



A High-Grade Spindle Cell Sarcoma with Novel SPIDR::TERT Fusion

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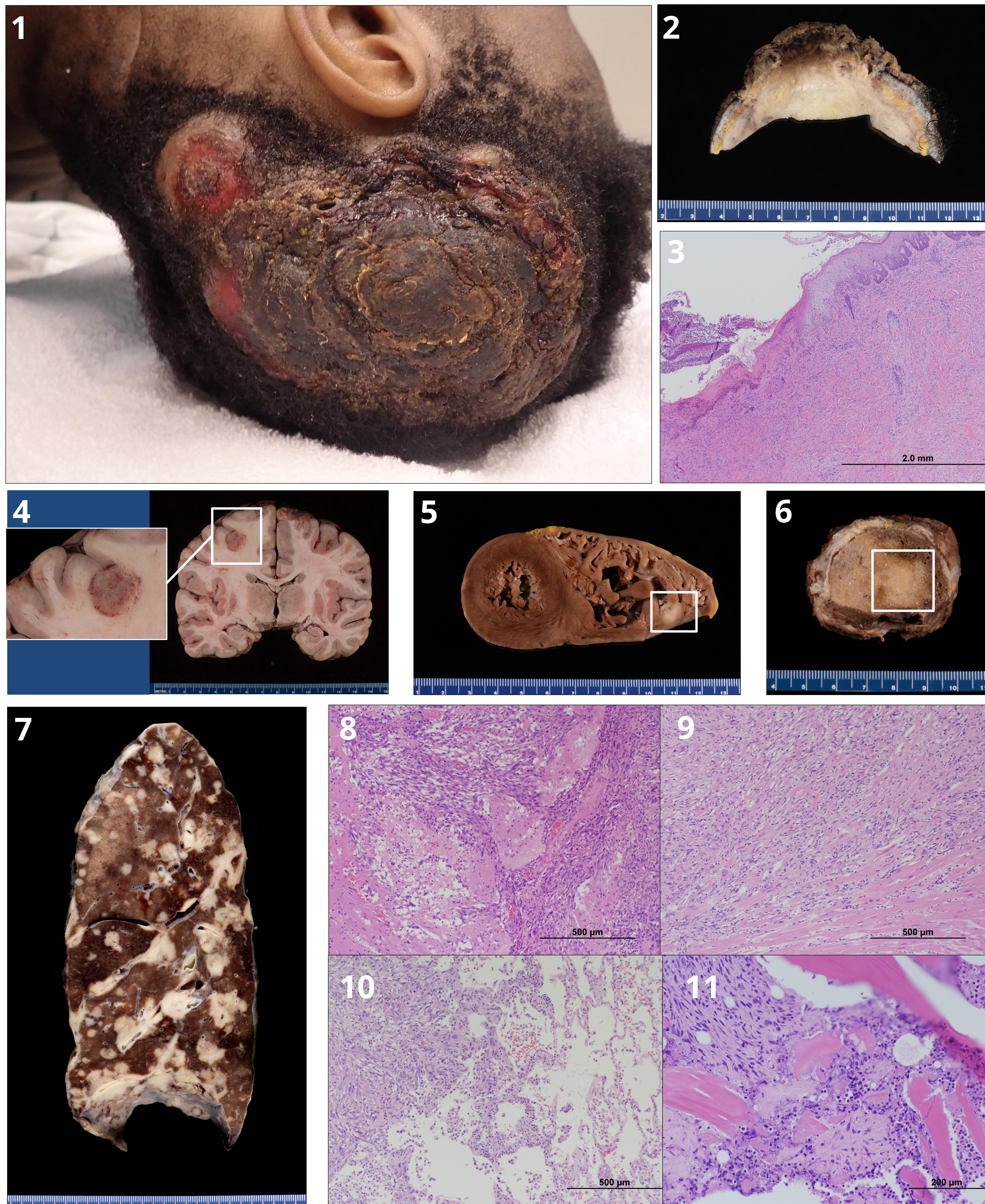
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Background

