

Pathological Spontaneous Humerus Fracture Due To Lung Tumor Metastasis

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Abstract

Lung cancer is the most common type of cancer, and patients may develop bone metastases in advanced stages. Bone metastases are most commonly seen in the proximal femur and proximal humerus in the extremities. Bone metastases are associated with poor prognosis and can have serious effects on the patient's quality of life. We present a 79-years-old male patient who presented to the physical therapy and rehabilitation clinic with complaints of pain and inability to use his right arm, without any previous symptoms. The patient was subsequently diagnosed with lung adenocarcinoma and conservative treatment was applied for a right humerus fracture. The patient died during the planning phase of lung cancer treatment. It should be kept in mind that arm pain, which is seen as a simple symptom, can also be caused by very serious diseases.

Key Words: Lung cancer, Metastasis, Pathologic fracture, Adenocarcinoma

Akciğer Tümör Metastazına Bağlı Patolojik Spontan Humerus Kırığı

Özet

Akciğer kanseri en sık görülen kanser türü olmakla beraber hastalarda ileri evrelerde kemik metastazları görülebilmektedir. Kemik metastazlarına ekstremitelerde en sık proksimal femur ve proksimal humerusta rastlanır. Kemik metastazları kötü prognozla ilişkilidir ve hastanın yaşam kalitesinde ciddi etkilenmelere neden olabilir. Biz öncesinde herhangi bir semptomu olmayan, fizik tedavi ve rehabilitasyon polikliniğine sağ kolunu kullanamama ve ağrı şikayeti ile gelen 79 yaşında bir erkek hastayı sunuyoruz. Hasta sonrasında Akciğer adenokanser tanısı almış olup, sol humerus fraktürüne konservatif tedavi uygulanmıştır. Akciğer kanseri için tedavi planlaması yapıldığı dönemde yaşamını yitirmiştir. Basit bir semptom olarak görülen kol ağrısının ciddi sistemik hastalıkların belirtisi olabileceği unutulmamalıdır.

Anahtar kelimeler: Akciğer kanseri, Metastaz, Patolojik fraktür, Adenokanser**Suggested Citation:** Cirakoglu D. Pathological Spontaneous Humerus Fracture Due To Lung Tumor Metastasis. ODU Med J, 2025;12(2): 69-74.Copyright@Author(s) - Available online at <https://dergipark.org.tr/tr/pub/odutip>

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INTRODUCTION

Lung cancer is the most common type of cancer worldwide. It is also the most important cause of cancer-related deaths (1). Due to its insidious onset, approximately 50% of cases are diagnosed at an advanced stage (2). Recent advances in

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medicine have increased 5-year survival rates (3). However, with the increase in survival, there has also been an increase in bone metastases and related comorbidities (4,5). Bone metastases constitute 80% of all malignant bone lesions. Bone metastases disrupt the structural integrity of the bone and can cause complications (6). Metastases involving long bones, in particular, can severely impair functional capacity and daily activities. After the femur, the humerus is the second most common long bone with pathological fractures (7).

Bone metastasis is an expected condition in advanced lung cancer. However, in the case we present, a case of humerus metastasis due to lung cancer, which was previously undiagnosed, was presented with the complaint of not being able to use the right arm. There are many patients who apply to physical therapy and rehabilitation and orthopedic clinics every day with complaints of arm pain and not being able to use it. This report aims to highlight the possibility of an underlying malignancy in such cases, albeit rare.

CASE REPORT

A 79-years-old male patient was admitted to the physical therapy and rehabilitation clinic with complaints of right arm pain and inability to use the arm. The patient stated in his anamnesis that he experienced sudden onset pain in his right arm upon waking two days earlier, followed by difficulty in using the arm, which progressed to

an inability to lift it despite partial pain relief. There was no history of trauma. In the physical examination of the patient, passive shoulder, elbow, wrist, and finger movements in the right upper extremity were full and painless. Actively, the right shoulder flexion was 15 degrees, abduction was 10 degrees, and extension was 10 degrees, and he could not perform internal and external rotation. Mild pain and crepitation were detected in the middle of the humerus with palpation, and radiological imaging was requested for the proximal arm. Anteroposterior humerus radiograph showed increased osteoblastic activity and fracture line in the middle section of the humerus, disrupting the bone cortex structure (Figure 1).



