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Can Macrocirculation Changes Predict Non-Healing Diabetic Foot Ulcers ?

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Adequate tissue oxygenation is considered an essential factor for wound healing. In the non-diabetic population, an uncompromised macrocirculation generally leads to adequate tissue oxygenation. On the contrary, the macrocirculation in diabetic patients may not correlate with tissue oxygenation because of structural changes in the capillary basement membrane. Therefore, tissue oxygenation measurement is recommended when determining tissue viability and selecting amputation levels in diabetic foot ulcers. Nevertheless, not a few medical professionals tend to predict the healing potential of diabetic ulcers relying on only macrocirculation evaluation results. The purpose of this study was to examine whether there is a correlation between macrocircualtion patency and tissue oxygenation in diabetic foot patients. Two commonly utilized methods for macrocirculation evaluation, CT angiography scanning and Doppler probing, were carried out. Macrocirculation scores were given according to the patency of each anterior and posterior tibial artery. Tissue oxygenation was measured by transcutaneous partial oxygen tension ($TcpO_2$), which is considered the gold standard for tissue oxygenation assessment. The macrocirculation scores were compared with and statistically analyzed against $TcpO_2$ values. Sixty-eight diabetic foot ulcer patients were included in this study. Eleven percent of the 'good' and nineteen percent of the 'fair' macrocirculation score cases had 'poor' $TcpO_2$ scores; sixty percent of the 'poor' macrocirculation score cases had 'good' $TcpO_2$ scores. Statistical analysis showed no correlation between macrocirculation and $TcpO_2$ scores. When predicting wound healing in diabetic foot ulcers, CT angiography and Doppler probing are not reliable enough to substitute for $TcpO_2$ measuring. Medical professionals managing diabetic foot ulcers should measure tissue oxygenation levels in order to select treatment methods.