
Distant forearm muscle metastasis from squamous cell lung carcinoma

Nikolaos BARBETAKIS¹, Georgios SAMANIDIS¹, Dimitrios PALIOURAS¹, Eleni MAVROUDI², Ioannis BOUKOVINAS³, Christodoulos TSILIKAS¹

¹ Department of Thoracic Surgery, Theagenio Hospital, Thessaloniki, Greece.

² Department of Anesthesiology, Theagenio Hospital, Thessaloniki, Greece.

³ Department of Clinical Oncology, Theagenio Hospital, Thessaloniki, Greece.

ÖZET

Ön kolda yassı hücreli akciğer kanserinin kas metastazi

Elli dokuz yaşında, yassı hücreli akciğer kanserine bağlı ön kolda kas metastazi olan erkek hasta sunuldu. Sağ pnömo-nektomiden 14 ay sonra, hasta sağ ön kolda kitle ve sağ dirseğinin fleksiyonuyla ortaya çıkan ağrı yakınmasıyla başvurdu. Tümöre geniş enblok rezeksiyonu yapıldı ve metastatik olduğu doğrulandı. Eksizyon adjuvan kemoterapiden sonra 12 aydır hasta komplet remisyonda izlenmektedir.

Anahtar Kelimeler: Yassı hücreli akciğer kanseri, uzak metastaz, iskelet kas.

SUMMARY

Distant forearm muscle metastasis from squamous cell lung carcinoma

Nikolaos BARBETAKIS¹, Georgios SAMANIDIS¹, Dimitrios PALIOURAS¹, Eleni MAVROUDI², Ioannis BOUKOVINAS³, Christodoulos TSILIKAS¹

¹ Department of Thoracic Surgery, Theagenio Hospital, Thessaloniki, Greece.

² Department of Anesthesiology, Theagenio Hospital, Thessaloniki, Greece.

³ Department of Clinical Oncology, Theagenio Hospital, Thessaloniki, Greece.

Yazışma Adresi (Address for Correspondence):

Dr. Nikolaos BARBETAKIS, A. Simeonidi 2 54007 THESSALONIKI - GREECE

e-mail: nibarb@otenet.gr

A case of a 59-year-old man with a distant forearm muscular metastasis due to squamous cell lung carcinoma is presented. Fourteen months after a right pneumonectomy the patient was readmitted with a mass in the right forearm and pain in the right elbow during flexion. He underwent an en bloc wide resection of the tumor, which was confirmed to be metastatic. Twelve months after excision and adjuvant chemoradiotherapy he remains in complete remission.

Key Words: Squamous lung carcinoma, distant metastasis, skeletal muscle.

Lung cancer has been known to metastasize to every organ system. Intrathoracic sites by local spread include mediastinal lymph nodes, pleura, diaphragm, chest wall and pericardium. The most common extrathoracic sites are the adrenal glands, bone, brain and liver. Squamous cell carcinoma frequently recurs locally, whereas adenocarcinoma metastasizes distally most often to the brain.

Skeletal muscles are rare metastatic sites despite their rich blood supply and the fact that the muscular mass of the body accounts for a large percentage of the total body weight. Muscular metastases account for less than 1% of all malignant metastases of hematogenous origin and are discovered mainly during autopsy (1).

CASE REPORT

A 59-year-old man first came to our attention with chest pain and shortness of breath. A right lung mass was present on roentgenogram (Figure 1). His medical history was significant for diabetes mellitus and a recent 10 weight loss. Mediastinal lymph nodes measured less than 1 cm on chest computed tomography (Figure 2).



Figure 1. Chest X-ray showing the mass in the right lung.



Figure 2. Thorax CT scan with the tumor but with no mediastinal lymphadenopathy.

A metastatic evaluation including abdominal and brain computed tomography and bone scan was negative. Bronchoscopy brushings confirmed squamous cell carcinoma. After clinical staging (stage I, T2N0M0), the patient underwent a right posterolateral thoracotomy. Intraoperative intrathoracic nodal sampling found upper and lower paratracheal nodes and inferior pulmonary ligament node to be free of tumor and a right pneumonectomy was performed (surgical stage I, T2N0M0). Histopathology revealed a squamous cell lung carcinoma (Figure 3). The patient had an uneventful recovery and was discharged on postoperative day nine and was followed on an outpatient basis.

