Title

Rituximab Significantly Diminishes $CD86^+$ B Cells in Systemic Sclerosis

Authors and Affiliations

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Background/Purpose

Rituximab (RTX) is a monoclonal antibody that targets the CD20 surface marker. This results in a reduction of $CD20^+$ immune cell populations, foremost B cells. B cell depletion via RTX was found to be beneficial for patients suffering from systemic sclerosis (SSc), leading to an improvement of skin fibrosis and autoimmunity (1,2). However, little is known about the influence of RTX on specific B subsets in SSc.

The purpose of this study was to further characterize the effect of RTX on B cell populations in patients with SSc.

Material and Methods

Peripheral blood samples from 37 patients suffering from SSc (mean age: 54 years ± 1.64 SEM, female ratio: 0.78) and 10 age-matched healthy participants were drawn over a sampling period of 2 years. 20 SSc patients in this study group were at the time under RTX treatment and the modified Rodnan Skin score (mRSS) was measured before and after treatment start. The percentage of $CD19^{+/-}$, $CD20^{+/-}$ lymphatic cells and $CD19^+CD20^+$ B cells co-expressing either CD5, CD24, CD27 or CD86 on their surface was done by staining freshly isolated PBMCs. A quantitative flow cytometric bead-based assay (QuantiBRITE PE kit from Becton Dickinson) was used for the estimation of CD19 antibodies bound per cell. All cytometric measurements were performed using a standardized BD LSRFortessa platform.

Results

RTX induced a significant decrease in mRSS from 19.7 ± 2.8 to 8.1 ± 1.7 (mean± SEM; $p<0.000$). In addition, $CD19^-CD20^+$ cells were significantly diminished as a result of the treatment. Thus, the frequency of $CD19^-CD20^+$ cells in the non-treatment group was 1.3% ± 0.3% compared to 0.7% ± 0.2% ($p = 0.048$). Within the B cell population 33.3% ± 3.8% were positive for CD86, a checkpoint molecule for the activation of T cells during an immune response. RTX treatment significantly decreased this B cell population to 11.2% ± 4.7% ($p = 0.039$). Quantification of the number of CD19 molecules on the surface of $CD19^+CD20^+$ B cells revealed a significantly lower number in SSc patients compared to healthy participants The mean ± SE of molecules per cell was 6862 ± 625 and 7449 ± 569, respectively ($p \leq 0.001$).

Conclusion

RTX treatment in SSc might not only be effective by reducing B cells but also by down regulation of the CD86 B cell surface marker on B cells. This would indicate that B cells under RTX treatment are less capable of activating T cells.

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Citation

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