High Monthly T2 Lesion Burden Associated with Improved EDSS upon Starting Treatment in Multiple Sclerosis

Yu, Charles C. 1 3; Lancias, Samantha 1; Tutlam, Nhil 1; Xu, Junchan2; Cook, Stuart 1; Cadavid, Diego 3; Naismith, Robert T. 1

1Neurology, Washington University School of Medicine, St. Louis, MO. 2Radiology, Mount Sinai School of Medicine, New York, NY. 3Case Western Reserve University School of Medicine, Cleveland, OH. 4UMDNJ, Newark, NJ. - Biogen Idec, Cambridge, MA

Background

- Multiple sclerosis is characterized by inflammation, demyelination, and axonal loss.
- Contrast enhancing lesions (CEls) represent regions of active inflammation and blood-brain barrier breakdown. T2 hyperintensities represent demyelinated plaques.
- CEls can be disseminated in time and space, and may lead to adverse clinical outcomes.

Objectives

- To determine the relationship between acute Gd-DTPA (Gadolinium) enhancing or non-enhancing T2/FLAIR (fluid-attenuated inversion recovery) lesion volumes and clinical outcome measurements.
- To stratify the correlation with respect to treatment, age, gender, and ethnicity.

Method

- Monthly MRIs were collected from 75 treated relapsing MS subjects over 2 years.
- Lesion volumes over time were evaluated by EDSS (better, stable, or worse), treatment (interferon vs. glatiramer acetate), age (<36 vs. 36+), gender, and ethnicity (Caucasian vs. African American vs. Hispanic).
- Figure 1. A lesion segmentation (green) of a patient with numerous T2/FLAIR lesions at 0 month = baseline scan, -1 month = screening scan, 1 month = baseline scan, 3, 6, 9, 12, and 15, respectively. Blue arrows represent newly developed lesions.

Results

- Table 1. Baseline characteristics of the 75 patients randomized in the BECOME study (Cadavid et al. Neurology 2008.). Nearly half of the patients were not white.
- IFN β1b = interferon beta 1b (Betaseron); GA = glatiramer acetate (Copaxone);
- EDSS = Expanded Disability Status Scale

Results - continued

- Over 2 years, patients with improved EDSS status by the end of the trial trended towards higher baseline EDSS score (ANOVA, p=0.06) and had higher monthly T2 lesion burdens (ANOVA, p=0.001).
- EDSS categorization:
  - better = negative ΔEDSS score of ≥ 1.0;
  - stable = a ΔEDSS score < 1.0;
  - worse = positive ΔEDSS score of ≥ 1.0

Conclusions

- Preliminary analyses suggest that patients with higher baseline EDSS scores and higher MRI lesion burdens benefited the most from disease-modifying therapy over 2 years.
- Medications are anti-inflammatory. Perhaps those with the most inflammation have higher baseline EDSS and better response to treatment over the short term.
- In this cohort with early MS and CIS, no differences were seen in T2 lesion burden by treatment or baseline demographic features.
- Perhaps with longer follow-up, MS lesion volume and progression can provide insight for predicting clinical outcomes.
- A 7-year clinical and MRI follow-up of the BECOME subjects is underway. Results may shed light on the early MRI findings and long-term effect of lesions and clinical outcomes.

Correspondence & Acknowledgement

Charles Cong Yu
Case Western Reserve University School of Medicine
cxy177@case.edu

This project was funded through a grant from the Foundation of the Consortium of Multiple Sclerosis Centers’ MS Workforce of the Future program.