

Unusual case of isolated post-styloid parapharyngeal space metastasis in a treated case of carcinoma supraglottis: A case report and review of literature

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ABSTRACT

Squamous cell carcinoma of supraglottis is a common head and neck malignancy, comprising 30% of laryngeal carcinoma. Supraglottic carcinoma commonly metastasizes to the Levels II, III, and IV cervical nodes, and distant metastases are uncommon. Delayed local and regional recurrences are known, local recurrence being more common. We report a case of carcinoma supraglottis with the advanced locoregional disease at initial presentation and treated with neoadjuvant chemotherapy followed by chemoradiotherapy with a complete response on post-treatment positron emission tomography-computed tomography (PET-CT) scan. Surveillance PET-CT showed an isolated lesion in the left post-styloid parapharyngeal space, where neurogenic tumors are more common and isolated nodal metastasis is unusual. We did ultrasound-guided FNAC and cytology confirmed the presence of metastatic poorly differentiated carcinoma.

Key words: Carcinoma, Supraglottis, Parapharyngeal space, FNAC, Cytology

Carcinoma larynx constitutes around 25% of head and neck malignancies and around 30% of which arise in supraglottis [1]. Tobacco and alcohol consumption are important risk factors for carcinoma larynx [2,3]. Most patients with carcinoma supraglottis usually present late as the most common presenting symptom in the early stage is pain and hoarseness of voice is seen only in the advanced stage of the disease indicating the involvement of glottis. Other presenting symptoms are neck mass, dysphagia, aspiration as well as its sequelae, and airway compromise [4]. TNM staging eighth edition is the staging system for carcinoma supraglottis. Supraglottic carcinoma commonly metastasizes to the Levels II, III, and IV cervical nodal levels [5]. The incidence of distant metastasis in head and neck squamous cell carcinoma is low [6,7]. In carcinoma supraglottis, local recurrence is more common than regional recurrence and the risk of recurrence increases with advanced primary tumor stage and nodal involvement. Isolated nodal metastasis to the post-styloid parapharyngeal space (PPS) which harbors level VIIb lymph nodes is very unusual in carcinoma supraglottis with no local recurrence or regional recurrence to lower cervical nodes.

In this case report, we report an unusual case of isolated post-styloid PPS metastasis, where nerve sheath tumors are more common than nodal metastasis. It is important to differentiate

between the two, which affects the patient's treatment. Obtaining tissue from such deep neck space for cytology/histopathology is sometimes difficult. We have also performed an unusual ultrasound-guided fine-needle aspiration cytology (FNAC) of this deep lesion and also discussed different access for obtaining tissue for cytology/histopathology.

CASE REPORT

A 69-year-old male patient was diagnosed with carcinoma supraglottis in 2019. Initial TNM staging at presentation was cT4N3bMo. He received nine cycles of neoadjuvant chemotherapy followed by definitive chemoradiotherapy (the last dose was on 04.03.2020). Post-treatment positron emission tomography-computed tomography (PET-CT) done in March 2020 showed complete response and the patient was on surveillance during which, he was completely asymptomatic. Surveillance PET-CT scan done in July 2021, approximately 16 months after completion of therapy, showed a hypoenhancing FDG avid soft tissue in the left post-styloid PPS close to the skull base. Superiorly, it was extending up to the jugular foramen and carotid canal without extension into it. There was no bone erosion. It encased the left internal carotid artery (ICA) (angle of contact was 360 degrees) and mildly displaced the left internal jugular vein (IJV). There was no increase in distance between the ICA and IJV when compared

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to the contralateral side (Fig. 1). There was no local recurrence in supraglottis or no involvement of lower cervical lymph nodes. Nerve sheath tumors are more common in post-styloid PPS and it is very unusual to have isolated nodal metastasis in post-styloid PPS. However, since the patient had a history of malignancy, our differentials were both metastasis and nerve sheath tumors.

Since the lesion was located medial to styloid process which was densely calcified, it was difficult to do CT-guided FNAC using retromandibular or transcondylar approach. Anterior approach through the infratemporal fossa was possible under CT guidance but was limited by the parapharyngeal venous plexus (Fig. 1). Hence, we evaluated with ultrasound for a possible approach for FNAC. Ultrasound revealed a solid hypoechoic soft-tissue mass in the left suprahyoid carotid space close to the skull base involving ICA and found a safe window for FNAC using the transparotid approach. Hence, we performed ultrasound-guided FNAC (Fig. 2). Smears obtained were cellular and cytology revealed metastatic poorly differentiated carcinoma.

Although the disease was limited to suprahyoid post-styloid PPS, curative radiotherapy was not possible due to the high risk of a carotid blowout and spinal cord and brainstem myelopathy. Hence, the patient started on chemotherapy (Nanoxel, Carboplatin, and Cetuximab) and received 13 cycles. PET-CT scan done after chemotherapy showed a significant interval decrease of the lesion in the left post-styloid carotid space with mild residual soft-tissue thickening which showed no FDG uptake, suggestive of complete metabolic response (Fig. 3).

