Development of carcinoma erysipeloides from malignant seeding along a pleural catheter tract in a patient with primary lung adenocarcinoma

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INTRODUCTION

Skin metastases occur in up to 5% of patients with a primary localized malignancy and up to 10% of patients with metastatic disease.[1-3] Skin findings are not commonly present at the time of primary cancer diagnosis, but can be the first indicator of metastatic spread.[2] Skin metastases characteristically present as multiple firm and painful nodules in close proximity to the internal malignancy. Carcinoma erysipeloides (CE) is a unique manifestation of cutaneous metastasis that presents as a well-defined painful erythematous patch or plaque, mimicking an infectious process such as cellulitis or erysipelas. CE is most often observed in inflammatory breast cancer and presents as an erythematous patch over the breast. Uncommonly, CE can originate from other primary malignancies including lung, ovaries, and pancreas. We present a rare clinical case of CE in a patient with a history of lung carcinoma and a chronic malignant pleural effusion.

Abbreviation used:

CE:	carcinoma erysipeloides
MRSA:	Methicillin-resistant *Staphylococcus aureus*
TTF1:	Thyroid Transcription Factor 1

CASE REPORT

The patient is an 82-year-old male with a 3-year history of stage IV BRAF (v-raf murine sarcoma viral oncogene homolog B1) V600E mutated lung adenocarcinoma. He was admitted in October 2021 with MRSA (Methicillin-resistant *Staphylococcus aureus*) bacteremia and subsequently underwent antibiotic therapy for 6 weeks. A pleural catheter, which had been placed to assist with draining a chronic malignant pleural effusion, was removed upon discharge from the hospital. At that time, the patient was stable on trametinib and dabrafenib. Three weeks after the catheter removal, the patient reported a mildly tender and erythematous bulge at the prior catheter exit site. On exam, there was a linear bulla with faint redness surrounding the previous catheter site. Chest computed tomography showed fluid in the chest tube tract (Fig 1). He underwent subsequent incision and drainage with a negative gram stain and culture. Dermatology was consulted in January 2022 after the rash continued to progress despite aggressive antimicrobial therapies. In the interim, he had been switched to pembrolizumab monotherapy after a computed tomography scan revealed asymptomatic pneumatosis intestinalis. On exam, there was a 7 cm erythematous, non-tender scaly patch with poorly defined borders extending out from the former catheter site near the right costophrenic angle towards the anterior chest wall (Fig 2). Other than mild pruritus, review of systems was otherwise negative. A punch biopsy at the visit

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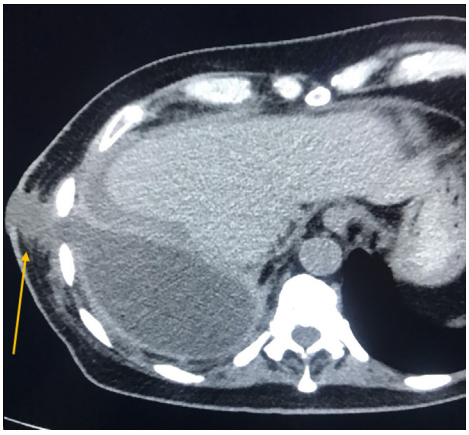

Fig 1. Computed tomography chest November 2021. Fluid has filled the chest tube tract in the right lateral chest wall (*arrow*).

showed spongiotic dermatitis with no evidence of malignancy. The patient was maintained on antibiotics and immunotherapy with the addition of topical triamcinolone and ketoconazole. The rash remained relatively stable for a few months before it began expanding rapidly. On repeat exam, the patient had an erysipelas-like, indurated plaque with numerous surmounting lustrous papules on the right flank extending to the mid-abdomen measuring 35 cm × 30 cm (Fig 3). A repeat punch biopsy was taken from the superior area of the eruption which was diagnostic for metastatic lung adenocarcinoma. These findings were supported with strongly positive TTF1 and CK7 staining (Fig 4). Radiation therapy was recommended and started by his oncology team in July 2022 in addition to his current immunotherapy. Despite ongoing treatment, the patient died in late August 2022.

