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Oncocytic differentiation in salivary gland tumours

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Abstract
An oncocytic mucoepidermoid carcinoma and an oncocytic pleomorphic adenoma occurred in a 47-year-old male and a 75-year-old female, respectively. Both presented as asymptomatic parotid gland masses without evidence of facial nerve paralysis and were treated by superficial parotidectomy. There has been no evidence of recurrence or metastasis. Oncocytic change is rare in major salivary gland mucoepidermoid carcinoma with only two previously reported cases. Marked oncocytic transformation of pleomorphic adenomas can cause their confusion with oncocytomas. Recognition of oncocytic differentiation in various salivary gland tumours is important to avoid misclassification of these lesions.

Key words: Salivary gland neoplasms, oncocytoma, pleomorphic adenoma

Introduction

Oncocytic neoplasms of the salivary glands include oncocytoma, Warthin tumour, and oncocytic carcinoma. Oncocytes can be found in other tumours, particularly pleomorphic adenoma and this can cause confusion in diagnosis. Oncocytic differentiation has been previously reported in two salivary gland mucoepidermoid carcinomas and in a number of pleomorphic adenomas (Christopherson, 1949; Greenberg and Haley, 1957; Blanck *et al.*, 1970; Sidhu and Waldo, 1975; Gray *et al.*, 1976; Feiner *et al.*, 1986; Pulitzer and Reitmeyer, 1987; Palmer *et al.*, 1989; Hamed *et al.*, 1994). We describe a parotid mucoepidermoid carcinoma and a pleomorphic adenoma, both of which showed marked oncocytic change.

Materials and methods

The two neoplasms reported here were identified in the Mayo Clinic archives. In addition, 842 oncocytic lesions were examined in the Mayo Clinic files but no other similar examples were identified. The neoplasms were fixed in 10 per cent neutral buffered formalin, processed in the usual fashion, and stained with haematoxylin and eosin as well as with phosphotungstic acid–haematoxylin (PTAH). A mucicarmine stain was performed on the mucoepidermoid carcinoma. Immunohistochemistry for S-100 protein (HSC, Toronto, Canada; 1:800 dilution) and muscle specific actin (HHF-35) (Dako, Carpinteria, CA; 1:50 dilution) was performed on the oncocytic pleomorphic adenoma by a modified avidin–biotin–peroxidase method (Ferreiro, 1994). Clinical data, treatment, and follow-up were obtained by chart review.

Case reports

Case 1

A 47-year-old white male was found to have a right parotid mass on routine physical examination. The mass was firm, easily moved, non-tender, and there was no facial nerve palsy or lymphadenopathy. A superficial parotidectomy was performed. There was no evidence of recurrence or metastasis over a 10-year follow-up period. The patient died subsequently of a ruptured abdominal aortic aneurysm. No autopsy was performed.

Situated in the parotid gland was a 1.5 cm cystic mass. The neoplasm was infiltrative and had a biphasic appearance with most of the neoplasm composed of oncocytes which contained abundant granular eosinophilic cytoplasm and centrally placed nuclei with readily distinguishable nucleoli (Figure 1). Areas of typical mucoepidermoid carcinoma were seen adjacent to and intermingled with the oncocytic cells (Figure 2). The mucoepidermoid component was composed of variably-sized cysts set in a fibrotic stroma. The cysts were lined by mucinous goblet cells as well as oncocytes (Figure 3). Some cells with a squamoid appearance were also present. PTAH stained the oncocytes intensely blue with a granular texture. Mucicarmine stain confirmed the presence of mucin in the cytoplasm and lumina of the goblet cell lined cysts.

Case 2

A 75-year-old female presented to the Mayo Clinic with a two-year history of an enlarging mass near the angle of the left mandible. The mass was painless and there was no evidence of facial nerve paralysis. At surgery, a superficial parotidectomy was performed and follow-up of 10 months has shown no evidence of recurrence or metastasis.

