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CASE REPORT Open Access

Incidental meningioma detected with [^{18}F]-FDOPA PET/CT

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Abstract

A 59 year old patient was referred to our department to detect disease activity related to clinical symptoms of tiredness, weight loss and an elevated serum serotonine, suspicious of a neuro-endocrine tumour. A 18F-fluoro-l-dihydroxy-phenylalanine (FDOPA) PET/CT scan was performed, which showed focally increased uptake in the terminal ileum and in a mesenterial lymph node. Additionally, an area of intense uptake was observed intracranially. Histological analysis confirmed the presence of a WHO grade I meningioma. Few cases of FDOPA PET uptake in meningiomas have been published, underlining it is as a rare finding. Awareness of this potential finding is crucial to avoid misinterpretation as intracerebral metastasis.

Keywords: FDOPA, Neuro-endocrine tumours, Meningioma, Pitfalls, PET/CT, Brain tumours

A 59 year old patient was referred to our department to detect disease activity related to clinical symptoms of tiredness, weight loss and an elevated serum serotonine, suspicious of a neuro-endocrine tumour. A ^{18}F-fluoro-l-dihydroxy-phenylalanine (FDOPA) PET/CT scan was performed, which showed focally increased uptake in the terminal ileum and in a mesenterial lymph node (Fig. 1). Additionally, an area of intense uptake was observed intracranially (Fig. 2a, left frontal region). The atypical location of the uptake suggested the presence of a mengioma (Fig. 2b). Based on this PET finding, MRI was performed (2C), which showed an extra-axial mass with extensive contrast enhancement on T1 weighted imaging and a 'dural tail', typical of meningioma. Additional findings on MRI were midline shift and edema. Histological analysis confirmed the presence of a WHO grade I meningioma.

FDOPA PET has been used in the evaluation of brain tumours, among other PET techniques using amino acid tracers such as ^{11}C-methionine and -(2-[^{18}F]fluoroethyl)-l-tyrosine (FET) (Becherer et al. 2003; Fueger et al. 2010; Schiepers et al. 2007). The increased uptake of FDOPA is related to the L amino acid transporter (LAT). The LAT facilitates amino acid transport in

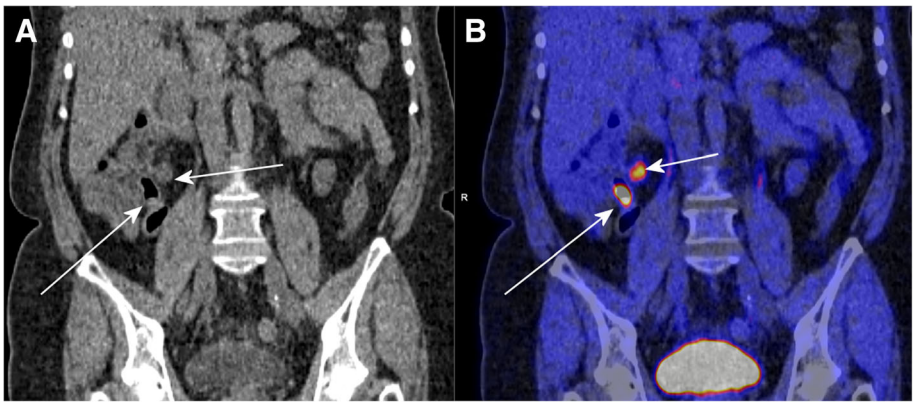

Fig. 1 After oral administration of 75 mg carbidopa, 300 MBq of ^{18}F-FDOPA was injected intravenously. Images were acquired 60 min after injection on a 64-slice PET/CT camera (mCT Biograph, Siemens Medical Solutions, Knoxville, TN USA,) whole body. Increased uptake was noted in the terminal ileum (left arrow) and in the mesentery (right arrow), as shown in figure 1**a** (CT only) and 1**b** (fused PET/CT images)

tumour cells, which in turn use it for protein synthesis. In meningiomas, high LAT1 expression has been described (Zitron et al. 2013). Consequently, increased uptake of FDOPA may be observed in these tumours. In addition, increased uptake of other amino acid PET tracers in meningiomas has been described, including a series of 10 meningiomas which showed increased uptake of -[^{11}C]methyl-L-tryptophan (AMT) (Zitron et al. 2013). as well as of somatostatin radiolabelled analogs (Soto-Montenegro et al. 2014).

Conclusions

Few cases of FDOPA PET uptake in meningiomas have been published (Calabria et al. 2016), underlining it is as a rare finding. Awareness of this potential finding is crucial to avoid misinterpretation as intracerebral metastasis.

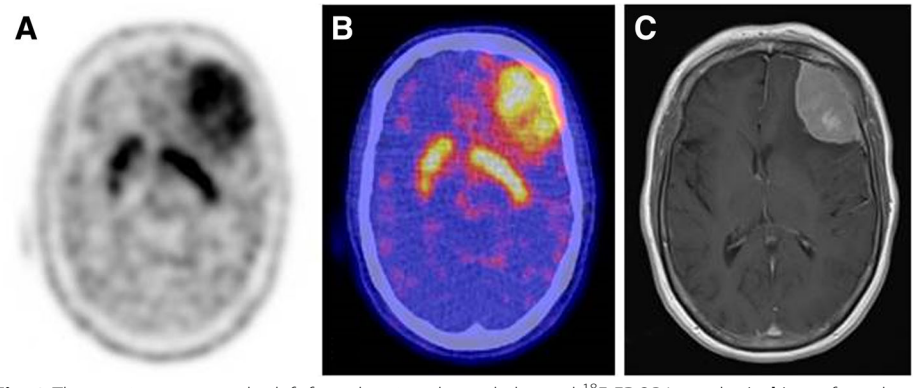

Fig. 2 The meningeoma on the left frontal region showed elevated ^{18}F-FDOPA uptake (**a**, **b**), confirmed on MRI (**c**). Physiological ^{18}F-FDOPA uptake in the striatum

Abbreviations
AMT: Methyl-L-tryptophan; FDOPA: Fluoro-l-dihydroxy-phenylalanine; FET: Fluoroethyl)-l-tyrosine; LAT: L amino acid transporter

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Authors' contributions
GNS: writing of the manuscript, lay-out, images. AWJMG, RHJAS, RAJOD: review of the article, providing comments. All authors read and approved the final mansucript.

Competing interests
The authors declare that they have no competing interests.

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