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Images of Interest / Imagens de Interesse

2-[^{18}F]-FDG-PET in the Differential Diagnosis Between Alzheimer's Disease and Frontotemporal Dementia

PET com 2-[^{18}F]-FDG no Diagnóstico Diferencial entre Doença de Alzheimer e Demência Frontotemporal

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Abstract

The differential diagnosis between Alzheimer's Disease and Frontotemporal Dementia is based on clinical evaluation, however 2-[^{18}F]-FDG-PET allows the recognition of different metabolism patterns that are useful to distinguish these entities.
We present the case of a patient with the clinical suspicion of Frontotemporal Dementia who underwent 2-[^{18}F]-FDG-PET, which showed a metabolism pattern characteristic of Alzheimer's Disease.

Keywords

PET; FDG; Alzheimer's Disease; Frontotemporal Dementia.

Resumo

O diagnóstico diferencial entre Doença de Alzheimer e Demência Frontotemporal baseia-se na avaliação clínica, no entanto a PET com 2-[^{18}F]-FDG permite o reconhecimento de diferentes padrões de metabolismo que são úteis na distinção destas entidades.
Apresentamos o caso de um doente com suspeita clínica de Demência Frontotemporal e que realizou PET com 2-[^{18}F]-FDG que evidenciou padrão de metabolismo característico de Doença de Alzheimer.

Palavras-chave

PET; FDG; Doença de Alzheimer; Demência Frontotemporal.

A 69-year-old male patient with progressive memory and behavioral deficits underwent cranioencephalic magnetic resonance imaging (CE MRI) which revealed predominant parietal cortical atrophy. Due to the marked behavioral changes and the clinical suspicion of Frontotemporal Dementia (FTD), he was referred for a brain positron emission tomography (PET) study with Fluorine-18 (2-[^{18}F]-FDG) fluorodeoxyglucose. Images acquired 30 minutes after intravenous administration of 241 MBq of 2-[^{18}F]-FDG showed a marked reduction in radiopharmaceutical uptake in the bilateral parietal cortex, especially in the precuneus (and posterior cingulate), moderate in the bilateral temporal cortex and less evident in the front. This essentially posterior pattern of hypometabolism is more suggestive of a neurodegenerative disease of the central nervous system of the temporoparietal type, namely Alzheimer's Disease(AD) (Fig. 1).

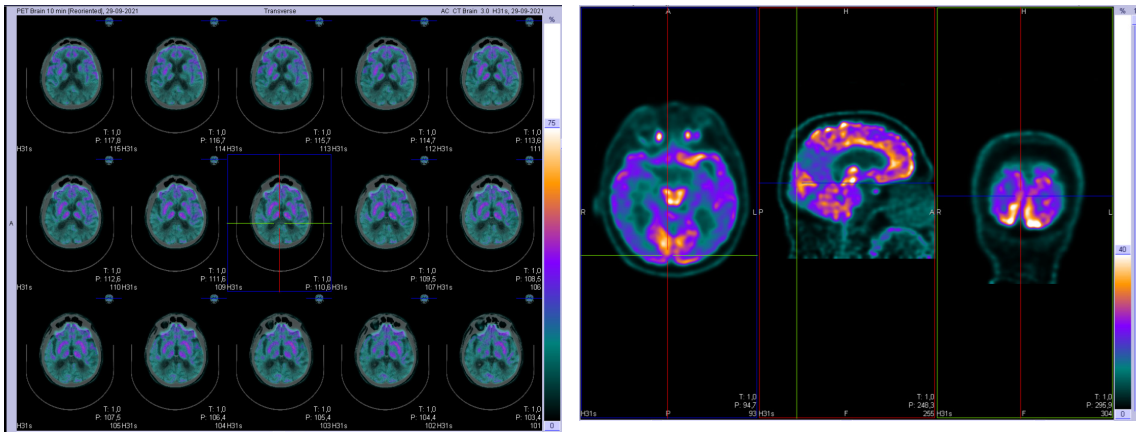

Figure 1 – Brain PET with 2-[^{18}F]-FDG showing bilateral temporoparietal hypometabolism, most evident in the precuneus and posterior cingulate, suggestive of Alzheimer's dementia.

Brain PET with 2-[^{18}F]-FDG reflects the consumption of glucose by glial cells, which produce adenosine triphosphate, allowing the normal functioning of the neuronal synapse. Consequently, it is a sensitive study in the detection of metabolism patterns that are characteristic of each dementia, being particularly useful in the differential diagnosis between AD and FTD.[1] Glucose hypometabolism in the anterior temporal, frontal, and anterior cingulate regions is frequently found in patients with FTD, while hypometabolism in the temporoparietal, precuneus, and posterior cingulate regions is more common in patients with early-stage AD, where, as disease progresses, there is involvement of the frontal cortex.[2]

Clinically, it is important to differentiate patients with FTD from those with AD, as FTD patients may experience serious adverse effects when treated with cholinesterase inhibitors.[3] In the present clinical case, the patient presented a picture dominated by behavioral alterations that raised the diagnostic hypothesis of FTD and the 2-[^{18}F]-FDG PET not only confirmed the presence of frontal involvement, but also evidenced the hypometabolism of posterior predominance, in accordance with the findings of the previous morphological examination (MR CE) and suggestive of AD.

Ethical disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.

Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.

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Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.

Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Protecção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

References

1. Nobili F, Arbizu J, Bouwman F, Drzezga A, Agosta F, Nestor P, Walker Z, Boccardi M. EANM-EAN Task Force for the prescription of FDG-PET for dementing neurodegenerative disorders. European association of nuclear medicine and european academy of neurology recommendations for the use of brain 18F-fluorodeoxyglucose positron emission tomography in neurodegenerative cognitive impairment and dementia: Delphi consensus. Eur J Neurol. 2018;25:1201-17.

2. Foster NL, Heidebrink JL, Clark CM, Jagust WJ, Arnold SE, Barbas NR, DeCarli CS, Turner RS, Koeppe RA, Higdon R, Minoshima S. FDG-PET improves accuracy in distinguishing frontotemporal dementia and Alzheimer's disease. Brain. 2007;130:2616-35.

3. Marcus C, Mena E, Subramaniam RM. Brain PET in the diagnosis of Alzheimer's disease. Clin Nucl Med. 2014;39:e413-22.