MLF lesions in MS patients diagnosed with internuclear ophthalmoplegia

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Question
What does a well defined clinical phenotype, INO, tell us about the clinico-radiological paradox?

Background
- Internuclear ophthalmoplegia (INO) is common in MS [1,2] and represent a delay of the movement of the adducting eye
- It is caused by a lesion in the medial longitudinal fasciculus (MLF) in the brainstem
- The INO-MLF model permits to interrogate the clinico-radiological paradox

Methods
- Eye movement measurement
  - Eye movement analysis
    - Fixation 1.0-3.5 s.
    - Target 1.5 s.
  - Eye movement analysis
    - Fig 2. DEMoNS protocol, pro-saccadic task [3]
    - Filtering, quality control, detection
    - Calculation of versional dysconjugacy index (VDI), Area under the curve (AUC), Peak velocity divided by amplitude (Pv/Am) [3]
    - Detection of INO [2]

Results
202 MS patients and 58 healthy controls included
- Clinico-radiological paradox in 50 MS patients (25%) (fig 4)
  - Mainly caused by an absence of MLF lesion on MRI in 45 INO patients and thought to be related to pure demyelination, pure axonal degeneration or technical factors among others.
  - INO’s with MLF lesion: more bilateral INO and higher VDI (fig 5)
- Comparison with clinical characteristics
  - Presence of INO was closely related to symptoms of double vision (p=0.009) and vision-related quality of life (p=0.001)
  - Paradox cases showed a longer disease duration, more progressive disease and higher EDSS than non-paradox cases (p<0.05)

Conclusions
- INO and MLF provide a suitable in vivo model to interrogate the clinico-radiological paradox in MS
- INO detection might be more sensitive and more clinically relevant than MLF rating on MRI