Figure 1. Anteroposterior humerus radiograph

On anteroposterior chest radiograph, the right sinus was blunted and right lower lobe ventilation was decreased (Figure 2).



Figure 2. Anteroposterior chest radiograph

Computed tomography (CT) of the right humerus revealed loss of cortical integrity and heterogeneous density in the right humeral diaphysis, which was consistent with the fracture line. On thorax CT, a right hilar 42 mm mass narrowing the right lung lower lobe bronchus and a 38x27 mm mass in the right lung upper lobe perihilar area were evaluated in favour of malignancy. A 90x66mm lytic hypodense mass lesion infiltrating the sternum and costosternal junction was suggestive of malignancy. PET CT showed a nodular lesion measuring approximately 9x11 mm with increased FDG uptake in the posterior segment of the right upper lobe of the lung. Irregularities and intensely increased FDG uptake were observed in the right humeral corpus. A lytic destructive lesion measuring approximately 36x49 mm with an

intensely increased FDG uptake containing a soft tissue component was observed at the distal end of the sternum. The patient was diagnosed with lung adenocarcinoma as a result of the lung biopsy. However, the patient's condition deteriorated during the treatment planning process, and he passed away two weeks later.

DISCUSSION

Bone metastases are most commonly observed in breast and prostate cancers, and less frequently in lung cancer. Bone metastases are most frequently seen in the vertebral column (6). In the extremities, it is most frequently seen in the proximal femur and proximal humerus (8). Lung cancer is often diagnosed at an advanced stage, and overall survival is limited. When there is bone metastasis, the survival rate decreases even more. In the literature, it is reported that when there is bone metastasis in lung cancer, the life expectancy is 3 to 12 months. This rate decreases even more in any bone fracture due to metastasis (9). Our case died in a short time during the treatment planning phase, as reported in the literature. The feature of our case is that the first symptom of lung cancer appeared as mild pain and difficulty in using the arm due to pathological fracture resulting from humerus metastasis. Normally, other symptoms are expected to appear before this stage in lung cancer. Many patients present to orthopedics and physical therapy and rehabilitation clinics with

similar complaints, especially shoulder and arm pain. In addition to the common causes of shoulder and arm pain, rare causes should also be considered. In the evaluation of patients, simple imaging methods for the painful area after the examination can give us clues. This is particularly relevant in today's medico-legal environment, where delayed diagnoses can have significant consequences.

Most bone metastases in lung adenocarcinoma are osteolytic. Osteoclasts are activated by tumor cells, resulting in osteolysis in the bone, and pathological fractures occur due to the decreased strength of the bone with altered structural properties (10). Radiotherapy is generally the primary treatment method for bone metastases (11). Bone formation is re-stimulated with radiotherapy, and patients' bone pain can be relieved. It is thought that radiotherapy probably causes degeneration and necrosis in cancer cells, and as a result, increases osteoblastic activity (12). If the risk of fracture due to metastasis is high or if a fracture has occurred, surgical treatment can be applied. However, it has been reported that surgical treatment does not prolong life expectancy in cases where pathological fractures develop due to metastasis. Therefore, in patients who do not want surgery, treatment of pain and neurological symptoms with noninvasive methods may be a good alternative (13). Our patient was followed up with

conservative methods such as immobilization without surgical treatment.

CONCLUSION

This case highlights that arm pain, which is often regarded as a minor symptom, can occasionally be the initial manifestation of a serious underlying malignancy such as metastatic lung cancer. Timely recognition of atypical presentations through appropriate imaging and clinical suspicion is crucial. Early diagnosis not only improves patient outcomes but also helps avoid diagnostic delays, which can lead to increased morbidity and potential medico-legal issues. In order to prevent both patients from being victimized and physicians from encountering legal problems, it should not be forgotten that a simple symptom such as arm pain, which is very common, can be caused by serious diseases such as metastatic lung cancer.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Author Contributions: Conception-Design- Supervision-Data Collection- Processing - Literature Search- Writing - Critical Review; Derya Cirakoglu

Conflict of Interest: The authors declare that they have no known competing financial interests or personal relationships that could affect the work reported in this article.

