INTRODUCTION

Regular surveillance of Head & Neck cancer patients is especially important in the first 2 years after treatment, since two-thirds of recurrences are found during that time period (1). Early detection of tumor recurrence or a second primary during follow-up may allow early salvage treatment and potentially confer survival advantage. The combined use of 18-fluorodeoxyglucose PET with CT attenuation correction (FDG PET/CTAC) has had a significant impact in post-treatment follow-up. FDG PET/CTAC with contrast enhanced CT (CE/CT) provides the best anatomic (2) and metabolic information in evaluating the effects of therapy on the original tumor, looking for evidence of residual tumor or recurrence, and for assessing regional lymphadenopathy or distant metastases (3).

CASE 1

A 61-year-old female with T1N1M0 oral maxillary alveolus SCC underwent surgical resection of the tumor with bilateral neck dissection. Post-treatment dental rehabilitation was performed with maxillary obturator prosthesis (Figure A). FDG PET/CTAC imaging performed at 7 months follow-up demonstrated high FDG uptake (SUV 11.6) along the resection site seen on the CE/CT images of the lesion (Figure B). Non-attenuation corrected (NAC) PET/CT images also confirmed increased activity, suggesting this was not due to over-correction artifact caused by the prosthesis. On physical exam however, the patient was asymptomatic and had no evidence of inflammation or infection at the concerned site (Figure C). A repeat PET/CT scan after removal of the prosthesis did not show any abnormality (Figure D).

DISCUSSION

FDG-PET/CTAC may be performed when there is suspicion of recurrence or at regular 6 to 12-month intervals in asymptomatic patients. However, FDG is not tumor specific, and in addition to its physiologic uptake in various organs, it can accumulate in inflamed tissue due to infection, post-surgical healing, or post-radiation therapy. Normal physiologic uptake in the oral cavity includes lymphoid tissue in soft palate, uvula, Waldeyer ring, as well as muscle activity, salivary gland activity, and metabolically active brown fat (4). Asymmetric uptake in post treatment setting needs to be viewed cautiously. Surgical resection may create an appearance of asymmetric uptake, and inflammation from radiation therapy can cause increased uptake leading to asymmetry. In addition, reconstruction techniques and prostheses can further alter the regional anatomy and even create artifacts on diagnostic imaging.

In this patient, possible explanations for the abnormal FDG uptake in the location of maxillary alveolus include: inflammation, infection, tumor, salivary pooling, lymphatic pooling, or SUV over-correction artifact of the maxillary obturator prosthesis due to CT-based attenuation correction technique. CTAC over-correction artifact was suspected in this case after clinically assessing the patient, who showed no inflammation, infection or tumor recurrence at the surgical site. Never-the-less, review of the non-attenuation images still showed abnormally increased uptake. Therefore, a repeat FDG-PET/CT scan, without the prosthesis in place was performed, which did not show any abnormality. We postulate that saliva pooling underneath the prosthesis was responsible for the focal FDG accumulation artifact.

False positive finding during surveillance can lead to additional diagnostic testing and surgical interventions, along with unnecessary patient anxiety. It is important for the managing and imaging physicians to be aware of potential artifacts and normal sites of physiologic uptake.

CONCLUSION

PET/CT images that demonstrate intense activity corresponding to dense structures should be viewed with caution. A review of the detailed history and physical examination as well as knowledge of potential artifacts is pertinent for both the managing and imaging physicians.

REFERENCES