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Metastatic lung cancer to the palate: Review of a case with immunohistochemical analysis

C. Michael Tsai [a,*], J.J. Closmann [a,b], Oliver Chang [c]

[a] Department of Oral Maxillofacial Surgery, University of Washington, Seattle, WA, USA
[b] Dentistry, VA Puget Sound Health Care System, Seattle, WA, USA
[c] Anatomic Pathology/ Dermatopathology, VA Puget Sound Health Care System, Seattle, WA, USA

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ABSTRACT

Oral lesions may present with or without symptoms and require close monitoring and often intervention by an Oral Maxillofacial Surgeon. Many oral lesions are benign but in those that are malignant, they are often primary lesions and rarely from metastasis. We present a case of a lesion in the soft palate of a completely edentulous lung adenocarcinoma patient on pembrolizumab. At the time of presentation, his lung cancer was thought to be well-controlled with immunotherapy. His oral lesion was biopsied and initially reported to be "poorly-differentiated carcinoma." Given his history of lung adenocarcinoma, through immunohistochemical comparison of the palatal specimen with previous lung specimen, the findings supported metastatic lung adenocarcinoma to the soft palate.

1. Introduction

Metastatic neoplasms to the oral cavity represent 1–3% of all oral malignancies [1] and may be encountered by the dentist. Common primary sites differ between sexes: For men, these metastatic lesions may come from lung, kidney, liver, and prostate primaries. For women, they commonly come from breast, genital organs, kidney, and colorectum primaries. Oral lesion was the first sign of an occult malignancy at a distant site in about 25% of metastatic cases [2].

According to data from National Center for Health Statistics, lung cancer represented the second most new cases (14%) of cancer for men in the USA. Lung cancer was found to be the leading cause of cancer-related deaths in both men and women [3]. Lung adenocarcinoma accounts for approximately one-third of cases of lung cancer [4].

In this case study, we present a patient, with a history of lung adenocarcinoma thought to be well-controlled with chemotherapy, who came to our clinic with a palatal lesion. The lesion was biopsied, and the initial histologic analysis was thought to represent a new primary of oral squamous cell carcinoma. Through immunohistochemical (IHC) comparison between the palatal specimen and the previous lung specimen, the findings suggested metastatic lung adenocarcinoma to the palate.

2. Case report

A 71-year-old edentulous male presented to our oral maxillofacial surgery clinic, on referral from his primary dentist, with a chief

* Corresponding author. OMS Program, University of Washington, Department of Oral and Maxillofacial Surgery, 1959 NE Pacific Street, HSB #B241, Box 357134, Seattle, WA, 98195-7134, USA.
E-mail address: mctsai@uw.edu (C.M. Tsai).

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complaint of an inability to wear his upper denture due to a sore on his right palate present for 2–3 months. The patient stated that the lesion caused mild to moderate pain and was slowly enlarging.

His past medical history consisted of atrial fibrillation, chronic obstructive pulmonary disease, lung cancer for which he received chemotherapy (was on pembrolizumab at time of presentation) and post-traumatic stress disorder. His social history was significant for 50 pack years of smoking tobacco, alcohol abuse and cannabis abuse. His medications included apixaban, pembrolizumab, levothyroxine and metoprolol succinate.

On exam, the patient had a 2 cm × 1.5 cm erosive appearing lesion (Fig. 1) at the junction of his hard and soft palate on the right side. The lesion was mildly tender to palpation and bleed slightly with manipulation. There was no palpable cervical or submandibular lymphadenopathy or masses clinically. A panoramic radiograph (Fig. 2) of the area was equivocal and a computed tomography (CT) scan was obtained (Figs. 3–5).

The CT scan report was as follow: "A 3.1 × 3.2 × 2 cm lobulated enhancing ill-defined mass involving the right aspect of the soft palate. The mass extends to involve the medial and lateral right pterygoid muscles. There is bony invasion of the right pterygoid process and posterior aspect of the right maxillary sinus. Bone destruction is noted in these areas. Borderline enlarged right level Ib and level IIa lymph nodes, each approximately 1 cm in short axis diameter. The right level IIa lymph node has slight internal low attenuation, which is suspicious for necrosis".

The patient was subsequently scheduled for an incisional biopsy in the operating room. A 5 mm punch biopsy was obtained and submitted for histologic examination along with detailed information regarding the patient's full history. Results of the biopsy initially revealed the following: "Positive for poorly-differentiated carcinoma". The specimen underwent further IHC staining with the findings compared with those of the patient's previous lung biopsy. The IHC results suggested metastatic lung adenocarcinoma, at which point the patient was referred to his oncologist to discuss treatment options.

