SKIN

BRIEF ARTICLE

Progression of an Atypical Fibroxanthoma to Metastatic Pleomorphic Dermal Sarcoma in a Lung Transplant Recipient: A Case Report

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ABSTRACT

Introduction: Atypical fibroxanthoma (AFX) and pleomorphic dermal sarcoma (PDS) are rare cutaneous malignancies often seen in elderly patients with photodamaged skin. Although solid organ transplant recipients (SOTRs) with AFX/PDS appear to have worse outcomes than the general population, the risk of progression from AFX to PDS in this group is not well studied. We present the case of a lung transplant patient with AFX recurring as PDS.
Case Presentation: A 68-year-old male lung transplant patient with an extensive history of skin cancer presented with a 9-millimeter erythematous papule on the right vertex scalp. Biopsy revealed AFX, and the tumor cleared with 1 stage of MMS. Seven months later, the patient developed a rapidly growing, hemorrhagic nodule at the site, which was diagnosed as PDS. Despite initial treatment with doxorubicin, pazopanib, and radiation to the lung, liver, and bone lesions, the patient's disease progressed. The patient was started on pembrolizumab with prednisone to mitigate the risk of organ rejection but succumbed to pneumonia with septic shock and respiratory failure.
Discussion: Transplant patients have an increased risk of poor outcomes related to PDS. ICIs may be considered in advanced cases in which other treatment options have been exhausted. In conclusion, SOTRs with AFX/PDS should be aggressively treated and monitored as their risk of unfavorable outcomes appears to be increased.

INTRODUCTION

Atypical fibroxanthoma (AFX) and pleomorphic dermal sarcoma (PDS) are a spectrum of rare cutaneous malignancies most commonly seen in elderly photodamaged patients.[1] PDS, which is more likely to result in poor outcomes, is characterized by subcutaneous invasion, increased mitoses, perineural and lymphovascular invasion (PNI/LVI), and necrosis.[1] According to a 2022 meta-analysis, AFX has a 1.72% 5-year risk of progression to PDS.[2] Although solid organ transplant recipients (SOTRs) with AFX/PDS appear to have higher rates of poor outcomes than the general population,[3] the risk of progression from AFX to PDS in this group has not been well studied. We present a case of AFX recurring as metastatic PDS in a lung transplant patient. This case is significant as

it exemplifies the importance of recognizing the increased risk of adverse outcomes associated with aggressive cutaneous malignancies in SOTRs.

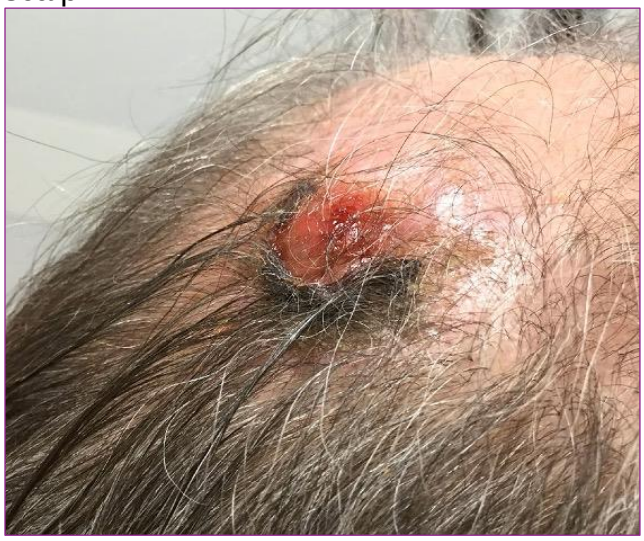
CASE REPORT

A 68-year-old male lung transplant recipient presented with a 9 millimeter erythematous papule on the right vertex scalp. Histology revealed a spindle cell proliferation extending to the reticular dermis without PNI, LVI, or necrosis. Immunohistochemical staining was positive for CD10 and CD68 and negative for AE1/3, p63, Melan-A, and SOX-10, rendering a diagnosis of AFX. The tumor cleared with one stage of Mohs surgery.

