CASE REPORT

DOI: 10.37047/jos.2023-99357

Pilomatrix Carcinoma with Pulmonary Metastasis

Fahri AKGÜL[a], Nuray CAN[b], Canberk TOPUZ[b], İvo GÖKMEN[a], Erkan ÖZCAN[a], Muhammet Bekir HACIOĞLU[a], Sernaz TOPALOĞLU[a], Bülent ERDOĞAN[a], İrfan ÇİÇİN[a]

[a]Division of Medical Oncology, Trakya University Faculty of Medicine, Edirne, Türkiye
[b]Department of Pathology, Trakya University Faculty of Medicine, Edirne, Türkiye

ABSTRACT A rare malignancy, pilomatrix carcinoma (PC) histologically originates from matrix cells in skin hair follicles. Pathologically, it can be confused with squamous cell carcinoma (SCC). A 56-year-old male was referred to us with a diagnosis of SCC of the right lung. After initial histopathological evaluation, the lung tissue was re-examined immunohistochemically, and a diagnosis of metastatic PC was made. Due to an absence of standardized treatment for metastatic PC, we administered a combination of carboplatin and paclitaxel due to its wide-spectrum anti-tumoral activities; however, the disease progressed despite first-line treatment. Although cyclophosphamide and etoposide were administered orally as a second-line therapy, the patient showed little progress and passed away despite two chemotherapy courses. Hence, the diagnosis, treatment, and prognosis of this rare tumor present several challenges. We aimed to contribute to this existing dilemma with our case report and literature review.

Keywords: Pilomatrixoma; pulmonary metastasis; skin neoplasms

Pilomatrix carcinoma (PC) is a rare malignancy that arises from hair matrix cells.[1] In 1961 Forbis and Helwig proposed the term "pilomatrixoma" for a benign tumor arising from the outer root sheath of the lesion's hair follicles. Although a malignant variant of pilomatrixoma, PC was first described by Lopansri and Mihm in 1980, it has been rarely reported globally to date.[2]

Most of the identified cases are middle-aged men without any known genetic predisposition.[3] The commonly affected regions are the scalp, neck, trunk, and upper as well as lower extremities, respectively.[4] Histopathologically, PC is characterized by the presence of squamous metaplasia in hyperchromatic vesicular atypical basaloid cells, increased mitosis, necrosis, infiltrative borders, lymphovascular invasion, and penetration into surrounding tissues.[5] However, the tumor might progress with local recurrence and distant metastasis, the most common site being the lung.[4] Although the local disease is treated with a wide excision, no standard treatment has been proposed yet for the treatment of the advanced stage.

We present a 56-year-old patient who was diagnosed with primary pulmonary squamous cell carcinoma (SCC) in an external center but was diagnosed with PC metastasis after our re-evaluation. We present the histopathological examinations, treatment, and prognosis of this patient. A literature review was conducted using the PubMed (https://pubmed.ncbi.nlm.nih.gov/, USA) database between 1980 and 2022, including relevant case reports and reviews.

TO CITE THIS ARTICLE:
Akgül F, Can N, Topuz C, Gökmen İ, Özcan E, Hacıoğlu MB, Topaloğlu S, Erdoğan B, Çiçin İ. Pilomatrix Carcinoma with Pulmonary Metastasis. Journal of Oncological Sciences. 2024;10(1):69-72.

Correspondence: Fahri AKGÜL
Division of Medical Oncology, Trakya University Faculty of Medicine, Edirne, Türkiye
E-mail: fariak@doctor.com

Peer review under responsibility of Journal of Oncological Sciences.

Received: 01 Sep 2023 ***Received in revised form:*** 07 Nov 2023 ***Accepted:*** 07 Nov 2023 ***Available online:*** 29 Nov 2023

CASE REPORT

A 56-year-old male with 30-pack years of smoking history was referred to our department. He had earlier undergone surgical excision for a mass (approximately 20 cm diameter) from the lower right abdominal region in 2018; the histopathological diagnosis was PC (Figure 1, Figure 2). Furthermore, a mass invading the right chest wall was detected in thoracic computed tomography (CT) in an external center (Figure 3A). Subsequently, a tru-cut biopsy was performed and a histopathological diagnosis of SCC was given. Therefore, the patient was referred to us.

