

## Right Ventricle Diastolic Pressure “Square Root Sign” Normalization During Pericardectomy

TV Scohy<sup>1\*</sup>; N Saouti<sup>2</sup>; N Voesten<sup>1</sup>; BM Gerritse<sup>1</sup>

<sup>1</sup>Department of Anaesthesiology, Amphia Hospital, Breda, The Netherlands.

<sup>2</sup>Department of Cardiothoracic surgery, Amphia Hospital Breda, The Netherlands.

\*Corresponding Author: **Thierry V Scohy**

Department of Anaesthesiology, Amphia Hospital,  
Breda, The Netherlands.

Tel: +31-0-765955570; Email: [tscohy@amphia.nl](mailto:tscohy@amphia.nl)

### Article Info

Received: Jun 08, 2022

Accepted: Jun 30, 2022

Published: Jul 05, 2022

Archived: [www.jclinmedsurgery.com](http://www.jclinmedsurgery.com)

Copyright: © Scohy TV (2022).

### Abstract...

An 80-yr-old male presented with pericarditis, pericardial effusion and fibrotic pericardium. Computed tomography revealed pericardial effusion and thickened pericardium. After general anesthesia, the standard invasive hemodynamic pressure monitoring, plus Right Ventricular Pressure (RVP) was transduced by placing the central venous pressure port of a pulmonary artery catheter into the right ventricle. The initial RVP tracing demonstrated a “dip-and-plateau pattern” or “square root sign” during diastole. Intraoperatively, after resecting the pericardium, diastolic RVP “square root sign” disappeared. This case clearly illustrates the intraoperatively improvement of the RV diastolic function during pericardectomy, demonstrating that no further surgical action is needed.

### Introduction

An 80-yr-old male presented with pericarditis, pericardial effusion and fibrotic pericardium. His symptoms consisted of general fatigue, abdominal distension and pain and enhanced shortness of breath with exertion for several months. He had no history of infectious diseases, mediastinal radiotherapy or cardiac surgery. Computed tomography revealed pericardial effusion of maximal 2.6 cm and thickened pericardium, suspicious for constrictive pericarditis (without hemorrhage). No signs of ascending aortic dissection. Diagnostic pericardial puncture failed, since it was not possible to advance a guide wire due to the stiffness of the pericardium. Therefore we proceeded with a surgical pericardial fenestration by right thoracoscopic approach.

General anesthesia was induced after peripheral venous and radial artery cannulation by administering propofol, sufentanyl and rocuronium. The patient was intubated with a single lumen tube and a bronchial blocker (EZ blocker, Rusch, Teleflex), anesthesia was maintained with Sevoflurane and Remifentanyl. After general anesthesia, the standard invasive hemodynamic pressure monitoring, plus right ventricular pressure (RVP) was transduced by placing the Central Venous Pressure (CVP) port of a pulmonary artery catheter (Swan-Ganz oximetry catheter, Edwards Lifesciences, Irvine, Calif) into the right ventricle. Transesophageal echocardiographic (TEE) examination was performed during mechanical ventilation before and after pericardial fenestration.

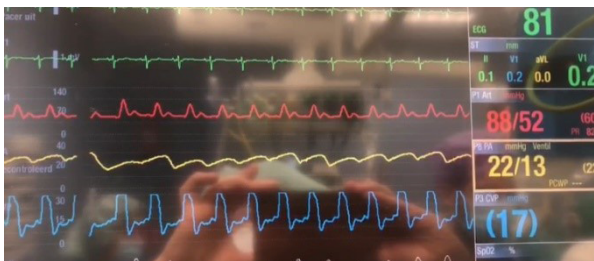
**Citation:** Scohy TV, Saouti N, Voesten N, Gerritse BM. Right Ventricle Diastolic Pressure “Square Root Sign” Normalization During Pericardectomy. *J Clin Med Surgery.* 2022; 2(2): 1020.

The initial RVP tracing demonstrated a “dip-and-plateau pattern” or “square root sign” with a mean pressure of 17 mm Hg (Figure 1). The TEE examination initially revealed a reduced left ventricular function with a measured LV ejection fraction of 25-30%, the ventricular septum was hypokinetic. Both the mitral valve and the aortic valve showed no signs of insufficiency or stenosis. The right ventricle was relatively small but with normal function. There was approximately 1 cm of pericardial effusion, the pericardium was thickened with spots of calcium deposits. TEE examination showed no pleural effusion or abnormalities of the ascending or descending aorta.

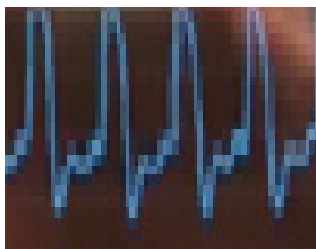
After collapsing the right lung the right pleural space was entered with 3 x 5 mm trocar ports. RVP was continuously monitored via the central venous pressure (CVP) port of a pulmonary artery catheter, which was introduced into the RV. Diastolic RVP showed a typical “dip-and-plateau pattern” or “square root sign” (Figure 1).

The pericardium was clearly abnormal with thickened and calcified aspect. After identifying the phrenic nerve the pericardium was opened. The adhesions could carefully be released from the right atrium and right ventricle. Minimal pericardial effusion was present. Large part of the pericardium covering the right atrium and right ventricle was resected and sent for culture and histology.

Intraoperatively, after resecting the pericardium, diastolic RVP “dip-and-plateau pattern” or “square root sign” disappeared (Figure 2). The patient recovered uneventfully. On follow-up, the patient was asymptomatic, with no ascites or pleural effusion.



**Figure 1:** Pre-operative RVP curve (blue), “Square root sign” in diastolic fase.



**Figure 2:** Detailed diastolic “square root sign”.



**Figure 3:** Intra-operative RVP curve P2 Art 2 (red), normal diastolic filling curve.



**Figure 4:** Normal diastolic pressure curve.

**Conclusions**

Only few studies exist illustrating the RVP curve pattern before and after pericardectomy [1,2]. The present case illustrates the intraoperatively improvement of the diastolic RV function during (right sided) pericardectomy, clearly demonstrating the efficacy of the procedure.

**References**

1. Skubas NJ, Beardslee M, Barzilai B, Pasque M, Kattapuram M, et al. Constrictive Pericarditis: Intraoperative Hemodynamic and Echocardiographic Evaluation of Cardiac Filling Dynamics. *Anesth Analg.* 2001; 92: 1424-6.
2. Imagawa H, Ishikawa K. Fading Out Dip-and-Plateau Pattern of Right Ventricular Pressure in Constrictive Pericarditis. *Circulation.* 2010; 122: 404-405.