

## A Case Report on the Treatment of NSCLC and the Early Integration of Palliative Care

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### ABSTRACT

Currently, treatment for Non-Small Cell Lung Cancer (NSCLC) depends on the cancer stage as well as the histology and genetic alterations found on pathology taking into consideration the patient's condition. Surgery, neo-adjuvant chemoradiation therapy, and targeted immunotherapy are all considered when discussing treatment options with a patient. Cure and survival rates in patients for NSCLC are low especially with metastasis, which usually occurs in the bone and brain. In patients with brain metastasis, treatment is often discontinued and early integration of palliative care in patients with advanced NSCLC is increasingly showing to improve quality of life. In this case report, we will discuss a case of a patient presenting with intractable back pain suspected to be spinal osteomyelitis secondary to pneumonia, however, it was discovered on pathology to be a recurrence of NSCLC with metastasis to the vertebrae and brain. We discuss and comment on the subsequent treatment plan involving immunotherapy, chemotherapy/radiation, and integration of palliative care in the treatment of NSCLC.

**Keywords:** Non-small cell lung cancer; Palliative care; Cauda equina syndrome; Targeted therapy; Spinal metastasis; Remission rates in NSCLC

### INTRODUCTION

Lung cancer is the leading cause of death caused by cancer in the US. Although the mortality rate has decreased significantly in the last several years (by 48% in males and 23% in females), it still results in more deaths than most cancers combined. Lung cancer screening has contributed to a 30% reduction in lung cancer shown by the National Lung Screening Trial. The earlier the diagnosis of lung cancer, will be the greater chance of survival. Lung cancer presents with a variety of respiratory symptoms such as cough, dyspnea, weight loss, and hemoptysis. Imaging obtained with Computed Tomography (CT) and Positron Emission Tomography (PET) scans, while pathology obtained by bronchoscopy, thoracentesis, or fine needle aspiration are also used to diagnose and stage lung cancer. It is important to distinguish between non-small cell lung cancer from small cell lung cancer because it determines prognosis and treatment.

Non-Small Cell Lung Cancer (NSCLC) has a better prognosis because it is often caught at an earlier stage than SCLC and can be treated surgically followed by post-operative chemotherapy. Cancer biomarkers can be obtained with liquid biopsy obtained from plasma, serum, urine, cerebrospinal fluid, and other sources that can be used to detect biomarkers that help to guide treatment. These most commonly include testing for EGFR driver mutations which could implicate benefit from treatment with Osimertinib. Mechanisms of treatment resistance have also been identified including mesenchymal-epithelial transition factor amplification and Human Epidermal growth factor Receptor 1 (HER2) amplifications [1]. Treatment plans for patients with NSCLC is determined by the patient's condition and the cancer's stage, histology, and any genetic alterations found on pathology. Surgical resection is recommended for patients with NSCLC stages I-IIIa, for example, and neo-adjuvant therapy is recommended for stages II-IIIa. Patients with stage III are usually non-surgical candidates and chemoradiation

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followed by targeted immunotherapy is the recommended treatment [2]. Immunotherapy with agents like pembrolizumab and atezolizumab, demonstrates a survival benefit in patients with local-advanced NSCLC. Molecular testing should be conducted at the time of diagnosis [3,4].

Guidelines for the work up of lung cancer recommend a PET scan to determine bone involvement. In a study researching bone imaging in NSCLC, patients with clinical N2 and N3 involvement were more likely to have bone metastasis and thus should undergo bone imaging [5]. Early integration of palliative care for patients with NSCLC offers many benefits and the median survival is longer in patients who have done so [6]. Brain metastasis left untreated can lead to rapid death. Metastasis occur in 18%-61% of patients and brain metastasis may lead to neurological disorders, which might lead to discontinuation of systemic treatment and hence prioritize palliative care [4]. The American Joint Committee on Cancer (AJCC) is moving towards a more personalized approach rather than a population approach with cancer treatment [7]. The overall cure and survival rates for NSCLC is still low especially in metastatic disease [8]. Bone and brain are both common sites of metastasis in NSCLC. In fact, brain metastasis is a common site of relapse in 30%-55% of NSCLC patients. The typical treatment is Whole Brain Radiotherapy (WBRT) and it can be used with systemic therapy or with local therapy. WBRT is the primary source of treatment with multiple metastasis [9]. For patients with oligo-metastasis, WBRT and surgical resection or stereotactic radiosurgery is also an option [10].

For patients with metastatic non-small-cell lung cancer, early involvement of palliative care in addition to standard care can drastically increase quality of life, reduce depressive symptoms, and decrease aggressive end-of-life treatments while still improving survival rates, as compared to patients who received only standard care [11]. Even late involvement of palliative care can decrease the odds ratio of dying in a hospital bed [12]. Dying in the hospital is associated with a diminished perception of quality end-of-life care from the patient's families [13].

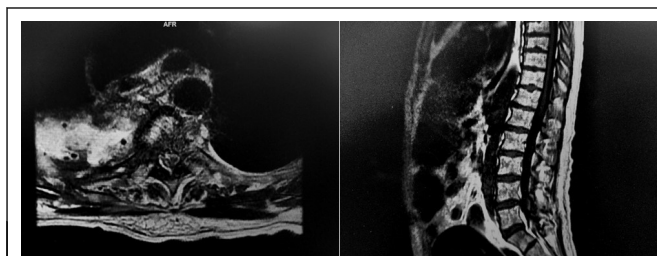
In this case study, we will discuss a case of a patient with NSCLC with metastasis to the vertebrae and brain, and the subsequent treatment plan as it relates to ruling out confounding differential diagnosis as well as the immunotherapy, chemotherapy/radiation, and integration of palliative care in the treatment of NSCLC.

