Tau PET in Corticobasal Syndrome

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18F-AV-1451 development in Alzheimer’s

*18F-AV-1451 was initially developed to study tau in Alzheimer’s disease.
*It is working well in identifying location and severity of Alzheimer’s disease tau

LOAD (n=4)

EOAD (n=8)

 IvPPA (n=7)

PCA (n=8)

Covaried for age, p(FWE)<0.05

*The tau protein in seen in corticobasal syndrome is often different from Alzheimer’s disease tau

Ossenkoppele et al., 2016
Corticobasal syndrome
underlying pathology

• Corticobasal syndrome:
  • can be associated with tau from corticobasal degeneration, progressive supranuclear palsy, Alzheimer’s disease
  • Can also be associated with non-tau neurodegenerative proteins, such as TDP-43
• Difficult to predict underlying pathology

![Pie chart showing the percentages of different underlying pathologies in corticobasal syndrome](Lee et al. 2011)
$^{18}$F-AV-1451 in corticobasal syndrome

- **Type I image**
- **Type II image**
- **Type III image**

Compare 7 CBS patients to 53 cognitively normal subjects, the "hotter" the area, the stronger the signal is compared to normal subjects. $p < 0.001$

Frequency map for 7 CBS patients, the "hotter" the area, the more patients have positive signal in this area.
$^{18}$F-AV-1451 in corticobasal syndrome

- $^{18}$F-AV-1451 signal strength correlates with motor symptoms severity
Does $^{18}$F-AV-1451 actually bind to CBD-tau?

Schonhaut et al. 2017
Josephs et al. 2016
18F-AV-1451’s troubling nonspecific binding

- **svPPA – 90% TDP-43 pathology**
  - 59 yo F, MMSE 28, CDR 1, PiB negative
  - 71 yo F, MMSE 24, CDR 0.5, PiB negative

- **C9ORF72 – TDP-43 pathology**
  - 48 yo F, MMSE 26, CDR 1, PiB negative
  - 71 yo F, MMSE 26, CDR 0.5, PiB negative
More work needs to be done.....

- $^{18}$F-AV-1451 binds to expected areas of tau pathology in the expected frequency of underlying tau pathology in corticobasal syndrome
- 2 cases that went to autopsy shows correlation of tau pathology in areas of PET signal
- $^{18}$F-AV-1451 has troubling nonspecific signal in neurodegenerative syndromes that are not expected to have tau
- More imaging to autopsy cases are needed
Thank you

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