Oscillations in cutaneous blood flow in hyperglycemic obese patients

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Obesity and hyperglycemia are known to affect the cardiovascular function and the regulation of peripheral distribution of blood flow. We studied the effects of low-glycemic and hypocaloric diet on skin blood flow oscillations in newly diagnosed hyperglycemic obese patients. Sixty normoglycemic (30 females) and sixty hyperglycemic (30 females) obese adults were recruited and treated with low-glycemic and hypocaloric diet for 6 months. Skin microvascular blood flow(SBF) was recorded using a laser Doppler monitoring apparatus (PeriFlux 4001 System, Perimed) and oscillations in blood flow were determined by wavelet transform. Moreover, reactive hyperemia was investigated after 2 min brachial artery occlusion. Hyperglycemic patients showed lower SBF when compared to normoglycemic subjects as well as total power spectral density(PSD), accompanied by impaired hyperemic response to artery occlusion. The PSD of oscillatory component in the range 0.052-0.15 Hz, related to myogenic activity, was lower in hyperglycemic than normoglycemic people. After dietary treatment, SBF (12.8±0.3 vs 9.1±0.5 PU, p<0.01) and total PSD (333.2±11.2 vs 116.5±11.4 PU2/Hz, p<0.01) significantly increased in hyperglycemic subjects as well as post-occlusive reactive hyperemia. The PSD of myogenic activity-related oscillatory component appeared to be augmented (35.0±0.7 vs 29.9±0.8%, p<0.01). In conclusion, hyperglycemia caused severe alterations in microcirculation, but low-glycemic and hypocaloric diet improve tissue perfusion state.