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ARTERY 2015: Invited lecture abstracts

CD1

VASCULAR ADAPTATION TO EXTREME CONDITIONS: THE ROLE OF HYPOXIA

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Abstract

The study of vascular adaptation to extreme conditions, and in particular to hypoxia, represents a unique opportunity in cardiovascular physiology, with relevant translational implications. First, it has crucial clinical consequences for about 140 million people worldwide living at high altitude and chronically exposed to hypobaric hypoxia. Second, an increasing number of lowlanders are exposed to high altitude for recreational or working purposes, including aged, diseased individuals: in these cases, hypoxia could be a trigger for acute cardiovascular events. Finally, hypoxia plays a major role in the pathogenesis of many diseases and chronic conditions, as respiratory (i.e. chronic obstructive pulmonary disease and obstructive sleep apnea syndrome) and cardiovascular disorders (i.e. heart failure, ischemic heart disease and cerebrovascular disease). Thus, results from field studies at high altitude might be important for a deeper understanding of their pathophysiology. This review is aimed at summarizing the main findings in the field of chronic and acute vascular adaptation to hypoxia, focusing on the role of nitric oxide (NO) and endothelial function, as well as large artery behavior.

CD2

CIRCADIAN BLOOD PRESSURE PROFILE AND TARGET ORGAN DAMAGE

Agnieszka Bednarek
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Abstract

The 24-hour brachial ambulatory blood pressure measurement (ABPM) has the unique ability to provide information on 24-hour averaged blood pressure (BP), on nocturnal BP and day–night BP changes, as well as on 24-hour BP variability, which all provide independent prognostic information over that provided by office BP measurements. The clinical relevance of ABPM is clearly established in both treated and untreated hypertensive individuals. ABPM shows a stronger correlation with subclinical organ damage than office BP and is a significantly better predictor of cardiovascular events.

In the last two decades, several devices have been made available that aim at estimating noninvasively central systolic blood pressure, that is, pressure in the ascending aorta. Nowadays, due to new techniques development, it is also possible to perform 24-hour central ABPM. In our study, we presented the circadian central systolic BP profile and showed that central pressure values differ significantly from peripheral pressure values, not only in standard, office conditions but also during regular daytime activity as well as during nighttime hours. Moreover, systolic pressure amplification (i.e. the difference between systolic peripheral and central BP) appears to vary over a 24-hour period, and the main factor leading to a lower systolic pressure

amplification at night is a nocturnal drop in the heart rate. Furthermore, we demonstrated that 24-central SBP is related to specific target organ damage, such as left ventricle mass index, left ventricle diastolic function, left atrial volume and intima-media thickness.

CD3

ALDOSTERONISM, HEART AND VESSELS

Aleksander Prejbisz
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It has been documented that absolute aldosterone excess in patients with primary aldosteronism (PA) has been associated with higher risk of heart, vascular and kidney damage independent on blood pressure and resulting in increased total cardiovascular risk. Structural (left ventricular hypertrophy) and functional (diastolic dysfunction) changes of the heart have been documented in patients with PA. We have shown that patients with resistant hypertension and PA are characterized by higher prevalence of left ventricular hypertrophy than patients with resistant hypertension without PA. Moreover this relationship was influenced by coexistence of obstructive sleep apnoea, being related to the pattern of left ventricular hypertrophy. In patients with PA the mechanisms by which elevated aldosterone exerts its deleterious effect lead to functional and/or structural abnormalities of the blood vessel wall being more pronounced than in patients with essential hypertension. Studies performed so far documented that patients with PA as compared with patients with essential hypertension are characterized by hypertrophy and fibrosis of small resistance arteries evaluated ex vivo, increased intima media thickness and more pronounced aortic stiffness. Our preliminary results from the ongoing study showed also for the first time that patients with PA are characterized by hypertrophic vascular remodelling of retinal arterioles evaluated in vivo by scanning laser Doppler flowmetry. In summary, current evidence convincingly demonstrates that patients with PA are characterized by more pronounced damage of heart, small and large arteries and kidneys than those with essential hypertension. These findings correspond to the high cardiovascular risk of patients with PA.

Focus

WHAT IS THE BEST METHOD TO EVALUATE RETINAL MICROCIRCULATION?

Joanna Harazny

The microvasculature of retinal ganglion cell layer, which is the part of central nervous system, can be investigated non-invasively in human. For clinical routine the fluorescence angiography is used to test patency and leak of retinal or choroid vessels, and to determine the blood passage time through the capillaries, but not to measure microperfusion. The first non-mydratic Heidelberg Retina Flowmetry with Scanning Laser Doppler Flowmetry (SLDF) technology using perfusion image analysis software AFFPIA has enabled simultaneously reliable examination of retinal microperfusion (RCF) and arteriolar morphology (inner and outer vessel diameters) with calculation of wall-thickness, wall-to-lumen-ratio (WLR), mean distance between vessels with 10–20 µm diameter, calculation of retinal microperfusion resistance coefficient by RCF and mean arterial pressure, and the estimation