A 2.5 cm encapsulated mass was noted in the tail of the parotid gland. At low power, the neoplasm was an encapsulated mass composed almost exclusively of oncocytes (Figure 4). A thin rim of characteristic pleomorphic adenoma with ducts and myxoid stroma was present (Figures 4 and 5). This area showed strong expression of muscle specific actin but S-100 protein was negative. The oncocytic areas were negative for both antibodies. A

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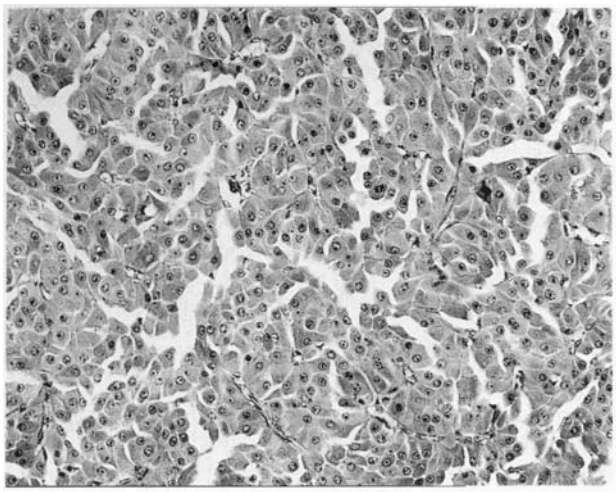

FIG. 1

High power photomicrograph of oncocytic areas of mucoepidermoid carcinoma. This view is identical in appearance to oncocytoma. The oncocytes stained strongly with PTAH.

PTAH stain strongly stained the oncocytes blue with a granular texture.

Discussion

The term oncocyte was coined by Hamperl (1931) to describe cells with abundant granular eosinophilic cytoplasm. The ultrastructural feature of oncocytes is marked mitochondrial hyperplasia. Neoplasms composed exclusively of oncocytes have since been described in a variety of organs including the kidney, adrenal, thyroid, parathyroid, and pituitary glands (Sasano *et al.*, 1991; Chang and Harawi, 1992). In the major salivary glands, the most common tumours composed of oncocytes are Warthin tumour, oncocytoma, and much less commonly oncocytic carcinoma. Oncocytic change has been reported in a variety of other salivary gland tumours including acinic cell carcinoma, pleomorphic adenoma, and mucoepidermoid carcinoma (Sidhu and Waldo, 1975; Hamed *et al.*, 1994).

Oncocytic differentiation is distinctly uncommon in major salivary gland mucoepidermoid carcinomas with only two other cases reported in the literature (Sidhu and Waldo, 1975; Hamed *et al.*, 1994). The extensive presence of oncocytes in a mucoepidermoid carcinoma can cause confusion, particularly with an oncocytoma. Oncocytomas are usually well-circumscribed, whereas mucoepidermoid carcinomas are infiltrative. Cysts lined by goblet cells as well as squamoid differentiation are not seen in oncocytomas but are present in mucoepidermoid carcinomas (Sidhu and Waldo, 1975; Hamed *et al.*, 1994). Sebaceous differentiation can be found in oncocytoma (Gray *et al.*, 1976) and this can be confused with goblet cell differentiation. In contrast to goblet cells, subaceous cells have foamy cytoplasm and a centrally placed nucleus. A mucin stain can be helpful in this distinction since mucin would be expected in goblet cells but should be absent in sebaceous cells.

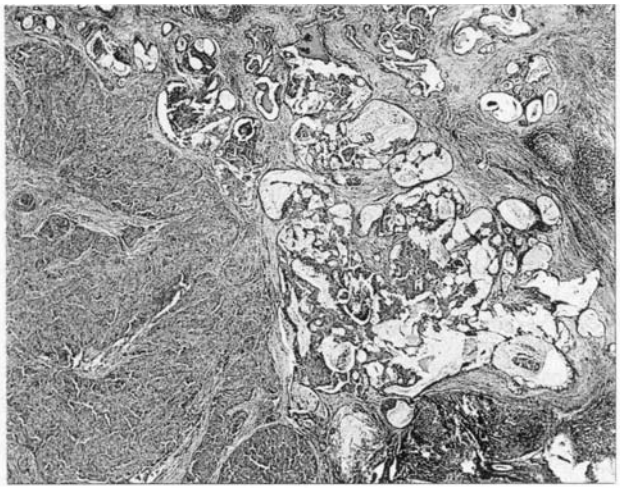

FIG. 2

Low power view of Figure 1 showing areas of oncocytic differentiation (left) and more typical mucoepidermoid carcinoma (right).

Oncocytic carcinomas also enter into the differential diagnosis. Oncocytic carcinomas are lesions which histologically resemble oncocytomas but are infiltrative and associated with vascular or nerve invasion (Sugimoto *et al.*, 1993). Most reported oncocytic carcinomas represent other entities, particularly salivary duct carcinoma, but rare examples of true oncocytic carcinoma have been reported (Sugimoto *et al.*, 1993). Both oncocytic carcinomas and mucoepidermoid carcinomas are infiltrative but goblet cell or squamous differentiation would not be expected in oncocytic carcinoma. However they are characteristic of oncocytic mucoepidermoid carcinoma (Sidhu and Waldo, 1975).

