International Journal of Research in Medical Sciences
Jagadeesh K et al. Int J Res Med Sci. 2026 May;14(5):2094-2097
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20261354

Case Report

Erythroderma as the first paraneoplastic manifestation of early-stage lung squamous cell carcinoma: a rare case report

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Received: 27 October 2025
Revised: 12 September 2025
Accepted: 22 April 2026

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ABSTRACT

Erythroderma is a severe inflammatory dermatosis affecting over 90% of the body surface area and commonly arises from pre-existing dermatoses or drug reactions. Paraneoplastic erythroderma is rare but clinically significant, especially in elderly patients, as it may precede the diagnosis of internal malignancy. Early identification and evaluation are essential for timely detection. An 85-year-old male with a 40 pack-year smoking history presented with rapidly progressive generalized erythema and scaling, without prior dermatologic disease or new medication exposure. Skin biopsy revealed subacute spongiotic dermatitis with dermal eosinophils. Given the unexplained presentation and patient's risk factors, systemic evaluation was pursued. Imaging demonstrated a right lower-lobe perihilar mass, and bronchoscopy with biopsy confirmed moderately differentiated squamous cell carcinoma of the lung. Supportive dermatologic therapy was initiated and sequential chemo-radiation was planned. Improvement in the erythroderma paralleled initiation of cancer-directed therapy. Erythroderma can rarely be the first manifestation of lung squamous cell carcinoma. In elderly patients with unexplained erythroderma, especially those with smoking history, malignancy screening should be undertaken after exclusion of common causes.

Keywords: Erythroderma, Lung squamous cell carcinoma, Early-stage lung cancer, Cutaneous paraneoplastic manifestation, Systemic malignancy with skin involvement

INTRODUCTION

Erythroderma, or exfoliative dermatitis, is characterized by erythema and scaling involving at least 90% of the body surface area. It represents a reaction pattern to numerous underlying diseases, including chronic dermatoses, drug reactions, infections, and malignancies.[1] The most frequent causes include exacerbations of pre-existing dermatoses such as psoriasis, atopic dermatitis, and pityriasis rubra pilaris, followed by drug hypersensitivity reactions.[2,3]

Malignancy-associated erythroderma accounts for a smaller proportion of cases and is most commonly linked to hematologic malignancies, particularly cutaneous T-cell lymphoma and Sézary syndrome.[4,5] Solid tumors, including lung cancer, rarely manifest with erythroderma. Lung cancer is associated with various paraneoplastic dermatoses, such as acanthosis nigricans, dermatomyositis, erythema gyratum repens, and hypertrophic osteoarthropathy.[6] However, erythroderma as an initial presentation of lung carcinoma is exceptionally rare, with only a few cases reported globally.[7,8]

Paraneoplastic cutaneous manifestations may precede, accompany, or follow the diagnosis of malignancy. Recognition of such manifestations is crucial, particularly in elderly patients or in those with significant risk factors such as smoking.[9,10] This case describes erythroderma as

the first paraneoplastic manifestation of moderately differentiated squamous cell carcinoma of the lung, highlighting the need for thorough systemic evaluation of unexplained erythroderma.

CASE REPORT

An 85-year-old male presented with progressive erythema and scaling over one week. Initially confined to the trunk, the eruption rapidly extended to involve more than 90% of his body surface area. There was no history of chronic skin disease, recent drug intake, infection, or constitutional symptoms. He had a 40 pack-year smoking history, having smoked from 1955 to 2013.

On examination, the patient was afebrile and stable. Dermatologic assessment revealed generalized erythema with fine scaling, giving the skin a shiny, exfoliative appearance. The trunk, upper limbs, lower limbs, and buttocks were extensively involved (Figure 1). Palms, soles, mucosa, scalp, and nails were normal. No lymphadenopathy or organomegaly was found.

