Soft tissue myoepithelial carcinoma of the neck with spinal invasion

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Abstract

Soft tissue myoepithelial neoplasms are a rare yet diverse group of tumors, ranging from benign to malignant lesions. Their presentation in the head and neck region is uncommon and represents a challenging diagnosis. Early identification of myoepithelial carcinoma is crucial given its more aggressive course compared to its benign counterpart, although the histopathological distinction between the two can be difficult. *EWSR1* gene rearrangement is found in half the cases and has a speculative role in pathogenesis. Complete excision remains the treatment of choice. The roles of chemotherapy and radiation are unclear. We report the hospital course of a 33-year-old female who presented to our institution with a posterior neck mass with spinal invasion, diagnosed as myoepithelial cancer. A literature review of these rare tumors is discussed here.

Introduction

Myoepithelial carcinomas are rare tumors of the salivary glands characterized by a mix of malignant cells with both epithelial and smooth muscle features. These neoplasms have been reported in other body parts, including the lungs, bones, breast, limbs, and soft tissue. However, presentation in the head and neck area is uncommon. Despite advances in molecular biology, their histopathogenesis remain incompletely understood. Due to the rarity of the disease, presentation at an uncommon site can lead to diagnostic challenges, thus delaying the diagnosis. We report a case of a young female patient who was diagnosed with a posterior neck myoepithelial carcinoma with invasion of the vertebrae and spinal cord and review the current literature.

Case Report

A 33-year-old, previously healthy, African-American female presented to our emergency department for headache associated with posterior neck mass that had been enlarging over the preceding two months. She reported dizziness and right upper extremity paresthesias. Recently, she also noticed progressively worsening dysphagia to solids. She stated a 40 pounds unintentional weight loss. She denied trauma to the neck and could not recall any inciting event. She denied smoking, or alcohol intake. She had no fever, chills or night sweats. Family history was not significant.

On physical exam, she had normal vital signs, with no evidence of airway obstruction. A 15 cm subcutaneous mass was noted extending from the lower occipital area to the lower posterior cervical region. It had a solid texture, fixed and non-tender on palpation. Motor power was noted to be 4/5 in the right upper extremity. The rest of her physical exam was unremarkable, with no organomegaly or lymphadenopathy.

On admission, hemogram showed severe microcytic anemia, mild thrombocytosis, with a normal white blood cell count. Ferritin was elevated; lactate dehydrogenase was 323 IU/L. She had normal liver and hepatic functions.

A computed tomography (CT) scan of the neck showed a large 13×13×18 cm soft tissue mass in the posterior neck inseparable from the paraspinal muscles, associated with osseous erosion (Figure 1). Also, an extension to the spinal canal was present, resulting in canal stenosis and cord compression at the level of C3-C4. The tumor also extended inferiorly to the level of the right lung apex. CT angiogram of the neck ruled out vascular invasion. Multiple CT guided core biopsies were performed, but a diagnostic conclusion could not be reached. An excisional biopsy was later performed by the neurosurgeon with intent to debulk the tumor and decompress the spinal cord. This resulted in hemilaminectomy and foraminotomy with fixation and fusion of cervical spine at the level of C2-C4. Given the extent of the disease, a complete surgical resection was not feasible.

The pathology specimen was reviewed in our institution and a tertiary specialized hospital. It was reported as poorly differentiated malignant neoplasm composed mostly of epithelioid cells with eosinophilic granular cytoplasms and atypical vesicular nuclei without duct formation (Figure 2). There is prominent necrosis and mitotic figures. Immunohistochemistry revealed strong positivity for S-100, CD99 and vimentin. The tumor cells also showed multifocal positivity for epithelial membrane antigen (EMA) and weak positivity for Pan-keratin and SOX 10. Microphthalmia-associated transcription factor tyrosinase and CAM 5.2 positivity was equivocal. P-63, melanoma antigen recognized by T-cells 1, Glial fibrillary acidic protein (GFAP), CD34, desmin, CD163, CD1a and PAX8 were negative. Based on the cytomorphology and immunophenotype, the final diagnosis was most consistent with high-grade myoepithelial carcinoma.

Salvage radiation therapy was planned postoperatively. However, bony metastasis was later discovered on magnetic resonance imaging (MRI) of lumbar spine and pelvis after she had complained of new onset lower back pain. Her condition rapidly deteriorated with tracheal compression and respiratory failure coupled with worsening neurological deficits. On her thirtieth hospital day, she died from complications of upper airway collapse secondary to the progression of her tumor.

