



DERMOSCOPY AND SKIN IMAGING

CUTANEOUS ACUTE GRAFT-VERSUS-HOST DISEASE ASSESSMENT BY CONFOCAL VIDEO MICROSCOPY

Inga Saknite⁽¹⁾ - Michael Byrne⁽²⁾ - Madan Jagasia⁽²⁾ - Eric Tkaczyk^(1,3)

Vanderbilt University Medical Center, Department of Dermatology, Nashville, TN, United States⁽¹⁾ - Vanderbilt University Medical Center, Department of Medicine, Nashville, TN, United States⁽²⁾ - Department of Veterans Affairs, Nashville, TN, United States⁽³⁾

Background: Skin inflammation is one of the first and most common manifestations of acute graft-versus-host disease (aGVHD), a potentially deadly immune-mediated disease that occurs in 30-60% of patients after stem cell transplantation. A fundamental challenge in developing effective treatment strategies for aGVHD is the lack of tools to study disease biology in real-time in post-transplant patients.

Objective: Although the importance of leukocyte-endothelial interactions to detect and track inflammation has been well shown in murine models, there are no published clinical studies in humans. In this study, we explore the feasibility to detect presence of aGVHD in post-transplant patients through the imaging of in vivo leukocyte motion.

Methods: We used a clinical confocal microscope (Vivascope 1500) to acquire videos of 5 aGVHD patients and 5 controls (no aGVHD) within 50±30 days post-transplant. The microscope is capable of real-time imaging of individual cells in the postcapillary vessels at 9 frames per second.

Results: The inflammatory tissue response causes increased expression of specialized endothelial proteins on vessel walls making leukocytes to roll, adhere and eventually extravasate into the tissue at a higher rate than in normal conditions. Through video analysis, we extracted five quantitative parameters: number and velocity of rolling leukocytes, number of adherent leukocytes (stationary >30 s), blood flow velocity, and number of vessels. A combined metric of these parameters shows the possibility to distinguish stem cell transplant patients without aGVHD from those with active disease.

Conclusion: In a limited number of subjects, we show that parameters characteristic of the dynamic motion in skin capillaries can be observed noninvasively in post-transplant patients and detect the presence of aGVHD. Further studies are needed to test the diagnostic potential of these parameters.

