

Prevalence and Risk Factors of Meibomian Gland Dysfunction, Posterior Blepharitis and Dry Eye based on a Population-Based Study (Hirado-Takushima Study) in Takushima Island in Japan

Reiko Arita, MD, PhD^{1,2} Takanori Mizoguchi, MD, ^{1,3} Motoko Kawashima, MD, PhD^{1,4}
Shima Fukuoka, MD, ^{1,5} Shizuka Koh, MD, PhD^{1,6} Rika Shirakawa, MD, PhD^{1,7}
Takashi Suzuki, MD, PhD^{1,8} Naoyuki Morishige MD, PhD^{1,8}

¹Lid and Meibomian Gland Working Group (LIME), Japan.

²Department of Ophthalmology, Itoh Clinic, Saitama, Japan.

³Mizoguchi Eye Clinic, Nagasaki, Japan.

⁴Department of Ophthalmology, Keio University, Tokyo, Japan.

⁵Omiya Hamada Eye Clinic, Saitama, Japan.

⁶Department of Ophthalmology, Osaka University, Osaka, Japan.

⁷Department of Ophthalmology, The University of Tokyo, Tokyo, Japan.

⁸Department of Ophthalmology Toho University Oomori Hospital, Tokyo, Japan.

⁹Division of Cornea and Ocular Surface, Oshima Eye Hospital, Fukuoka, Japan.

Purpose: Meibomian gland dysfunction (MGD) can be considered as a cause of posterior blepharitis (PB). On the other hand, MGD is a major cause of dry eye (DE). The purpose of this study is to evaluate the prevalence and risk factors of MGD, PB and DE in a population-based study (Hirado-Takushima Study) in Japan. In addition, we analyzed the coincidence rate of MGD and DE, DE and PB, MGD and PB and all of these diseases.

Methods: A total of 356 residents of Takushima Island with an age range of 6 to 96 years were participated in the study. Participants filled in questionnaires regarding ocular symptoms, systemic diseases, and lifestyle factors. Tear film-related parameters including lipid layer thickness, lipid layer grade, noninvasive and fluorescein breakup time of the tear film, lid margin abnormalities, meiboscore, meibum grade, tear meniscus height, corneal and conjunctival fluorescein staining score, Schirmer test value, and the presence of conjunctival papillae, pterygium, and conjunctivochalasis were evaluated. MGD was defined as (1) the presence of more than one ocular symptom; (2) more than one lid margin abnormalities, and (3) obstruction of meibomian glands as revealed by the detection of plugging and reduced meibum expression in response to moderate digital pressure in at least one eye. PB was defined as (1) the presence of more than one ocular symptom and (2) having a vascularity of lid margin. DE was defined according to the Asia Dry Eye Society criteria of (1) the presence of

more than one ocular symptom and (2) fluorescein BUT of ≤ 5 s. Risk factors for MGD, PB and DE were analyzed with univariate and multivariate logistic regression.

Results: The prevalence of MGD, PB and DE was 32.9%, 27.8% and 33.4%, respectively. The prevalence of MGD was associated with male sex (odds ratio [OR] of 2.42, with a 95% CI of 1.25-4.67), age (OR per decade increment of 1.53, 95% CI of 1.21–1.94), and oral intake of lipid-lowering agents (OR of 3.22, 95% CI of 1.05–9.87). The prevalence of PB was associated with age (OR of 1.52, 95% CI of 1.24–1.86), the presence of plugging (OR of 2.87, 95% CI of 1.64–5.01), the presence of a cardiac disease (OR of 2.60, 95% CI of 0.98–6.88), the presence of pterygium (OR of 2.05, 95% CI of 0.97–4.33) and higher BMI (OR of 1.07, 95% CI of 0.99–1.16). The prevalence of DE was associated with female sex (OR of 3.36, 95% CI of 1.85–6.07), contact lens wear (OR of 2.84, 95% CI of 1.08–7.43)], and the presence of conjunctivochalasis (OR of 2.57, 95% CI of 1.35–4.88) and lid margin abnormalities (OR of 3.16, 95% CI of 1.38–7.23). Coincidence rate of MGD and DE, DE and PB, MGD and PB was 12.9%. 11.2% and 16.6%, respectively. Coincidence rate of all 3 diseases was 5.9%.

Conclusion: MGD, DE and PB were common in Japan. About 10 % of 2 of 3 diseases were coexisted.