Discussion

Rare tumors are difficult to diagnose and lacks the necessary treatment for disease control, myoepithelial carcinomas are one of them. Unless diagnosed at a very early stage where a complete surgical resection is feasible with wide surgical margins, these tumors have adverse outcomes as evidenced in our case.

They have been classically described in the salivary glands and accounts for 1.5% of all salivary gland tumors.[1] However, they tend to occur in organs including breast, lung, soft tis-

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sue, bone and skin.[2-6] During embryogenesis, myoepithelial cells originate from the ectoderm and can differentiate bi-directionally to epithelial or mesenchymal tissue. As a result, these cells possess characteristics of both lineages.[7] The histogenesis of myoepithelial neoplasms is not well understood, because they appear not only at sites with normal myoepithelial cell lining of glandular/ductal structures (skin, lung, larynx, and breast) but also within soft tissues and bone, where myoepithelial cells are usually absent.[8]

The World Health Organization defines myoeptheliomas, on one hand, as tumors composed of myoepithelial cells with a solid, myxoid and reticular growth pattern. On the other hand, the malignant cells can have spindle, plasmacytoid, epithelioid or clear cell morphologies, yet share immunohistochemical features of myoepithelial carcinomas. Myoeptheliomas and myoepithelial carcinomas do not exhibit ductal epithelial structures; if they do, they are classified as mixed tumors.[9]

Hornick and colleagues reported a series showing that these tumors were equally distributed across gender.[10] The neoplasms were also found in all age groups, with a peak between thirty and fifty years of age.[10] Myoepithelial carcinomas, however, seem to be more common and more aggressive in children.[11] Only 15% of cases involved the head and neck region and the most common presenting symptom was a neck mass, similar to our patient.[10]

All cases in the Hornick series were reactive to an epithelial marker. The most sensitive epithelial markers were keratin AE/1-AE/3 or Pan-Keratin (93% of cases).[10] Varying rates of positivity were found for myogenic markers, the most sensitive of which was calponin (86% of cases). Other markers included smooth muscle actin, glial fibrillary acidic protein (GFAP) and p63.[10] Similarly, in their series of 14 primary soft tissue myoepithelial tumors, Rekhi and colleagues suggested that the optimal immunohistochemical markers are two epithelial markers (EMA and S-100) combined with a broad range of myogenic markers that include Keratins, GFAP, p63 and calponin. Taking into account the morphological features of the tumor is also an integral part of establishing the correct pathological diagnosis.[12] In our patient, immunohistological analysis had revealed positivity for S-100 and Pankeratin. In difficult cases, the genetic profile of soft tissue myoepithelial tumors can be evaluated. Antonescu and colleagues detected *EWSR1* gene rearrangements in half the tumors outside the salivary glands. The authors' findings support the hypothesis that the tumorigenesis of soft tissue tumors is distinct from their salivary counterparts. The rearrangement was present in both the benign and malignant tumors, irrespective of the extra-salivary location.[13] Tumors with a clear cell morphology harbor *EWSR1 POU5F1* fusion gene, which may help in establishing the diagnosis in difficult cases. Additional *EWSR1* fusions detected by Antonescu and colleagues were with the *POU5F1, PBX1, ZNF444* and *FUS* genes, in addition to a separately described *ATF-1* fusion gene.[14] The test for the *EWSR1* gene rearrangement was not performed for our patient.

Clinicians suspecting a myoepithelial tumor in soft tissue should be aware of the differential diagnosis that includes chondrosarcoma, shwanoma, metatstatic carcinoma and synovial sarcoma, and the need to rely on histological and immunophenotypic profiling to establish a diagnosis.[15]

MRI plays an important role in defining soft tissue myoepithelial carcinomas (location, invasion of proximal structures, dimensions) and assessing the possibility of resection.[16] The treatment of choice is wide surgical excision though this may be hindered by the need for preservation of organ function, as was the case in our patient.[17] The role of chemotherapy is unknown, although one case reported a response to taxane and platinum.[18] We did not opt to treat our patient with chemotherapy given the progression of her airway compromise and the uncertainty of the benefit of

