

Imaging of the Pericardium

A Multimodality Cardiovascular Imaging Update



Bo Xu, MB BS (Hons), FRACP, Deborah H. Kwon, MD,
Allan L. Klein, MD*

KEYWORDS

- Pericardium • Acute pericarditis • Recurrent pericarditis • Constrictive pericarditis
- Pericardial tamponade • Echocardiography • Multidetector computed tomography • CMR imaging

KEY POINTS

- Pericardial diseases represent diverse conditions, ranging from painful inflammatory states, such as acute pericarditis, to life-threatening tamponade and chronic heart failure due to constrictive pericarditis.
- Echocardiography is generally the first-line imaging investigation for the assessment of pericardial disorders.
- Multidetector cardiac computed tomography can be useful for the assessment of the location and extent of pericardial calcification in end-stage chronic constrictive pericarditis, as well as delineating congenital anomalies of the pericardium.
- Cardiac magnetic resonance (CMR) imaging can be used to demonstrate pericardial edema and pericardial late gadolinium enhancement, an imaging correlate of active inflammation with neovascularization and fibroblast proliferation.
- CMR imaging may help guide and modulate therapy decision, and monitor response to treatment in patients with pericarditis.



Video content accompanies this article at <http://www.cardiology.theclinics.com>.

INTRODUCTION

Pericardial conditions ranging from acute pericarditis and constrictive pericarditis to cardiac tamponade represent an important group of cardiovascular disorders; increased morbidity and mortality are associated with many of these conditions.^{1,2} Multimodality cardiovascular imaging is critical in the diagnosis and management of pericardial conditions, providing structural, functional, and hemodynamic information characteristic of pericardial diseases.^{3,4}

This review presents a clinically focused update on multimodality cardiovascular imaging of pericardial conditions. A focus is on forming a framework on when and how each cardiovascular imaging modality is helpful in each pericardial condition. An emphasis is given on how multimodality cardiovascular imaging may affect the diagnosis and management of patients with pericardial conditions.

ANATOMY OF THE PERICARDIUM

The pericardium is composed of the visceral and parietal layers, 2 avascular layers that surround the

Section of Cardiovascular Imaging, Center for the Diagnosis and Treatment of Pericardial Diseases, Heart and Vascular Institute, Cleveland Clinic, Desk J1-5, 9500 Euclid Avenue, Cleveland, OH 44195, USA

* Corresponding author.

E-mail address: kleina@ccf.org

Cardiol Clin 35 (2017) 491–503

<http://dx.doi.org/10.1016/j.ccl.2017.07.003>

0733-8651/17/© 2017 Elsevier Inc. All rights reserved.

heart and proximal great vessels (**Fig. 1**). The outer, parietal layer is fibrous, containing predominantly collagen, with interspersed elastin fibrils.³ The parietal layer is normally ≤ 2 mm thick. The inner, visceral layer is composed of a single layer of mesothelial cells, collagen and elastin (**Fig. 2**). Normally, there is a physiologic potential space between the visceral and parietal pericardial layers, which may contain up to 50 mL of fluid. Alterations in the thickness, elasticity of the pericardium, and accumulation of excessive pericardial fluid in disease states, can significantly alter normal cardiac filling.

ACUTE PERICARDITIS

Acute pericarditis is a frequently encountered clinical condition. Although the exact incidence of acute pericarditis is not known, it has been reported to account for a notable proportion (approximately 5%) of nonacute myocardial infarction-related chest pain cases presenting to the emergency department.^{5,6} However, the reported

incidence of acute pericarditis is likely underestimated, because there is no established gold standard for its diagnosis. The diagnosis of acute pericarditis is made clinically, based on the presence of 2 or more established diagnostic criteria (classical pleuritic-type chest pain on clinical history, supportive features on physical examination, such as a pericardial friction rub, typical electrocardiographic changes including diffuse, concave upward ST-segment elevation and PR depression, and the finding of a new pericardial effusion).^{3-5,7}

Transthoracic echocardiography (TTE) should be the initial cardiac imaging investigation for patients with suspected acute pericarditis (**Table 1**). The presence of a pericardial effusion on TTE, supported by the appropriate clinical context, is suggestive of acute pericarditis.^{1,2,5} However, it should be noted that most frequently, in acute pericarditis, TTE is unremarkable.^{1,6} Despite this, TTE should be performed in all patients with suspected acute pericarditis.⁸ Suspected acute pericarditis represents part of the clinical syndrome

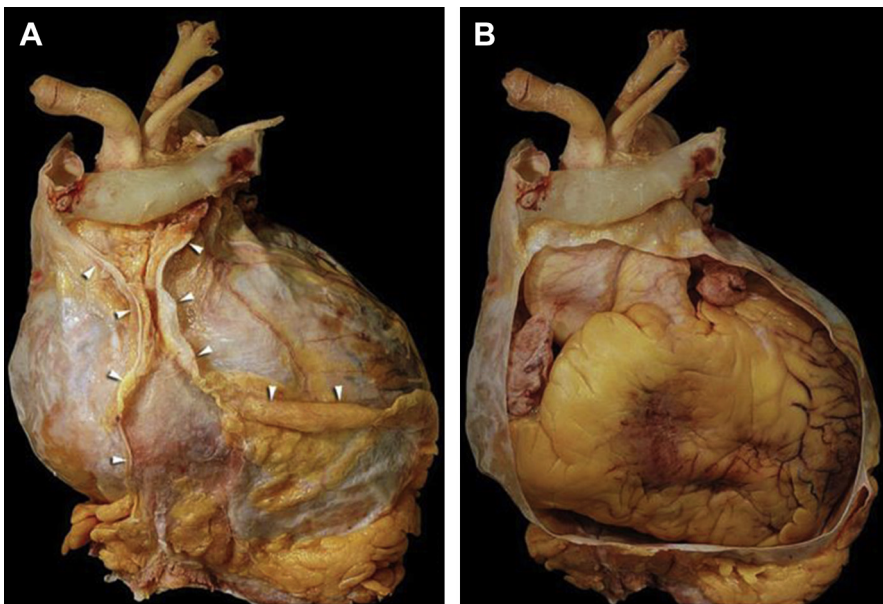


Fig. 1. Anatomy of the pericardium. Anterior view of the intact parietal pericardial sac (A). The attachment of the fibrous sac to the diaphragm is seen at the base. Abundant epipericardial fat is conspicuously present at the pericardial-diaphragm junction. The mediastinal pleura invest the lateral portion of fibrous pericardium. The anterior reflections of the mediastinal pleura are indicated by the white arrowheads. The space between the arrowheads corresponds to the attachment of the pericardium to the posterior surface of the sternum. Superiorly, the left innominate vein is seen merging with the superior vena cava. The arterial branches of the aortic arch are just dorsal to the innominate vein. The anterior portion of the pericardial sac has been removed to show the heart and great vessels in anatomic position (B). It distinctly shows how the proximal segments of the great arteries are intrapericardial. At that point, there is fusion of the adventitia of the great vessels with the fibrous pericardium. (Adapted from Klein AL, Abbara S, Agler DA, et al. American Society of Echocardiography clinical recommendations for multimodality cardiovascular imaging of patients with pericardial disease: endorsed by the Society for Cardiovascular Magnetic Resonance and Society of Cardiovascular Computed Tomography. *J Am Soc Echocardiogr* 2013;26:969; with permission.)

Download English Version:

<https://daneshyari.com/en/article/5599957>

Download Persian Version:

<https://daneshyari.com/article/5599957>

[Daneshyari.com](https://daneshyari.com)