

An unusual metastasis of lung adenocarcinoma: Biceps brachii muscle

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ABSTRACT

Skeletal muscle metastasis of nonsmall cell lung carcinoma (NSCLC) is a rare occurrence, and the most effective treatment modality is currently unknown. In this case presentation, we report a patient with NSCLC who underwent palliative radiotherapy for biceps muscle metastasis of NSLCS. Our case was a 49-year-old woman who had lung adenocarcinoma with biceps muscle metastasis. She had been followed up for 2 years due to Stage IV lung adenocarcinoma from whom a biopsy was taken from a painful mass in right arm that was found to be compatible with metastasis of lung adenocarcinoma. She had palliative radiotherapy for her painful mass and systemic chemotherapy was planned. After palliative radiotherapy, the pain originating from the metastatic mass in right biceps muscle alleviated. Palliative radiotherapy can be a valuable treatment option for cases with skeletal muscle metastasis.

KEY WORDS: Lung cancer, metastasis, radiotherapy, skeletal muscle

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INTRODUCTION

Lung cancer is the most common cause of cancer-related deaths worldwide.^[1] Eighty percent of all cases are nonsmall cell lung cancer (NSCLC). At the time of diagnosis, approximately 50% of the cases have distant metastasis. The most common sites of metastasis are the brain (10%), bone (7%), liver (5%), and adrenal glands (3%).^[2] Despite the high vascularity and large mass of muscle tissue, skeletal muscle metastasis in lung cancer is rare. The most common presenting complaint of skeletal muscle metastasis is a pain (83%), followed by perceived mass (78%).^[2] Prognosis and the most effective treatment of skeletal muscle metastasis are currently unknown. It is difficult to distinguish primary soft tissue sarcoma from metastatic carcinoma without performing a biopsy.^[3] In

most cases, muscle metastasis is seen after the tumor has widespread lymphatic and distant organ metastasis through blood vessels. In this study, we aim to present a case with lung adenocarcinoma who had biceps brachii metastasis.

CASE REPORT

A 49-year-old nonsmoker female admitted to our clinic with a productive cough, dyspnea, and fatigue 2 years ago. Physical examination revealed crackles on upper zone of the left lung. Computerized tomography revealed a 23 mm × 19 mm lesion with a soft tissue density in a close proximity to the distal part of the left pulmonary artery in anterior segment of left upper lobe and nodules some of which had cavitation in both lungs [Figure 1].

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In bronchoscopy, no endobronchial lesion was detected. Transbronchial parenchymal biopsy and bronchial lavage were obtained from the anterior and posterior segments of left upper lobe. Transbronchial biopsy was reported as lung adenocarcinoma [Figure 2]. Abdominal tomography and brain magnetic resonance imaging (MRI) were all normal in the screening of distant metastases.

The patient was diagnosed as Stage IV lung adenocarcinoma due to contralateral lung nodules and given four cycles of gemcitabine and cisplatin. Vertebral metastases were detected in follow-up. Palliative radiotherapy to vertebral column was applied. The chemotherapy continued with erlotinib. At the 1st year of erlotinib therapy, right arm MRI performed due to pain and swelling of right arm and showed 8.5 cm lesion with hypointensity in T1-weighted series and hyperintensity in T2-weighted series with a regional contrast enhancement located within the right biceps muscle [Figure 3]. Tru-cut biopsy was performed with the guide of ultrasonography. Biopsy taken from the lateral side of the right arm, infiltrative carcinoma were seen with adenoid structures between muscle fibers; and immunohistochemistry with cytokeratin 7 and thyroid transcription factor-1 showed a positive reaction [Figure 4]. Palliative radiotherapy was applied to the

right arm lesion, and chemotherapy regimen was changed as docetaxel and cisplatin.

DISCUSSION

Lung cancer is a leading cause of cancer-related mortality. Despite the advances in diagnosis and treatment, 5-year survival rate is around 14%.^[4] The most common sites of distant metastasis in lung cancer are surrenal glands, liver, bone, and brain.^[5]

Skeletal muscle metastasis of lung cancer was first reported by Fisher *et al.*^[6] Willis, reported 4 skeletal muscle metastases in their autopsy series composed of 500 lung cancer patients.^[7] Skeletal muscle metastasis is a rare occurrence for any tumor with a reported incidence <1%.^[7,8] The most common tumors that cause skeletal muscle metastasis are tumors originating from thyroid, esophagus, stomach, pancreas, colon, rectum, bladder, breast, ovary, and prostate.^[9] The most common sites of muscle metastasis are thigh muscles, iliopsoas, and paraspinous muscles.^[10]

The mechanism of skeletal muscle metastasis is unclear. Despite its rich vascular blood supply and a large mass in the body, it is resistant to hematogenous metastases. Organs that are frequently metastasized, including liver, lung, and bone have rich capillary networks and blood supply. As a result of the muscle metabolism, substances such as lactic acid, free oxygen radicals, and low pH in the environment constitute an infertile medium for proliferating tumor cells.