Seven months later, the patient developed a rapidly growing, bleeding nodule at the site **(Figure 1)**. Histology again revealed a spindled tumor staining positive for CD10 and negative for P63, Melan-A, and SOX10, but now with extensive subcutaneous infiltration, cellular atypia, and mitotic activity consistent with PDS. A computed tomography (CT) of the head was suspicious for galeal involvement, and the patient was referred to Surgical Oncology for wide excision and drilling of the outer calvarial table (see **Figure 2** for the defect 1 month post-operative). Although negative histologic margins were achieved, 5 months later the patient developed local recurrence and metastases to the lungs, liver, and right ilium (see **Figure 3** for a PET-CT demonstrating these findings).

The patient then underwent 5 cycles of doxorubicin, radiation to the distant metastases, and a one-month course of pazopanib with continued progression. Immunotherapy was initially avoided due to his transplant status, but given the continued progression he was started on pembrolizumab. This was administered with prednisone to help mitigate the risk of organ rejection. After 2 cycles of pembrolizumab, the patient succumbed to pneumonia with septic shock and respiratory failure.

Figure 1. AFX previously treated with Mohs surgery recurring as PDS on the right vertex scalp.



DISCUSSION

This case report demonstrates the progression of a small, seemingly straightforward AFX to metastatic PDS in a lung transplant recipient. A multicenter retrospective cohort study demonstrated that AFX and PDS tend to behave more aggressively in SOTRs. In this study, the local recurrence rate in SOTRs was 25% for AFX and 50% for PDS, and the metastasis rate was 8% for AFX and 75% for PDS. However, the sample size was small (n=17), and further research on this topic is needed.[3]

The treatment of advanced AFX/PDS is complex, with no standard guidelines or FDA-approved therapies. Management is further complicated in SOTRs, as the risk of organ

Figure 2. Surgical defect 1 month after wide excision of the PDS recurrence and drilling of the outer calvarial table with Surgical Oncology.

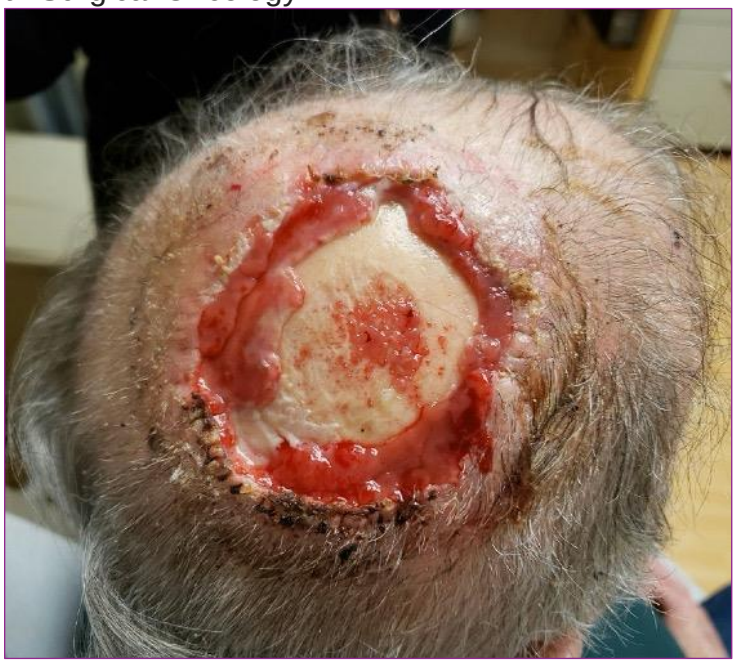
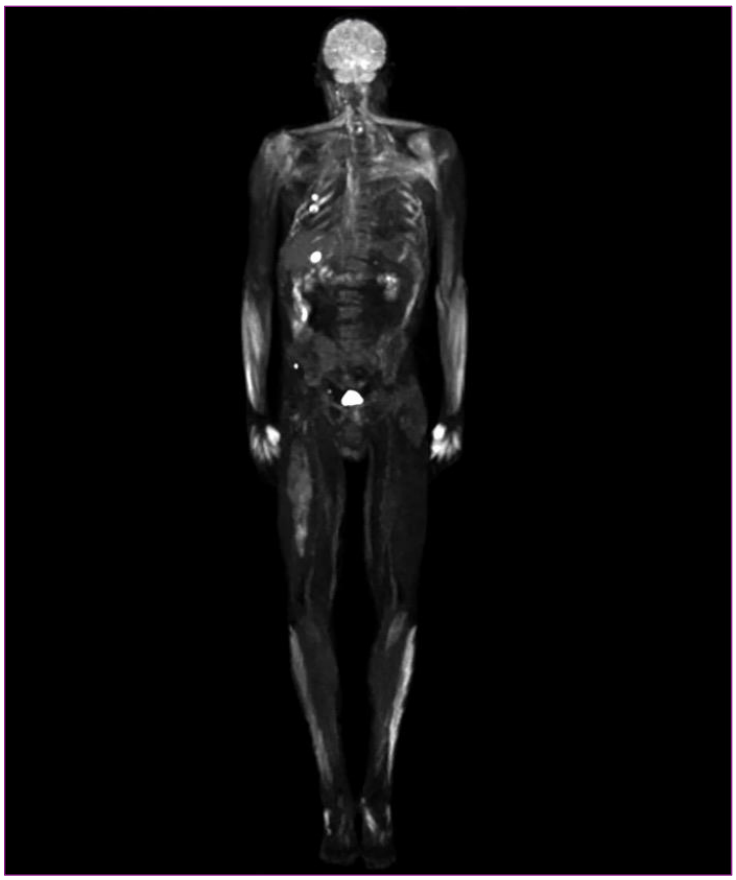