## CASE PRESENTATION

A 59-year-old male presented to the emergency room with intractable back pain with a past medical history of stage 4 non-small cell lung cancer, status post radiation-induced fibrosis, COPD, and current tobacco use disorder. His NSCLC was treated with radiation and chemotherapy regimen followed by durvalumab (Imfinzi), a PD-1 inhibitor a year prior (2021).

A few weeks post-discharge, he presented to the ED for intractable acute thoracic back pain associated with tachypnea. His physical exam revealed diminished breath sounds and prolonged expiratory phase bilaterally, consistent with his COPD. His vital signs showed he was afebrile, tachycardic with a

rate of 110 bpm, tachypneic with RR of 24. His labs showed an initial lactic acid level of 2.3 and with an elevated white blood cell count of 29, meeting sepsis criteria. The patient's CTA showed extensive cavitory pneumonia of his right lung. A sepsis work up including urine culture, echocardiogram was negative for endocarditis, and blood cultures were negative as well. An MRI revealed destructive changes on his spine, centered at T4-T5 disc space, suggestive of osteomyelitis and diskitis, which were presumed results of infectious seeding from the adjacent pulmonary consolidation and pleura. He was placed on Vancomycin and Zosyn for the diskitis, and admitted with routine nebulizer treatments. The aspirate collected of his spinal fluid grew no bacteria and was AFP negative. Two days after being admitted for his back pain and being on intravenous hydromorphone, he reported urinary incontinence and lower bilateral extremity weakness. His labs indicated a decrease in WBC from 24,000 to 10,000 and a subsequent decrease in his lactic acidosis levels. Physical exam of his lower extremities showed only dorsiflexion of his left foot was intact with little to no movement of his right extremity. His reflexes were absent and his sensation was intact. A second MRI was ordered showing complete loss of T4-T5 marrow replacement and stir prevertebral soft tissue abnormality concerning for loculated abscess/phlegmon and infectious disease and neurosurgery were consulted. Neurosurgery conducted a T4-T5 corpectomy with T3-T5 laminectomy and a T2-T7 fusion and a drain was placed. Pathology from his corpectomy showed stage 4 non-small cell lung cancer, and oncology was consulted. Because his spinal aspirate, blood cultures, and echocardiogram were negative for infection suggesting his malignancy may explain his entire presentation. His prognosis and future options were discussed with the patient. The patient was admitted to rehabilitation with consults to physical and occupation therapy. His severe and persistent pain was eventually controlled on a Patient-Controlled Analgesia (PCA) pump. He was discharged eight days after his transference to rehab, with a discussion of palliative chemotherapy treatment. One month later, he returned to the ED with focal neurologic defects including slurred speech and a right-sided facial droop. MRI revealed multiple brain metastasis and the patient chose to be discharged home with home hospice (Figures 1 and 2).



**Figure 1:** MRI of Lumbar Spine lateral view. Note: MRI Thoracic Spine-T1-T2, which is the area of interest. Prevertebral soft tissue abnormality concerning for abscess/phlegmon. Noted to be continuous with right upper lobe enhancement suggesting they may be continuous with each other.



**Figure 2:** CT of Chest and Spine. Note: Extensive pneumonia of the right upper lobe with some potential fistula formation of right chest wall. Lung fibrosis s/p radiation of his previous non-small cell lung cancer.

## RESULTS AND DISCUSSION

In this patient, the recurrence of his NSCLC was not diagnosed until the pathology returned from his surgery. His complicated past medical history and the initial presentation suggestive of an infectious cause made his treatment challenging and his prognosis poor. Infection needed to be ruled out immediately as there were multiple alarm symptoms including his fever, focal spinal pain, and eventually focal neurologic symptoms requiring the sepsis work up, MRI, and the eventual craniectomy. Eventually, his decision to abstain from treatment resulted in the involvement of a palliative care specialist as well. His decision to pursue hospice was reasonable based upon his discussions about his prognosis and the various treatment options available. According to the current literature available brain metastasis often leads to the cessation of systemic therapy in favor of treating neurologic deficits. While it is impossible to determine if implementing systemic therapy would have prevented his NSCLC from metastasizing to the brain, it is quite possible that systemic therapy may have negatively impacted his quality of life.

## CONCLUSION

The patient's choice to pursue hospice was based on the information that therapy would have led to a diminished quality of life in his final days and was made after judging the costs and benefits of each option. This patient is a good example of someone who would likely have benefited from implementing palliative care early in his initial therapy. This might have led to better health outcomes, less time in the ICU, fewer hospitalizations, and, according to some research, a significant

improvement in mood, and even the family's perception of quality of life. Treatment options should always be an individual decision based upon the treatment goals and the patient weighing the risks and benefits available. While there is a good deal of research on the improvement of quality of life with early incorporation of palliative care, more research should be done on the improvement of quality of life in those patients who have a recurrence of NSCLC and if it would lead to catching the recurrence earlier in the disease course.

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