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TEACHING CASE

Oncocytic lipoadenoma of the parotid gland: Immunohistochemical and cytogenetic analysis

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Abstract

Salivary gland oncocytic lipoadenoma is an exceptional benign tumor composed of mature adipose tissue associated with a mixture of oncocytes. We report a case of oncocytic lipoadenoma showing sebaceous differentiation, and provide a cytogenetic analysis, which has not yet been described. A 64-year-old male developed a left parotid gland, well-encapsulated tumor measuring $3.5 \times 3\,cm^2$, showing mature fat cells associated with oncocytic changes of epithelial components. Immunohistochemistry showed a dual epithelial population with ductal (positivity for AE1/AE3, CK19, CK7 antibodies) and basal-cell (positivity for p63, CK14, CK5,6 antibodies) differentiation in oncocytic areas. Moreover, oncocytic cells were stained with anti-alpha-1 antichymotrypsin antibody and phosphotungstic acid–hematoxylin staining. Molecular cytogenetic analysis showed a translocation t(12;14), resulting in structural rearrangement of the region framing the *HMGA2* gene at 12q14.3. Such alterations in *HMGA2* have been described in both lipomas and pleomorphic adenomas of the salivary glands.

Keywords: Oncocytic lipoadenoma; Parotid gland; Immunohistochemistry; Cytogenetic

Introduction

Oncocytic lipoadenoma of the salivary glands is an exceptional benign tumor arising in parotid and submandibular glands [1,9,13,14]. This tumor is well encapsulated and composed of large areas of mature adipose tissue and areas of oncocytic cells [1,9,13,14]. These tumors belong to the group of salivary gland tumors with both adipose and epithelial tissues, including sialolipoma and lipoadenoma tumors [10,18,20,22]. The first case of oncocytic lipoadenoma of the salivary gland was described by Hirokawa et al. [9] in 1998. Since then, three supplementary cases have been published [1,13,14]. The purpose of the present study is to report a new case of oncocytic lipoadenoma of the parotid gland

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with immunohistochemical study. Moreover, we provide the first cytogenetic analysis of such tumor.

Case report

A previously healthy 64-year-old male was seen in the Department of ORL (Pasteur Hospital, Nice, France) for evaluation of a painless swelling in the left preauricular area of 2-year duration. The CT scan revealed a deep lobe and an ill-defined lesion of low density with a heterogeneous aspect that led to the diagnosis of pleomorphic adenoma. A partial parotidectomy was performed with preservation of the facial nerve. The patient was followed up for 2 years without any sign of recurrence.

Methods

The surgical specimen measured $5 \times 4.5 \times 3\,cm^3$ and weighed 15 g. The tumor had a fatty consistency, measured 3.5 cm in its largest diameter, and was completely encapsulated. Examination of crossing sections showed a yellowish tumor with small micronodules of light gray tan measuring 0.2–0.4 cm. A diagnosis of a benign adipose tumor with oncocytic areas was made on the basis of frozen sections. The surgical specimen was fixed in formalin, embedded in paraffin, and deparaffinized sections were stained with hematoxylin, eosin, and saffron (HES) and phosphotungstic acid–hematoxylin (PTAH). Immunohistochemical staining was performed using an automated Ventana BenchMark® instrument (Tucson, AZ, USA). A standard avidin–biotin–peroxidase complex staining technique was performed using the indicated primary antibodies (Table 1). Normal salivary gland tissue adjacent to the tumor was used as a control. After surgical excision, a fresh fragment from the tumor was prepared for cytogenetic and fluorescence *in situ* hybridization (FISH) analyses. Mechanical and collagenase dissociation of the tumor sample was performed according to Limon et al. [16]. Bacterial artificial chromosome (BAC) clones RP11-30I11 and RP11-118B13 located proximal to the 5′ and distal to the 3′ region of the *HMGA2* gene (http://genome.ucsc.edu) were used as a two-color break-apart probe to detect rearrangements in the *HMGA2* region, as described previously [11]. The BAC clones from the Roswell Park Cancer Institute Library (Buffalo, NY) were obtained from the Children's Hospital Oakland Research Institute (http://www.bacpac.chori.org). They were hybridized to metaphase cells according to standard procedures.

Results

Microscopic examination showed a well-circumscribed proliferation, consisting primarily of mature adipose tissues (70% of the tumor area) surrounded by a thin fibrous capsule with incomplete septae extending into the tumor mass. Islands or less delimited zones consisting of oncocytes were found in the lesion (Figs. 1A and B). These cells exhibited abundant eosinophilic fine granular cytoplasm and a single small rounded nucleus, and were arranged in microglandular or solid patterns or were isolated, and admixed with adipocytes (Fig. 1C). A few oncocytic populations were composed of small, densely eosinophilic cells with pyknotic nuclei (Fig. 1D). Mature sebaceous glands were present in some rare areas, admixed with oncocytic cells, and more rarely with mature adipocytes (Figs. 1E and F). Oncocytic cells and adipocytes showed no mitotic figures and atypia, and invasion through the fibrous capsule was not seen. Some acini and ductal structures were present in the adipose tissue and in oncocytic nodules, surrounded by lymphoid and plasmatic inflammatory infiltrates (Fig. 1G).

Table 1. Primary antibodies used in this study and immunohistochemical profiling of the oncocytic component.

Antibodies	Manufacturers	Clones	Dilution	Intensity	Labeled cell types
Cytokeratin 19	Dako	RCK108 monoclonal	1:30	+ to + + +	LC
Cytokeratin 14	Novovastra	LL002 monoclonal	1:20	+ + +	BC and MEC
Cytokeratin 5/6	Zymed	D5/16B4 monoclonal	1:50	+ +	BC, MEC, and LC
Cytokeratin 7	Dako	OV-TL 12/30 monoclonal	1:50	+ + +	LC
AE_1/AE_3	Ventana	AE1/AE3/PCK26 monoclonal	Pre-diluted	+ to + + +	BC and LC
α-SMA	Immunotech	1A4 monoclonal	Pre-diluted	+ +	BC and MEC
S100 protein	Immunotech	polyclonal	1:300	+ +	MEC
p63	Dako	4A4 monoclonal	1:50	+ + +	BC and MEC
α1-Antichymotrypsin	Biogenex	A1A88	1:200	+ + +	BC and LC

LC: luminal cells; BC: basal cells; MEC: myoepithelial cells. SMA: smooth muscle actin.