

# Metastatic Adenocarcinoma of Lungs, Mimicking Primary Scapular Tumor: A Case Report and Review of Literature

Anson Albert Macwan<sup>1</sup>, Saurav Narayan Nanda<sup>1</sup>, Debasish Mishra<sup>1</sup>,  
Ashish Purohit<sup>1</sup>, Eshwar Patel<sup>1</sup>, Ashok Gachhayat<sup>1</sup>

## Learning Point of the Article:

Any bony swelling should be evaluated for secondary malignancy.

## Abstract

**Introduction:** Cancer metastasis to the scapula and tibia is an infrequent clinical presentation. Lung cancer is one of the leading causes of death in the world. Around 80–85% of lung cancer are non-small cell lung cancer and around 30–35% of them are adenocarcinoma which metastasize to bone. Scapular metastasis is a rare event and presents with bone pain.

**Case Report:** In this case report of 56-year-old male, presented with swelling to the scapula as a first symptom followed by swelling in the tibia. On further investigation, it was found to be multiple metastasis primaries as an adenocarcinoma of the lung. He was managed with palliative chemotherapy, which enhanced the patient's quality of life, slowing down the disease process and clinical improvement.

**Conclusion:** Lung cancer is the most common cancer which is progressing rapidly and spreading commonly to bones. When patients present with a mass or any suspicion of tumor, careful clinical examination and diagnostic tools often catch malignancy.

**Keywords:** Scapular metastasis, adenocarcinoma lung, bone metastasis, palliative chemotherapy, non-small cell lung carcinoma.

## Introduction

One of the leading causes of death due to cancer in the United States is lung cancer in men and women after breast cancer [1]. The estimated numbers are around 20,000 new cases and 135,000 deaths in 2020 in the United States [1]. Lung cancer distribution varies due to different variables such as age, sex, ethnicity, and smoking habits of the geographic location [2]. Most lung cancers, around 80–85%, are non-small cell lung carcinoma, subdivided into adenocarcinoma, squamous cell carcinoma, and large cell carcinoma. Adenocarcinoma, previously known as bronchoalveolar carcinoma, occurs mainly in people who smoke. It is common in the younger age group and is common in females [1]. Adenocarcinoma of the lung is most commonly metastasize to bone, and around 30–40% of patients present primarily with bone metastasis and skeletal-related events. Approximately 33% of patient with lung cancer present

with distant metastasis. One of the most commonly involved sites is bones, and it can be any bone. Scapular metastasis is a rare event and around 25% of patient with scapular involvement present with bone pain [3]. This case report is an example of initial presentation as a scapular swelling and pain in one of the most common malignancy worldwide.

## Case Report

A 56-year-old male presented to orthopedic OPD with chief complaints of pain in the left shoulder and difficulty using the arm for 3 months and associated with pain while taking a deep breath. The pain started gradually and increasing intensity. The pain was aggravated with movements and decreased with rest. There was associated mild pain in the right thigh and right tibia for the past 1 month. He also had sleep disturbances due to pain.

Access this article online

Website:  
www.jocr.co.in

DOI:  
10.13107/jocr.2021.v11.i06.2250

## Author's Photo Gallery



Dr. Anson Albert Macwan



Dr. Saurav Narayan Nanda



Dr. Debasish Mishra



Dr. Ashish Purohit



Dr. Eshwar Patel



Dr. Ashok Gachhayat

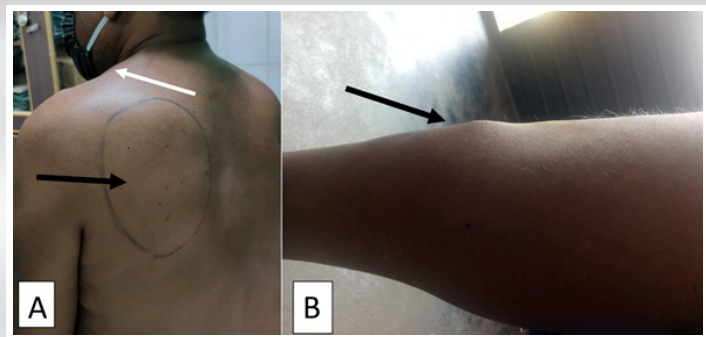
<sup>1</sup>Department of Orthopaedics, Kalinga Institute of Medical Science, Kalinga Institute of Industrial Technology, KIIT Road, Patia, Bhubaneswar, Odisha, India.