Fourteen months later the patient was readmitted with a mass in the right forearm and pain in the right elbow during flexion. Physical examination revealed a firm, painful tumor. Computed tomography (CT) and magnetic resonance imaging confirmed the presence of a muscular mass with indistinct margins (Figure 4). There was no further evidence of metastatic disease. The patient underwent an en bloc wide resection of the mass which proved to be metastatic. Muscular

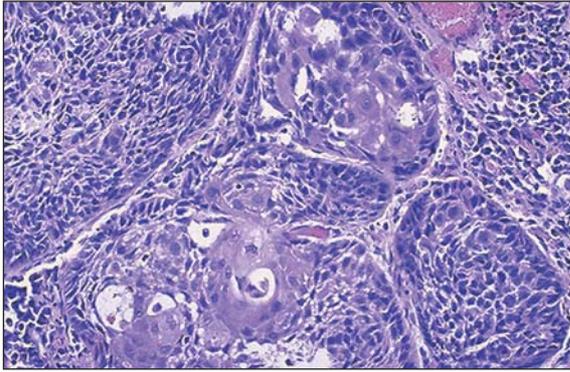


Figure 3. Histopathology revealed a squamous cell lung carcinoma (HE, x200).

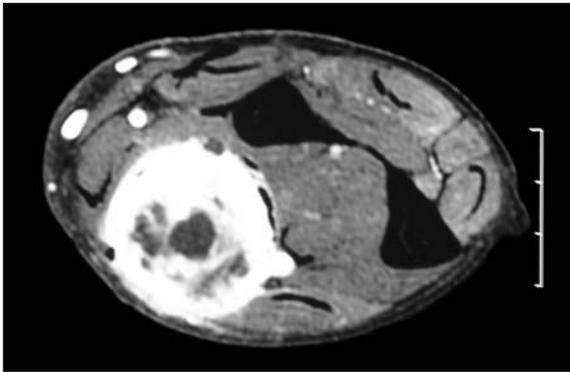


Figure 4. Magnetic resonance image of the metastatic tumor with intratumoral necrosis and edema in the surrounding tissues.

invasion due to a metastatic moderately differentiated squamous cell carcinoma with immunohistochemical characters compatible to the primary tumor was confirmed (Figure 5). Adjuvant chemotherapy (cisplatin and etoposide) and radiotherapy (40 cGy in 16 fractions with opposed anterior-posterior/posterior-anterior fields). One year follow up including CT of chest, abdomen, brain as well as bone scans has revealed no evidence of recurrence.

DISCUSSION

Skeletal muscle is one of the most uncommon sites of metastasis from any malignancy. Although direct muscle invasion by carcinoma is well recognized, only a few cases of metastasis distant from the primary tumor have been published. Primary sites include the stomach, pancreas, colon, rectum, thyroid gland, kidney, urinary bladder, uterus, lung, breast, ovary, prostate and

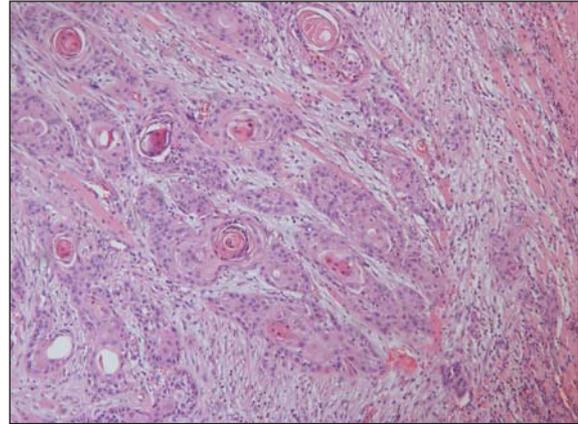


Figure 5. Muscular invasion (right upper corner) due to a metastatic moderately differentiated squamous cell carcinoma (HE, x200).

esophagus (2). The limited number of reports on metastasis to the skeletal muscle may be attributable to the fact that it can remain asymptomatic or undetected by physical examination and diagnostic studies. Therefore the real incidence of skeletal muscle metastasis may be underdiagnosed and best estimated by reviewing autopsy data.

