Case Report

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Surgery Section

Cutaneous Scalp Metastasis Unveiling an Occult Lung Adenocarcinoma: A Case Report

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ABSTRACT

Cutaneous metastasis from internal malignancies is an uncommon clinical occurrence, with skin involvement as the initial manifestation of visceral malignancy being particularly rare. We report the case of an 84-year-old male who presented with a hyperpigmented proliferative lesion on the left parietal scalp, clinically suspected to be a primary skin malignancy. Wide local excision was performed, and histopathological examination surprisingly revealed metastatic adenocarcinoma. Immunohistochemistry (IHC) of the tissue showed positivity for Cytokeratin (CK) 7, CK 20 and Thyroid Transcription Factor (TTF1), indicative of a pulmonary origin. Subsequent Fluorodeoxyglucose Positron Emission Tomography (FDG PET)-Computed Tomography (CT) imaging identified a metabolically active mass in the right lower lobe of the lung, along with right paratracheal lymphadenopathy and skeletal metastases. This case highlights the critical role of histopathology and IHC in identifying metastatic skin lesions and determining their origin. Lung adenocarcinoma is known to metastasise to the skin, although scalp involvement as the initial presentation is extremely rare. This case underscores the importance of considering metastatic disease in atypical skin lesions, particularly in elderly patients, and illustrates the need for a multidisciplinary approach to diagnosis and management.

Keywords: Cutaneous metastasis, Immunohistochemistry, Metastatic lung cancer

CASE REPORT

An 84-year-old male patient, a known smoker (40 pack years), came with a hyperpigmented proliferative lesion of around 3×3 cm present over the left parietal region of the scalp for three months, with an increase in size from around 1×1 cm. Patient does not have any significant family history of malignancy and no history of similar lesions elsewhere on the body. The patient is not allergic to any drugs and is not on any regular medications.

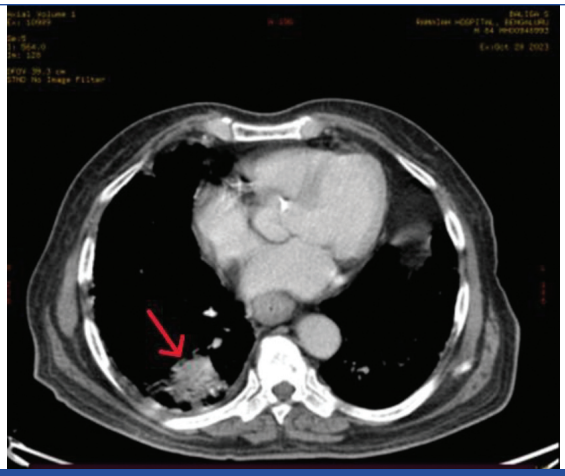
On physical examination, there was a 3×3 cm non-tender, proliferative growth with blackish discolouration, irregular margins and surface with no ulcer/discharge [Table/Fig-1]. There were no signs of local inflammation. On cervical lymph node examination, there were no clinically palpable lymph nodes. The initial differential diagnoses clinically considered were malignant melanoma, squamous cell carcinoma or basal cell carcinoma.

Initial investigations, including an X-ray of the head, were normal. Patient underwent wide local excision of the growth over the scalp on the left parietal region with local advancement flap under general anaesthesia. However, the histopathology report of the scalp lesion revealed metastatic adenocarcinoma with margins free of tumour. This led to further investigations to know where the primary malignancy was arising from, and hence a PET-CT scan was done, and tissue blocks were sent for Immunohistochemistry (IHC). The FDG PET CT scan revealed a metabolically active soft-tissue mass in the right posterior basal segment of the lung, measuring 4.5×4.9×4.2 cm, along with a few prominent right paratracheal lymph nodes and multiple lytic small skeletal lesions [Table/Fig-2]. The patient underwent a CT scan of the thorax to evaluate the full extent of disseminated disease [Table/Fig-3]. The histopathology of the specimen showed compactly arranged tubular and acinar structures in the dermis, suggestive of adenocarcinoma [Table/Fig-4,5]. The IHC markers CK 7, CK 20 and TTF1 were positive, suggestive of metastatic adenocarcinoma leading to the final diagnosis of skin metastasis of lung adenocarcinoma [Table/Fig-6a,b].