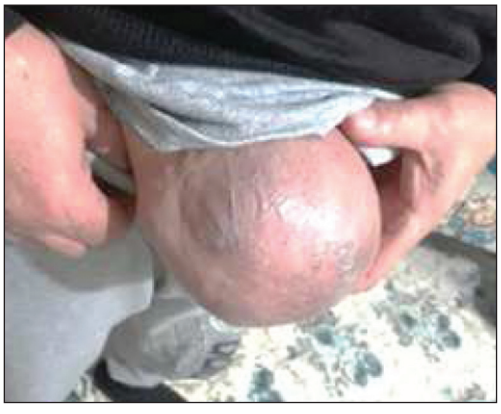

FIGURE 1: Primary pilomatrix carcinoma mass in the lower right abdomen skin (approximately 20 cm in diameter).

However, the patient did not report back to the hospital for histopathology results. During the last three years, he did not receive any treatment. With the suspicion that the right lung mass in the thoracic CT might be metastatic, we re-evaluated the lung pathology material taken from the external center for histopathological confirmation. Consequently, it was reported as PC metastasis. After consultation with a thoracic surgeon, surgery was ruled out. Furthermore, after consulting the radiation oncology department, he was considered unfit for radiotherapy because the thoracic mass had spread over a large area.

Since there is no standardized treatment for PC to date, we administered a combination therapy of carboplatin (AUC 5) and paclitaxel (175 mg/m^2) in 21-day cycles as a first-line therapy because of its broad-spectrum anti-tumor activity. However, the

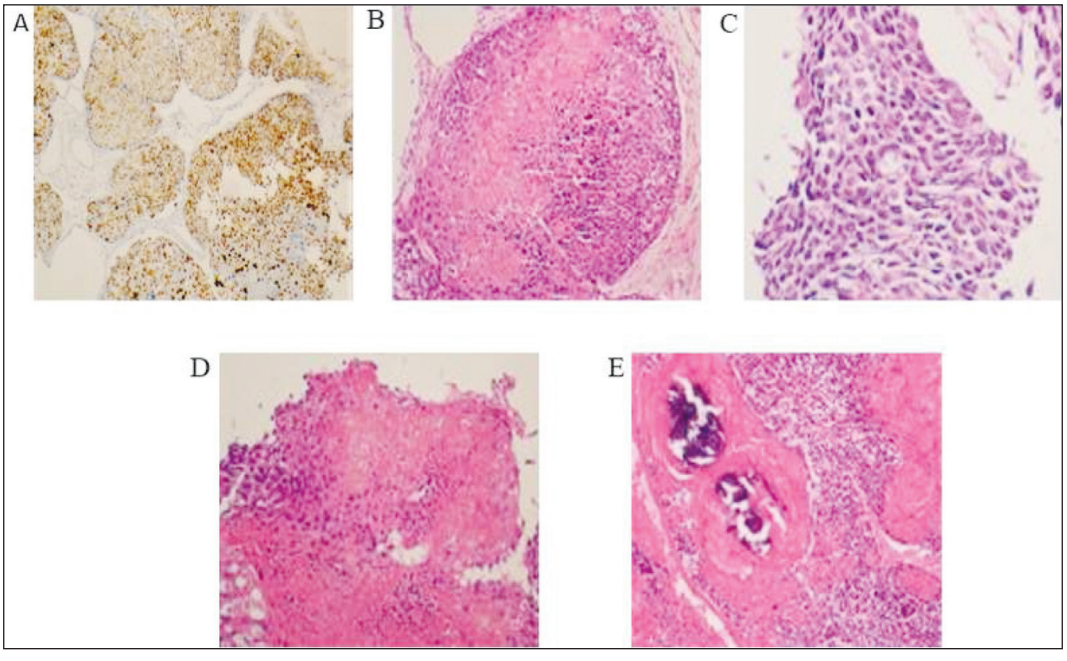

FIGURE 2: A) GATA 3 immunohistochemical staining x100-Nuclear positivity in tumor cells in the lung. **B)** 2- H&E, x200-Basaloid cells with prominent nucleoli and shadow cells in the middle of the tumor in the lung, some of which have a pleomorphic appearance, some with vesicular nuclei and some with hyperchromatic nuclei. **C)** H&E, x400-Basaloid cells with a highly atypical appearance in lung tumor, with increased mitosis with unclear cytoplasmic borders. **D)** H&E, x200-Keratinized area containing shadow cells in the upper part of the picture in lung tumor and basaloid tumor cells in their periphery. **E)** H&E, x200-Picture of the skin localized tumor primary. Shadow cells and basaloid tumor cells surrounding the calcification centrally.