3. Discussion

Metastatic tumors in the oral cavity are uncommon. It appears more frequently in males and occurs at the average age of 58 [5]. Among these cases, metastatic lesions in the oral cavity is found more frequently in the mandible than the maxilla [6–8]. Hirshberg et al., reviewed 673 cases of oral metastasis in 2008 and found that 16.6% were metastasis from lung. Of the cases that were from lung, 51.8% were in jaw bones and the other 48.2% were in the soft tissue [7].

The biology of cancer metastasis to the oral cavity is not well-understood but thought to be a complex process characterized by tumor establishment and cell migration, followed by invasion through lymphatics and vasculature, extravasation, and formation of distant tumors [11]. In 1940, Baston postulated that the spread of tumor cell from the lung may occur through the valveless vertebral venous plexus into distal sites such as head and neck [12].

TTF-1 or thyroid transcription factor-1 is a tissue specific homeodomain-containing transcription factor that plays an important role in the development of the lung and thyroid gland. In adults, TTF-1 is found exclusively in thyroid and pulmonary epithelial cells. Analysis of lung cancer tissue shows that TTF-1 is expressed in high frequency in 85–90% of small cell carcinomas and 75–80% of adenocarcinoma. It is not expressed typically in squamous cell carcinoma and large cell carcinoma [4].

For this particular case, H&E-stained sections contain an uncircumscribed, high-grade neoplasm arranged in irregular nests and cords, extending to fatty tissue. Neoplastic cells are poorly-differentiated, and exhibit significant pleomorphism, enlarged nuclei, and prominent nucleoli. Rare gland formation is identified. On H&E-stained sections alone, the differential diagnosis includes a poorly-differentiated squamous cell carcinoma or mucoepidermoid carcinoma; however, given the patient's known history of lung

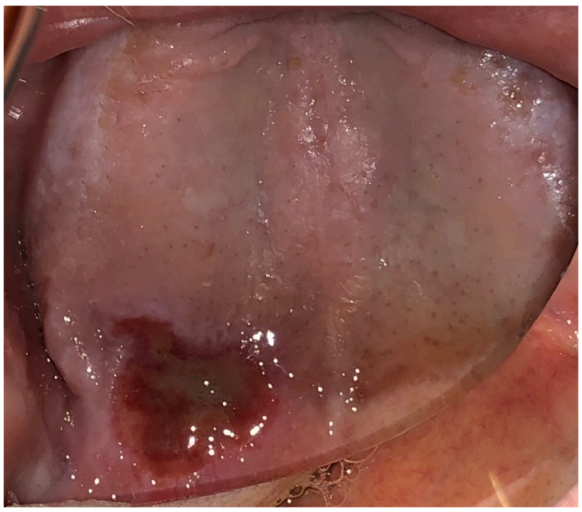

Fig. 1. Right-sided lesion noted at the junction of hard and soft palate.

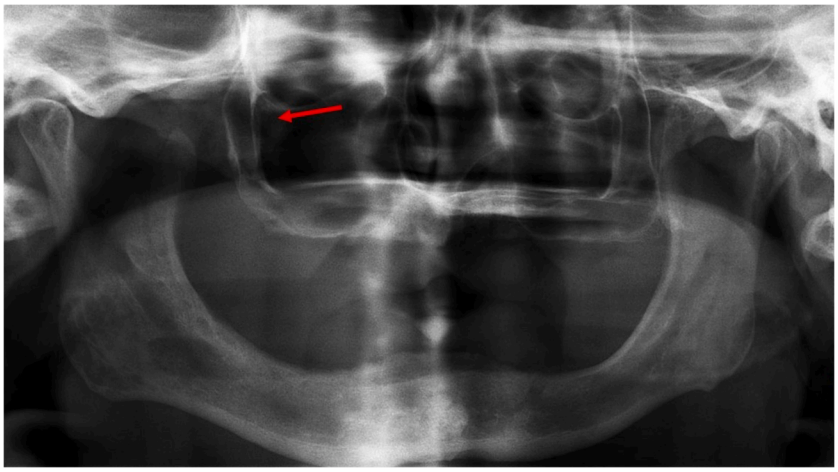

Fig. 2. Panoramic radiograph of lesion (arrow) without obvious evidence of bony destruction of maxilla.