### Address of Correspondence:

Dr. Anson Albert Macwan,

Department Of Orthopaedics, Kalinga Institute of Medical Science, Kalinga Institute of Industrial Technology, KIIT Road, Patia, Bhubaneswar, Odisha - 751 024. India.

E-mail: ansonmac89@gmail.com



**Figure 1:** Clinical image showing. (a) Scapular swelling with black arrow and cervical swelling with white arrow. (b) Tibia swelling with an arrow.

The patient was a non-smoker, an office clerk by profession and did not have any history of any chronic illness.

There was a non-tender bony swelling size of 10 × 9 × 1 cm over the left infrascapular area on examination. There was a decrease in ROM of the shoulder. There is also associated diffuse cervical swelling of 4 × 3 × 2 cm on the same side of the neck (Fig. 1a).

There was diffuse mild swelling present at the proximal thigh region with deep tenderness with a full range of motion of the hip joint. There is associated bony swelling over the right tibia 20 cm distal to knee joint of size 10 × 6 × 1 cm, skin overlying was normal, non-tender, adhered to bone, and non-fluctuant (Fig. 1b).

The patient was investigated with an X-ray, computed tomography (CT) scan of the right upper limb and positron emission tomography (PET) scan. X-ray of the left scapula shows the lytic lesion with periosteal reaction over the upper border of the scapula (Fig. 2). X-ray of right femur shows the periosteal response with cortical thickening of metadiaphyseal area (Fig. 3a). X-ray of the right tibia shows periosteal reaction with cortical thickening of the diaphyseal area (Fig. 3b). CT imaging showing an osteoblastic lesion in the scapula, femur, and tibia (Fig. 4a-c). On magnetic resonance imaging (MRI) scan of the scapula T2 and proton density fat saturation images showed multiple irregulars, heterogeneously hyperintense lesions scattered over the Scapula (Fig. 5). PET CT showed increased FDG uptake in the osteoblastic lesion with a soft-



**Figure 2:** Radiograph of the left scapula shows the lytic lesion with periosteal reaction over the upper border of the scapula with an arrow.



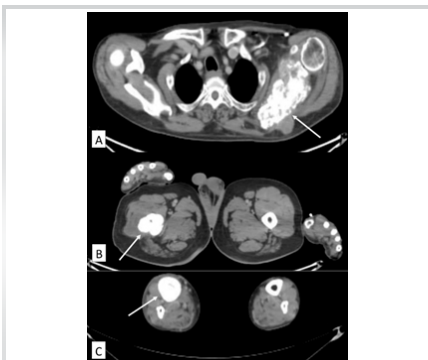
**Figure 3:** Radiograph of the right femur and right tibia. (a): Periosteal response with cortical thickening of metadiaphysis of the right femur with white arrow. (b) Periosteal response with cortical thickening of diaphysis of the right tibia with white arrow.

tissue component involving scapula of size 8.7 × 7.1 cm, C4 vertebral body, and D10 vertebral body, right 4th rib, right ischiopubic ramus, right proximal femur, and right proximal tibia (Fig. 6).

