Case Report

Salivary duct carcinoma with striking neutrophil-tumor cell cannibalism

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Abstract

Cannibalism of neutrophils by tumor cells has previously been reported in certain carcinomas, lymphoma and melanoma. Tumor cannibalism is believed to serve as a tumor-immune escape mechanism, associated with high-grade aggressive cancers with a significantly increased metastatic potential. This interesting phenomenon has not been previously documented in association with salivary gland tumors. We report, for the first time, striking neutrophil-tumor cell cannibalism associated with a high grade, aggressive and metastatic salivary duct carcinoma of the parotid gland highlighted within cytological and surgical excision pathology specimens.

Key words: Cannibalism, duct carcinoma, neutrophils, phagocytosis, salivary gland

INTRODUCTION

A wide variety of benign and malignant salivary gland tumors are recognized. These tumors exhibit an impressive range of morphological diversity, often exhibiting remarkable histopathological features. Tumor cell cannibalism of hematopoietic cells (neutrophils, lymphocytes and erythrocytes) has been reported in certain carcinomas, endometrial tumors and melanoma.[1-3] To the best of our knowledge, neutrophil-tumor cell phagocytosis (cannibalism) has not previously been reported in association with salivary gland tumors. We report, for the first time, striking neutrophil-tumor cell cannibalism in a salivary duct carcinoma of the parotid gland highlighted within both fine needle aspiration (FNA) and surgical excision pathology specimens.

CASE REPORT

Clinical features

A 55-year-old Caucasian man presented with left-sided facial pain, erythema and swelling of his left parotid gland. His past medical history was non-contributory. Magnetic resonance imaging (MRI) revealed an infiltrating mass centered in the tail of the left parotid gland involving both superficial and deep portions of the parotid, with probable invasion of the underlying left sternocleidomastoid muscle and overlying subcutaneous tissue. Imaging also identified a left posterior auricular lymph node suspicious for metastatic disease.

Cytopathological features

An ultrasound-guided FNA was performed of the left parotid mass from which Papanicolaou-stained direct
smears and a ThinPrep slide were made. A cell block was also prepared and stained with H and E. The aspirate was cellular and showed crowded 3-dimensional groups of poorly differentiated carcinoma cells that had enlarged pleomorphic nuclei with prominent nucleoli. Virtually all the tumor cells had vacuolated cytoplasm containing many (up to 50) intact as well as degenerated neutrophils [Figures 1 and 2]. The nucleus of some tumor cells was pushed to the periphery by the many ingested neutrophils. The background also showed numerous neutrophils.

**Histopathological features**

A left radical parotidectomy with facial nerve resection and accompanying left modified neck dissection was undertaken. Macroscopical evaluation revealed a solid, multifocal neoplasm almost 3 cm in greatest dimension. Light microscopic examination showed an infiltrative, high-grade salivary duct carcinoma (TNM pathologic stage pT2pN2BpMx) with ulceration of the overlying skin, extension into adjacent soft tissue, angiolymphatic invasion and focal necrosis. Similar to the FNA, there were many phagocytic tumor cells congested with neutrophils. Tumor cannibalism of leukocytes was identified both within the resected parotid gland tumor [Figure 3] and metastases to three lymph nodes. Immunohistochemical stains showed that the neoplastic cells were positive for cytokeratin-7 and androgen receptor, but negative for cytokeratin-20 and p63. ERG FISH studies were negative for translocations.

**DISCUSSION**

The phenomenon of cell cannibalism refers to the engulfment of cells within other cells. Until recently, cannibalism was recognized as a phenomenon seen mainly with tumor cells ingesting other tumor cells. Recent reports have shown tumor cell engulfment of other cells (xeno-cannibalism) as well, such as neutrophils, lymphocytes and erythrocytes.\(^2,^4,^5\) With cannibalism, larger cells typically consume smaller cells. Cannibalism is a different entity from phagocytosis. Cannibalizing tumor cells exclusively ingest live cells, whereas macrophages exclusively phagocytose dead cells. The nucleus of the ingested cell typically remains unaltered while the nucleus of the cannibal cell becomes more semilunar in shape and pushed to the periphery. Eventually the cannibalized cell gets destroyed (“digested”).\(^4\) Moreover, cannibalism appears to be a passive process, unlike phagocytosis where engulfment by pseudopods exists.\(^6\) Cannibalism also differs from emperipolesis where cell engulfment (penetration) is temporary and the internalized cell is not destroyed.\(^7\)

The exact mechanisms involved and factors controlling cannibalism are not completely resolved. It is believed that cannibalism occurs so that tumor cells can feed on ingested cells. In other words, the main factor regulating...
The authors declare that they have no competing interests.

AUTHORSHIP STATEMENT BY ALL AUTHORS

All authors of this article declare that we qualify for authorship as defined by ICMJE. All authors are responsible for the conception and design of this study, participated in its design and coordination, and helped to draft the manuscript. All authors read and approved the final manuscript.

ETHICS STATEMENT BY ALL AUTHORS

As this is a case report without patient identifiers, approval from Institutional Review Board (IRB) is not required at our institution.

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