DISCUSSION

Supraglottic carcinoma is a common head and neck malignancy comprising around 30% of laryngeal cancer [1]. TNM staging eighth edition is the staging system for carcinoma supraglottis. Supraglottic carcinoma commonly metastasizes to the Levels II, III, and IV cervical nodal levels [5].

Various treatment options are available for advanced carcinoma larynx from surgery to non-surgical organ preservation therapy such as radiotherapy, chemoradiotherapy, or a combination of these. Recently, there is a paradigm shift in the management of advanced squamous cell carcinoma of the larynx, from surgical management to organ preservation non-surgical treatment such as radiotherapy and chemoradiotherapy [8]. Recurrences often occur predominantly at the primary site, while the risk of delayed regional recurrence in cervical nodal levels II, III, and IV is also higher in carcinoma supraglottis and the risk increases with advanced disease at presentation [9,10]. Isolated nodal metastasis to the post-styloid PPS which contains level VIIb lymph nodes is very unusual in carcinoma supraglottis with no local recurrence or regional recurrence to lower cervical nodes.

PPS is one of the deep neck spaces, shaped like an inverted pyramid, and extends from skull base superiorly to hyoid bone inferiorly. PPS is divided into two compartments depending on its relation with the styloid process, pre-styloid, and post-styloid compartments. Post-styloid PPS is also called as carotid space. Pre-styloid PPS contains minor ectopic salivary glands,

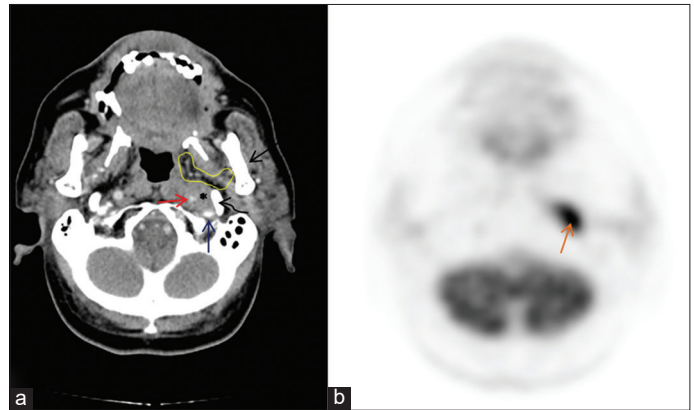


Figure 1: (a) Axial CT scan in soft-tissue window shows a soft-tissue lesion in the left post-styloid parapharyngeal space (asterisk) encasing the ICA (red arrow) and displacing the IJV (blue arrow). Yellow marked area shows pterygoid venous plexus. Black straight arrow – Mandible. Black curved arrow – styloid process. FDG PET image (b) at the corresponding level shows FDG uptake in the post-styloid PPS lesion (orange arrow)

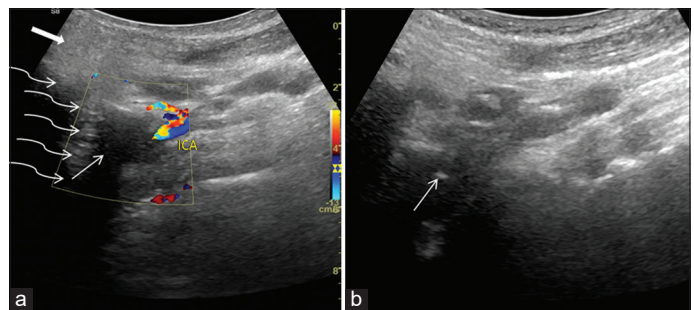


Figure 2: (a) Ultrasound shows a solid, hypoechoic soft tissue in the left post-styloid parapharyngeal space (thin arrow) close to the ICA (colored vessel). Block arrow indicates parotid gland and curved arrows indicate bone causing acoustic shadowing. (b) Ultrasound guided FNAC done with tip of the FNAC needle within the lesion (arrow)

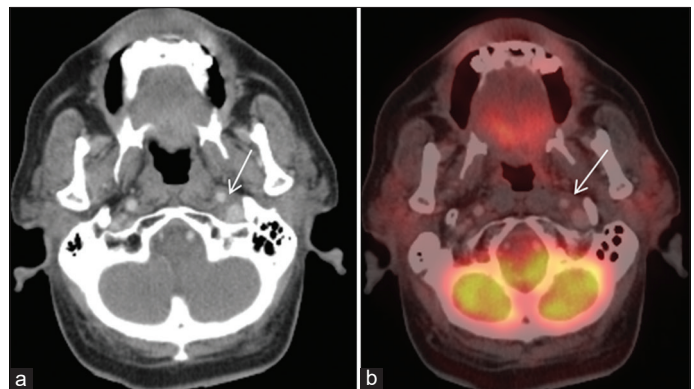


Figure 3: PET-CT scan done after chemotherapy shows significant interval decrease of the lesion in the left post-styloid carotid space with mild residual soft-tissue thickening (arrow in a) which shows no FDG uptake on corresponding fusion image (arrow in b), suggestive of complete metabolic response

mandibular division of trigeminal nerve, internal maxillary artery, ascending pharyngeal artery, and pterygoid venous plexus, whereas the post (retro)-styloid compartment contains ICA, IJV, IX to XII cranial nerve, cervical sympathetic chain, and glomus bodies [11]. Post-styloid PPS also contains post-styloid lymph

