Human Pathology (2018) **74**, 109–113

ELSEVIER

Human PATHOLOGY

www.elsevier.com/locate/humpath

Case study

Primary mammary analogue secretory carcinoma of the lung: a case report☆

Tao Huang MD, PhD[a], Jonathan B. McHugh MD[a], Gerald J. Berry MD[b], Jeffrey L. Myers MD[a,*]

[a]*Department of Pathology, University of Michigan, Ann Arbor, MI, 48109*
[b]*Department of Pathology, Stanford University Medical Center, Stanford, CA, 94304*

Received 1 September 2017; revised 11 October 2017; accepted 16 October 2017

Keywords:
Lung;
Mammary analogue secretory carcinoma (MASC);
Salivary gland tumor;
ETV6-NTRK3 fusion

Summary Mammary analogue secretory carcinoma (MASC) is a recently discovered salivary gland tumor described mostly in the major salivary glands and occasionally in the skin. We report a primary endobronchial tumor with histology, immunophenotype, and *ETV6* rearrangement characteristic of MASC in a 62-year-old woman. The diagnosis was initially made on a transbronchial biopsy with fluorescence in situ hybridization confirmation of *ETV6* rearrangement. The patient underwent lobectomy demonstrating a large endobronchial mass. To our knowledge, this is the first report of MASC arising as a primary pulmonary tumor. This tumor was unusual in that it is the largest (8.5 cm) MASC ever reported, showed an increased mitotic count (6/10 high-power fields) without high-grade cytology, and presented with advanced-stage disease that included visceral pleural invasion and lymph node metastasis.

1. Introduction

Salivary gland–type tumors of the lung are uncommon, accounting for <1% of all primary lung neoplasms [1]. The spectrum of pulmonary salivary gland–type tumors has been expanding in recent years [2]; however, to our knowledge, primary pulmonary mammary analogue secretory carcinoma (MASC) has not been reported.

The term MASC was initially proposed by Skalova et al in 2010 based on its strong resemblance to breast secretory carcinoma, which shares similar histologic, immunohistochemical, and molecular features [3]. Both tumors have a recurrent balanced chromosomal translocation of t(12;15)(p13;q25) resulting in a fusion gene of *ETV6-NTRK3*, which has not been found in other salivary gland tumors [3].

MASC has been reported most often in the parotid gland but has been found in several other head and neck locations including submandibular gland and minor salivary glands [3-6]. MASC has rarely been reported outside of the head and neck region; reports are limited to a few cutaneous cases and one esophageal tumor [7,8]. We describe MASC arising as a primary endobronchial lung tumor in a 62-year-old woman.

2. Materials and methods

2.1. Clinical summary

A 62-year-old woman had a remote history of a right-sided parotid neoplasm of unknown histologic type in 1982, for which she underwent parotidectomy with negative margins

☆ Disclosures: We have no potential conflicts of interests and no significant financial contributions to this work that could have influenced the outcome.

* Corresponding author.

https://doi.org/10.1016/j.humpath.2017.10.027
0046-8177/

followed by 6 weeks of radiation to the right side of her neck. She had no recurrence of her parotid neoplasm. In 2015, she underwent total thyroidectomy for a papillary thyroid carcinoma confined to the right lobe of her thyroid gland. A follow-up computed tomographic (CT) scan of her neck performed on January 11, 2017, did not show any concerning lymph nodes, but showed a right upper lobe mass. A positron emission tomography (PET)/CT scan of her chest revealed an FDG-avid lobular mass measuring 4.8 × 3.7 cm in the anterior upper lobe of the right lung (Fig. 1A). There was also a contiguous lesion that extended from the mass towards the right lung hilum, measuring 2.3 × 1.4 cm. A transbronchial biopsy was followed by right upper lobe lobectomy.

2.2. Histochemistry and immunohistochemistry

Hematoxylin and eosin and mucicarmine stains were performed according to routine laboratory protocols. The following primary antibodies were used for immunohistochemical stains performed on an automated Ventana BenchMark ULTRA stainer: TTF1 (clone: 8G7G3/1), napsin A (clone: IP64), mammaglobin (clone: 304-1A5), S100 (clone: rabbit polyclonal), GCDFP-15 (clone: EP1582Y), GATA3 (clone: L50–823), SOX10 (clone: rabbit polyclonal), p63 (clone: 4A4), and Ki-67 (clone: 30–9).