In addition to the three reported cases of major salivary gland oncocytic mucoepidermoid carcinoma (including this case), oncocytic mucoepidermoid carcinomas have been reported in the bronchus of the lung and the lacrimal gland (Stafford *et al.*, 1984; Pulitzer and Eckert, 1987; Levin *et al.*, 1991).

Oncocytic change in pleomorphic adenomas is not particularly common but 24 examples can be found in the literature (Christopherson, 1949; Greenberg and Haley, 1957; Blanck *et al.*, 1970; Gray *et al.*, 1976; Pulitzer and Reitmeyer, 1987; Palmer *et al*, 1989). Examples with marked oncocytic differentiation, such as our own, are much less common and at least three cases of pleomorphic adenoma with extensive oncocytic change have been mistakingly reported as oncocytomas (Christopherson, 1949; Greenberg and Haley, 1957; Feiner *et al.*, 1986). Oncocytic neoplasms with areas resembling pleomorphic

FIG. 3

High power view of Figure 1 showing cystic areas of mucoepidermoid carcinoma lined by both goblet cells and oncocytes. The goblet cells stained strongly with mucicarmine stain.

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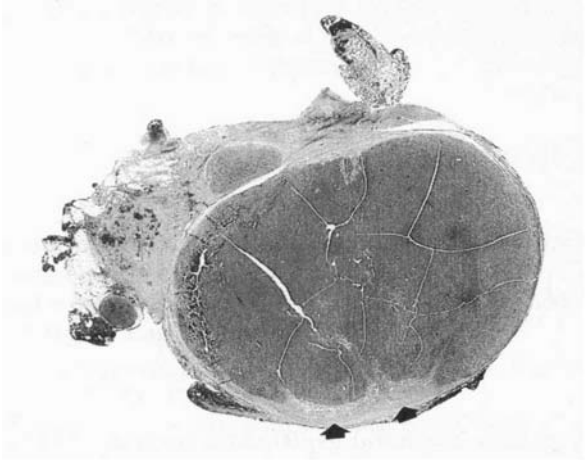

FIG. 4

Low power photomicrograph showing neoplasm with the appearance of an oncocytoma. A thin rim of pleomorphic adenoma is present (arrows).

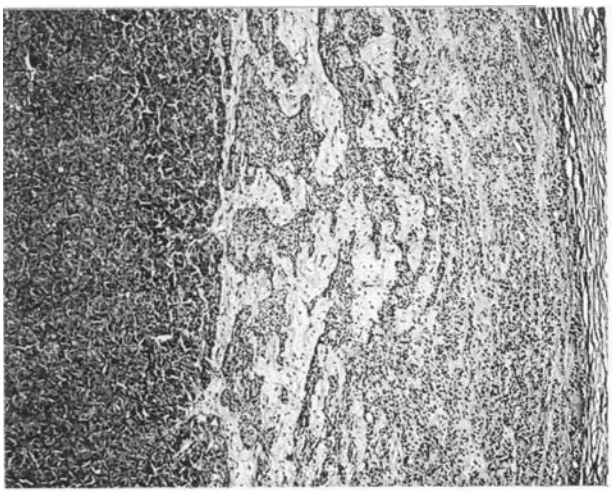

FIG. 5

High power view of Figure 4 showing both oncocytic differentiation (left) as well as areas resembling pleomorphic adenoma (right). The latter areas stained strongly with muscle specific actin.

adenoma (myxoid or chondroid stroma, etc.) should be classified as pleomorphic adenomas rather than oncocytomas. Interestingly, four oncocytic pleomorphic adenomas have been associated with psammoma bodies (Feiner *et al.*, 1986; Palmer *et al.*, 1989). Psammoma bodies are rarely found in major salivary gland tumours but are most commonly seen in acinic cell carcinomas. Although our case did not contain psammoma bodies, their presence may be a clue to a diagnosis of oncocytic pleomorphic adenoma since they have been found in four out of 24 (17 per cent) reported cases.

Conclusion

We report oncocytic variants of pleomorphic adenoma and mucoepidermoid carcinoma. In particular, recognition of oncocytic mucoepidermoid carcinoma is important because most other primary oncocytic neoplasms of the major salivary glands are benign.

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