MON-704: Tear Glands and the Diabetic Patient: Is It a Biomarker?

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Background: Tear glands in the eyelids, meibomian glands, play a role in tear film production and tear film stabilization. Diabetic patients often complain of dry eye and eye pain. Recently, there are new infrared (820nm) photography techniques to image meibomian glands easily in patients.

Purpose: To study meibomian glands in diabetic patients with dry eye.

Methods: A retrospective chart review (2017-2019) of Type 2 Diabetes Mellitus (T2DM) patients and non-diabetic patients with the diagnosis of "dry eye" in EHR (eClinicalworks, Westborough, MA) was performed. Infrared eyelid imaging (820 nm wavelength, Heidelberg Spectralis, Heidelberg, Germany) was taken. T2DM: Inclusion criteria: 1) HbA1c of > 5.7% who also had infrared eyelid imaging performed + 4 weeks of their HbA1c lab test results; 2) the percentage loss of meibomian glands for each eye, then averaged, for each patient. Control: Inclusion criteria: 1) non-diabetic patients; 2) HbA1c lab test results; 3) infrared eyelid imaging was performed; 4) percentage loss of meibomian glands was calculated for each eye, then averaged per patient. Exclusion criteria for both T2DM and Controls: younger than the age of 18 years old, older than 90 years old, no glaucoma topical medications, no eyelid surgery, no corneal surgery, no conjunctival surgery.

Results: n=120 patients, Avg Age=69.6 years (sd=15.1, range 23-89 years). Diabetic patients: n=60 patients, Male=30, Female=30, Avg Age=65.1 years (sd=11.50, med=65.5, range 36-85 years). Controls: n=60 patients, Male=37, Female=23, Avg Age=54.1 years (sd=16.4, med=56.5, range 23-89 years). Meibomian gland loss: Diabetics=51.54%, Controls=11.29% ($p<0.0001$, t-test). Of the 60 DM patients: 35/37pts with HbA1c > 6.6% had greater loss of meibomian glands (>40%), compared to 12/23 DM patients with HbA1c < 6.5%, $p=0.0001$.

Discussion: Loss of meibomian glands in diabetic patients have been recently investigated; however, its relationship to HbA1c as a possible biomarker has not been widely discussed in literature. In this small study, loss of meibomian glands occur more frequently with elevated HbA1c, perhaps due to microischemia of the eyelids, thereby resulting in loss of meibomian glands.

Conclusion: Loss of meibomian glands may suggest a need for HbA1c testing and further monitoring of the patient's diabetic condition. Infrared imaging of the eyelid may be useful in characterizing dry eye in diabetic patients.