung cancer metastasis to cervical skeletal muscles is extremely rare. In this case, CT initially revealed what looked to be a mass in the oropharyngeal region and multiple cervical lymphadenopathies. In addition,

the patient's severe trismus due to the mass on the masticator muscle prevented sufficient clinical examination of the oropharyngeal mucosa. Thus, an accurate initial diagnosis of primary lung cancer was difficult. With careful examination, it would have been possible to notice that the cervical mass was located within the right medial pterygoid muscle, and that it was not in contact with the oropharyngeal mucosa. These findings suggest a mass in the muscle rather than oropharyngeal cancer.

Lung cancer metastasis to cervical lymph nodes is also relatively rare, and only a limited number of cases present with advanced lymphatic metastases. In contrast, the present case had unclear metastases to the mediastinal lymph nodes. It is unlikely that the primary lung cancer metastasized directly to the cervical lymph nodes. Rather, we assumed that it was more probable that the lung cancer metastasized to the skeletal muscles in the neck before metastasizing to the cervical lymph nodes.

Fine needle biopsy was performed for our patient, and cytology revealed SqCC. A literature review revealed that the most common histological type of lung cancer to cause skeletal muscle metastases is adenocarcinoma (42%), followed by SqCC (38%), non-small cell lung carcinoma (NSCLC) (8.8%), small cell carcinoma (2.6%), and large cell carcinoma (2.6%) [2]. Lung cancer often metastasizes to other tissues and organs such as the brain (10%), bones (7%), liver (5%), and the adrenal glands (3%) [3, 4]. In contrast, metastasis to the skeletal muscles is much less common for NSCLC [2]; one retrospective study of lung cancer patients reported a frequency of 0.75–9% [5, 6]. The most common sites of skeletal muscle metastases from NSCLC are the lower limbs, upper limbs, the abdominal wall, and chest wall [2]. Lung cancer metastases to masticator muscles are relatively rare, but the exact frequency is not known. Trismus was thought to occur due to the involvement of the mandibular nerve from the medial pterygoid metastasis. Because of its rarity, these cases are easily misdiagnosed as head and neck diseases.

One of the limitations of this case report is the lack of pathological evidence for the lung mass. As the patient's situation worsened quickly, we were unable to biopsy either of the masses in the lungs or the muscles.

When multiple lesions are found, it is important to assess which of the lesions is the primary site. Examining the situation from as many dimensions as possible will help with choosing the best treatment option. To this end, formation of a multidisciplinary tumor board is critical prior to treatment initiation. Collaboration between the clinicians and the radiologists is a key requirement.

Fig. 1 CT images show a mass mainly located in the right masticator space (**a** arrow) and a venous thrombosis (**a** arrowhead). The lesion mimicked oropharyngeal cancer, but CT reveals that the lesion is located inside the medial pterygoid muscle. Continuous soft tissue mass showing enhancement was observed in the right mandibular nerve (**b** arrow) into the foramen ovale (**c** arrow), which suggested perineural spread along the third division of the trigeminal nerve (V3), passing through the skull base. Multiple lymphadenopathies

on the right side of the neck were evident, likely originating from the medial pterygoid muscle metastasis (**d** arrows). Right supraclavicular lymph node metastasis was evident (**e** arrow), with little lymphadenopathy in the mediastinum or pulmonary hilar. Chest CT showed a mass in the lower lobe of the left lung. The mass was spiculated, with bronchus and vascular involvement, which was suspicious of lung cancer (**f** arrow)

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Nguyen NC, Chaar BT, Osman MM (2007) Prevalence and patterns of soft tissue metastasis: detection with true whole-body F-18 FDG PET/CT. *BMC Med Imaging* 7:8
2. Pop D, Nadeemy AS, Venissac N, Guiraudet P, Otto J, Poudenx M et al (2009) Skeletal muscle metastasis from non-small cell lung cancer. *J Thorac Oncol* 4(10):1236–1241
3. Quint LE, Tummala S, Brisson LJ, Francis IR, Krupnick AS, Kazerooni EA et al (1996) Distribution of distant metastases from newly diagnosed non-small cell lung cancer. *Ann Thorac Surg* 62(1):246–250
4. Schuchert MJ, Luketich JD (2003) Solitary sites of metastatic disease in non-small cell lung cancer. *Curr Treat Option Oncol* 4(1):65–79
5. Surov A, Hainz M, Holzhausen HJ, Arnold D, Katzer M, Schmidt J et al (2010) Skeletal muscle metastases: primary tumours, prevalence, and radiological features. *Eur Radiol* 20(3):649–658
6. Perisano C, Spinelli MS, Graci C, Scaramuzzo L, Marzetti E, Barone C et al (2012) Soft tissue metastases in lung cancer: a review of the literature. *Eur Rev Med Pharmacol Sci* 16(14):1908–1914

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.