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Pathogens in the meibomian gland and conjunctival sac: Microbiome of normal subjects and patients with meibomian gland dysfunction

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Statement of the Problem: Dry eye is an ocular disease characterized by ocular discomfort due to an abnormal quantity or quality of tear film, which causes pathological changes in the ocular surface. The prevalence of dry eye has increased in recent years, and bacteria isolated from the ocular surface were thought to be correlated to the severity of dry eye. This study aims to explore the composition of the ocular microbiome in normal subjects and patients with one major kind of dry eye, Meibomian gland dysfunction (MGD).

Methodology & Theoretical Orientation: Seventy subjects (140 eyes) were enrolled in our study. Signs of dry eye were evaluated and bacterial species in the conjunctival sac (CS) and Meibomian gland (MG) secretions were then identified by 16S rRNA gene sequencing. Additionally, seventeen subjects (34 eyes) were further evaluated to determine differences in the microbiomes in the surface and deep layers of Meibomian gland using a segmental secretion analysis.

Findings: The positive bacterial isolation rate was markedly higher in MG secretions than in the CS. The bacterial composition of the control and mild group was simple, whereas the composition of bacteria was more complex as the severity of MGD increased. The positive bacterial isolation rate and number of bacterial types were significantly higher in the severe MGD group than those in the control, mild and moderate MGD groups. *Corynebacterium macginleyi* was only detected in the severe MGD group, with an isolation rate of up to 26.3%. Furthermore, a new grading system for bacterial severity of MGD was proposed and the severity of MGD appeared to be positively correlated with a higher grade of bacterial severity. The segmental secretion analysis showed severe MGD had a significantly higher incidence of bacterial discordance rate.

Conclusion & Significance: The severity of MGD was positively correlated with a higher isolation rate, a greater number of bacterial species, and a higher grade of bacterial severity, which implied that MGD might be correlated with bacterial changes. This study provided some basis for the indications of antibiotic in clinical practice.

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