

Case Report

First case of ^{18}F -choline uptake in acoustic schwannoma after stereotactic radiotherapy

ABSTRACT

A 69-year-old male patient, with bilateral hypoacusia and tinnitus, had a diagnosis of left vestibular schwannoma with synchronous meningioma on the left frontal lobe. After partial surgical resection of the acoustic schwannoma, this was followed by stereotactic radiosurgery on the residual lesion. The patient had a metachronous prostate cancer treated with conformal radiotherapy associated to 6 months of hormone therapy with luteinizing hormone/releasing hormone analog. During follow-up, prostate-specific antigen value increased to 0.27 ng/mL and the patient underwent ^{18}F -methylcholine positron emission tomography/computed tomography (^{18}F -choline PET/CT). The whole-body scan demonstrated a focus of increased uptake at level of the left cerebellopontine angle and at the left frontal lobe, corresponding to the known vestibular schwannoma and meningioma. A subsequent brain contrast-enhanced magnetic resonance imaging (MRI) showed an increased dimension of the left cerebellopontine neuroma and dimensional stability of the left frontal meningioma compared with previous MRI of 6 months earlier. To the best of our knowledge, we describe the first case of a ^{18}F -choline PET/CT demonstrating a relapse of a vestibular schwannoma after stereotactic radiotherapy.

Keywords: ^{18}F -Choline, positron emission tomography/computed tomography, schwannoma

INTRODUCTION

In May 2012, a 69-year-old male patient, with a medical history of bilateral hypoacusia and tinnitus, had a contrast-enhanced magnetic resonance imaging (MRI) diagnosis of left vestibular schwannoma with synchronous meningioma on the left frontal lobe. After 6 months, due to the worsening of symptoms, the patient underwent a partial surgical resection of the acoustic neuroma, whose cellular architecture was classified as “Antoni B” pattern, followed by stereotactic radiosurgery on the remnant (planning target volume [PTV], 6.7 cm³ covered with a margin dose of 12 Gy).

During that time, the patient, also, had a metachronous prostate cancer (cT2cN0cM0, Gleason score of 4 + 3 and prostate-specific antigen [PSA] of 9 ng/mL) treated with a conformal radiotherapy associated to 6 months of hormone therapy with luteinizing hormone/releasing hormone analog.

PROCEDURE

In January 2017, during follow-up, PSA increased to 0.27 ng/mL and the patient underwent an ^{18}F -methylcholine positron emission tomography/computed tomography (^{18}F -choline PET/CT). The whole-body scan demonstrated increased tracer uptake at level of the left cerebellopontine angle and of the left

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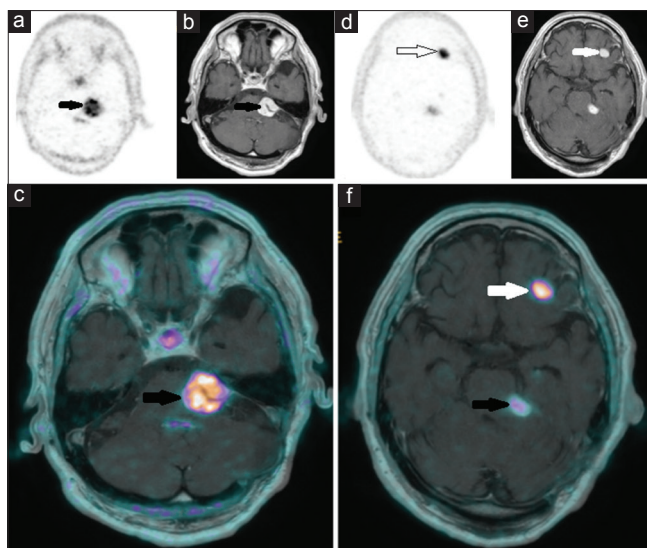


Figure 1: Positron emission tomography/computed tomography showing high grade of ¹⁸F-choline uptake (black arrow) in the left cerebellopontine neuroma (a-f) and in the left frontal meningioma (white arrow) (d-f)

frontal lobe [Figure 1], corresponding to the known vestibular schwannoma and meningioma (maximum standardized uptake value, respectively, 4.4 and 5.8). A subsequent brain contrast-enhanced MRI showed an increased dimension of the left cerebellopontine schwannoma (25 mm vs. 22 mm) and a dimensional stability of the left frontal meningioma compared with previous MRI dating to 6 months earlier.

CONCLUSION

It is well known that PET-based molecular imaging, as demonstrated with tracers as ¹¹C-methionine, may contribute to the evaluation, treatment planning, and follow-up of patients with skull base meningiomas and schwannoma.^[1] In a recent review, Calabria *et al.*^[2] underlined the potential role of choline metabolism PET tracers in the detection of benign and malignant brain tumors. Recently, Malamitsi *et al.*^[3] described as an incidental findings on

¹⁸F-choline PET/CT of an acoustic schwannoma. To the best of our knowledge, we described the first case of ¹⁸F-choline PET/CT uptake in a local recurrence of a vestibular schwannoma after stereotactic radiotherapy. In the era of "Precision Medicine," it is intriguing the hypothesis that radiolabeled choline, as demonstrated for gliomas,^[1] may be considered also in this setting as a biomarker able to predict an aggressive biology of a brain nonmalignant lesion.^[4]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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