Aging effect on microcirculation: a multiscale entropy approach on laser speckle contrast images

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Résumé en anglais	Purpose: It has long been known that age plays a crucial role in the deterioration of microvessels. The assessment of such deteriorations can be achieved by monitoring microvascular blood flow. Laser speckle contrast imaging (LSCI) is a powerful optical imaging tool that provides two-dimensional information on microvascular blood flow. The technique has recently been commercialized, and hence, few works discuss the postacquisition processing of laser speckle contrast images recorded in vivo. By applying entropy-based complexity measures to LSCI time series, we present herein the first attempt to study the effect of aging on microcirculation by measuring the complexity of microvascular signals over multiple time scales. Methods: Forearm skin microvascular blood flow was studied with LSCI in 18 healthy subjects. The subjects were subdivided into two age groups: younger (20–30 years old, n = 9) and older (50–68 years old, n = 9). To estimate age-dependent changes in microvascular blood flow, we applied three entropy-based complexity algorithms to LSCI time series. Results: The application of entropy-based complexity algorithms to LSCI time series can differentiate younger from older groups: the data fluctuations in the younger group have a significantly higher complexity than those obtained from the older group. Conclusions: The effect of aging on microcirculation can be estimated by using entropy-based complexity algorithms to LSCI time series.

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