Value of Fine-Needle Aspiration Biopsy in Initial Evaluation of Floor of the Mouth Masses:
Report of a Case of Low-Grade Mucoepidermoid Carcinoma

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Low-grade mucoepidermoid carcinoma (LG MEC) is a rare tumor which can occur in the minor salivary glands as intraoral lesion, more frequently in the palate and very rarely in the floor of the mouth. Traditionally, the diagnosis has been made on surgical resection specimens only. There is new growing evidence that these lesions can be accurately diagnosed by a fine-needle aspiration (FNA) biopsy procedure. In this article, we report a case of LG MEC of the floor of mouth diagnosed by FNA and confirmed by subsequent surgical resection. We also provide clues for high index of suspicion for these rare lesions, both clinically and morphologically. Diagn. Cytopathol. 2010; 38:81–84.

Key Words: fine-needle aspiration; low-grade mucoepidermoid carcinoma; cytology; floor of the mouth; minor salivary gland

Tumors of the minor salivary glands origin are in general rare and they usually involve the palate. The floor of the mouth is a very rare location but tends to be associated with a high incidence of malignancy. Intraoral lesions and especially floor of the mouth lesions are traditionally evaluated by surgical biopsy, and a limited number of cases diagnosed by fine-needle aspiration (FNA) are reported in the literature.[1–5]

We report a new case of low-grade mucoepidermoid carcinoma (LG MEC) of minor salivary gland origin involving the floor of the mouth which was diagnosed by FNA. We also review the literature and discuss important criteria for making a correct first-step evaluation by FNA biopsy of these rare lesions.

Case Report

The patient was a 55-year-old African-American female who presented with an intraoral swelling involving the left retromolar region and floor of the mouth.

The patient's medical history was unremarkable and she was not a smoker.

The otorhinolaryngologic examination revealed a 2-cm mass in the back of the floor of the mouth, which was radiologically eroding into the left mandible (Fig. 1).

The clinical diagnosis was of left mandible/lingual plate area mass and she was referred to our institution for diagnostic biopsy and treatment. The decision was made to first evaluate the mass by FNA biopsy.

Cytological Findings

A FNA biopsy of the intraoral mass was performed and the aspirate contained cyst fluid which appeared mucoid. The aspirate Thin-Prep (TP) smears showed sparse cellularity with bland to mildly atypical cells including a mixture of a few mucous cells, squamous cells and rare polygonal cells within a mucoid background.

The cell block sections were very helpful, displaying microfragments of tissue with intimate mixture of intermediate cells and mucous cells including goblet-like dis-

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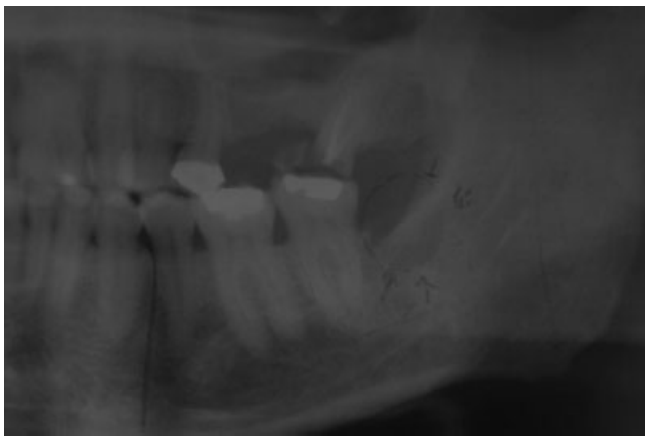

Fig. 1. Head X-ray showing the tumor in the back of the floor of the mouth eroding into the left mandible.

tended cells. The background showed cellular debris, fluid and macrophages indicative of a cystic component (Figs. C-1 and C-2).

The cytomorphologic findings of the lesion were consistent with LG MEC. The differential diagnosis included benign, well-known mimickers of LG MEC such as chronic sialadenitis, necrotizing sialometaplasia and other cystic lesions (ranula, mucocele). Surgical removal of the mass was recommended.

A left marginal mandibulectomy was performed followed by reconstruction of the left mandible with buccal fat pad graft.

Surgical Pathological Findings

On gross examination, the specimen measured 3.6 × 2.2 × 1.5 cm and contained a portion of posterior tongue with attached left mandible lingual bone plate. After decalcification, the specimen was serially sectioned and showed a white-gray tan irregular soft mass, with partly cystic mucoid cut surfaces measuring about 1.4 cm. The tumor encroached and involved the adjacent mandibular bone. Histologic examination revealed a cystic tumor with classic features of LG MEC (Fig. C-3).