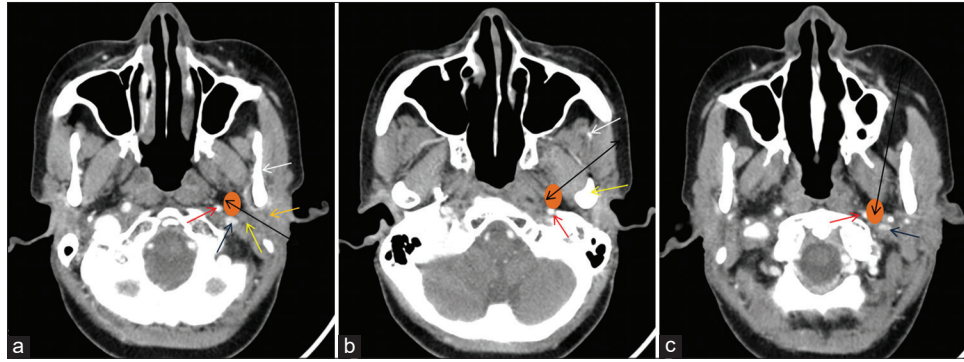


Figure 4: (a) Retromandibular approach: Orange shaded area – possible lesion in PPS, white arrow – mandible, yellow arrow – parotid gland, yellow arrow – non calcified styloid process. Red arrow – ICA, blue arrow – IJV, double black arrow – possible trajectory of needle; (b) Subzygomatic transcondylar approach: Orange shaded area – possible lesion in the left PPS close to skull base, white arrow – coronoid process of mandible, yellow arrow – condyloid process of mandible, red arrow – ICA, double black arrow – possible trajectory of needle; (c) anterior approach through infratemporal fossa: Orange shaded area – possible lesion in the left PPS, white arrow – red arrow – ICA, blue arrow – IJV, double black arrow – possible trajectory of needle

nodes which are the cranial continuation of Level II lymph nodes and is labeled as Level VIIb in the neck node-level classification system [12]. The most common pathology of post-styloid PPS is neurogenic tumors such as Schwannoma and neurofibroma, mostly arising from the vagus nerve but may arise from other nerves. The glossopharyngeal nerve lies lateral to the ICA and ansa cervicalis is also embedded in the anterior carotid sheath which may involve or displace the ICA. Post-styloid lymph nodes receive efferent from nasopharyngeal mucosa and they are at risk of involvement in carcinoma nasopharynx and also from any other head and neck primary malignancies which have massive infiltration of the upper level II lymph nodes through retrograde lymph flow [11-13].

Many tumors show an overlap of imaging features and FNAC/biopsy is necessary for diagnosis and appropriate management. Image guidance is required to target deep non-palpable head and neck lesions, which is less time consuming, and less morbid procedure than open surgery. The proximity of lesions to major neck vessels, nerves, airways, and body structures makes biopsy/FNAC of these lesions challenging. Ultrasound-guided procedures have the advantage of real-time imaging capability, visualization of vessels without the need for iodinated contrast material, lack of ionizing radiation, and low cost. However, the lack of window due to the presence of body structures and aerodigestive tract precludes the use of ultrasound guidance in deep-seated head and neck lesions. Hence, CT guidance is preferred to target these lesions [14]. Possible approaches for CT-guided FNAC/biopsy of PPS lesion are described in Fig. 4. However, when the lesion is surrounded by the difficult to penetrate bony structures and where the oblique course is difficult, evaluating the lesion with ultrasound for FNAC/biopsy is sometimes helpful as in our case, which allows real-time visualization of the needle and makes the oblique course easier.

Our case was previously treated for advanced carcinoma supraglottis (cT4N3bMo) with complete response. Surveillance FDG PET-CT showed isolated hypoenhancing FDG avid soft-tissue lesion in the left post-styloid PPS, located lateral to the ICA and encasing it. Therefore, our imaging differentials were

neurogenic tumor and nodal metastasis. It was located medial to the styloid process limiting lateral approach and the anterior approach was limited by the presence of pterygoid venous plexus (Fig. 1). Therefore, we performed ultrasound-guided FNAC using a lateral transparotid approach, which allowed oblique access through a window (Fig. 2). Retromandibular (aka “facial vein”) vein can be used as a landmark to locate facial nerve which lies lateral to the vein, to avoid injury to the nerve [15].

CONCLUSION

Head and neck cancers may present with delayed regional recurrence or distant metastasis at an unusual site where other benign tumors are more common. Often the patient can be asymptomatic during surveillance and imaging plays an important role in diagnosing locoregional recurrence and distant metastasis. Obtaining tissue for cytology/histopathology is useful to exclude other possible causes. Ultrasound and CT-guided FNAC/biopsies are useful in this regard and lesions should be evaluated with both ultrasound and CT scan for possible safest approach.

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