Lack of Predictive Correlation Between Peripheral Arterial Tone and Color Flow Doppler Parameters in Men with Erectile Dysfunction

Introduction and Objectives: Erectile Dysfunction (ED) is associated with systemic cardiovascular disease. Many patients have reduction in penile arterial inflow and venous occlusion as measured by color flow penile Doppler. Peripheral arterial tone (PAT) abnormalities, measured non-invasively in the upper extremity, correlate with cardiac disease and mortality. We wished to study whether penile hemodynamics correlated with PAT and whether the less invasive PAT could reliably predict the results of penile Doppler in men with ED.
Materials and Methods: Fifty men presenting to an ED clinic who requested etiologic evaluation were tested with an Endo-PAT2000 machine which assessed the Augmentation Index(AI) (normal < 3%), a measure of arterial stiffness and Reactive Hyperemia Index(RHI) (normal > 1.8), a measure of endothelial vasodilation. Penile hemodynamics were measured following pharmacologic erection with prostaglandin E1 using color flow Doppler. Arterial insufficiency was defined as peak systolic velocity (PSV) < 30 cm/s and venous insufficiency as end diastolic velocity (EDV) >3 cm/s. Comorbidities were recorded and degree of ED assessed by the International Index of Erectile Function (IIEF). Between-group comparisons were done using Wilcoxon rank-sum test for continuous variables and chi-square test for categorical variables. Simple and multivariable logistic regression analyses were used for analysis of both Doppler measures.
Results: Patients ranged in age from 21 to 74 (mean 51.1) and had a mean IIEF of 28.0. By Doppler, 58% had decreased arterial inflow and 48% had venous insufficiency. By Endopat, 54% had decreased endothelial relaxation and 44% had increased arterial stiffness. By univariate logistic regression, increased arterial stiffness was marginally associated with arterial insufficiency (p=0,0656), while only increasing age (p=0.0025) was associated with venous insufficiency; RHI was not correlated with PSV or EDV. The closest association was between low AI and low PSV, with a sensitivity of 0.55 and specificity of 0.71.
Conclusions: In our ED patient cohort, peripheral arterial tone did not reliably predict arterial or venous findings on penile color flow Doppler. These tests appear to measure different although potentially complementary aspects of the local and systemic vasculature.