Macrophage Activation Pattern in Human Choroidal Neovascular Membranes

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Abstract

Purpose: In the present study we aim to characterize the pattern of macrophage activation in human choroidal neovascular membrane (CNV) following anti-VEGF and/or photodynamic therapy (PDT).

Methods: 39 surgically excised CNV were stained using CD68, CCR7 and CD163 antibodies staining for pan macrophages, classically activated macrophage (M1 macrophages) and alternatively activated macrophage (M2 macrophages); respectively. The immunopositive cell density was calculated per mm² in 400X images. M1/M2 ratio was calculated. Paired sample test and unpaired t test was used. The level of significance was assumed if p <0.05.

Results: In hemorrhagic CNV a selective shift of the macrophage activation towards the alternatively activated macrophages was detected. Hemorrhagic CNV had a significantly higher M2 macrophage compared to both classic and occult CNV. PDT treated CNV showed an overall reduction of pan macrophages with selective reduction of M2 cells causing a shift towards classic macrophage activation pattern compared to controls. Adjuvant use of avastin caused a reduction of both M1 and M2 subtypes compared to controls and an increase pan macrophages compared to PDT monotherapy treatment.

Conclusions: Macrophages play major but conceivably also different roles in CNV development. The identification of different activation patterns may be important for distinct therapeutic strategies.