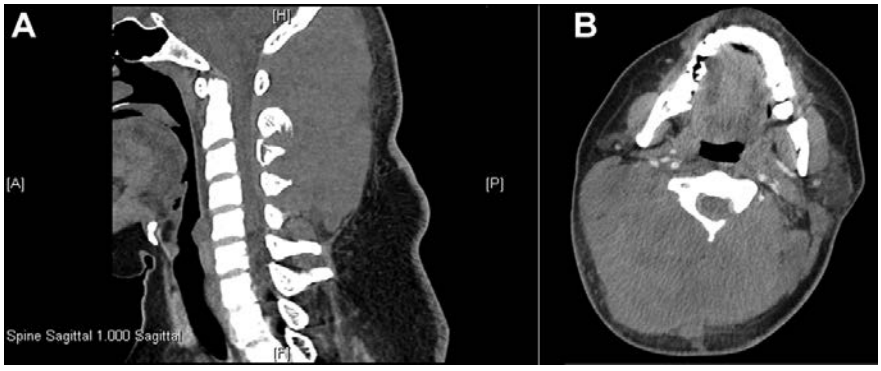

Figure 1. A, B. Computed tomography scan of the neck showing a large soft tissue mass in the posterior neck inseparable from the para-spinal muscles, with osseous erosion and extension into the spinal canal and resultant spinal cord compression.

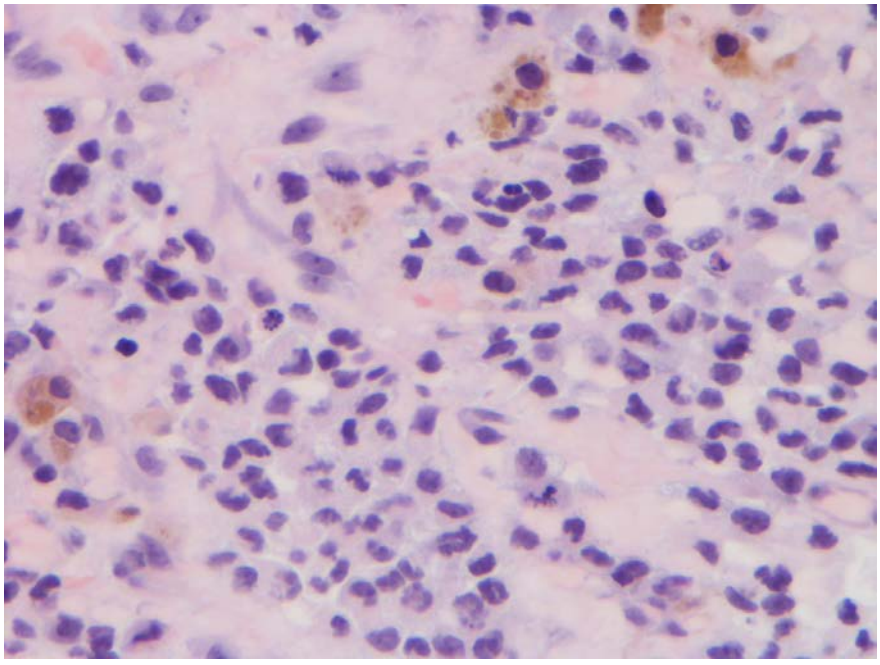

Figure 2. Hematoxylin and Eosin slide showing diffuse sheets of tumor cells with no duct formation. The tumor cells have palely eosinophilic and granular cytoplasm and atypical vesicular nuclei, which are consistent with epithelioid cells. Mitotic figures are readily identified.

chemotherapy. The role of radiation therapy is not clear and has been mostly studied in tumors in the head and neck region.[19,20] Our initial intention was to treat our patient with radiation for palliation. The prognosis of myoepithelial carcinomas depends on the histological characteristics and completeness of the excision, but definite prognostic factors have not yet been defined,[6] although, in the presence of metastasis, the prognosis is dismal.[21] Future studies are needed to better guide the management of this aggressive carcinoma.

Conclusions

We present the case of a young female who presented with a neck mass who was found to have a myoepithelial carcinoma of the soft tissues. The prognosis is unfavorable given its aggressive behavior, the difficulty in establishing a diagnosis, and the lack of clear evidence of treatment benefits. Clinicians should include this entity in the differential diagnosis of any new rapidly enlarging soft tissue mass especially in young patients, because an early diagnosis and intervention can potentially lead to resection, the only treatment that is curative. Pathology remains the standard of diagnosis. Core biopsy might not always contain all the necessary information or provide adequate perspective. If there is potential compromise to an adjacent organ, early primary surgical exploration should be considered. Our patient's short disease course leading to a fatal outcome highlights the paramount importance of a high index of suspicion. More research especially in the therapeutic field is needed to better guide clinicians in their decisions.

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