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Oral findings during follow-up of nasopharyngeal squamous cell carcinoma treatment: A case report

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Abstract

A 50-year-old woman with a long history of nasopharyngeal cancer (T2N2M0, squamous cell carcinoma) underwent chemoradiotherapy and surgery. In the past, to prevent tumor recurrence or metastasis, she underwent concurrent chemoradiotherapy or neck dissection. However, during a follow-up 10 years after the surgery, intense F-18 fluorodeoxyglucose uptake was detected in the oral area (SUVmax 6.0). A biopsy of the area with F-18 fluorodeoxyglucose uptake revealed pathological inflammation. Radiography showed the presence of a wisdom tooth, located at the F-18 fluorodeoxyglucose accumulation site, and pericoronitis of this tooth was detected. Our findings indicate the importance of considering the effect of inflammatory conditions, such as periodontal disease, in using F-18 fluorodeoxyglucose positron emission tomography/computed tomography during follow-up after head and neck cancer treatment.

Keywords

Oncology, oral hygiene, medical imaging, radiology, nuclear medicine

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Introduction

F-18 fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT) is useful for the detection of recurrence and metastasis after head and neck cancer therapy and is routinely performed to detect primary head and neck cancers, lymph node and distant metastases, and second primary malignancies.[1] However, FDG is not a malignancy-specific agent; this tracer can accumulate in various regions, including benign tumors and inflamed tissues. Benign lesions with increased FDG uptake have been reported in more than 25% of FDG PET/CT studies which involved patients with confirmed or suspected malignancy, with inflammation as the most common cause of increased FDG uptake.[2] Although malignancy and inflammation have similar FDG findings, the corresponding treatment is different. Misdiagnosis leading to delayed or inaccurate treatment may result in poor prognosis in patients. The association between PET/CT accumulation and inflammation, a characteristic feature of periodontal disease, remains unclear. This report highlights aspects of FDG PET/CT images taken 10 years after nasopharyngeal cancer treatment in a 50-year-old woman with a history of nasopharyngeal cancer.

Case report

A 50-year-old woman with a long history of left nasopharyngeal cancer (T2N2M0, squamous cell carcinoma)

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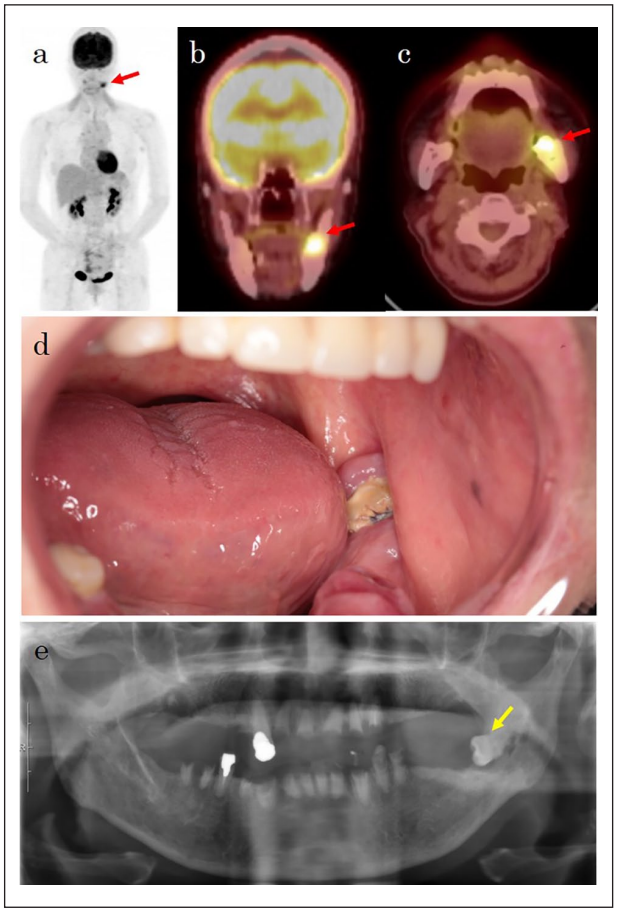

Figure 1. Diagnostic images and intraoral photographs: (a) Maximum intensity projection image obtained with F-18 fluorodeoxyglucose positron emission tomography showing intense uptake in the oral area (SUVmax 6.0, red arrow). (b) Coronal image obtained with F-18 fluorodeoxyglucose positron emission tomography/computed tomography showing intense uptake in the left mandibular area (red arrow). (c) Transverse image obtained with F-18 fluorodeoxyglucose positron emission tomography/computed tomography showing intense uptake in the left mandibular area (red arrow). (d) Intraoral photograph showing a bone-like tissue and swelling in the left mandibular gingiva. (e) Panoramic radiograph taken during long-term follow-up. The yellow arrow indicates the wisdom tooth in the left mandible.

