

中文題目：從心電圖導向的腎動脈普卜勒波形所獲得的收縮時間間隔，可作為一種新穎獨立預測不良心臟事件的預測因子

英文題目：Systolic time intervals derived from electrocardiographic gated intra-renal artery Doppler waveform as a novel predictor of cardiac outcomes

作者：李文賢^{1,2}，許栢超^{1,3}，朱俊源¹，李弘昊¹，李智雄^{1,3}，顏學偉^{1,3}，林宗憲^{1,3}，蘇河名^{1,2,3}，溫文才^{1,3}，賴文德^{1,3}，許勝雄^{1,3}

服務單位：高雄醫學大學附設中和紀念醫院心臟內科¹，高雄市立小港醫院²，高雄醫學大學醫學系³

前言：Heart failure is an important and contributes to large budget on health care and cardiac death. Systolic time intervals (STIs), including pre-ejection period (PEP) and ejection time (ET), are well established echocardiographic indicators for global cardiac performance and prognostic predictors in patients with heart failure. Conventionally, renal ultrasonography just can assess anatomic and vascular information. The aims of our study were to measure STIs from renal Doppler ultrasonography and evaluated their prognostic value for adverse cardiac events.

材料及方法：This study consecutively included patients referred for echocardiographic examinations at Kaohsiung Municipal Hsiao-Kang Hospital from June 2012 to December 2012. Patients with atrial fibrillation, significant aortic or mitral valve diseases, left bundle branch block, or inadequate image visualization were excluded. Additionally, patients with a history of unilateral or bilateral renal artery stenosis, unilateral or bilateral nephrectomy, end stage renal disease receiving renal replacement or renal transplantation therapy, acute kidney injury, and acute unilateral or bilateral hydronephrosis were also excluded.

Ultrasonographic examinations were performed using multi-functional duplex Doppler ultrasonography with a CX50 (Philips Compact Xtreme System, USA) ultrasound machine with a 2.5-MHz pulsed Doppler frequency and a 3.5-MHz convex array transducer. We applied internal ECG signal into Doppler ultrasound. Then, intra-renal Doppler signals were obtained from the arcuate arteries at the cortico-medullary junction. The formula of renal RI calculated as (peak systolic velocity – minimum diastolic velocity)/peak systolic velocity. The renal PEP measured from the onset of the QRS complex to the foot of the renal pulse Doppler waveform. The renal ET measured from the foot to the dicrotic notch of the renal pulse Doppler waveform. The renal PEP and ET were determined three times for each kidney and then the values from bilateral kidneys were averaged to obtain the mean value for later analysis. All measurements were performed by one experienced physician who was blinded to the other data of the subjects.

結果：There were 14 cardiac events identified in this population, including 9 cardiac deaths and 5 hospitalizations for heart failure during an average follow-up of 30.9 months (25th-75th percentile: 30-33 months). Multivariable Cox analysis showed that presence of chronic heart failure, decreased estimated glomerular filtration rate, and increased renal PEP/ET (with an increase of 0.01 unit,

hazard ratio = 1.055, P = 0.004) were independently associated with increased cardiac events. The addition of renal PEP/ET to a Cox model containing important clinical variables provided an extra benefit in prediction of adverse cardiac events (chi-square increase, 9.996; P = 0.002).

結論：The renal PEP/ET derived from renal Doppler sonography was a useful predictor of adverse cardiac events and could offer an additional prognostic value over conventional clinical parameters in predicting cardiac prognosis.

Key words: systolic time intervals, renal Doppler, electrocardiography, cardiac outcomes