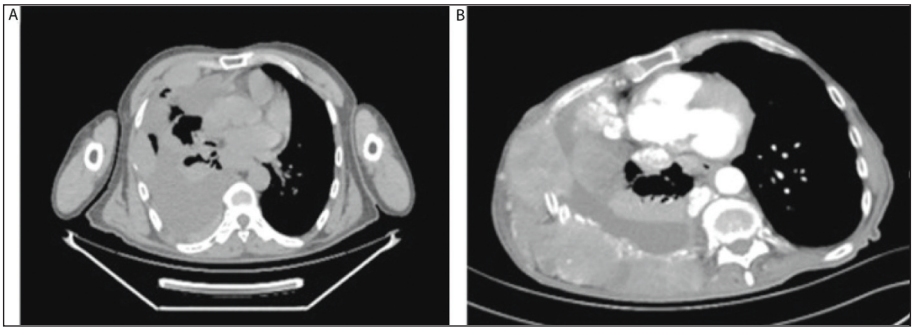

FIGURE 3: A) Numerous lesions, the largest of which is 10 cm in size, destroying the ribs in the intercostal spaces in the right lung. **B)** Multiple lesions on the right thoracic wall that destroy the ribs and are progressive in size compared to previous imaging.

lung's metastatic lesion showed progression on CT imaging after three chemotherapy cycles. Based on a successful case previously treated with oral cyclophosphamide and etoposide, we administered the same chemotherapy regimen.[6] The patient began combination chemotherapy with 50 mg oral cyclophosphamide (1×1) everyday and 50 mg etoposide (2×1) for five days, repeating treatment every 21 days. Additionally, the patient's thorax and abdominal CT imaging were performed after three chemotherapy courses (Figure 3B). The patient, after progression, was taken to the intensive care unit due to worsened clinical condition. However, he passed away after ten days of follow-up and treatment. The patient provided informed consent for the case report.

DISCUSSION

PC presents as a slow-growing, nodular skin or subcutaneous mass.[1] In our case, although the primary abdominal giant nodular lesion was excised with a negative surgical margin, lung metastasis was observed three years after the excision of the abdominal giant nodular lesion. Herrmann et al. examined the epidemiological and clinical features of 123 patients and found that 76% of them were white males, and the mean age at diagnosis was 52 years. Moreover, 17 of the 123 patients displayed metastases, and 10 of these patients had lung metastases.[7] Similarly, our case was based on a middle-aged white male who had lung metastases. Although most of the lesions are observed in the head, neck, and extremities; in our case, the primary lesion was localized in the right lower abdomen skin.[1]

PC is a tumor that is often misdiagnosed and can be only differentiated through histopathological examination from pilomatrixoma.[4] Since PC is morphologically very similar to SCC, it can only be distinguished immunohistochemically.[8] Furthermore, PC and SCC display positive and negative immunohistochemical results for GATA 3, respectively. Nonetheless, our patient showed positive results for GATA-3, and a diagnosis of PC was given. Since the invasive mass in the right chest wall was histopathologically reported as SCC in the external center, we, after re-evaluation, diagnosed it as low-grade PC.

Often underestimated by clinicians, PC is frequently misdiagnosed as a sebaceous cyst clinically.[4] If PC has not been diagnosed histopathologically before, the detection of the primary lesion becomes difficult after it metastasizes. Our case displayed pulmonary metastasis three years after the primary lesion's excision. Although PC has a locally aggressive behavior, metastasis occurs in 10% of all cases.[9] Even though no large metastatic case studies have been reported to date, several case-based studies have been published. Gould et al. reported a case of PC with bilateral lung metastases.[5] Similarly, in 2002, De Gálvez-Aranda et al. stated that knee PC can metastasize to the lung and lymph nodes.[10]

There is no standard approach for treating metastatic PC yet. Therefore, the carboplatin and

paclitaxel combination was dispensed as a first-line treatment because of its broad anti-tumoral activity. However, the patient's disease progressed despite this therapy. Based on the metastatic PC case, which had a successful outcome at Akdeniz University, we also administered oral cyclophosphamide and etoposide treatment as second-line chemotherapy.[6] Nonetheless, our patient, who progressed after the third course, developed respiratory failure and died.