Discussion

Traditionally, the tongue and floor of the mouth swellings and masses have been evaluated by surgical biopsy. In the majority of cases, lesions in these locations are in fact easily accessible by FNA biopsy.[1]

Among these lesions, minor salivary gland neoplasms are relatively rare, but when they occur they are more likely to be malignant than are tumors of major salivary glands (about 60% versus 20–25%).[2] The minor salivary gland neoplasms in the oral cavity more frequently involve the palate, while the floor of the mouth is a very rare location.[5–14] When they occur in this exceedingly rare location, however, they are virtually always malignant.[2]

Recently, there is more interest in the FNA approach for initial evaluation of intraoral/floor of the mouth lesions. Previous reports showed that the FNA is a valuable procedure for first-step evaluation of various lesions.[1,4–6] It is a rapid and noninvasive procedure, well tolerated by patients, cost-effective and a reliable method for diagnosis of intraoral lesions.[4,5]

Mucoepidermoid carcinoma of the floor of mouth can be accurately diagnosed by FNA biopsy. The aspirate may be sparsely cellular, which, in addition to the relatively bland-appearing glandular cells, can result in a false-negative diagnosis. One has to search for intermediate cells with transition to mucinous cells. The presence of the characteristic combination of squamous, transitional and mucinous cells in a cluster is highly suspicious of MEC.[7]

Cohen et al.[8] in their comprehensive study of FNA biopsy diagnosis of mucoepidermoid carcinoma examined 13 cytologic features, including those commonly mentioned in the literature as being indicative of MEC. Using a stepwise logistic regression analysis they identified three cytologic features as most predictive of this tumor. These three key cytologic features are: intermediate cells, squamous cells and overlapping epithelial groups. In their study, intermediate cells were found only in mucoepidermoid carcinoma. Although squamous cells and overlapping epithelial groups were identified in other lesions (3 and 15%, respectively), the combination of all three features was found only in mucoepidermoid carcinoma. Furthermore, in this large study including 34 MEC cases, Cohen et al. reported that by using all these three cytologic features, the sensitivity of diagnosing MEC on FNA was 97% and the specificity was 100%. Within the group of low grade MEC (16 out of 34 total cases) the most consistent cytologic features were overlapping epithelial groups, mucin-containing cells and intermediate cells.[8]

It is well known that aspirates from many LG MECs may in fact yield extremely low cellular to essentially acellular cytologic material despite multiple aspirates. These aspirates often contain only watery mucoid fluid with scattered chronic inflammatory cells and are inseparable from those obtained from benign cystic lesions, such as mucous retention cysts (mucocele). In these challenging cases, it is important to remember that a low cellularity or acellular aspirate does not completely rule out LG MEC in a clinically worrisome setting.[7]

The differential diagnoses for LG MEC on aspiration biopsy cytology include non-neoplastic, benign mimickers of LG MEC and, less often, other neoplastic lesions.

Among the benign non-neoplastic conditions, most common considerations should be for benign salivary gland cysts (ranula, mucocele), chronic sialadenitis and