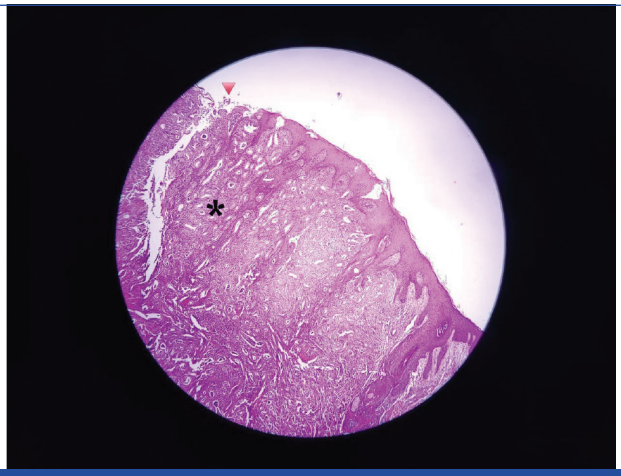
The patient was advised to undergo chemotherapy and radiotherapy after the diagnosis was confirmed. However, considering his advanced age, limited survival benefit and overall prognosis, he declined to undergo any further treatment and succumbed to the illness six months after the initial diagnosis.

[Table/Fig-1]: Preoperative image of the scalp shows a hyperpigmented proliferative lesion on the left parietal scalp.

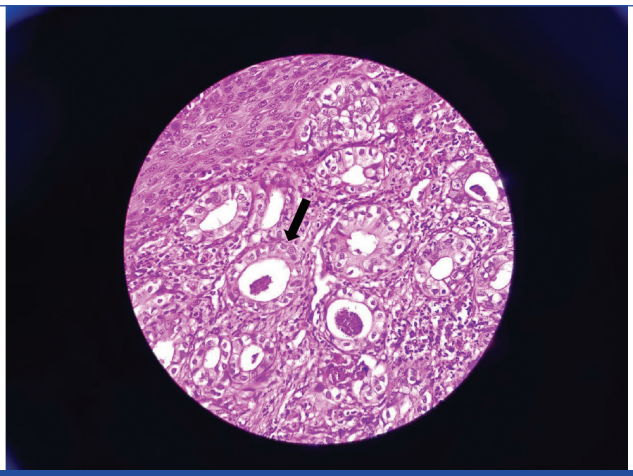
[Table/Fig-2]: PET-CT image showing FDG uptake in the right lobe of the lung (red arrow).



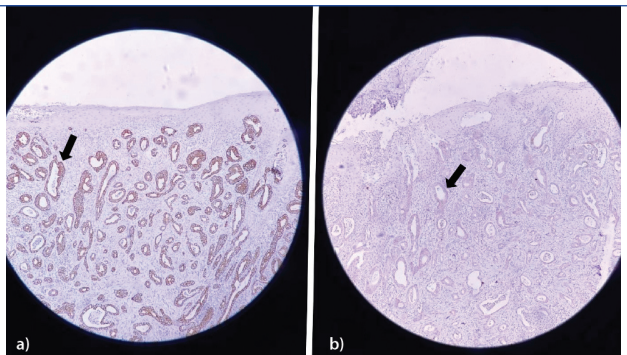
[Table/Fig-3]: CT image showing the right lung nodule (red arrow).



[Table/Fig-4]: Focally ulcerated epidermis (red arrow head) with dermis exhibiting compactly arranged tubular-acinar structures (Black Asterisk) (H&E stain, 4x).



[Table/Fig-5]: Tubules lined by cuboidal to columnar cells with mild pleomorphic nuclei (Black arrow), prominent nucleoli, and moderate cytoplasm (H&E stain, 40x).



