MAGNON
– Implementation and Value of Lublin Criteria and Quantitative MRI Analysis in Clinical Routine Care of MS Patients

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The 2013 revised description of MS phenotypes (Lublin criteria)\(^1\) provides a detailed definition of individual patient status in secondary progressive multiple sclerosis (SPMS), where patients are assessed annually based on progression and activity (MRI and/or relapse).

Classification according to the Lublin criteria is currently not broadly used in routine care in Germany.

**Objective**

MAGNON aims to evaluate whether access to standardized quantification of MRI data and assessment of MS patients based on the Lublin criteria provides additional benefit for neurologists working in day-to-day MS patient management.

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1. Lublin F et al. Neurology 2014; 83 (3):278-286
Methods

- Approximately 3600 MRI studies from 100 centers in Germany will be analyzed.
- The results are visualized and provided to the participating physicians on a standardized report.
- The value of standardized MRI analysis and the impact on patient assessment, including potential changes in Lublin classification, is evaluated by questionnaires (Figure 1).
Methods
– MRI Analysis

- MRI sets are acquired by local radiologists using a standard protocol and after passing a qualification process.
- Standardized MRI analysis is performed by means of a centralized processing pipeline (Biometrica MS®, jung diagnostics GmbH, Hamburg, Germany; Figure 2, Tables 1 & 2 (next slide)).

Figure 2. Example MAGNON report with analyses of the brain volume in relation to healthy subjects and volume change over time
**Methods**  
– MRI Analysis

### MRI Requirements

**3D T1-weighted gradient echo sequence**

- Standard (vendor recommended) protocol settings  
  (MPRAGE for Siemens, TFE for Philips, FSPGR for GE)
- High resolution = 1.0 mm
- Slice thickness = 1.2 mm

**2D or 3D FLAIR**

- Standard (vendor recommended) settings
- Axial orientation in 2D (3 mm)

### Table 1

**Quantitative MRI parameters of the MAGNON report**

- Quantification of total brain volume
- Quantification of thalamic volume
- Quantification of grey and white matter volumes
- T2 lesion volume and lesion number
- Percentage of brain volume change (PBVC) in case of follow-up scans
Between April 2020 and July 2020, the first 24 neurological sites were included for data collection.

For preliminary analysis, baseline questionnaires were available from 13 sites, each treating 342 ± 215 patients (Mean ± SD).

ICD coding showed a similar distribution of MS subtypes as previously published for Germany\(^1\) (Figure 3).

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Figure 3: Mean ± SD, n = 13 sites; each site treating 342 ± 215 patients (Mean ± SD)

\(^1\) Heibel M et al. Presented at AAN. 2020; Abstract ID:4169
Results – SPMS Patient Distribution

- 64.8% of SPMS patients were classified as G35.30 (no imposed relapses or progression\textsuperscript{1}), while 35.2% of SPMS patients were considered to have relapses or progression (G35.31; Figure 4).
- Applying the Lublin criteria, physicians considered 36.2% of their SPMS patients to be active, either with progression (21.2%) or without progression (15.0%; Figure 5).

\textsuperscript{1}https://www.icd-code.de/icd/code/G35.-.html (accessed 04.August 2020)
Conclusions

• Based on the first available baseline data, participating centers show a similar distribution of MS subtypes (ICD-10 35.x) as previously reported, indicating a representative sample of MS patients in Germany.

• More than one third of SPMS patients were classified as having relapses or progression (ICD-10 35.31).

• More than one third of SPMS patients (36.2%) have active SPMS according to the Lublin criteria.

• Quantification of lesions as well as brain and thalamic atrophy during follow-up in MAGNON are expected to inform the individual assessment of disease activity and progression according to the Lublin criteria, leading to a more accurate classification of MS phenotypes.

• MAGNON will help to gauge the potential of quantitative MRI analysis in routine clinical practice.
Thank you