To conclude, the diagnoses of both pilomatrixoma and PC are frequently missed by clinicians and pathologists. Therefore, care should be taken while evaluating slow-growing skin nodular masses, and the possibility of PC should be kept in mind. Subsequently, this tumor might reappear years later with local recurrences or visceral metastases. However, treatment for metastatic PC has not been standardized yet. As a result, PC is a rare tumor with difficulties in diagnosis, prognosis, and treatment. Therefore, improved diagnostic and therapeutic approaches can lead to better outcomes for PC patients.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Fahri Akgül, İrfan Çiçin, Sernaz Topaloğlu;* ***Design:*** *Fahri Akgül, Erkan Özcan, İvo Gökmen;* ***Control/Supervision:*** *İrfan Çiçin, Nuray Can, Sernaz Topaloğlu;* ***Data Collection and/or Processing:*** *İrfan Çiçin, Muhammet Bekir Hacıoğlu;* ***Analysis and/or Interpretation:*** *Bülent Erdoğan, Muhammet Bekir Hacıoğlu;* ***Literature Review:*** *Nuray Can, Fahri Akgül, Canberk Topuz;* ***Writing the Article:*** *Fahri Akgül, Erkan Özcan;* ***Critical Review:*** *İrfan Çiçin, Bülent Erdoğan;* ***References and Fundings:*** *Fahri Akgül;* ***Materials:*** *Canberk Topuz, İvo Gökmen.*

REFERENCES

1. White C, Farsi M, Esguerra D, Miller R. Not your average skin cancer: a rare case of pilomatrix carcinoma. J Clin Aesthet Dermatol. 2020;13(6):40-42. [PubMed] [PMC]
2. Lopansri S, Mihm MC Jr. Pilomatrix carcinoma or calcifying epitheliocarcinoma of Malherbe: a case report and review of literature. Cancer. 1980;45(9):2368-2373. [Crossref] [PubMed]
3. Sau P, Lupton GP, Graham JH. Pilomatrix carcinoma. Cancer. 1993;71(8):2491-2498. [Crossref] [PubMed]
4. Jones C, Twoon M, Ho W, Portelli M, Robertson BF, Anderson W. Pilomatrix carcinoma: 12-year experience and review of the literature. J Cutan Pathol. 2018;45(1):33-38. [Crossref] [PubMed]
5. Gould E, Kurzon R, Kowalczyk AP, Saldana M. Pilomatrix carcinoma with pulmonary metastasis. Report of a case. Cancer. 1984;54(2):370-372. [Crossref] [PubMed]
6. Arslan D, Gündüz S, Avci F, et al. Pilomatrix carcinoma of the scalp with pulmonary metastasis: a case report of a complete response to oral endoxan and etoposide. Oncol Lett. 2014;7(6):1959-1961. [Crossref] [PubMed] [PMC]
7. Herrmann JL, Allan A, Trapp KM, Morgan MB. Pilomatrix carcinoma: 13 new cases and review of the literature with emphasis on predictors of metastasis. J Am Acad Dermatol. 2014;71(1):38-43.e2. [Crossref] [PubMed]
8. Song M, Chekmareva M, Bachmann G, Gibbon D. Pilomatrix carcinoma of the vulva. Gynecol Oncol Rep. 2015;15:9-11. [Crossref] [PubMed] [PMC]
9. Bueno D, Caniego-Casas T, Sánchez-Martínez MC, Saavedra-Serrano C, Palacios J, Pérez-Mies B. Vulvar pilomatrix carcinoma: morphologic and molecular features. Int J Gynecol Pathol. 2021;40(5):482-486. [Crossref] [PubMed]
10. De Gálvez-Aranda MV, Herrera-Ceballos E, Sánchez-Sánchez P, Bosch-García RJ, Matilla-Vicente A. Pilomatrix carcinoma with lymph node and pulmonary metastasis: report of a case arising on the knee. Am J Dermatopathol. 2002;24(2):139-143. [Crossref] [PubMed]