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Respiratory effect on the pulse spectrum

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Abstract:

During the last decade, progressive achievements in haemodynamics have shown that radial artery pulse pressure can be used to estimate the vascular properties of the internal organs. Clinical experiments have shown that slow and regular respiration has a large effect on the heart rate variability (HRV). This phenomenon is called respiratory sinus arrhythmia (RSA). It is known that respiration-related oscillations in venous return cause oscillations in stroke volume and blood pressure. It also can be inferred from cardiac output that systemic blood pressure has a similar respiration-related cycle. Moreover we found that the fluctuations of harmonics of arterial pulse are consistent with the fluctuation of HRV. This means that the whole cardiovascular system (CVS) makes rapid adaptation during respiration, and the harmonic proportions of arterial pulse were modified during different breath rates. This result shows that the regular respiration also has a large effect upon Windkessel properties of CVS.