The decedent is a 21-year-old male who presented to the emergency department (ED) with fever, shortness of breath, low back pain, and a draining scalp mass. The mass had appeared four years prior and was diagnosed via biopsy as a benign dermal abscess. Six months prior to his presentation to the ED, the mass had begun to grow rapidly. Subsequent magnetic resonance imaging (MRI) and computed topography (CT) scans revealed widespread metastatic disease involving the brain, lungs, lymph nodes, pancreas, bone, and subcutaneous soft tissue. A repeat punch biopsy of the scalp mass demonstrated involvement of the dermis and subcutaneous soft tissue by a malignant spindle cell neoplasm. However, immunohistochemistry (IHC) and next-generation sequencing (NGS) ancillary testing did not align with an established tumor profile. Unfortunately, the decedent was not considered a candidate for surgical resection of the scalp mass due to underlying dermal involvement. Systemic treatment was not recommended due to a lack of a more definitive tumor diagnosis. Following further decline and consultation with palliative care, the decedent was transitioned to comfort care and expired within a month of hospital admission.

Results

Upon autopsy, external exam showed a cachexic male with a 16.0 x 9.0 x 3.0 cm fungating, ulcerated, indurated, anchored, and full-thickness left scalp skin mass. Evisceration and prosection revealed grossly identifiable metastases in the brain, lungs, pleura, diaphragm, pancreas, pericardium, myocardium, spleen, thyroid, vertebrae, and bilateral kidneys. Of note, severe thoracic and abdominal lymphadenopathy and grossly positive lymph nodes were also observed. The lungs were notable for severe pulmonary edema, congestion, and pleural effusion. Other notable findings included left ventricular dilation and hypertrophy, as well as severe hepatic congestion. A broad IHC workup of 34 stains on the punch biopsy included positive staining for SMA, EMA, calponin, CAM5.2, and GLUT1. Solid tumor NGS demonstrated SPIDR::TERT rearrangement, as well as TP53 and KRAS mutations.



Discussion

Inconclusive IHC staining leaves many possibilities for tumor origin. Positive EMA, GLUT1, and CAM 5.2 stains indicate a potential dedifferentiated sarcomatoid carcinoma or malignant perineurioma. However, no differentiated components were identified, and staining was negative for claudin-1, a more specific perineurial marker. Importantly, claudin-1 expression can be lost in a malignant perineurioma transformation.¹ Positive KRAS and TP53 mutations were present, though these mutations are found in many different malignancies and therefore are not indicative of a specific diagnosis.² Uniquely, the NGS demonstrated a novel SPIDR::TERT rearrangement, thus far undocumented in the literature. TERT fusions have been identified in a variety of other unclassified spindle cell sarcomas, suggesting a possible role as a primary driver of or secondary event within malignancy.³ Taken together, these findings did not offer a definitive diagnosis. Thus, a descriptive diagnosis of exclusion was rendered: high-grade SPIDR::TERT rearranged spindle cell sarcoma.

Conclusion

This case presents a novel SPIDR::TERT gene rearrangement, uncovering a need for further research on the fusion and its clinical implications. The role of the pathologists' assistant (PA) in this setting is to perform meticulous sectioning and extensive documentation of gross pathology, aiding any future researchers of TERT gene fusions with the ultimate goal of maximizing positive patient outcomes.

Figures

1. Gross photo of external exam of scalp mass.
2. Cross section of scalp mass with tumor involving dermis.
3. Tumor involving epidermis, H&E-stain, 4X.
4. Brain with tumor involving gray/white matter junction.
5. Heart with tumor involving right ventricular wall.
6. Vertebra with tumor involving vertebral bone.
7. Lung with multifocal tumor deposits.
8. Tumor involving brain parenchyma, H&E stain, 10X.
9. Tumor involving myocardium, H&E stain, 10X.
10. Tumor involving lung parenchyma, H&E stain, 10X.
11. Tumor involving bone marrow, H&E stain, 20X.

References:

1. Hornick JL, Fletcher CD. Soft tissue perineurioma: clinicopathologic analysis of 81 cases including those with atypical histologic features. *Am J Surg Pathol*. 2005;29(7):845-858.
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3. Hue SS, Saoud C, Bahceci D, Villafania L, Benhamida J, Antonescu CR. Expanding the Morphologic and Molecular Spectrum of Spindle Cell Tumors Associated With TERT Fusions. *Genes Chromosomes Cancer*. 2025;64(12)