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REFERENCES

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* (2024) 74:229–63. doi:10.3322/caac.21834
 2. Li S, Peng Y, Weinhandl ED, Blaes AH, Cetin K, Chia VM, et al. Estimated number of prevalent cases of metastatic bone disease in the US adult population. *Clin Epidemiol.* (2012) 4:87–93. doi: 10.2147/CLEP.S28339
 3. Stopeck A, Brufsky A, Kennedy L, Bhatta S, Bhowmik D, Buchanan J, et al. Costeffectiveness of denosumab for the prevention of skeletal-related events in patients with solid tumors and bone metastases in the United States. *J Med Econ.* (2020) 23:37–47. doi: 10.1080/13696998.2019.1651122
 4. Shiraishi Y, Hakozaiki T, Nomura S, Kataoka T, Tanaka K, Miura S, et al. A multicenter, randomized phase III study comparing platinum combination chemotherapy plus pembrolizumab with platinum combination chemotherapy plus nivolumab and ipilimumab for treatment-naïve advanced non-small cell lung cancer without driver gene alterations: JCOG2007 (NIPPON study). *Clin Lung Cancer.* (2022) 23:e285–8. doi: 10.1016/j.clcc.2021.10.012
 5. Scagliotti GV, Parikh P, von Pawel J, Biesma B, Vansteenkiste J, Manegold C, et al. Phase III study comparing cisplatin plus gemcitabine with cisplatin plus pemetrexed in chemotherapy-naïve patients with advanced-stage non-small-cell lung cancer. *J Clin Oncol: Off J Am Soc Clin Oncol.* (2023) 41:2458–66. doi: 10.1200/JCO.22.02544
 6. Demir AK, Çiçek M, Şahin F, Hasgöl B, Taş U, Ayan M (2014). Malign akciğer tümör metastazına bağlı spontan servikal vertebral kırık. *Kocatepe Tıp Dergisi*, 15(3), 331-334.
 7. Sarahrudi K, Wolf H, Funovics P, Pajenda G, Hausmann JT, Vécsei V. Surgical treatment of pathological fractures of the shaft of the humerus. *J Trauma* 2009; 66: 789-794.
 8. Weschenfelder W, Weschenfelder F, Spiegel C, Schrenk KG, Hofmann GO. Are we underestimating pathological fracture risk in malignant bone lesions of the proximal
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- humerus? *Skeletal Radiol.* 2025 Jan 18. doi: 10.1007/s00256-025-04875-9. Epub ahead of print. PMID: 39825888.
9. Tang J, Gu Z, Yang Z, Ma L, Liu Q, Shi J, Niu N, Wang Y. Bibliometric analysis of bone metastases from lung cancer research from 2004 to 2023. *Front Oncol.* 2024;14:1439209. Published 2024 Aug 6. doi:10.3389/fonc.2024.1439209
10. Wu S, Pan Y, Mao Y, Chen Y, He Y. Current progress and mechanisms of bone metastasis in lung cancer: a narrative review. *Transl Lung Cancer Res.* 2021;10(1):439-451. doi:10.21037/tlcr-20-835
11. Greco C, Forte L, Erba P, Mariani G. Bone metastases, general and clinical issues. *Q J Nucl Med Mol Imaging* 2011;55(4):337-52.
12. Vakaet LA, Boterberg T. Pain control by ionizing radiation of bone metastasis. *Int J Dev Biol* 2004;48(5-6):599-606.
13. Utzschneider S, Wicherek E, Weber P, Schmidt G, Jansson V, Dürr HR. Surgical treatment of bone metastases in patients with lung cancer. *Int Orthop* 2011;35(5):731-6.