Fig. 3. CT scan of lesion showing bony erosion into right posterior maxilla, medial and lateral pterygoid muscles (arrows).

adenocarcinoma, immunopositivity for TTF-1 and CK7 and negativity for CK20 features are highly suggestive for metastatic lung adenocarcinoma [9,10].

This case presented a diagnostic dilemma for the surgeons as the pathology report from the initial biopsy read "poorly differentiated carcinoma" and suggested a new primary malignancy for the patient, likely squamous cell carcinoma or high grade mucoepidermoid carcinoma. However, given close communication between the surgical and pathology teams regarding the patient's previous history of lung adenocarcinoma and access to the previous lung biopsy specimen, an expeditious IHC comparison was possible and findings were suggestive of metastatic lung adenocarcinoma. This highlights the importance of having the surgical team provide all the relevant patient information to the pathology team to save time, money, and increased reporting accuracy and clinical impact.

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Conflicts of interest

None of the authors has a financial or non-financial interest in the products or devices mentioned in this work.

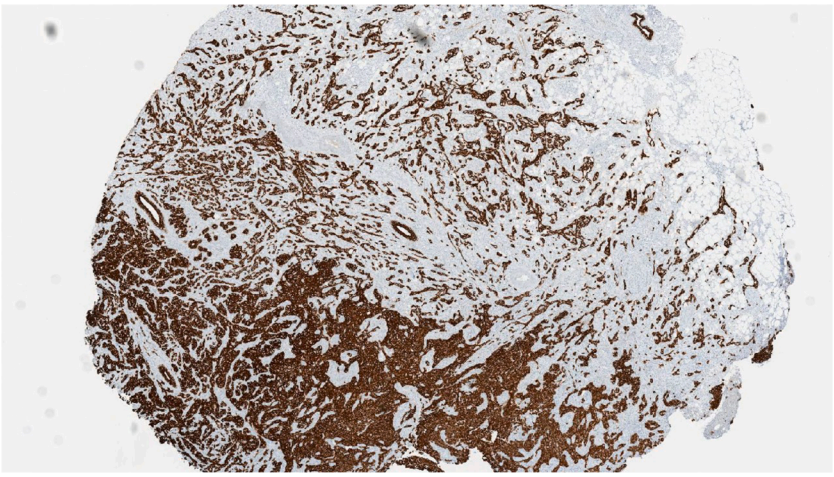

Fig. 4. (CK7; 2x) The highly infiltrative neoplasm within the palate biopsy is highlighted by a cytokeratin 7 immunostain. Background normal ducts and glands are also CK-7 immunopositive.

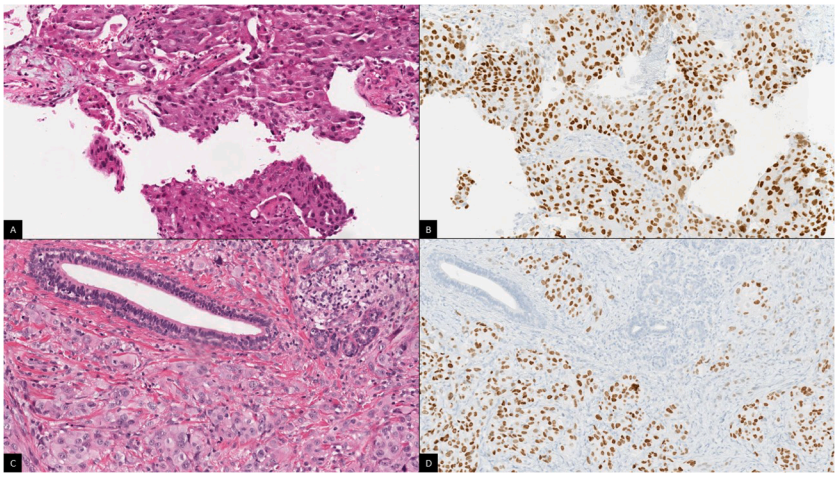

Fig. 5. (A; H&E, 10x) Fragments of lung contain diffuse neoplasm; no normal lung parenchyma is present. (B; TTF-1, 10x) Neoplastic cells exhibit nuclear immunopositivity for TTF-1. (C; H&E, 10x) Biopsy of the palate reveals a morphologically similar neoplasm with diffuse interstitial spread around background salivary ducts and glands. (D; TTF-1, 10x) TTF-1 immunopositivity with tumor cells supports a pulmonary origin.

Ethics statement

The guidelines in the Declaration of Helsinki were followed at all times during this work. Institutional review board approval was not required.

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