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Rhinophotodynamic therapy in the treatment of sinonasal polyposis

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Aim of Study: To assess the mechanisms, therapeutic efficacy and potential effect of rhinophotodynamic therapy (RPDT; per viam terminal deoxynucleotidyl-transferase/dUTP nick end labeling/TUNEL-assay), for detection of epithelial/inflammatory cell apoptosis in light-exposed control and sinonasal polyps (SNp) tissue samples, as well as the role of inflammatory mediators (AAM/ELISA test) in the development of SNp.

Presumption: Based on the nasal/sinus mucosa hypertrophy in CRS (chronic rhinosinusitis), we expected preoperatively an elevated concentration of AAM in biopsy specimens of chronically altered sinonasal mucosa, as compared with normal mucosa, as well as to find a significantly lower concentration of AAM in biopsy specimens of chronically altered SNpmucosa, and absent or substantially reduced mass in RPDT treated-SNp.

Study Design: UV/VIS-RPDT uses a mixture of the light of visible and UV-wavelength ($\lambda=310-650$ nm). The UV-wavelength light significantly reduces the number of T-memory-cells, in particular T-cells responsible for the production of IL-5, and via the mechanism of apoptosis, also directly reduces eosinophil/Eo-count and the Eo-cationic-protein-activity (these cells directly influence reduction in the number of Eo-cells, as one of the most active effector cell lines in allergologic reaction). UVA-light blocks the release of histamine from basophilic/mast-cells, while UVB-light has the same additive effect on mast-cells. The SNp-specimens, collected upon FESS, were cut into pieces, *in vitro* irradiated with various doses of UV/VIS, and then selectively with UV&VIS. Histopathologic diagnosis was made by SNp-specimen treatment with 5-delta-aminolevulinic-acid/DALA, followed by irradiation with VIS light. Upon final SNp-tissue storage paraffin blocks, TUNEL-assay was performed to detect apoptosis on epithelial and inflammatory cells in the irradiated and control SNp-tissue specimens.

Conclusion: intranasal RPDT has proved efficacious in SNp-therapy (sinus and nasal SNp-mass significant reduction), as confirmed by determination of induced epithelial cell and subepithelial leukocyte apoptosis, followed by significant reduction of synthesis of AA-metabolites.

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