

Necrotizing Skin and Soft Tissue Infection Mimicking Cutaneous Metastasis in Lung Cancer

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Abstract

Cutaneous metastases occur in 0.7–9% of cancer patients, most commonly from lung cancer in men. When present in lung cancer (1–12% of cases), they indicate poor prognosis with a mean survival of 5–6 months. More often, necrotizing skin and soft tissue infections (NSSTIs) are seen, though they can be diagnostically challenging and can result in delays in treatment. We present a 61-year-old man with newly diagnosed non-small cell lung cancer (NSCLC) and a two-week history of a necrotic abscess on his chest. Following incision and drainage of an 8 x 8 cm cavity, his condition worsened. CT revealed a spiculated lung mass extending into the chest wall, raising concern for cutaneous metastasis. However, cultures grew *Streptococcus constellatus* and *Actinomyces odontolyticus*; blood cultures also revealed *S. constellatus*. With further investigation into the patient's history, it was discovered that the patient had poor dentition and recent full dental extraction. With targeted antibiotics, he improved and was discharged. This case highlights the importance of having high suspicion for commonly encountered microorganisms in the appropriate setting. Given the risk of rapid decompensation, patients suspected of having NSSTI should be evaluated for evidence of both local complications, hematogenous spread, and initiation of timely treatment, including source control and appropriate antimicrobial therapy.

Keywords: necrotizing skin infection, lung cancer

1. Introduction

Cutaneous metastases represent a significant aspect of cancer progression, occurring in a notable percentage of patients across various malignancies. Among these, lung cancer stands out as a primary source, with cutaneous metastases observed in 1-12% of patients. This manifestation often signifies an advanced stage of disease and is associated with a dismal prognosis (1). In addition to cutaneous metastases, there exists a spectrum of other cutaneous manifestations that warrant attention. Notably, necrotizing skin and soft tissue infections (NSSTIs) emerge as a formidable challenge in clinical practice. NSSTIs encompass a diverse array of severe soft tissue infections characterized by rapid tissue necrosis and systemic toxicity (2). These infections can arise in various

anatomical locations and are rarely encountered in the head and neck region. We present a unique case of a 61-year-old male with a past medical history significant for recently diagnosed non-small cell lung cancer (NSCLC) who had a large necrotic abscess on his chest that was initially thought to be cutaneous metastasis but was discovered to be a NSSTI.

2. Case Report

A 61-year-old male presented to the hospital for an elective urologic procedure. The patient has a past medical history significant for bladder cancer treated with chemotherapy, chronic obstructive pulmonary disease, and a recently discovered large peripheral right upper lobe mass that was diagnosed as NSCLC. Upon presentation, he was tachycardic. Physical exam revealed a large

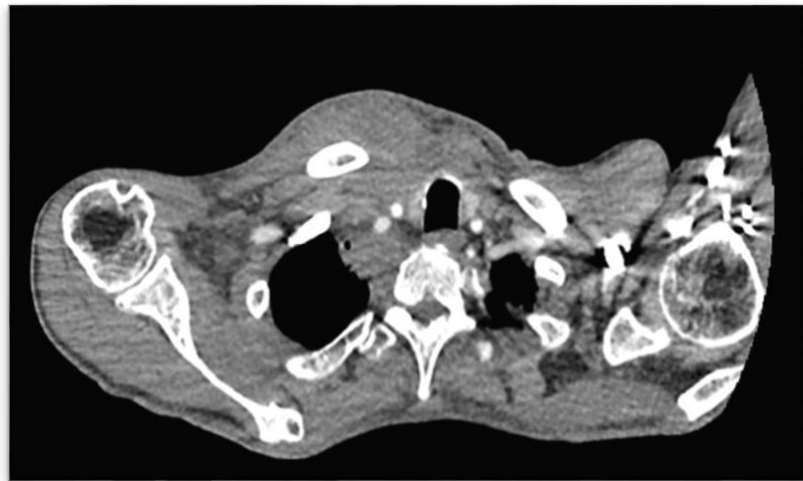


Image 1: Physical exam revealed a large 8x8 centimeter necrotic abscess in the right upper chest wall