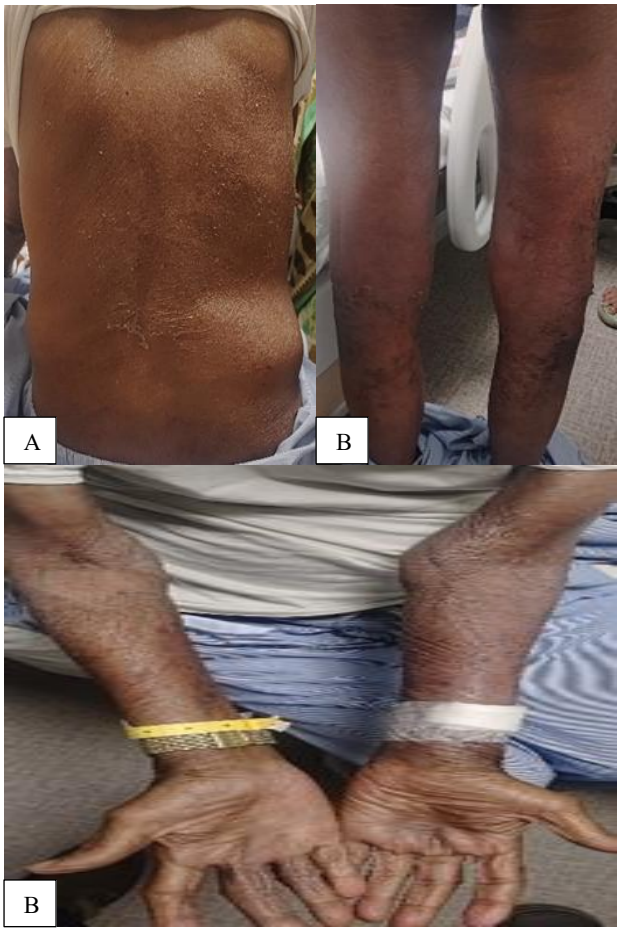

Figure 1 (A-C): Clinical examination revealed widespread erythema, fine scaling, and a glazed skin appearance predominantly in a bathing-suit distribution.

Laboratory evaluation revealed normal hematologic, hepatic, renal, and thyroid function. Skin biopsy demonstrated subacute spongiotic dermatitis with dermal eosinophils and mild perivascular inflammation (Figure 2). The absence of features suggestive of psoriasis, cutaneous lymphoma, or drug hypersensitivity complicated the diagnostic process.

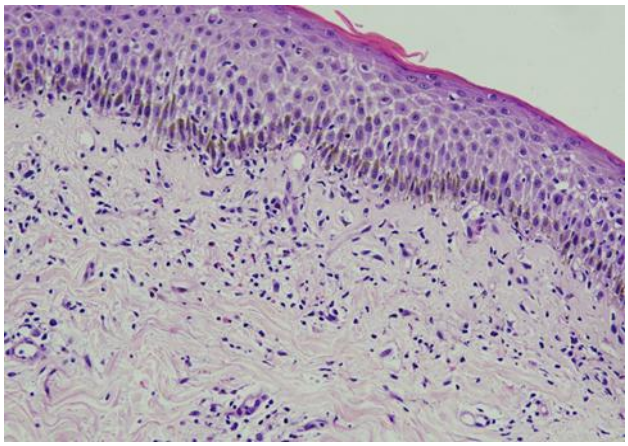

Figure 2: Skin biopsy showing subacute spongiotic dermatitis with dermal interstitial eosinophils.

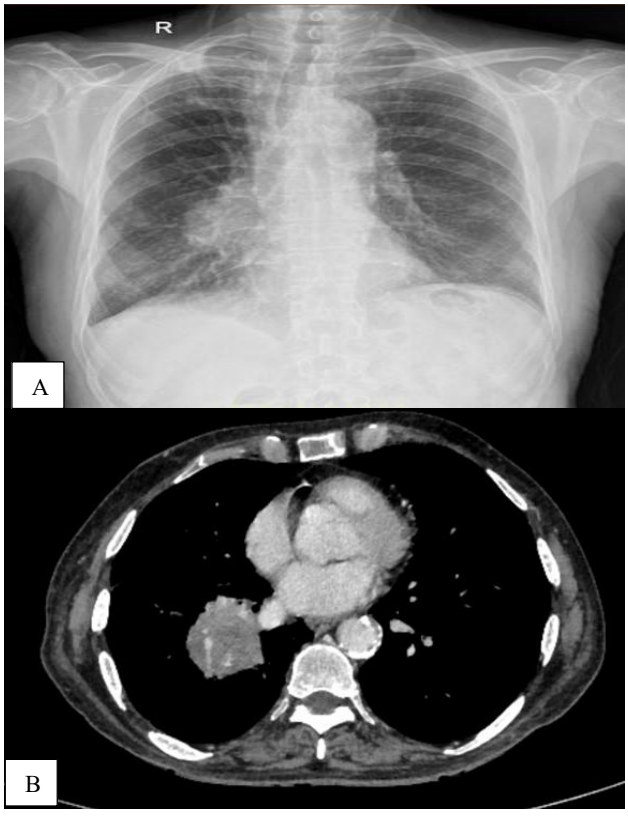

Figure 3 (A and B): Chest x ray showing right perihilar dense opacity in the right side in the mid and lower zone with pulmonary vessels passing through the density and oncology CT scan with contrast of the thorax showed a mass lesion in the right lower lobe in the perihilar region measuring 4.2×4.3×5.6 cm.