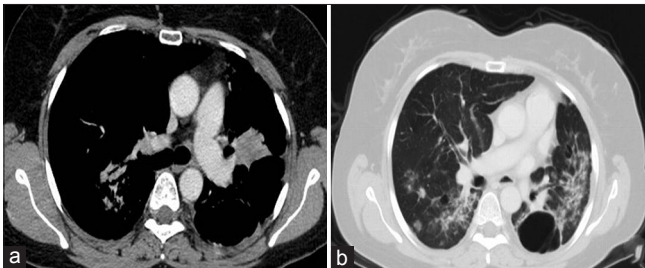


Figure 1: Thorax computerized tomography: 23 mm × 19 mm lesion with a soft tissue density in a close proximity to the distal part of the left pulmonary artery in anterior segment of left upper lobe (a) and nodules some of which had cavitations in both lungs (b)

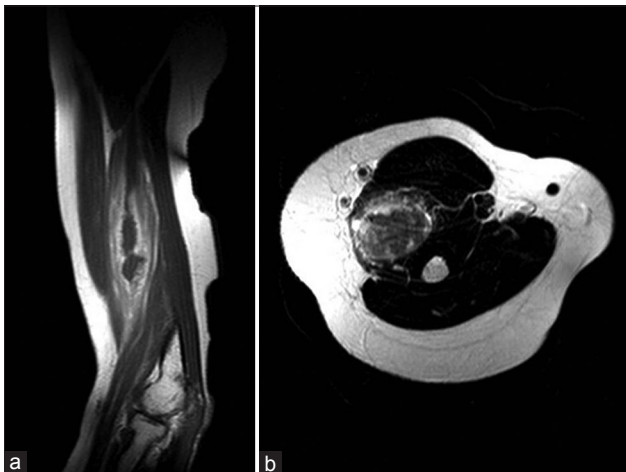


Figure 3: Magnetic resonance imaging of right arm: 8.5 cm lesion with hypointensity in T1-weighted series (a) and hyperintensity in T2-weighted series (b) with a regional contrast enhancement located within the right biceps muscle

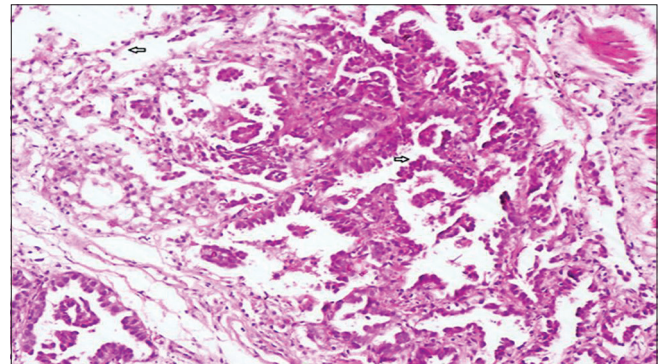


Figure 2: Parenchymal biopsy: Alveoli consisting of cells with marked nuclear pleomorphism and normal alveoli (H and E, ×100)

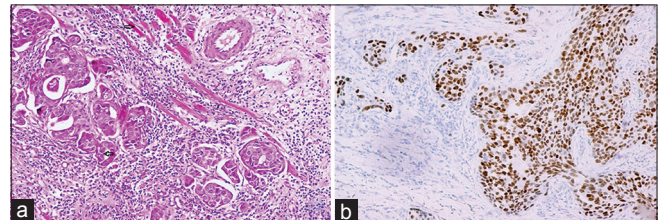


Figure 4: Biopsy specimen: Areas of infiltrative carcinoma forming adenoid structures between muscle fibers (H and E, ×100) (a) and immunohistochemical positivity with thyroid transcription factor-1 staining (TTF-1, ×100) (b)

In addition, mechanical insults due to contractions, high tissue pressure, and widely alternating blood flow are also against the survival of tumor cells.^[11,12]

There are several hypotheses proposed for skeletal muscle metastasis in lung cancer. The most widely accepted hypothesis is the hematogenous route.^[13] In this hypothesis, it is believed that tumor cells are formed through tumor embolism. Some authors suggested that skeletal muscle metastases might originate from abnormal lymph nodes found in the muscle.^[14] In a study by Bocchino, *et al.*^[15] 1754 lung cancer patients treated between 2007 and 2012 were analyzed and 46 (2.6%) had skeletal muscle metastasis. Despite the variations between different studies in terms of the association between histologic subtypes and skeletal muscle metastasis, 40 patients in that study (87%) had NSCLC and 6 had (13%) small cell lung cancer. Among NSCLC patients, 24 (60%) had adenocarcinoma as in our case. The most common initial manifestation of skeletal muscle metastasis is a pain. Pain can be accompanied by extremity swelling. The case presented herein also applied with pain and swelling. The diameter of metastatic mass varies between 1 and 20 cm in different series.^[2,15] In our case, 8.5 cm painful mass originating from lung adenocarcinoma metastatic to biceps brachii muscle was detected. Diagnostic methods for skeletal muscle metastasis are not specific. Direct films usually show only soft tissue shadows. MRI usually reveals hypointense signal in T1 and hyperintense signal in T2. MRI is preferred to distinguish soft tissue metastasis from an abscess, sarcoma, and other conditions.^[16] Similarly, our case had hypointense signal on T1 and the hyperintense signal on T2 series. The optimum treatment and prognosis of skeletal muscle metastasis from lung cancer are unclear. Depending on the clinical characteristics, treatment options include observation, surgery, chemotherapy and radiotherapy.^[15] Chemotherapy and/or radiotherapy may be preferred depending on the mass of primary tumor, extent of metastatic disease, invasion to other organs, and severity of pain. We preferred palliative radiotherapy in our case due to the pain of muscle metastasis. We planned to continue her treatment with chemotherapy. Skeletal muscle metastasis is rare, but it should be kept in mind for patients with lung cancer. Optimal management of muscle metastasis is debated. Radiotherapy can be an effective treatment option for pain palliation in muscle metastasis.

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Conflicts of interest

There are no conflicts of interest.

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