Image 2: CT-scan images revealed a spiculated mass with extension across the chest wall anteriorly

necrotic abscess on the right anterior chest (Image 1), which was present for two weeks. Urological procedure was deferred while general surgery was consulted for incision and drainage. The incision and drainage were performed, and necrotic tissue was debrided from an 8 x 8 centimeter cavity in the right upper chest wall. After his procedure, the patient's hemodynamic status worsened. The patient was admitted to the Intensive Care Unit, fluid resuscitated, and started empirically on piperacillin/tazobactam and vancomycin due to worsening hemodynamic status and concerns for possible septic shock. Chest CT-scan revealed a spiculated mass with extension across the chest wall anteriorly (Image 2), which was worrisome for malignancy. When the Chest CT-scan results were correlated with his recent diagnosis of NSCLC, it

was initially thought to be a manifestation of cutaneous metastasis, suggesting a poor prognosis. While awaiting wound culture results, the patient continued to be treated with empiric antibiotics. A few days later, the wound cultures revealed *Streptococcus constellatus* and *Actinomyces odontolyticus*, with blood cultures growing *S. constellatus*. With further investigation into the patient's history, it was discovered that he had very poor dentition, and two weeks prior to presentation, he had all of his teeth extracted. Instead of the initial diagnosis of NSCLC with metastasis to the skin, the patient was diagnosed with an NSSTI, ultimately changing the direction of his treatment. Based on the culture data and susceptibility panel, his antibiotics were narrowed to ceftriaxone and metronidazole. A few days later, the patient improved and was discharged on amoxicillin-clavulanate for nine to twelve months.

3. Discussion

Cutaneous metastases represent a challenging aspect of cancer progression, occurring in a significant percentage of patients with cancer, ranging from 0.7% to 9% (1). Among men, lung cancer emerges as a primary source, accounting for approximately 24% of cases (1). In the context of lung cancer, cutaneous metastases are observed in 1-12% of patients (1). Unfortunately, when cutaneous metastases manifest in lung cancer patients, they typically indicate advanced disease and are associated with a poor prognosis, with mean survival of five to six months due to limited therapeutic options. In contrast, NSSTIs, though more frequently encountered than cutaneous metastases, pose a significant diagnostic challenge, especially in patients with underlying malignancy. Misidentification of NSSTIs as metastatic lesions may delay life-saving interventions and result in rapid clinical deterioration. This case illustrates the importance of maintaining a broad differential diagnosis, particularly when evaluating skin lesions in immunocompromised or oncologic patients. Within the spectrum of NSSTIs, those affecting the head and neck region are rare and have a particularly high mortality rate due to the proximity of many vital anatomical structures (3). NSSTIs of the head and neck are often caused by *Actinomyces*, which are seen in dental infections, oromaxillofacial surgery or traumas, and oral flora, such as *Streptococcus anginosus* (including *S. constellatus*) (4, 5). These infections exhibit a

propensity to disseminate via fascial planes, often exploiting avenues created by dental manipulation, particularly in patients with compromised dentition, and may mimic the appearance of neoplastic infiltration on imaging, further complicating the diagnostic process. This case highlights the importance of having high suspicion for microorganisms in specific clinical contexts. A thorough review of the patient's medical history, recent procedures, medications, and visual inspection can provide valuable clues for developing a differential diagnosis that both includes cutaneous metastases and NSSTIs and guides initial treatment options. Diagnostic imaging, particularly contrast-enhanced CT or MRI, can aid in distinguishing NSSTIs from malignancy by identifying features such as gas formation, fascial thickening, fluid collections, or rapid tissue destruction—findings more consistent with infection, further guiding medical management. In addition, emerging biomarkers like elevated procalcitonin or lactate may support the diagnosis of severe bacterial infection, although their specificity remains limited in oncologic populations. Early recognition of NSSTIs—signaled by symptoms such as severe pain out of proportion to exam, rapid progression, tissue necrosis, bullae, crepitus, and systemic symptoms—is essential (2). Prompt initiation of empiric broad-spectrum antibiotics, surgical consultation for source control, and ICU-level monitoring are crucial to improve outcomes and prevent rapid clinical deterioration. Ultimately, distinguishing between infectious and malignant etiologies of cutaneous lesions in cancer patients requires a multidisciplinary approach. Timely recognition and management of NSSTIs may be lifesaving, while missed or delayed diagnosis can lead to devastating consequence.

4. Conclusion

In summary, this case emphasizes the importance of a systematic approach to the evaluation and management of NSSTIs, focusing on clinical suspicion, thorough assessment, and expedited intervention to optimize patient outcomes.

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