CASE REPORT

Diagnostic Challenges in the Fine Needle Aspiration Biopsy of Chronic Sclerosing Sialadenitis (Küttner's Tumor) in the Context of Head and Neck Malignancy: A Series of 4 Cases

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Abstract Chronic sclerosing sialadenitis (CSS) is a benign chronic inflammatory condition of the salivary gland. Clinically, CSS patients may present with a neck mass, often suggesting a neoplastic process. Fine-needle aspiration (FNA) is frequently used to evaluate these lesions. We present a series of 4 patients with CSS, in whom all but one had history of squamous cell carcinoma. The previous diagnosis of malignancy appeared to influence the interpretation of the cytologic preparations. Four patients who had undergone resection of a neck nodule that eventually was diagnosed as CSS were identified. FNA was performed in all 4 cases, and the final cytologic diagnosis

in these cases included squamous cell carcinoma, basaloid neoplasm, and salivary gland neoplasm. During intraoperative consultation, the lesions were identified as benign, atrophic salivary gland with chronic inflammation, or sialadenitis with atypical glands. All resected specimens were submitted for histopathological examination and were considered diagnostic for CSS. CSS is a potential pitfall in the FNA interpretation of salivary gland lesions, especially if there is a previous history of head and neck malignancy. Awareness of this entity, adherence to strict cytologic criteria, and careful clinicopathologic correlation are helpful in preventing misinterpretation and unnecessary surgical intervention.

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Introduction

Chronic sclerosing sialadenitis (CSS) or Küttner's [1] tumor is a chronic inflammatory condition that affects the salivary glands, especially the submandibular gland. Clinically, CSS patients may present with a firm neck nodule or mass that suggests a neoplastic process [2, 3]. Surgically excised CSS have a solid cut surface with preserved lobulations and fibrotic interlobular tissues that reflect the benign nature of the disease. Microscopically, these lesions are easily identified as benign, showing fibrosis that encircles the salivary gland lobules and is accompanied by chronic inflammation [4, 5]. The cytologic features of fine-needle aspiration (FNA) of CSS include a low-to-moderate degree of cellularity, and ducts surrounded by chronic inflammatory cells or collagen bundles and fragments of fibrous stroma [4, 5]. FNA is frequently used to evaluate

salivary gland neoplasms as it is a cost-effective method with minimal risk to the patient [2, 4, 6]. However, given the clinical presentation, particularly in the setting of previously diagnosed malignancy, some cytopathologic features of CSS may result in the misinterpretation of the cytologic preparation [7]. We report herein, a series of 4 patients with CSS, all of whom had a previous history of malignancy in the head and neck area, and each patient subsequently developed a mass in the parotid and submandibular salivary gland. All of the patients underwent FNA of their salivary gland mass, and in each case, a discrepancy was found between the cytologic diagnosis and the final histopathologic diagnosis. This select population, due to their relevant history of malignancy, represents a diagnostic challenge in the FNA interpretation of CSS. The FNA cytologic findings of CSS, as well as the histopathologic findings of these resected cases of CSS, are reviewed.

Methods

Following approval from the institutional review board (IRB) at The Ohio State University (IRB-approved protocol number 2002H0089), we specifically searched cases of CSS diagnosed in surgical pathology with a prior FNA biopsy in which a discordant cytologic diagnosis of malignancy was rendered. Four cases, two females and two males, were encountered. The patients had undergone resection of a neck nodule, and each had a final surgical pathology diagnosis. The clinical and histopathologic findings were reviewed by two pathologists (MEL and OHI) and are summarized in Table 1.

Results

Clinical Features

The mean age of the patients was 66.2 years. All patients presented with a palpable lesion (average size—1.5 cm) in the head and neck region, 3 with a submandibular nodule and one with a parotid nodule. Three of the patients had history of squamous cell carcinoma (SCC) in the head and neck region. One patient had history of melanoma involving the skin of the neck. Computed tomography (CT) scan was available in case 3 (Fig. 1a) and positron emission tomography (PET) scan of salivary gland region showed physiologic 18F-fluorodeoxyglucose (18F-FDG) uptake in the area (Fig. 1b).

