

Clinical Features Associated With Adverse Events in Patients With Post-Pericardiotomy Syndrome Following Cardiac Surgery



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Postpericardiotomy syndrome (PPS) may be associated with tamponade and pericardial constriction that may require procedural intervention. The aim of this study was to identify clinical features associated with adverse events requiring procedural intervention in patients with PPS. A total of 239 patients who developed PPS after cardiac surgery were monitored for 12 months. PPS was diagnosed if 2 of the 5 following findings were present: fever without infection, pleuritic pain, friction rub, pleural effusion, and pericardial effusion (<60 days after surgery). The primary end point was the development of pericardial effusion or pericardial constriction requiring procedural intervention. Among 239 patients with PPS, 75 (31%) required procedural intervention. In a univariate analysis, the odds of a procedural intervention were decreased with older age (odds ratio [OR] 0.98, 95% confidence interval [CI] 0.96 to 0.99) and with colchicine used in combination with anti-inflammatory agents (OR 0.45, 95% CI 0.26 to 0.79). However, the odds were increased in patients with preoperative heart failure (OR 1.84, 95% CI 1 to 3.39) and early postoperative constrictive physiology (OR 5.77, 95% CI 2.62 to 12.7). After multivariate adjustment, treatment with colchicine along with anti-inflammatory agents was associated with lower odds of requiring intervention (OR 0.43, 95% CI 0.95 to 0.99). Independent positive predictors of procedural intervention included age (OR 0.97, 95% CI 0.95 to 0.99), time to PPS (OR 0.97, 95% CI 0.95 to 0.99), and early postoperative constrictive physiology (OR 6.23, 95% CI 2.04 to 19.07). In conclusion, younger age, early-onset PPS, and postoperative constrictive physiology were associated with the need for procedural intervention in patients with PPS, whereas colchicine was associated with reduced odds of adverse events and procedural intervention. © 2014 Elsevier Inc. All rights reserved. (Am J Cardiol 2014;114:1426–1430)

Postpericardiotomy syndrome (PPS) is an inflammatory process that develops in patients who have undergone surgery that involves opening the pericardium.¹ PPS typically affects 10% to 40% of patients and occurs anywhere from a few days to few weeks after cardiac surgery.¹ The severity of PPS can present as acute or recurrent pericarditis, pericardial effusion with or without tamponade, or constrictive pericarditis with hemodynamic instability requiring surgical intervention.² Medical treatment consists of nonsteroidal anti-inflammatory drugs, colchicine, and, in severe cases, oral steroids.^{3–6} PPS is diagnosed by the presence of ≥ 2 of the following clinical features: fever in the absence of infectious source, pleuritic chest pain, pericardial friction rub, pleural effusion, and a

persistent pericardial effusion 1 to several weeks after surgery.³ Severe consequences associated with PPS include large pericardial effusion with cardiac tamponade and constrictive pericarditis, which require pericardiocentesis and pericardiectomy, respectively.^{4,7–8} Identification of clinical features that predict the need for procedural intervention in patients with PPS is important to initiate preventive therapy. In this observational study, we sought to examine clinical characteristics associated with a need for procedural interventions in patients with PPS.

Methods

From the Cleveland Clinic pericardial disease database, we retrospectively identified 239 consecutive patients diagnosed with PPS from January 1, 2007, to December 31, 2010, who met the following criteria: (1) age >18 years, (2) history of cardiac surgery, including coronary artery bypass grafting, valvular repair or replacement, and ascending aortic surgery; and (3) clinical diagnosis of PPS <12 months after surgery. Electronic medical records were used to collect patients' demographics, laboratory and imaging data, and medical and surgical treatments. Those who were lost to follow-up were excluded from the study. Patients were considered to have PPS if they met 2 of the 5 following criteria: fever in the absence of an infectious source, pleuritic chest pain, friction rub, pleural effusion, and pericardial effusion of any size after surgery.^{3,4} The primary end point

