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TCVGH International Medical Conference

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Speech Title

演講主題

Cardiac MR Evaluating 4D Flow And Kinetic Energy

心臟磁振造影評估四維血流動力學與動能能量

Abstract 摘要：

Phase contrast (PC) MRI is a unique technology to evaluate the movement of fluid or soft tissue in terms of 2D, 3D and 4D directions. It can provide the velocity and mass of the object simultaneously in high quality of objective measurements while keeping high reproducibility and reliability. Here we describe the principles of the PC pulse sequence to generate the 2D flow images, and pulse sequence modification (such as respiratory trigger) to develop the 3D flow. We will introduce the computed fluid dynamics (CFD) and the potential methods to integrate with PC true measurement of flow data in 4D flow in vector maps, streamline maps and path line maps. Thus, we can evaluate the CFD-based 4D flow for intraventricular and intra-aortic fluid visualization and quantification. By integrating the mass and velocity data, we can calculate the kinetic energy of the fluid or tissue of interest. I will illustrate several key applications, such as 4D flow vorticity of the ascending aorta in Marfan syndrome; intraventricular flow compartments in failing heart and myocardial kinetic energy of the left ventricle after repair of tetralogy of Fallot.