DISCUSSION

New skin lesions within the anatomical region of a known malignancy should raise suspicion for cutaneous metastasis. In men, lung cancer is the leading cause of skin metastasis and lesions most frequently arise on the trunk followed by the head and neck.[2,4] Skin metastases from lung cancer are classically described as single or multiple firm nodules. CE is a unique manifestation of malignancy where delays in diagnosis are common. CE arising from lung cancer is a rare manifestation that has been described in a handful of prior case reports.[5-7]

Not only does CE mimic entities like erysipelas and cellulitis, but patients undergoing chemotherapy and immunotherapy can also have fevers, leukocytosis, and elevated inflammatory markers, further clouding the clinical picture. Additionally, these patients can have concomitant infections such as pneumonia or

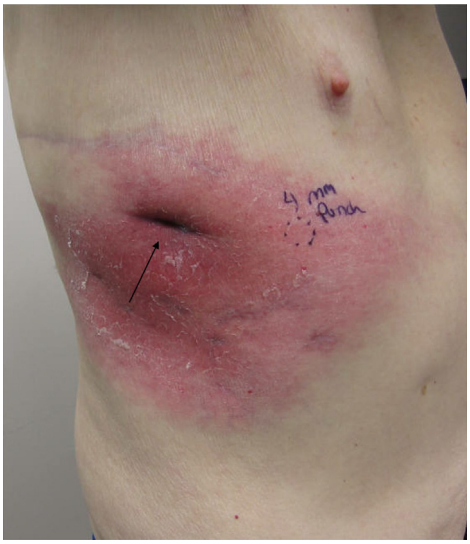

Fig 2. Physical exam January 2022. A well circumscribed violaceous indurated plaque on the patient's right flank surrounding the site of a previous pleural catheter (*arrow*) with expansion to the anterior chest.

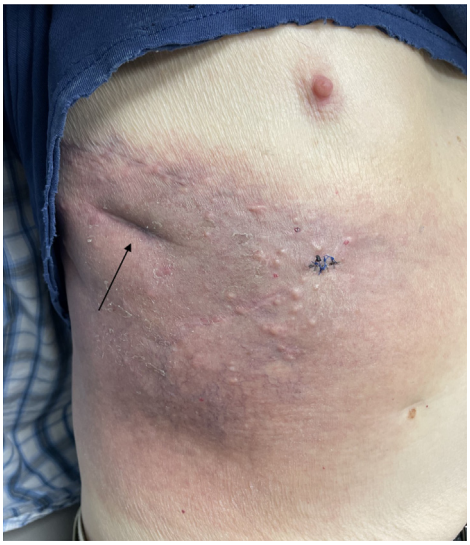

Fig 3. Physical exam June 2022. The plaque expanded outwards and became more violaceous. Papules formed in the superior-medial portion of the plaque. Previous catheter site is indicated by the *arrow*.

bacteremia, furthering the diagnostic challenge. This patient's immunotherapy further confounded the presentation given the broad array of cutaneous side effects seen with these therapies.

Cancer cells spread to the skin through local invasion, local metastasis, or remote metastasis. CE is related to infiltration of dermal lymphatics by malignant cells.[8] In our patient, the skin lesion developed in the site of a pleural drain, suggesting the role of the catheter tract serving as a conduit for