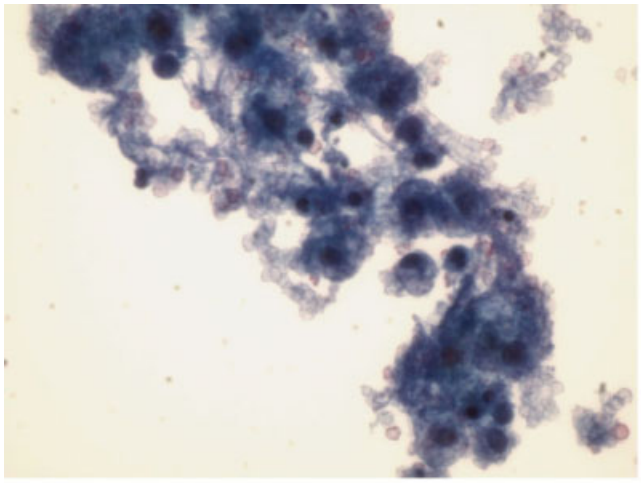

Fig. C-1

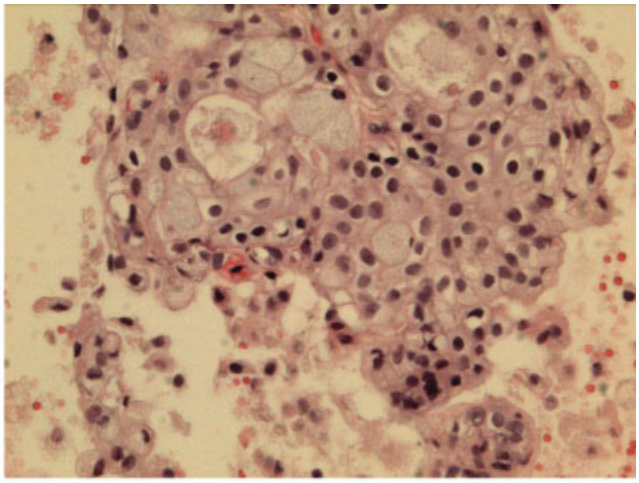

Fig. C-2

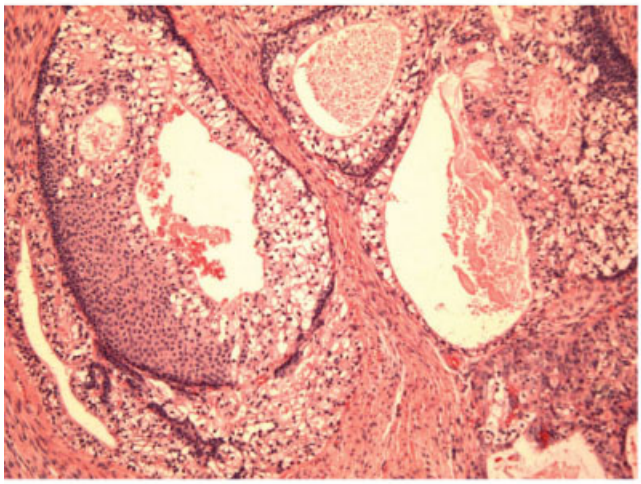

Fig. C-3

Figs. C-1–C-3. Fig. C-1. Photomicrograph of low-grade mucoepidermoid carcinoma on a ThinPrep slide displaying scant cellularity with macrophages and possible degenerated bland epithelial cells. Note the background of cellular debris and fluid indicative of a cystic component (Papanicolaou, ×600). **Fig. C-2.** Cell block section of FNA of low-grade mucoepidermoid carcinoma shows microfragments of tissue with intimate mixture of intermediate and mucous cells including goblet-like distended cells (H&E, ×400). **Fig. C-3.** Histological section of low-grade mucoepidermoid carcinoma showing characteristic solid and cystic tumor growth pattern with the presence of nests of squamous cells and glandular elements (H&E, ×100).

necrotizing sialometaplasia. Aspirates of both non-neoplastic cysts and the cystic component of LG MEC may yield mucoid cyst fluid containing a few foam cells (histiocytes or muciphages) and rare bland epithelial cells.[7] In addition, squamous metaplasia in a benign mucocele can make the differential diagnosis more difficult. Therefore, when the lesions are predominantly cystic, it is important to drain cysts as completely as possible, and reaspirate any residual mass. The presence of increased cellularity and cytologic atypia including irregular nuclear membranes, are important clues to a diagnosis of low-grade MEC.[2]

Chronic sialadenitis with prominent squamous or mucous metaplasia or both (mucoepidermoid metaplasia) is differentiated from LG MEC by presence of inflammation and relatively normal-appearing acinar and ductal epithelial cells. Clinically, a history of recurring pain is usually present.

Neoplastic lesions, in general, are more often a practical consideration in the differential diagnoses of high-grade MEC. Nonetheless, the differential diagnoses for LG MEC may include neoplastic lesions such as pleomorphic adenoma and Warthin's tumor. As opposed to Pleomorphic adenoma, the mucoid material in LG MEC is not distinctly fibrillar, and the mesenchymal spindle cells are usually sparse or absent. Warthin's tumor is extremely rare in minor salivary glands, if it occurs at all.[2]

The ideal preparation method for FNA samples, including those of salivary glands lesions, has been under debate during the last decade, especially following the introduction of liquid-based cytology (LBC) monolayer technique, usually TP or SurePath.[15–19] Many studies have compared the conventional smears (CS), LBC (mostly TP), Cytospin and cell block (CB) methods for diagnostic accuracy and adequacy in salivary glands FNA specimens.[15–17] Although there is no consensus currently, most authors agree that LBC is comparable with CS method.[15,16] However, it seems that both LBC and CS methods are favored over CB method.[17] Recent studies by Partiff et al. and Afify et al. comparing LBC and CS

preparation methods found that both have overall equivalent diagnostic yield, although CS may be preferable in cases of pleomorphic adenoma. Partiff et al. recommended using both methods together to achieve optimal diagnostic accuracy. Afify et al. in a large review of 844 salivary gland FNA cases found that CS method is superior to both CB or cytospin methods.[16] They found that cytospin contributed additional information in only 2% and CB in 12%. Furthermore, when CS slides were nondiagnostic, cytospin slides contributed additional information in 10% and CB slides in 44%. This latter finding correlates with our case in which the CS slides were scanty cellular with only few scattered cells, while the CB slides were very helpful in establishing the diagnosis of MEC. In our experience, we found the combination of CB and CS methods as complementary and most useful. In our institution, we recommend this combined preparation unless on-site adequacy evaluation during the FNA procedure revealed scant cellularity, in which case we use the LBC ThinPrep instead of CB.

In summary, we report a rare case of LG MEC of the minor salivary glands of the floor of the mouth which adds further supporting evidence that FNA is a valuable first diagnostic step in the evaluation of tongue and floor of the mouth lesions. This procedure may provide a preliminary assessment of the lesion or result in a definitive diagnosis.

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