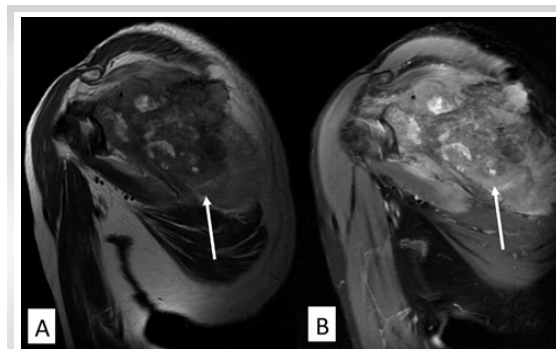
The patient was further investigated with a core biopsy of the lesion of the left scapula, right proximal femur, and right proximal tibia. On histopathological examination, the lesion was found to be metastatic adenocarcinoma (Fig. 7). On further immune histochemistry analysis, the sample was CK positive, CK 7 positive, TTF-1 positive, Napsin A positive, Ck20 negative, p63 negative, and cd56 negative suggestive of metastatic adenocarcinoma with lung primary. The patient was further managed with chemotherapy with methotrexate, carboplatin and zoledronate with the advice of the medical oncology team. On follow-up at 1 month and 3 months, there was mild pain in the scapula, thigh, and leg with minimal increase in the size of the scapular tumor.

**Discussion**

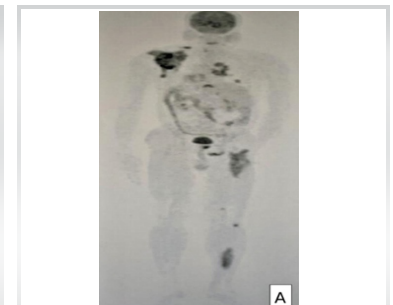
Bone metastasis is a prevalent scenario following lung cancer with a median survival rate of less than a year. According to a retrospective study of 259 non-small cell lung cancer, the most common metastasis site is the following order, spine, ribs, ilium, sacrum, and femur. Some uncommon sites are humerus, scapula and sternum [4]. These metastatic lesions cause a significant impact on the patient in terms of morbidity,



**Figure 4:** Cross-section computed tomography scan showing osteoblastic lesion of (a)-scapula (b)-femur (c)-tibia with an arrow.



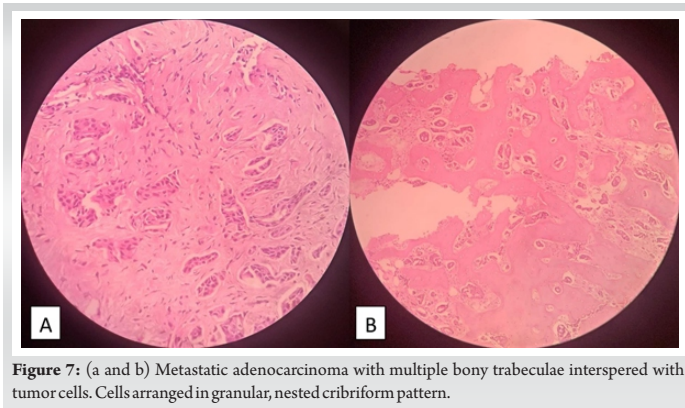
**Figure 5:** Magnetic resonance imaging image. (a): T2 image showing heterogeneously hyperintense lesions scattered over the Scapula with an arrow. (b): Proton density fat saturation image showing heterogeneously hyperintense lesions scattered over the Scapula with an arrow.



**Figure 6:** Positron emission tomography-computed tomography showing increased FDG uptake in the osteoblastic lesion with a soft tissue component involving scapula, vertebral body, D10 vertebral body, right 4th rib, right ischiopubic ramus, right proximal femur, and right proximal tibia.







**Figure 7:** (a and b) Metastatic adenocarcinoma with multiple bony trabeculae interspersed with tumor cells. Cells arranged in granular, nested cribriform pattern.

mortality, quality of life of the patient, functional dependency, treatment cost and hospital stay. Persistent pain is common in patient with bone metastasis, especially in the limbs, chest, and back. Although bone metastasis has a poor outcome, now due to recent advances survival rate and people living with bone metastasis are increased [5].

Scapular metastasis of NSCLC is a rare presentation, and the route of the metastasis is hematogenous. Bone metastasis secondary to renal, breast, prostate, and thyroid are common, but metastasis to scapula is rare. The usual presentation is a vague pain around the shoulder for few months with a decrease in range of motion and usually relieved by analgesic and rest. All the patient presenting to the outpatient department with shoulder and scapular pain with long duration without any history of trauma should be investigated thoroughly. If any suspicious mass is present, we should consider other possible primary pathology, and a multidisciplinary approach should be considered. In our case, the patient presented to us with an initial swelling, pain, and decrease range of motion gradually for 6 months. When the patient was further evaluated and, it was found to be adenocarcinoma of the lung as a primary lesion [4].