The reasons for the rarity of metastatic tumors in skeletal muscle are still unclear, but may be related to various factors, such as extremely variable and turbulent blood flow, high tissue pressure, β -adrenergic stimulation, tissue oxygen levels, metabolism (effect of lactic acid on metastatic cell production) and host immune responses (3). After establishing an animal model of blood flow to the quadriceps femoral muscle, Luo et al recently investigated the possible mechanisms of skeletal muscle metastases (4). They concluded that skeletal muscle-delivered factors may play a key role in the mechanism of skeletal muscle metastases. These factors were found to have low molecular weights and were trypsin but not heat resistant. Based on their results the factors may be peptides. Weiss experimentally showed that cancer cell survival is great in denervated muscle that is unable to contract as opposed to electrically stimulated muscle (5). His hypothesis is that the rapid death of most cancer cells after delivering to some target organs is a consequence of their mechanical interactions within the microvasculature.

Clinical symptoms of muscular metastases are local or generalized muscular pain, muscular swelling, palpable masses, decreased range of motion of joints, fever, weight loss and malaise.

Detection of muscular metastases is not always easy. Although they can be painful, as in our case, a significant number of them are subclinical and tend to be incidental findings. Ultrasound is useful in differentiating solid from cystic masses. Pretorius and Fishman diagnosed 30 skeletal muscle metastases from primary carcinoma in 15 patients using contrast-enhanced helical CT (6). Former studies suggest that magnetic resonance imaging is superior to computed tomography in its ability to detect muscle metastases (7). Their typical appearance includes low signal intensity on T1-weighted images and high signal intensity on T2-weighted scans.

Therapy in patients with muscular metastasis includes surgical removal only in localized disease. Where there is extensive disease, chemoradiotherapy serves as a palliative tool. Affected patients receive adequate relief of symptoms and return of functions in most cases (8). In our case the development of muscle metastasis advanced patient's staging to stage IV with the likelihood of widespread metastatic disease and poor prognosis. Most case reports of muscle metastasis report disseminated disease and death within one year (8). Surprisingly our patient remains in complete remission one year later.

In conclusion, metastatic spread to skeletal muscle may appear in different malignant tumors. Muscular pain, weakness or palpable soft tissue masses in patients with proven or suspected malignancy should always raise suspicion of metastatic muscular disease.

REFERENCES

1. Combalia A, Sastre S, Casas F. Lung carcinoma with metastasis to biceps muscle: Report of a case and review of literature. *Eur J Orthop Surg Traumatol* 2004; 14: 172-6.
2. Heyer CM, Rduch GJ, Zgoura P, Stachetzki U, Voigt E, Volkmar N. Metastasis to skeletal muscle from esophageal adenocarcinoma. *Scand J Gastroenterol* 2005; 40: 1000-4.
3. Marioni G, Blandamura S, Calgaro N, et al. Distant muscular (gluteus maximus muscle) metastasis from laryngeal squamous cell carcinoma. *Acta Oto-Laryngologica* 2005; 125: 678-82.
4. Luo CH, Jiang YY, Liu YX, Li XH. Experimental study on mechanism and rarity of metastases in skeletal muscle. *Chin Med J* 2002; 115: 1645-9.
5. Weiss L. Biomechanical destruction of cancer cells in skeletal muscle: A rate regulator for hematogenous metastasis. *Clin Exp Metastasis* 1989; 7: 483-91.
6. Pretorius ES, Fishman EK. Helical CT of skeletal muscle metastases from primary carcinomas. *Am J Roentgenol* 2000; 174: 401-4.
7. Berquist TH. Magnetic resonance imaging of musculoskeletal neoplasms. *Clin Orthop* 1989; 244: 101-8.
8. Herring CL Jr, Harrelson JM, Scully SP. Metastatic carcinoma to skeletal muscle. A report of 15 patients. *Clin Orthop* 1998; 355: 112-4.