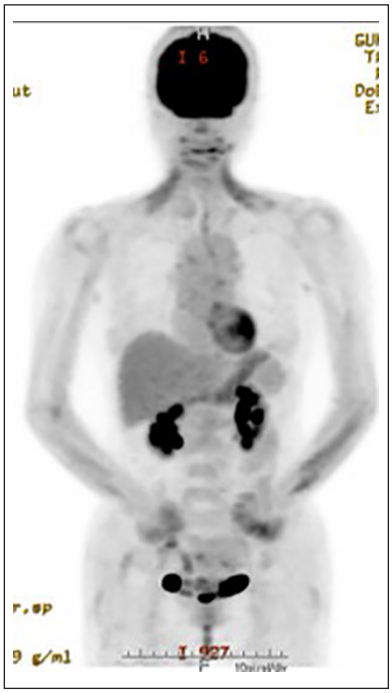

Figure 2. Disappearance of FDG accumulation during the subsequent patient follow-up.

was treated in our institute. In 1998, concurrent chemoradiotherapy using 60 Gy + cisplatin (135 mg) was administered. In 2002, concurrent chemoradiotherapy using 60 Gy + cisplatin (180 mg) + docetaxel (60 mg) for right level II lymph node metastasis was administered. In 2003, concurrent chemoradiotherapy using 50 Gy + cisplatin (120 mg) + docetaxel (56 mg) for left level IV lymph node metastasis was administered. In 2005, she underwent neck dissection for the treatment of cancer recurrence in the left submandibular lymph node. Because of multiple recurrences and metastases, FDG PET/CT scan was performed annually. FDG was administered intravenously at a dose of 5 MBq/kg after the patient had undergone at least 6 h of fasting. PET was performed approximately 60 min after the administration of FDG using a PET/CT scanner (Discovery STE; GE Healthcare) with a 700.00 mm field of view and a slice thickness of 3.27 mm. Nuclear medicine physicians interpreted the findings of the FDG PET/CT image. FDG PET/CT performed in 2015 demonstrated intense FDG uptake in the left mandibular area (SUVmax 6.0; Figure 1(a)–(c)), which was suggestive of malignancy. There was a bone-like hard tissue in the left mandibular gingiva, around which was swelling and pain on palpation (Figure 1(d)), suggesting radiation osteomyelitis or pericoronitis. A biopsy of the area of FDG uptake revealed pathological inflammation. Radiography showed the presence of a wisdom tooth (Figure 1(e)) at the site of FDG accumulation, and pericoronitis of the tooth was detected.

After abatement of the pericoronitis, no FDG accumulation was detected during the subsequent FDG PET/CT follow-up in the following year (Figure 2).

Discussion

In this case, FDG PET/CT performed 10 years after the last recurrence of nasopharyngeal cancer demonstrated increased FDG uptake in the left mandibular gingiva due to inflammation (pericoronitis), based on biopsy results. Radiography revealed a wisdom tooth at the site of FDG accumulation, and pericoronitis, a type of periodontal disease, was detected around this wisdom tooth. FDG accumulation in the patient

was a result of inflammation, and this presentation is often difficult to diagnose.[1,2] Although uncommon, intraoral FDG accumulation due to periodontal disease has been reported.[1,3] Factors that influence the diagnosis of recurrence and metastasis seem noteworthy, particularly, inflammation in periodontal disease.

Metastatic tumors in the oral cavity, which are not commonly observed during long-term follow-up, account for approximately 1% of all oral malignancies.[4] Similar to the site of FDG uptake in the patient in this case study, the most common sites of oral metastasis are the gingiva and alveolar mucosa.[4] Local recurrence and lymph node metastasis are considered most likely to occur following head and neck cancer treatment. In particular, it is necessary to monitor the status of oral hygiene practices during follow-up after head and neck cancer treatment.

Radiation osteomyelitis remains a common pitfall of FDG PET/CT.[5] Radiation osteomyelitis is a late complication of high-dose irradiation for the treatment of head and neck cancer and constitutes a lifelong problem for cancer survivors.[1] In addition, a second primary malignancy is another long-term complication of high-dose irradiation. The risk of a second primary malignancy increases exponentially with time.[6] Thus, it is important to note unusual findings during follow-up FDG PET/CT.

However, FDG PET/CT is not available in all cancer treatment facilities worldwide. Furthermore, FDG PET/CT is rarely attempted 10 years after treatment, except in patients who have had multiple relapses (as reported in this study).

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Author contributions

All authors were responsible for the treatment and care of the patient because this case required a lengthy follow-up. A.M., N.K., N.O., H.K., Y.M., H.S., Y.T., and T.O. drafted the original manuscript. A.M. was involved in the conception of the report. All authors critically reviewed the report. A.M. took the oral photograph. K.C., S.Y., and T.O. analyzed the treatment and contributed to the final drafting of the manuscript. All authors have read and approved the final manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

The institutional ethics committee exempted this study from regular institutional review board review process due to the retrospective non-invasive and observational nature of the study.

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Informed consent

Written informed consent was obtained from the patient.

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