Da Silva et al. reviewed 1025 non-small cell lung cancer patients, and 13% of the patients had developed bone metastasis in 8 months. The spinal column and vertebra were involved commonly, followed by the pelvis and ribs and scapula. The scapula was rarely involved [6]. Hanagiri et al. reviewed 177 patients with one patient of scapular involvement in his series [7].

Tibia metastasis secondary to lung cancer is a rare condition and is considered as a poor prognostic marker. Kelly et al. studied 592 patients with bone metastasis for 13 years, and out of them, there were 26 cases with metastasis to the tibia. Out of which, four patients had lung cancers with an average survival of 10 months [8].

Femur metastasis is a common bone to be involved along with the spine. In most cases, the patient presents with multiple site involvement. Pain is the usual presentation that causes difficulty in weight bearing and also causes immobilization. In one study,

they reviewed 283 pathological fractures and 23 impending fractures in the femur and 8.5% was contributed by lung cancer [9].

Non-small cell lung cancers can extend to ribs and vertebrae due to the closest anatomical location of the tumor. rib involvement is a common entity and presents to us as chest pain and breathing difficulty. It happens due to the involvement of the intercostal nerves, and it is often refractory to analgesics [4].

Bone metastasis is the most common bone tumor, and it is often multicentric. To diagnose the pathology behind metastasis, radiological examinations, biopsy, and clinical examinations play an important role. Standard radiological examinations such as X rays and bone scintigraphy with good sensitivity are essential in catching the metastasis. X-ray, CT, and MRI are a sensitive and specific tool when there is extensive metastasis. The most important diagnostic tool is PET-CT, in which the whole skeletal system can be screened and help us find the spread of the metastasis. The further confirmation of the diagnosis is usually with the histopathological examination by fine-needle aspiration cytology, core needle biopsy or open biopsy. All of these methods have their benefits and disadvantages. The decision should be taken by the surgeon and also the location of the tumor [10].

Around 80% of lung metastases are lytic, mixed variety is found in around 15% of cases, and the remaining 5% are of blastic variety. Blastic variety is most commonly associated with adenocarcinoma and small cell carcinoma. In the malignant phase of the disease, it presents as bone metastasis as the first symptom [11]. In today's era, immunohistochemistry has a very important role in classifying the tumor in subtypes and for accurate decision-making in choosing the treatment. Immunohistochemistry is a widely used technique, which is easily available, cost-effective and gives us timely results. Lung cancer should be differentiated between adenocarcinoma, squamous cell carcinoma, and newly categorized neuroendocrine tumors. TTF 1 and Napsin A are a diagnostic marker of adenocarcinoma, and the positivity of TTF-1, CK7, and CK 20 differentiate it as primary lung adenocarcinoma from metastatic lung adenocarcinoma [12]. For diagnosing squamous cell carcinoma, markers such as p63, p40, and CK 5/6 positivity is important. For diagnosis of newly recognized neuroendocrine tumor, one of the three neuroendocrine markers, Chromogranin A, Synaptophysin or CD 56, is important [11].

The treatment part of metastatic bone cancer has many corners to cover. The most significant complaint is the pain. Pain mainly arises from the stretching of the receptors present on the endosteum and periosteum. For mild pain, NSAIDs or paracetamol are helpful to manage pain. For mild to moderate

intensity, tramadol, codeine, or dextropropoxyphene is useful. For those with severe pain, morphine, methadone, oxycodone, buprenorphine, hydromorphone, and fentanyl are helpful. Corticosteroids are also used as co-analgesics for pain due to bone metastasis [5].

The next challenge after controlling the pain is to treat bone metastasis and skeletal complications. Different treatment modalities depend on the nature of cancer, such as radiotherapy, radionuclides, bisphosphonates, and surgical excision have been described. For the management of Non-Small cell lung cancer, combination chemotherapy is the protocol of choice. Combining cisplatin or carboplatin or the use of erlotinib and gefitinib or monoclonal antibodies like bevacizumab has shown promising results [5].