[Table/Fig-6]: a) Diffuse and strong immunoreactivity of the tumour cells lining the tubules for CK 7 (black arrow); b) Immunostaining showing weak positivity for CK 20 (black arrow) (10x magnification).

DISCUSSION

Cutaneous and scalp metastases from lung cancer are rare but clinically important markers of advanced disease, and in some cases may be the first manifestation of an otherwise silent visceral malignancy [1,2].

Reported incidence of cutaneous metastases in lung cancer ranges from approximately 0.22-12%, but presentation as the initial sign of disease is distinctly uncommon [1,2]. As reported by Gupta V et al., a 51-year-old male presented with a painless scalp nodule, which was diagnosed as a lung adenocarcinoma [1]. According to da Costa AR et al., skin metastases in adults originate from malignancies located in internal organs, highlighting lung cancer, breast cancer, melanocytes, oral cavity, colon, kidneys, ovaries, and stomach, whereas the scalp accounts for a minority but is overrepresented relative to its surface area, likely due to rich vascularity [2].

The differential diagnosis of a new scalp or skin nodule in an adult includes benign lesions such as epidermoid or pilar cysts, lipoma, haemangioma, adnexal tumours, and dermatofibroma, as well as inflammatory or infectious conditions like cutaneous abscesses, fungal infections, and granulomatous diseases [3,4]. The most common histological subtypes of cancers affecting the scalp are squamous cell carcinomas and basal cell carcinomas [5]. The malignant considerations include primary cutaneous adnexal carcinomas, basal cell carcinoma, squamous cell carcinoma, melanoma, cutaneous lymphoma, and leukaemia cutis, in addition to metastatic deposits from lung, breast, gastrointestinal, renal, and prostate primaries [6].

Pathophysiology of cutaneous metastasis reflects haematogenous or lymphatic dissemination of malignant cells from the primary tumour, representing a late step in the metastatic cascade [6]. Neoplastic cells detach from the primary lung tumour, invade local vessels, survive in the circulation, adhere to dermal or subcutaneous microvasculature, extravasate, and proliferate within a permissive microenvironment. This process is facilitated by epithelial-mesenchymal transition, proteolytic enzyme activity, angiogenesis, and evasion of immune surveillance [6].

The predilection of certain primaries for specific cutaneous sites is thought to relate to patterns of venous and lymphatic drainage and to local vascularity; the richly vascular scalp is disproportionately involved and accounts for a notable subset of cutaneous metastases from lung and other internal malignancies [3]. Lung adenocarcinoma frequently gives rise to moderately to poorly differentiated dermal deposits arranged in nests, cords, or sheets without epidermal connection, and the typical CK7+/CK20-, TTF-1– and Napsin A positive immunophenotype supports a pulmonary origin [2-4].

Management of cutaneous metastases from lung cancer is individualised and primarily palliative, guided by disease burden, histology, molecular profile, prior therapies, and performance status [5]. For solitary or symptomatic lesions, wide local excision can achieve local control, provide diagnostic tissue, and improve cosmesis or comfort; adjuvant or palliative radiotherapy is useful for painful, bleeding, or ulcerated nodules, especially on the scalp, where surgery may be morbid [3].

The development of cutaneous metastases from lung cancer is generally associated with widespread disease and a dismal prognosis, with reported median survival after the appearance of skin lesions ranging from approximately 2.9 to six months in most series [2-4]. Literature suggests that patients with a solitary cutaneous metastasis, good performance status, and limited extracutaneous spread may achieve longer survival, occasionally exceeding one to two years, particularly when treated with active systemic therapy [5].

Multidisciplinary management involving oncology, dermatology, radiation oncology, and palliative care is crucial to optimise symptom control, integrate systemic options, and align treatment with patient

goals, recognising that cutaneous metastasis typically signifies advanced-stage disease with limited survival [4].

CONCLUSION(S)

This case reports a scalp tumour which was the initial manifestation of metastatic lung adenocarcinoma, aligning with the documented rarity of this clinical entity. The diagnostic process underscores the critical role of histopathology and IHC in identifying the metastatic origin of skin lesions.

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