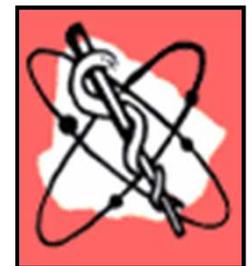


64 year-old female

Memory deficit of mesotemporal profile and mild cognitive impairment

Rodolfo Ferrando, MD, MSc

**Associate Professor of Nuclear Medicine
Hospital de Clínicas, Facultad de Medicina
Universidad de la República
Montevideo, Uruguay**

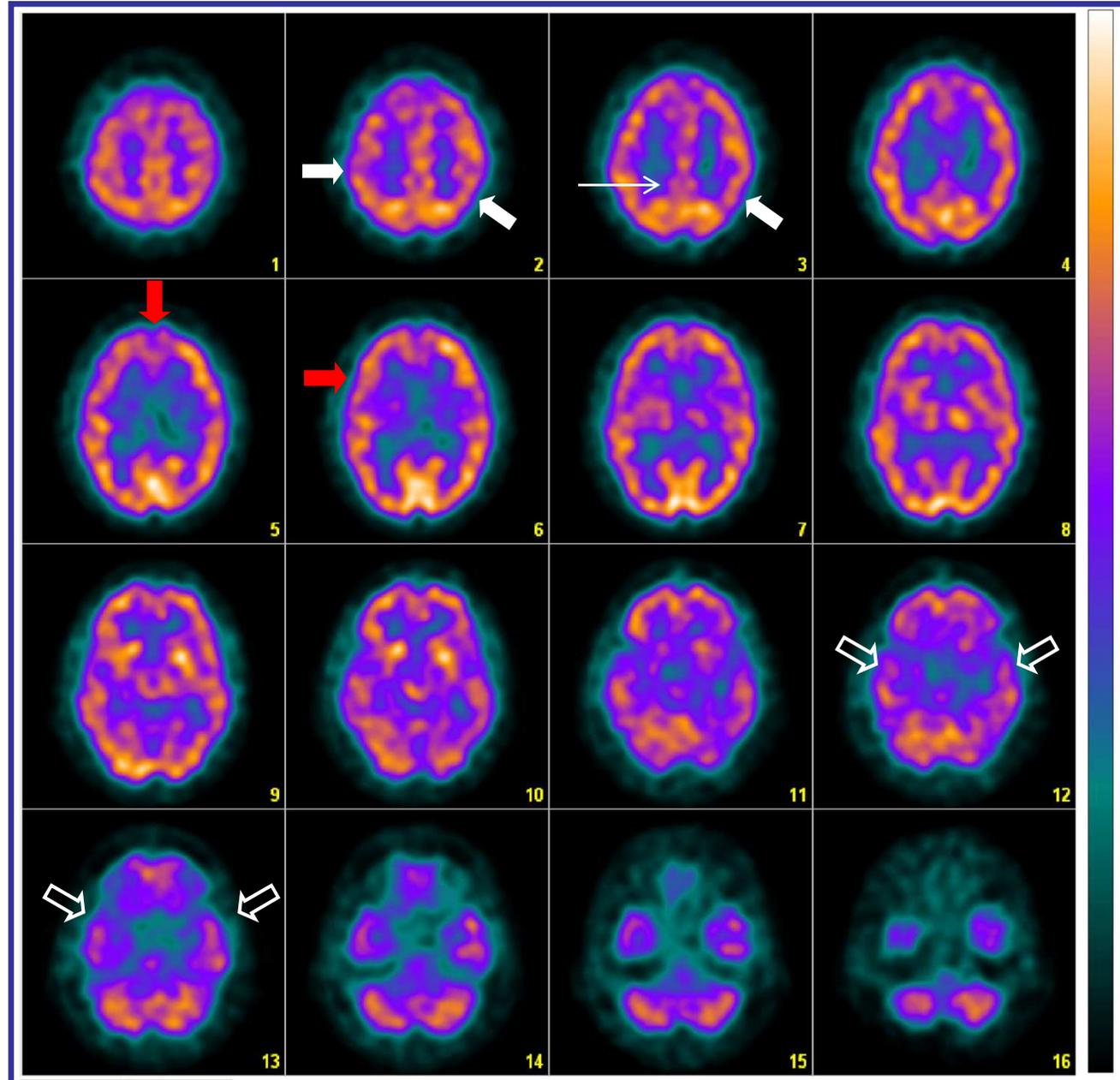


Clinical statement

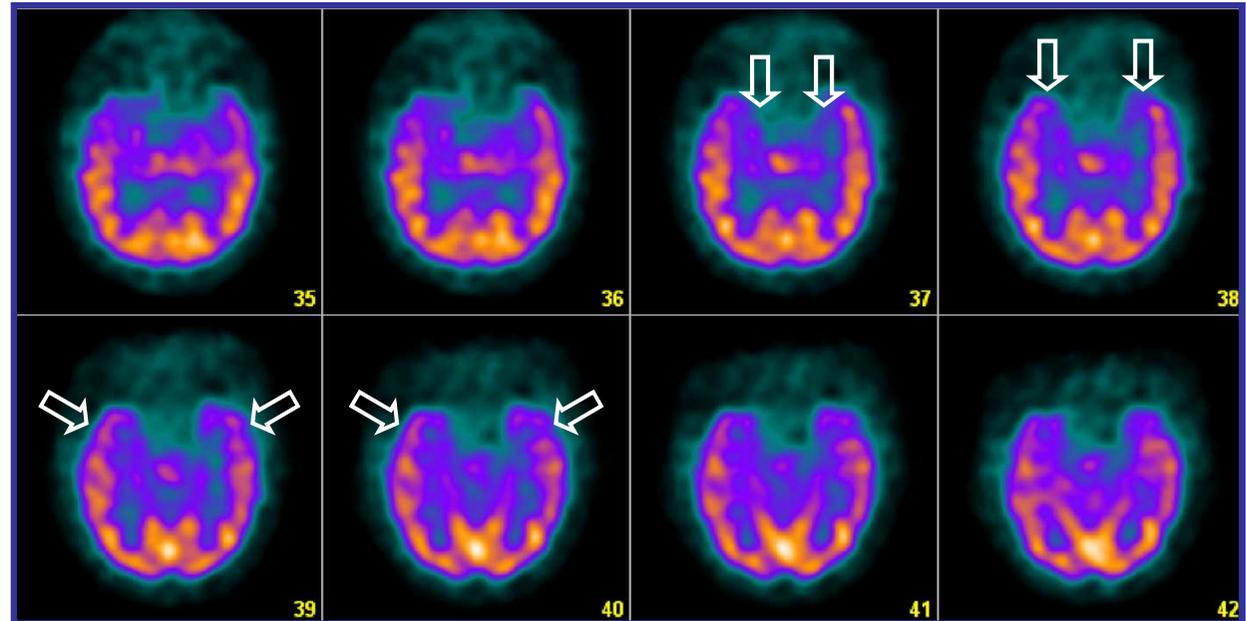
- 64 y/o female.
- Hypertension.
- Cognitive impairment 2 years of evolution.
- Neuropsychological study: memory deficit of mesotemporal profile. Mild cognitive impairment.
- Normal CT scan

- Brain SPECT is indicated for further evaluation in patient under 65 years old with mild cognitive impairment suggestive of mild AD.
- Images were acquired in a dual head gammacamera 60 min. p.i. of ^{99m}Tc -ECD (925 MBq).
- 128 steps, 25 seconds each. 128×128 matrix. 2.9 mm pixel size. No scatter correction was performed.
- OSEM reconstruction (5 cycles 2 subsets). Prefiltering with Butterworth order 10, cut-off frequency 0.25. Attenuation correction 12 cm^{-1} . Transaxial slices parallel to AC-PC line. Reorientation to temporal long axis.