FNA Cytologic Findings

All four patients had FNA prior to surgery. Rapid on-site evaluation (ROSE) was available in three cases. The immediate cytologic diagnoses (ICDx) rendered in 3 cases were SCC, carcinoma, and salivary gland neoplasm, respectively. The final cytologic diagnosis (FCDx) in these cases was SCC, basaloid neoplasm, and salivary gland neoplasm, respectively (Table 1). In one case, only a FCDx of SCC was given; this case did not have an immediate interpretation. All cases were stained with Diff-Quik and Papanicolaou stains and had a cell block prepared from needle washings. The cases were signed out by different board certified cytopathologists who had various levels of experience in cytology, ranging from 5 to 25 years. Cytologically, all of the cases showed rare cell clusters with tridimensional architecture and minimal to mild nuclear

Table 1 Summary of clinical and microscopic findings of patients

Case Number	Age at the time of diagnosis	Sex	Site	Relevant medical history	Radiation and chemotherapy history of previous malignancy	Final cytologic diagnosis	Pathologic diagnosis of resected specimen
1	59 years	Male	Parotid nodule	Squamous cell carcinoma of tonsil	Yes	Squamous cell carcinoma, metastatic	Chronic sclerosing sialadenitis
2	88 years	Male	Submandibular mass	Melanoma	No	Squamous cell carcinoma	Chronic sclerosing sialadenitis
3	67 years	Female	Submandibular mass	Squamous cell carcinoma of soft palate and floor of mouth	No	Basaloid lesion	Chronic sclerosing sialadenitis
4	51 years	Female	Submandibular nodule	Squamous cell carcinoma of subglottis	No	Salivary gland neoplasm	Chronic sclerosing sialadenitis

Fig. 1 a Case 3—CT scan shows a localized nodule in salivary gland. **b** Case 3—PET scan did not show evidence of increased uptake of FDG in nodule identified by CT scan

atypia. Squamous metaplasia was evident in case 1 (Fig. 2a); clusters of basaloid cells were present in case 3 (Fig. 3a). A cellular aspirate was not seen in all of these cytologic preparations.

Gross and Histopathologic Findings

All patients had an intraoperative consultation (IOC) that included the gross evaluation of the excised nodules and examination of frozen sections of the tissue. Grossly, 3 cases showed no evidence of tumor; however, in one case, a 1.1 cm white-tan nodule was identified. During IOC, the lesions were identified as benign ($n = 2$), atrophic salivary gland with chronic inflammation ($n = 1$), and sialadenitis with atypical glands ($n = 1$).

All of the resected specimens showed benign salivary glands with prominent fibrosis encasing the lobules, focal squamous metaplasia and mild to moderate lymphoplasmacytic infiltrates (Figs. 2b, c, 3b, c). These histopathological features mirrored the FNA findings, and were considered to be consistent with CSS.

Discussion

We present a unique cohort of CSS cases occurring in the head and neck, and arising in the context of previous head and neck malignancy (typically squamous cell carcinoma). The presence of clinical mass that is composed of metaplastic squamous epithelium and lacks acini may influence the cytopathologist to consider a neoplastic process such as squamous cell carcinoma, especially in a patient with a history of head and neck malignancy. Also, the occurrence

of three-dimensional clusters of basaloid cells can lead to a false diagnosis of basaloid neoplasms, including basaloid salivary gland tumors or basaloid squamous cell carcinoma. Therefore, careful evaluation of these specimens may prevent misinterpretation and over-treatment. Adherence to strict diagnostic criteria for malignancy should be exercised. The presence of isolated clusters of squamous cells should not be equated with malignancy, particularly when obvious malignant features of the epithelial cells are lacking, and in the absence of atypical epithelial cell clusters.