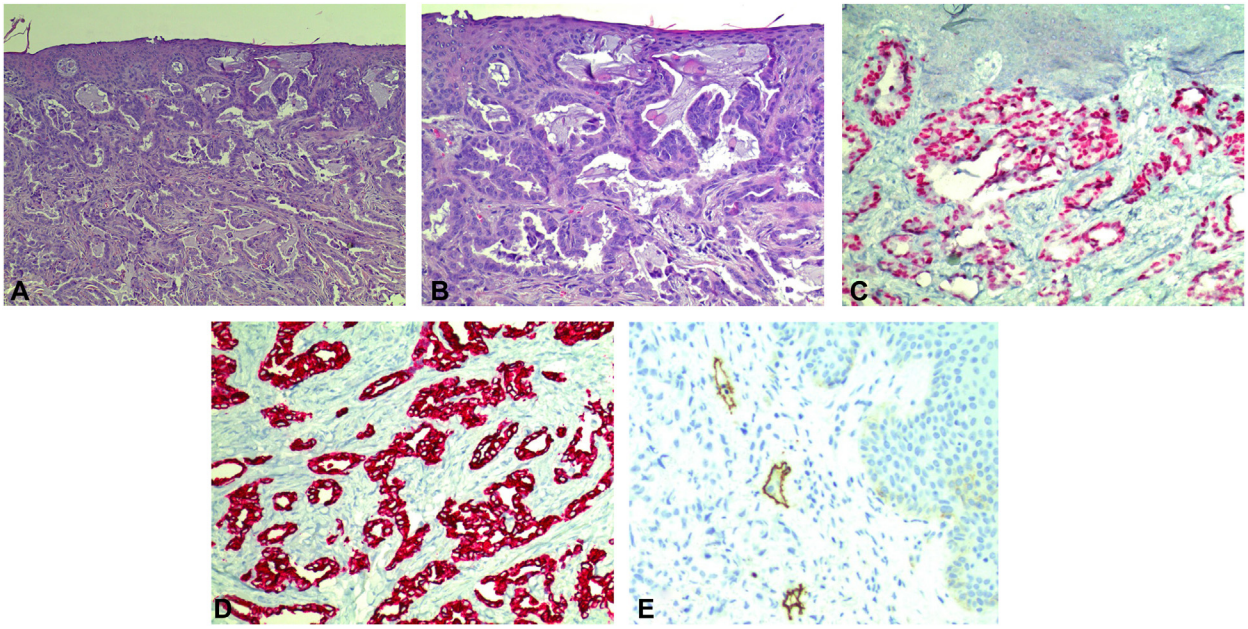

Fig 4. Chest wall punch biopsy. **A** and **B,** Diffuse dermal infiltrate composed of large pleomorphic cells with prominent mitotic figures forming glandular structures with evidence of infiltration in vessel lumens (H&E). **C,** Thyroid Transcription Factor 1 (TTF1) positive cells. **D,** CK 7 positive cells (**E**) D2-40 stain demonstrates malignant infiltration of lymphatics.

metastatic spread. A previous case report of a patient with lung carcinoma and a malignant pleural effusion also developed CE surrounding the site of a previous indwelling pleural catheter.[5] Thus, the risk of cutaneous seeding should be considered a risk of indwelling pleural catheters in patients with malignant effusions.

The initial presentation in our patient's case was very suggestive of infection given he was previously bacteremic with MRSA, and the recent drain removal site was identified as a possible source. The clinical picture was further complicated by a negative biopsy at first presentation. The lack of response to multiple courses of broad-spectrum antibiotics and lack of fever were helpful indicators that the skin findings were not infectious in etiology. Skin biopsy is the gold standard of diagnosis, but similar to our case, multiple biopsies over a course of time may be required to reach a diagnosis.[4,9] Accurate diagnosis and development of a treatment plan should involve a multidisciplinary team approach.

Cutaneous metastasis is associated with poor survival with an average survival following diagnosis ranging from 3 to 7.5 months.[4] Current expert guidelines for inflammatory breast cancer recommend a trimodal approach of systemic chemotherapy, surgery, and radiation therapy.[10] Treatment for non-breast CE has centered on systemic chemotherapy for the primary malignancy. Past case studies have reported the use of various combinations of chemotherapy and immunotherapy agents.[5,6] Radiation therapy is a possible adjunct to consider.

This case describes a rare manifestation of skin metastasis and the potential association with cutaneous spread via pleural catheter. CE should be considered in patients with a known malignancy, and especially if the eruption is located near the site of the primary cancer. Prompt biopsies for histopathological examination should be completed, and a high index of suspicion should be maintained if antimicrobial therapies are not effective. In addition, physicians should be aware of the potential for seeding malignant cells when inserting a pleural catheter for malignant effusions.

Conflicts of interest

None disclosed.

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