Given the patient's age and significant smoking history, malignancy evaluation was pursued. Chest radiography showed a right perihilar opacity. Contrast-enhanced CT revealed a right lower-lobe perihilar mass measuring 4.2× 4.3×5.6 cm (Figure 3).

Bronchoscopy with radial EBUS revealed mucosal irregularity. Tissue specimens obtained through transbronchial biopsy, TBNA, and BAL demonstrated nests of atypical squamous cells with keratinization, consistent with moderately differentiated squamous cell carcinoma (Figure 4). Cytology from mediastinal station 7 nodes was negative.

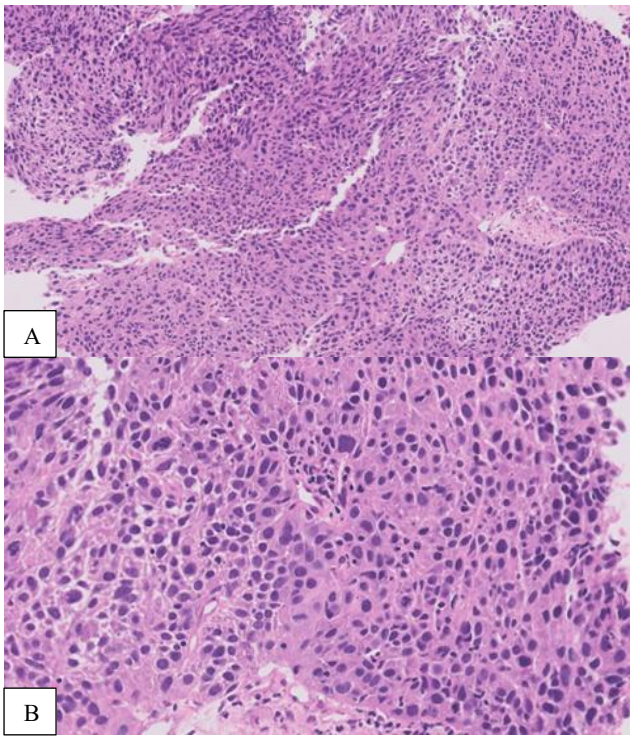

Figure 4 (A and B): Endobronchial biopsy showing poorly differentiated squamous cell carcinoma of the lung and core biopsy from station 7: no malignant cells.

The patient was referred to oncology. PD-L1 testing and NGS profiling were performed. Considering comorbidities and tumor stage, sequential chemo-radiation was planned.

Supportive dermatologic therapy included emollients, topical corticosteroids, and antihistamines. With initiation of cancer treatment, the erythroderma progressively improved. The temporal relationship between therapy and resolution of skin findings strongly supported a paraneoplastic mechanism.

DISCUSSION

Erythroderma is a dermatologic emergency requiring prompt identification of the underlying cause. While chronic dermatoses and drug reactions account for the majority of cases, malignancy-related erythroderma should be considered in elderly patients with acute onset and no identifiable trigger.[11,12]

Paraneoplastic erythroderma is rare and most commonly associated with hematologic malignancies. Its association with lung cancer is extremely uncommon, with only isolated case reports available.[7,8] Paraneoplastic cutaneous manifestations are believed to arise due to tumor-related cytokine release, immune dysregulation, or cross-reactivity between tumor antigens and skin epitopes.[13,14]

Lung cancer is known for its diverse paraneoplastic phenomena, but erythroderma is seldom reported.[16,17] In many cases, as in ours, the cutaneous manifestation precedes the cancer diagnosis. For this reason, erythroderma of unknown cause in an elderly smoker should prompt immediate systemic evaluation.

Curth's criteria for paraneoplastic dermatoses include: Parallel course of skin disease and tumor, exclusion of other causes, characteristic tumor association and resolution of skin findings with treatment.

These criteria were met in our case: the patient had no drug exposure or primary dermatoses, was diagnosed with lung squamous cell carcinoma, and his erythroderma improved after oncologic therapy.[18]

This case reinforces the importance of detailed systemic evaluation in unexplained erythroderma. Early detection of underlying malignancy can significantly improve clinical outcomes.

CONCLUSION

Erythroderma is an uncommon paraneoplastic manifestation of lung squamous cell carcinoma. In elderly patients presenting with unexplained erythroderma, clinicians should maintain a high suspicion for malignancy, especially in individuals with a smoking history. Early diagnosis through imaging and biopsy facilitates timely oncologic intervention and can lead to significant improvement in cutaneous symptoms.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Jagadeesh K, Brunda MS, Furtado S, Shetty S, Faeazi SN. Erythroderma as the first paraneoplastic manifestation of early-stage lung squamous cell carcinoma: a rare case report. Int J Res Med Sci 2026;14:2094-7.