Depletion of memory B cells is effective to prevent relapses in AQP4 antibody NMOSD but not in MOG antibody disorder

Pierre Durozard1,3, Audrey Rico Lamy1,3, Clémence Boutiere1,3, Romaric Lacroix2, Corinne Brunet2, Shirley Fritz2, Adil Maarouf1,3, Jean Pelletier1,3, Bertrand Audoin1,3
1Pôle de Neurosciences Cliniques, Service de Neurologie, 2Hematology and Vascular Biology Department, APHM, 3CRMBM UMR 7339, CNRS, Aix-Marseille Université

Objective: To assess if monitoring of memory B cells is relevant to individualize the frequency of rituximab administration in MOG-antibody disorder as previously demonstrated for AQP4-antibody disorder.

Background: NA

Design/Methods: 16 adult patients with MOG-antibody disorder and 29 adult patients with AQP4-antibody disorder were included in a prospective monocentric observational study. All patients were treated with rituximab using an individualized dosing schedule according to memory B cells count. Memory B cells were measured monthly from the second month after rituximab infusion and in case of relapse. Memory B cells were considered to be depleted if their frequency was less than 0.05% in peripheral blood mononuclear cells by flow cytometric analysis. Relapses, memory B cells count during relapses and EDSS were collected.

Results: Mean follow-ups were 38 months (13-79) in AQP4-positive patients and 19 months (9-38) in MOG-positive patients. After rituximab initiation, 13 relapses occurred in 7 out of 29 AQP4-positive patients (24%). In MOG-positive patients, 10 relapses occurred in 6 out of 16 patients (37.5%). While memory B cells have reemerged in 12 out of 13 relapses (92.5%) occurring in AQP4-positive patients, they have reemerged in only 2 out of 10 relapses (20%) occurring in MOG-positive patients (p<0.001). These relapses occurred after a median time of 2.6 months (range 0.6 - 5.8), since the last infusion, in MOG positive patients, and 7 months (range 0.8 - 13) in AQP4 positive patients (p < 0.001).

Conclusions: Identification of patients with short reemergence of memory B cells occurring before 6 months appears relevant to improve the efficacy of rituximab in AQP4-antibody disorder but not in MOG-antibody disorder where most relapses occur despite accurate depletion of memory B cells. This argues for a distinct pathophysiological mechanisms underlying relapses in MOG- vs AQP4-antibody disorder providing another clue to individualize MOG-antibody disorder as a novel disease entity.