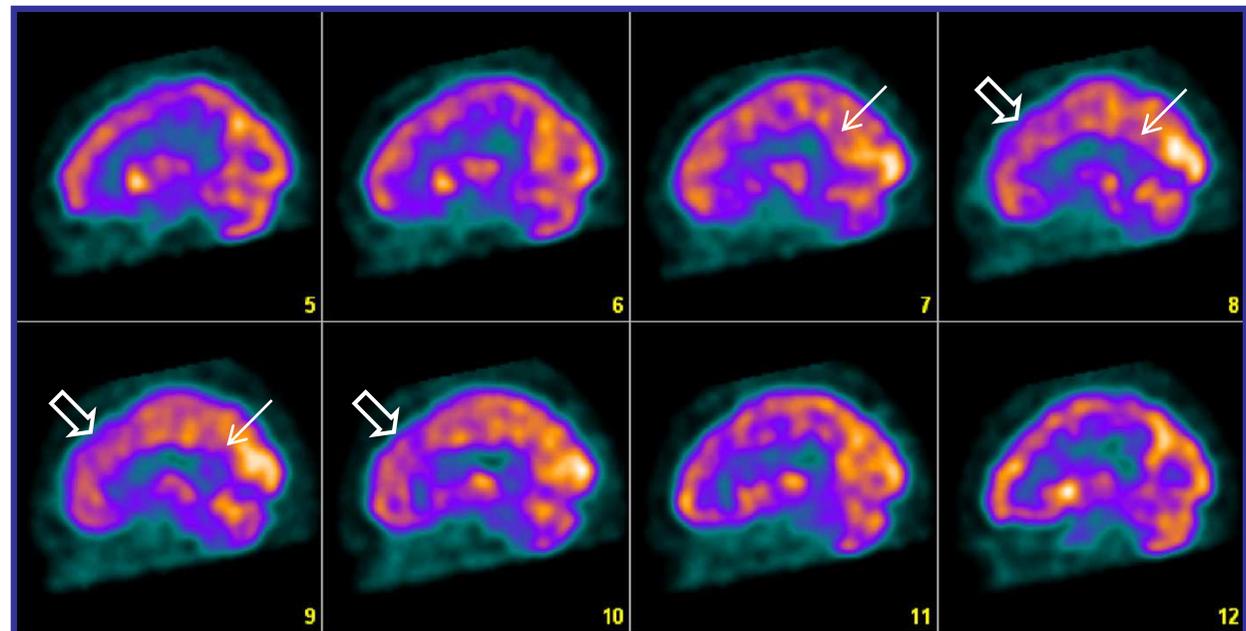
Transaxial slices:
Bilateral temporal hypoperfusion (white arrows).
Mild bilateral posterior parietal and posterior cingulate (thin white).
Mild bilateral medial prefrontal and right inferolateral frontal hypoperfusion (red).



Temporal long axis slices:
Bilateral temporal hypoperfusion is better delineated, mesial temporal involvement is more evident.



Sagittal slices:
Mild bilateral posterior cingulate hypoperfusion is better delineated (thin arrows).
Mesial prefrontal involvement is also seen (white).



Interpretation

- Images are consistent with AD.

Discussion

- Temporal hypoperfusion with mesial involvement is present in AD and is the most evident finding in this patient, although more specific pattern consist of bilateral posterior parietal or temporoparietal changes.
- Posterior cortical pattern is usually seen in early stages. Deafferentation from parahippocampal cortex (directly connected to posterior cingulate), contributes to this feature.
- Posterior cingulate hypoperfusion is not always present in AD, but when present is a specific sign.
- Temporal long axis and sagittal slices are very useful to depict mesial temporal and posterior cingulate involvement.

Conclusion

- At least half of the patients with mild cognitive impairment will develop AD.
- Recognition of a dysfunctional pattern consistent with AD supports a progressive cognitive decline and can help implementing adequate treatment in early stages with possible impact on the course of the disease.
- Posterior parietal/temporoparietal w/wo posterior cingulate involvement is the most specific feature.
- Temporal hypoperfusion affecting mesial structures is also seen in AD, although less specific when present alone.

Teaching points

- Brain SPECT in mild cognitive impairment and mild AD
- Predictive patterns of progressive cognitive decline

References

- Matsuda H. The role of neuroimaging in mild cognitive impairment. *Neuropathology*. 2007;27(6):570-7.
- Silverman DH, Truong CT, Kim SK, et al. Prognostic value of regional cerebral metabolism in patients undergoing dementia evaluation: comparison to a quantifying parameter of subsequent cognitive performance and to prognostic assessment without PET. *Mol Genet Metab*. 2003;80(3):350-5.
- Guedj E, Barbeau EJ, Didic M, et al. Effects of medial temporal lobe degeneration on brain perfusion in amnesic MCI of AD type: deafferentation and functional compensation? *Eur J Nucl Med Mol Imaging*. 2009;36(7):1101-12.