Figure 3. Full body PET-CT scan demonstrating metastatic PDS to the right lung, liver, and right ilium.



rejection with immunotherapy must be considered. PDS has been shown to be responsive to immune checkpoint inhibitors (ICIs),[4,5] but SOTRs have been excluded from trials given the risk of organ rejection. Newer data has suggested that ICIs can be considered in SOTRs with advanced malignancies in which other options have been exhausted, with the risk of rejection being 41.2% in a recent systematic review.[6] Furthermore, a recent pilot study suggested that the risk of rejection may be mitigated by combining ICIs with systemic steroids, as in our patient.[7]

In conclusion, SOTRs with AFX/PDS should be treated aggressively and monitored closely as they appear to have a higher risk of poor outcomes. ICIs may be considered in advanced cases in which other treatment options have been exhausted.

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References:

1. R Soleymani T, Aasi SZ, Novoa R, et al. Atypical Fibroxanthoma and Pleomorphic Dermal Sarcoma: Updates on Classification and Management. *Dermatol Clin* 2019;37(3):253-259.
2. Ørholt M, Aaberg FL, Abebe K, et al. Risk factors for local atypical fibroxanthoma recurrence and progression to pleomorphic dermal sarcoma: A meta-analysis of individualized participant data. *J Surg Oncol* 2022;126(3):555-562.
3. McCoppin HH, Christiansen D, Stasko T, et al. Clinical spectrum of atypical fibroxanthoma and undifferentiated pleomorphic sarcoma in solid organ transplant recipients: a collective experience. *Dermatol Surg* 2012;38(2):230-239.
4. Klein S, Persa OD, Mauch C, et al. First report on two cases of pleomorphic dermal sarcoma successfully treated with immune checkpoint inhibitors. *Oncoimmunology* 2019;8(12):e1665977.
5. Klein S, Quaas A, Noh KW, et al. Integrative Analysis of Pleomorphic Dermal Sarcomas Reveals Fibroblastic Differentiation and Susceptibility to Immunotherapy. *Clin Cancer Res* 2020;26(21):5638-5645.
6. Portuguese AJ, Tykodi SS, Blosser CD, et al. Immune Checkpoint Inhibitor Use in Solid Organ Transplant Recipients: A Systematic Review. *J Natl Compr Canc Netw* 2022;20(4):406-416.e11.
7. Tsung I, Worden FP, Fontana RJ. A Pilot Study of Checkpoint Inhibitors in Solid Organ Transplant Recipients with Metastatic Cutaneous Squamous Cell Carcinoma. *Oncologist* 2021;26(2):133-138.