### Conclusion

Lung cancer is the most common cancer which is progressing

rapidly and spreading commonly to bones. The survival rate is very poor, and diagnosing and treating on time can increase survival with modern advancements. When symptoms are unnoticed by patients or missed by physician can be presented lately with musculoskeletal symptoms. When patients present with a mass or any suspicion of tumor, careful clinical examination and diagnostic tools often catches the common malignancies.

### Clinical Message

When any patient present to the clinician for scapular swelling or pain and there is any suspicious of any malignancy, it is important to do careful clinical examination and diagnostic tools to catch the common malignancy such as lung tumor and treat early to get positive outcome.

### References

1. American Cancer Society. Lung Cancer Statistics: How Common is Lung Cancer. United States: American Cancer Society, October 1, 2019 Available from: <https://www.cancer.org/content/dam/CRC/PDF/Public/8703.00.pdf>.
2. Torre LA, Siegel RL, Jemal A. Lung cancer statistics. In: Ahmad A, Gadgeel S, editors. Lung Cancer and Personalized Medicine. Advances in Experimental Medicine and Biology. Vol. 893. Cham: Springer; 2016.
3. Beckles MA, Spiro SG, Colice GL, Rudd RM. Initial evaluation of the patient with lung cancer: Symptoms, signs, laboratory tests, and paraneoplastic syndromes. *Chest* 2003;123 Suppl 1:97S-104S.
4. D'Antonio C, Passaro A, Gori B, Del Signore E, Migliorino MR, Ricciardi S, et al. Bone and brain metastasis in lung cancer: Recent advances in therapeutic strategies. *Ther Adv Med Oncol* 2014;6:101-14.
5. Oyewumiv M, Alazizi A, Wehrung D, Manochakian R, Safadi FF. Emerging lung cancer therapeutic targets based on the pathogenesis of bone metastases. *Int J Cell Biol* 2014;2014:236246.
6. da Silva GT, Bergmann A, Thuler LC. Incidence and risk factors for bone metastasis in non-small cell lung cancer. *Asian Pac J Cancer Prev* 2019;20:45-51.
7. Hanagiri T, Kodate M, Nagashima A, Sugaya M, Dobashi K, Ono M, et al. Bone metastasis after a resection of stage I and II primary lung cancer. *Lung Cancer* 2000;27:199-204.
8. Kelly CM, Wilkins RM, Eckardt JJ, Ward WG. Treatment of metastatic disease of the tibia. *Clin Orthop Relat Res* 2003;415:S219-29.
9. Habermann ET, Sachs R, Stern RE, Hirsh DM, Anderson WJ Jr. The pathology and treatment of metastatic disease of the femur. *Clin Orthop Relat Res* 1982;169:70-82.
10. Łukaszewski B, Nazar J, Goch M, Łukaszewska M, Stępiński A, Jurczyk MU. Diagnostic methods for detection of bone metastases. *Contemp Oncol (Pozn)* 2017;21:98-103.
11. Tang P, Hicks DG. Histopathology of skeletal metastases. In: Heymann D, editor. *Bone Cancer*. 2nd ed., Ch. 39. United States: Academic Press; 2015. p. 461-70.
12. Su YC, Hsu YC, Chai CY. Role of TTF-1, CK20, and CK7 immunohistochemistry for diagnosis of primary and secondary lung adenocarcinoma. *Kaohsiung J Med Sci* 2006;22:14-9.

**Conflict of Interest:** Nil

**Source of Support:** Nil

**Consent:** The authors confirm that informed consent was obtained from the patient for publication of this case report

### How to Cite this Article

Macwan AA, Nanda SN, Mishra D, Purohit A, Patel E, Gachhayat A. Metastatic Adenocarcinoma of Lungs, Mimicking Primary Scapular Tumor: A Case Report and Review of Literature. *Journal of Orthopaedic Case Reports* 2021 June;11(6): 40-43.

