

## **Constrictive Pericarditis in the Modern Cardiology Era: Quantitative Analysis of Constrictive Physiology Using Four-Dimensional Magnetic Resonance imaging**

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### **Objectives:**

The purpose of this study was to quantitatively analyze the left ventricular (LV) and right ventricular (RV) constrictive physiology.

### **Background:**

Since magnetic resonance imaging (MRI) provides high resolution assessment of ventricular volumes, it may provide insights into the complex hemodynamic constrictive physiology.

### **Methods:**

Fourteen patients with surgically proven constrictive pericarditis and 10 normal subjects were included. Three dimensional MRI covering the whole myocardium in the short axis projection was performed. LV and RV volumes were evaluated over the whole cardiac cycle to generate a four-dimensional MRI dataset for assessment of ventricular systolic function and filling parameters: end-diastolic and end-systolic volume, filling time, early and late filling volume, E/A ratio, peak filling rate (PFR), and time to peak filling rate (TPFR).

### **Results:**

In patients compared with normal subjects, LV and RV end-diastolic and end-systolic volumes were significantly smaller (all  $P < 0.05$ ) and biventricular filling time was significantly shorter (both  $P < 0.001$ ). In early diastole, LV and RV filling volumes were increased ( $P = 0.08, P < 0.001$ ; respectively); in late diastole, however; LV and RV filling volumes were significantly reduced (both  $P < 0.05$ ) in patients compared with normal subjects. Biventricular E/A ratio and PFR were higher (all  $P < 0.001$ ) and TPFR of the right ventricle was lower ( $P = 0.02$ ) in patients compared with normal subjects.

### **Conclusion:**

Quantitative MRI analysis of the constrictive physiology showed a reduction in end-diastolic and end-systolic volumes and demonstrated a typical hemodynamic response. In early diastole both ventricles have a rapid and increased filling, in late diastole, however; the constricted pericardium allowed only a slight ventricular filling.