2.3. FISH

Fluorescence in situ hybridization (FISH) for *ETV6* rearrangement was performed on formalin-fixed, paraffin-embedded (FFPE) tumor sections according to standard protocol using a commercially available *ETV6* dual-color break-apart rearrangement probe (Empire Genomics, Buffalo, NY). Two hundred tumor nuclei were analyzed.

3. Results

Sections of the transbronchial biopsy showed an epithelial neoplasm comprising a relatively uniform population of mildly atypical cuboidal cells with centrally located oval-shaped nuclei, vesicular nuclear chromatin, small but conspicuous nucleoli, and variably abundant eosinophilic cytoplasm. The cells were arranged in solid, tubular, and papillary growth patterns, and accompanied by intraluminal eosinophilic secretions in microcystic spaces (Fig. 1B-D). This combination of features supported a diagnosis of low-grade adenocarcinoma; however, immunohistochemical stains for TTF1 and napsin A were negative. Mucicarmine highlighted the extracellular secretions and rare intracytoplasmic globules.

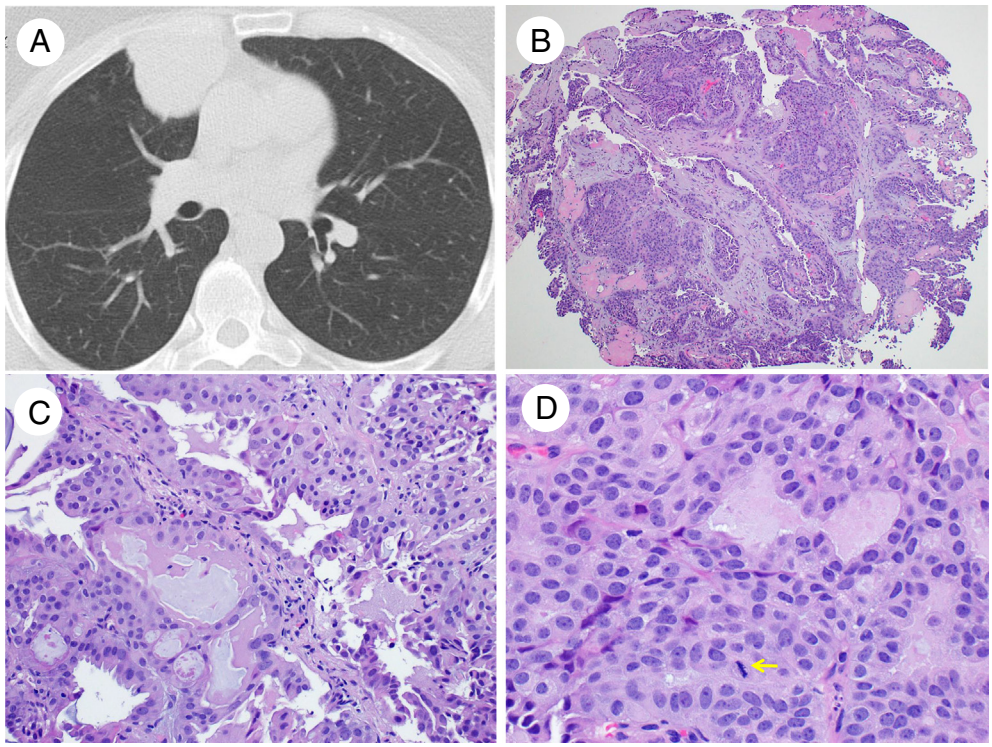

Fig. 1 A, A chest CT scan reveals a lobular mass in the anterior right upper lobe of the lung. B-D, Transbronchial biopsy showing range of histologic features characteristic of MASC. B, Low-power magnification (4×) photomicrograph showing a tumor with predominantly tubular, papillary, and solid patterns. C, At higher magnification (20×), pale pink secretory material is easily identified in the microcystic spaces. D, The neoplastic cells appear uniform with oval vesicular nuclei, small but conspicuous nucleoli, and abundant pink cytoplasm. A mitotic figure is indicated by an arrow (original magnification ×40).