The anti-inflammatory effect of isotonic glycerol in Sjögren’s syndrome-related dry eye

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Purpose: In patients suffering from Sjögren’s syndrome, eye surface staining is more prominent, tear secretion is decreased, and subjective symptoms are significant. First-line therapy of this disease is tear supplementation. In case of corneal complications or serious subjective symptoms, topical or systemic anti-inflammatory therapy may be advantageous. The chronic use of both topical and systemic anti-inflammatory drugs may cause various side effects.

Methods: 21 patients (18 female, 3 male) were enrolled into our prospective, unmasked, self-controlled study (ISRCTN17717813). The mean age of patients was 60.4±11.4 years. All patients fulfilled our inclusion criteria: lid parallel conjunctival folds (LIPCOF) > grade 1, lissamine green staining in Oxford scheme grade > grade 2, decreased tear secretion, clinically significant subjective symptoms [ocular surface disease index (OSDI)], diagnosis of Sjögren’s syndrome. All subjects used different artificial tears before the study. During the study period, the subjects used a preservative-free, unit-dose artificial tear, Conheal®, containing isotonic glycerol and 0.015% sodium hyaluronate four times a day for three months. The patients had three visits during this period. Ordinal data and non-normally distributed data were analyzed by non-parametric Wilcoxon Signed Rank Test, meanwhile, normally distributed data were compared by Paired T Test using SPSS Statistics 22. The number of participants was verified by power analysis.

Results: The three-month long continuous use of Conheal® resulted in a decrease of the LIPCOF degree from an initial value of 2.48±0.75 on the right eyes and 2.57±0.75 on the left eyes to 1.33±0.73 and 1.38±0.67, respectively (P_{right}<0.001, P_{left}<0.001). The initial lissamine green staining of the eye surface also decreased significantly (P_{right}=0.001, P_{left}<0.001) from 1.76±0.89 and 1.95±0.86 to 0.29±0.56 and 0.29±0.56, respectively. There was a significant decrease (P<0.001) in the OSDI values from 55.81±15.19 to 32.54±19.51. Tear secretion did not change significantly (P_{right}=0.38, P_{left}=0.45).

Conclusions: Our results show that using the investigated artificial tear resulted in a significant improvement of the subjective and objective symptoms of the Sjögren’s syndrome-related dry eye disease, without the need of anti-inflammatory agents. We suspect, based on in vitro experiments, that isotonic glycerol-induced decrease of HLA-DR expression may be responsible for this favorable effect.