Differences in Microbiomes Between Intact Diabetic Skin, Diabetic Foot Ulcers, and Non-Diabetic Skin

Diabetic foot ulcers account for 67% of all lower extremity amputations in the US and cost ~25 billion dollars in care annually. People with diabetes and especially those with foot ulcerations are more susceptible to infections. The majority of infections in diabetic ulcers are poly-microbial, but the precise relationship between the microbial community and impaired wound healing remains unclear. This study assessed differences in skin microbiomes between intact diabetic skin (DS), diabetic foot ulcers (DFU), and non-diabetic skin (NDS) from healthy controls.

For this study, 40 subjects total, 20 with a non-infected plantar DFU and 20 age and gender matched controls were recruited. For subjects with diabetes, cultures were obtained from their foot ulcer and from the contralateral foot at the equivalent ulcer location. Bilateral foot cultures were obtained from healthy controls.

A taxon heat map showed elevated relative abundance of taxa such as Ezakiella, Anaerococcus, Peptoniphilus, and Finegoldia in the DFU. These are likely opportunistic pathogens. Many taxa appear to be anaerobic organisms in the DFU. Overall, the dominant microflora is composed of Corynebacterium, Staphylococcus, and Stenotrophomonas.

The image above shows DS and DFU microbiomes were more similar to each other and both DS and DFU microbiomes were significantly different from NDS. This study found that NDS and DS harbored similar quantity of microbiome while DFU harbored significantly greater microbiome, however taxon richness was
significantly lower in DFU and DS versus NDS. Predilection of select taxons of microbiome to both DS and DFUs as compared to the variability of numerous taxons noted in NDS may help contribute to the increased prevalence of infections in people with diabetes.

References:

Katie Springer, Class of 2021 from Dr. William M. Scholl College of Podiatric Medicine
2021 APMSA Delegate
APMSA Legislative Liaison

Worked with Stephanie C. Wu, DPM, MSc at the Center for Lower Extremity Ambulatory Research (CLEAR)