Investigation of tear osmolarity in systemic sclerosis: relation to disease activity.

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Abstract

Purpose: To investigate the frequency of dry eye syndrome (DES) by measuring tear osmolarity with TearLab system (TearLab Corp, San Diego, Calif.) in patients with systemic sclerosis (SSc) and the relationship between the severity of DES and SSc disease activity.

Methods: In this cross-sectional prospective study, 44 consecutive patients with SSc were enrolled; this study was performed according to the declaration of Helsinki and was approved by an institutional ethic commission. Twenty-two right eyes of all enrolled patients were examined in this study. Tear osmolarity measurements, tear break-up time (TBUT) test, and Schirmer's tests (type I and II) were performed. SSc disease activity was evaluated according to the disease activity score calculated with modified Rodman Skin Score (mRSS). Skin thickening is assessed on 17 body areas: fingers, hands, forearms, arms, feet, legs and thighs (bilaterally), and the face, chest and abdomen (singly). Each area is scored from 0 to 3, where 0 is normal skin and 3 is severe thickening (range 0 (no thickening) to 51 (severe thickening) in all 17 areas). The patients were divided into 3 groups according to mRSS scores as follows: mild (mRSS ≤ 3.2), moderate (3.2 < mRSS ≤ 5.1), and severe (mRSS > 5.1).

Results: DES was identified in 34 (77.2%) patients with SSc according to the classification of Dry Eye Disease of International Dry Eye Workshop (2007) and tear osmolarity values according to recommendations of the manufacturer with a cutoff value of 308 mOsm/L. There were significant differences among the 3 groups (divided according to the mRSS score) concerning tear osmolarity ($p < 0.001$) and TBUT ($p < 0.05$) scores, whereas there was no significant difference between these groups regarding Schirmer scores ($p > 0.05$). In addition, mRSS values were positively correlated with tear osmolarity values ($r = 0.610$, $p < 0.001$), negatively correlated with Schirmer scores, ($r = -0.231$, $p = 0.045$), and negatively correlated with TBUT scores ($r = -0.325$, $p = 0.007$) among all patients.

Conclusions: Our study demonstrated a high prevalence of DES in patients with SSc and a relationship between the SSc disease activity and severity of DES by using tear osmolarity measurements with the TearLab system. Therefore, tear osmolarity measurement can not only be added to other classical tests for diagnosing DES but could also be used for assessing the degree of disease activity of SSc.