Hypertension and retinal microvascular dysfunction (HyperVasc): protocol of a randomised controlled exercise trial in patients with hypertension.

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Hypertension is a global healthcare burden that affects the structure and function of the macrocirculation and microcirculation and induces disease-specific end-organ damage. Vascular biomarkers are essential to timely diagnose this end-organ damage to improve cardiovascular (CV) risk stratification and medical decision making. Exercise therapy is an effective means to improve vascular health and reduce overall CV risk. However, it is still not clear whether high-intensity interval training (HIIT) is recommendable for patients with hypertension to reduce blood pressure, increase cardiorespiratory fitness and ameliorate vascular health.; The 'Hypertension and retinal microvascular dysfunction' trial will investigate macrovascular and microvascular impairments in hypertensive patients compared with healthy controls to investigate hypertension-induced end-organ damage by using gold-standard methods as well as newly developed unique retinal microvascular biomarkers. In addition, this trial will investigate the reversibility of retinal end-organ damage by assessing the effects of an 8-week supervised and walking based HIIT on blood pressure, cardiorespiratory fitness as well as macrovascular and microvascular health, compared with a control group following standard physical activity recommendations. Primary outcome will be the arteriolar-to-venular diameter ratio. Secondary outcomes will be arteriolar and venular diameters as well as the flicker-light-induced dilation. Further outcomes will be other retinal microvascular biomarkers, flow-mediated dilation of the brachial artery as well as blood pressure, cardiorespiratory fitness, microalbuminuria, hypertensive retinopathy and classical CV risk markers. Analysis of variance and analysis of covariance will be used to investigate group differences between healthy controls and hypertensive patients and training effects in hypertensive patients, respectively.; The Ethics Committee of Northwestern and Central Switzerland approved this study (EKNZ-2021-00086). All participants will give informed consent.; NCT04763005.

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