In all 4 cases, an intraoperative consultation was indicated; the gross examination and the frozen section interpretations prevented more aggressive or unnecessary treatment. Surgically, the excised lesions showed a solid cut surface with preserved lobulations and fibrotic interlobular tissues that confirmed the benign nature of the lesions. Histopathologically the resected lesions were identified as benign and showed a preserved lobular architecture, with the lobules separated by thick interlobular fibrotic septa. The glandular parenchyma supported a dense lymphoplasmacytic infiltrate with acinar loss, and the salivary ducts exhibited periductal fibrosis. Although CSS most commonly affects submandibular salivary glands, the parotid nodule (case 1) was also diagnosed as CSS as it showed the characteristic histopathological features of CSS (Fig. 2b, c). Squamous metaplasia of ducts was also evident in case 1.

There is sparse precedent literature specifically addressing misdiagnosis of CSS on FNA. Extensive literature search identified a case report of CSS, which was initially diagnosed as a salivary gland neoplasm on FNA, similar to one of our cases [8]. Additionally, potential

Fig. 2 **a** Case 1—FNA showing a three-dimensional cluster of squamoid cells with mild atypia (Diff-Quik Stain, original magnification $\times 400$). **b** Case 1—resected specimen showing lobular appearance of salivary gland with prominent fibrosis surrounding lobules and prominent lymphoplasmacytic infiltrates (H&E, original magnification is $\times 40$). **c** Case 1—high power showing prominent squamous metaplasia of ducts (H&E, original magnification $\times 400$)

diagnostic challenges in CSS with prominent lymphoid infiltrates were reported by Cheuk and Chan [4] and Kaba et al. [5]. Cytologic differential diagnosis of CSS having a

Fig. 3 **a** Case 3—FNA showing cluster of basaloid cells (Diff-Quik Stain, original magnification $\times 400$). **b** Case 3—resected specimen showing lobular silhouette of salivary gland parenchyma with prominent fibrosis surrounding lobules and prominent lymphoplasmacytic infiltrates (H&E, original magnification $\times 40$). **c** Case 3—high power showing prominent lymphoplasmacytic infiltrates and periductal fibrosis (H&E, original magnification $\times 200$)

diffuse lymphoid infiltrate includes benign lymphoepithelial lesion, lymphoepithelial cyst, Warthin tumor, and lymphoma [4, 5, 8, 9]. The presence of a heavy lymphoid

infiltrate was not noted in any of our four cases. Additionally, SCC, basaloid neoplasms and mucoepidermoid carcinoma may be included in the cytologic differential diagnosis of CSS [10–12]. In our series, one of the cases had metaplastic squamous epithelium, in addition to a history of previous SCC, which led to the FNA diagnosis of metastatic SCC. This patient also had undergone radiation and chemotherapy as part of primary treatment for SCC. None of the other three cases had received any radiation or chemotherapy. Another case had synchronous lesions of SCC of the subglottis and a submandibular mass, the latter of which was biopsy proven as CSS. To our knowledge, there are no reported cases of CSS and SCC occurring simultaneously in the English-language literature, however there is a report of sebaceous lymphadenoma and primary SCC of salivary gland developing concurrently [13].

A contributing factor that may have affected the outcome of the fine needle aspiration interpretation was the scant/limited amount of cellular material. Cytopathologists should be aware of this scenario and should be cautious if making a diagnosis of malignancy based on cytologic preparations with a modest cellular sampling. In the absence of clear-cut atypical features, one should not commit to malignant diagnoses and FNA should be repeated. Additionally, experience in cytopathology is also an important factor that may affect the accurate interpretation of FNA samples. In our case series, all four cases were signed out by four different cytopathologists with different levels of experience in head and neck cytopathology ranging from 5 to 25 years.

In summary, FNA of CSS of the salivary glands in patients with a prior history of head and neck malignancy may pose a challenge in their interpretation. Awareness of this problem, strict adherence to cytologic criteria, and careful clinicopathologic correlation are helpful in preventing a misdiagnosis and unnecessarily aggressive surgical intervention.

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