DAREMUS
Dansk Selskab for Forskning i Multipel Sklerose

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Comorbidity patterns in a nationwide cohort of Danish persons with multiple sclerosis

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Hypothesis: The occurrence of chronic comorbidities differs among persons with multiple sclerosis (MS) compared with controls without MS.

Methods: In this combined case-control and cohort study, all Danish born MS cases with MS onset 1980-2005 were identified from the Danish MS Registry and matched with controls regarding year of birth, gender, and municipality on 1 January in the year of MS onset (index date).
We included the following comorbidity categories: Psychiatric diseases, cerebrovascular diseases, cardiovascular diseases, chronic lung diseases (asthma and chronic obstructive pulmonary disease), diabetes, autoimmune diseases, cancer, and Parkinsons disease.
Individual-level information on diagnoses was obtained from several nationwide registries and linked to the study population by personal identification numbers.
To assess the occurrence of comorbidities before and after MS onset, study participants were followed from January 1977 to the index date, and from the index date through December 2012.
We used logistic regression to calculate odds ratios (OR), and Cox regression to compute hazard ratios (HR).

Results: A total of 8.947 MS cases and 44.735 controls were eligible for inclusion. Prior to MS onset, MS cases had a higher risk of diabetes (OR 1.64 (95% CI 1.17-2.31, $p<0.0005$)), and a lower risk of cerebrovascular disease (OR 0.69 (95% CI 0.48-0.99, $p=0.043$)). After MS onset, the cumulative incidences of the following comorbidities were increased among MS cases: Psychiatric diseases (HR 1.25 (95% CI 1.04-1.51, $p=0.020$)), cerebrovascular diseases (HR 2.23 (95% CI 2.06-2.40, $p<0.0005$)), cardiovascular diseases (HR 1.08 (95% CI 1.02-1.15, $p=0.013$)), autoimmune diseases (HR 1.18 (95% CI 1.08-1.30, $p<0.0005$)), and Parkinsons disease (HR 2.50 (95% CI 1.66-3.76, $p<0.0005$)), whereas it was decreased for chronic lung diseases (asthma and chronic obstructive pulmonary disease) (HR 0.80 (95% CI 0.75-0.86, $p<0.0005$)) and cancer (HR 0.88 (95% CI 0.81-0.95, $p=0.01$)).

Discussion: Our results indicate substantial differences between MS cases and controls regarding the risk of comorbidities, both before and after the clinical onset of MS, and indicate temporal variations in comorbidity risk over the course of MS. Although these differences may not all be of equally high clinical relevance, they may contribute novel insights into shared underlying mechanisms of the co-existing diseases.

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