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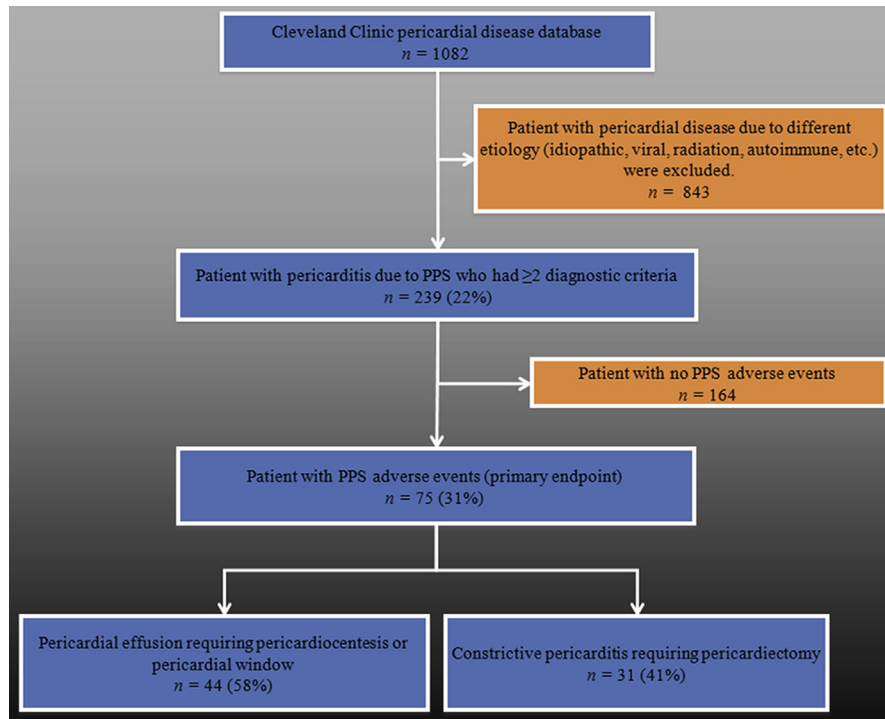


Figure 1. Selection of patients for retrospective analysis.

was a procedural intervention <12 months after the diagnosis of PPS. Procedural intervention was due to hemodynamically significant pericardial effusion with tamponade requiring pericardiocentesis or pericardial window and/or constrictive pericarditis refractory to medical therapy and requiring pericardiectomy. Cardiac tamponade was defined as the presence of a moderate to large pericardial effusion with echocardiographic and clinical features of tamponade.^{9,10} Constrictive pericarditis was diagnosed by the presence of a constellation of clinical symptoms; evidence of right-sided cardiac failure; and echocardiographic, hemodynamic, and/or cardiac magnetic resonance imaging–based imaging criteria.¹⁰

Continuous variables are expressed as mean \pm SD and categorical variables as percentages. Unpaired Student's *t* tests were used to compare continuous variables (normal distribution), and Fisher's exact tests or chi-square tests were used for categorical variables, as appropriate. The predictors of failed medical therapy after PPS response were investigated using multivariate logistic regression analysis. Variables that were significant on univariate analysis were entered into a multivariate model using a forward Wald selection to obtain the final model. The strength of the model was expressed using Nagelkerke's R^2 . All statistical tests were 2 sided. A *p* value <0.05 was set a priori and considered statistically significant. Statistical analyses were performed using SPSS version 11.5 for Windows (SPSS, Inc., Chicago, Illinois).

Results

Of 1,082 consecutive patients in the pericardial disease database between January 1, 2007, and December 31, 2010, 843 patients did not meet the inclusion criteria and were

excluded (Figure 1). The study cohort consisted of 239 patients (mean age 58 ± 16 years, 72% men) who developed PPS after a mean time of 27 ± 18 days after cardiac surgery (Table 1). All patients who experienced PPS with cardiac surgery were followed for 12 months after diagnosis with PPS.

Among patients with PPS, procedural interventions were required in 31%. Of the diagnostic criteria used to define PPS, the most common findings in our patient cohort included pericardial effusion (88%), pleuritic chest pain (57%), and pleural effusion (56%). All patients with fever had negative workup for an infectious cause and were not treated with antibiotics. Coronary artery bypass grafting was the most common surgery performed in patients included in this study (42%), followed by aortic valve surgery (29%), mitral valve surgery, (26%) and aortic surgery (23%). PPS and its complications were independent of the type of surgery. Patients presented with PPS approximately 3 to 4 weeks after surgery. Treatment for PPS included nonsteroidal anti-inflammatory drugs (41%), aspirin (75%), steroids (35%), colchicine (21%), and a combination of colchicine with another anti-inflammatory medication (41%). Inflammatory markers including C-reactive protein and the Westergren sedimentation rate were elevated in all patients after cardiac surgery. Overall, 14% of patients with PPS presented with constrictive physiology defined as symptoms of right-sided cardiac failure along with echocardiographic findings of constriction <2 weeks after surgery¹¹ (Figure 2). All patients with constrictive pericarditis (31 patients) underwent cardiac magnetic resonance imaging. Pathologic change in the pericardium, defined as pericardial thickness >2 mm, was present in only 5 patients (16%) (Figure 2). Among the 239 patients who presented with PPS, 75 developed complications leading to procedural interventions. Pericardial effusion with tamponade was present in 44 patients, and among them, 20

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