P2.41: ACUTE RESPIRATORY CHANGES IN AUGMENTATION INDEX ARE RELATED TO AORTIC RESERVOIR FUNCTION

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Abstracts

Flow-mediated dilation after ischemia, %

![Graph showing flow-mediated dilation after ischemia, %](example_graph1.png)

Flow-mediated dilation post-NTG, %

![Graph showing flow-mediated dilation post-NTG, %](example_graph2.png)

P2.41
ACUTE RESPIRATORY CHANGES IN AUGMENTATION INDEX ARE RELATED TO AORTIC RESERVOIR FUNCTION
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Background: Augmentation index (Alx) is an independent predictor of mortality. Current theory states augmented pressure (AP) is principally due to wave reflection. Subtle changes in AP occur with respiration, but the mechanisms are not fully understood. This study aimed to determine the possible contribution of wave reflection and aortic reservoir function to respiratory changes in Alx.

Methods: Simultaneous invasive pressure and Doppler flow velocity were recorded in the ascending aorta via intra-arterial wire in 24 consecutive participants undergoing cardiac catheterisation or surgery. We performed wave intensity analysis to derive forward and reflected waves, and calculated reservoir pressure in five patients displaying marked respiratory AP changes (see figure). Data was compared between four respiratory cycles of expiration (high AP) with inspiration (low AP) in each individual.

Results: AP and Alx raised during expiration compared to inspiration (5±4mmHg, 10±13% vs. -1±2mmHg, -6±4%, P<0.001 for both). Despite this, wave reflection was not significantly changed (-1x10^6 to 2x10^7 vs. -6x10^6 to 5x10^7 W.m^2 s^-2, P=0.50). However, reservoir pressure was significantly higher during expiration compared with inspiration (95±23 vs. 88±20 mmHg, P<0.001), as were forward compression waves (41x10^5 to 27x10^5 vs. 36x10^5 to 24x10^5 W.m^-2 s^-2, P=0.04). The change in AP between inspiration and expiration correlated with change in reservoir pressure (r=0.81, P=0.001), but not reflected wave intensity (r=-0.19, P=0.41) or heart rate (r=-0.33, P=0.15).

Conclusions: Acute changes in AP and Alx occur during normal respiration. These changes appear related to aortic reservoir function and cannot be explained by conventional wave reflection theory.

P2.42
A NEW BLOOD PRESSURE-INDEPENDENT ARTERIAL STIFFNESS INDEX, CARDIO-ANKLE VASCULAR INDEX (CAVI)
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The Cardio-Ankle Vascular Index (CAVI) is a new indicator of the stiffness of arteries from the origin of the aorta to the ankle of the lower leg. The theory is based on the stiffness parameter β. CAVI is essentially independent of blood pressure at a measuring time. This is confirmed by the study using adrenergic β1 receptor-blocking agent, metoprolol in human. When metoprolol is administered to men, blood pressure decreased and pulse wave velocity is decreased. But, CAVI remains constant. This result was also confirmed by the study using rabbits using same apparatus. CAVI increased with aging and showed higher values in males than in females. CAVI showed high value in patients with cerebral infarction, coronary stenosis, and chronic kidney disease. As for the risks of coronary artery disease, CAVI showed high value in hypertension, diabetes mellitus, dyslipidemia, smoking, and metabolic syndrome. Furthermore, improvement of those risk factors by drugs or lifestyle changes reduced CAVI in most cases. In other words, CAVI is a useful indicator for the management of coronary risk factors.