A 20-year experience with isolated pericardiectomy: Analysis of indications and outcomes

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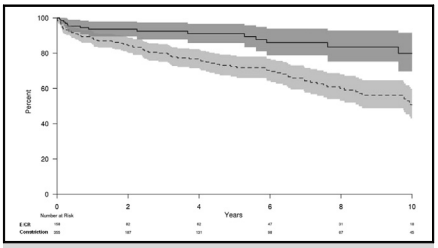
ABSTRACT

Objectives: Outcome after pericardiectomy depends on many factors, but no large study has provided clarity on the effects of patient variables or cause of pericarditis on patient survival. We report early and late results from a 20-year experience with isolated pericardiectomy.

Methods: From January 1993 to December 2013, 938 patients underwent pericardiectomy at our institution. In order to establish a homogeneous population to analyze the impact of pericardiectomy, we excluded patients with prior chest radiation, malignancy, and concomitant valvular or coronary procedures. We identified a cohort of 521 who underwent isolated pericardiectomy; of these, 513 patients gave consent for research and comprise the cohort for this analysis; median age at operation was 57 years (range, 18-84 years) and 363 (71%) were men. Indications for pericardiectomy were effusive/chronic relapsing pericarditis in 158 (31%) and pericardial constriction in 355 (69%). Prior coronary artery bypass grafting had been performed in 84 patients (14%). Median preoperative left ventricular ejection fraction was 60% (range, 24%-80%), and 77% of patients were in New York Heart Association (NYHA) functional class III/IV.

Results: Surgical approach was median sternotomy in 412 (80%), left thoracotomy in 71 (14%), and clamshell in 30 (5%). Extent of pericardial resection was radical in 414 (81%), subtotal in 71 (14%), and completion in 28 (5%). Cardiopulmonary bypass was used in 205 (40%). Overall mortality was 12/513 (2.3%); 3/158 (1.9%) for the effusive/chronic relapsing group versus 9/355 (2.5%) for the constriction group ($P = .65$). In the absence of multivariate predictors, which could not be identified, univariate predictors associated with increased risk of early death included lower left ventricular ejection fraction (hazard ratio [HR], 1.09; $P = .03$) and preoperative renal insufficiency (HR, 9.9; $P < .001$). Median duration of follow-up was 29 months (maximum 20.5 years) and overall 5-, 10-, and 15-year survival was 80%, 60%, and 38%, respectively. Overall survival according to surgical indication was higher in the effusive/chronic relapsing group when compared with the constriction cohort ($P < .001$). Independent predictors associated with increased risk of overall mortality identified on multivariate analysis included older age (HR, 1.05; 95% confidence interval [CI], [1.03, 1.07]; $P < .001$), congestive heart failure (HR, 1.49; 95% CI, [1.03, 2.2]; $P = .02$), diabetes (HR, 1.83; 95% CI, [1.2, 2.7]; $P = .004$), completion pericardiectomy (HR, 2.4; 95% CI, [1.2, 4.7]; $P = .01$), and chronic obstructive pulmonary disease (HR, 2.45; 95% CI, [1.5, 3.9]; $P = .004$). During the follow-up period, 80% of patients were free from NYHA functional class III/IV symptoms at 5 years and 78% at 10 years.



Late survival is different after pericardiectomy depending on indication for surgery.

Central Message

Early mortality after isolated pericardiectomy is low irrespective of the indication for surgery, and the majority of patients were free from significant heart failure symptoms during follow-up.

Perspective

There are many reports validating the benefit of pericardiectomy, but there remains a poor understanding of which patients derive the most benefit from surgery, what comorbid conditions contribute most to postoperative morbidity and mortality, the superiority of a particular surgical approach or, most importantly, the long-term outcomes after intervention.

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Abbreviations and Acronyms
CABG = coronary artery bypass grafting
CHF = congestive heart failure
COPD = chronic obstructive pulmonary disease
HR = hazard ratio
IABP = intra-aortic balloon pump
LV EF = left ventricular ejection fraction
MI = myocardial infarction
NYHA = New York Heart Association

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Conclusions: Whereas early mortality after isolated pericardiectomy is low irrespective of the indication for surgery, late follow-up demonstrates better outcomes after pericardiectomy for effusive/chronic relapsing pericarditis compared with pericardial constriction. Importantly, the majority of patients were free from significant heart failure symptoms during follow-up. (J Thorac Cardiovasc Surg 2016;■:1-11)

The history of pericarditis dates back hundreds of years with the first known written reference by Richard Lower in 1669. He described dyspnea and intermittent pulse in a patient with constrictive pericarditis. The first successful ''decortication of the heart,'' as it was titled, in the United States was performed in 1928, in Boston, by Dr Churchill on an 18-year-old girl manifesting with marked cardiac decompensation. Over the years, more elegant descriptions of clinical presentation have emerged and pericarditis was subclassified into constrictive and effusive types.[1,2]

The true incidence of pericarditis in the general population is not known as it can be insidious and painless and thus go undiagnosed; however, general estimates indicate approximately 6% have signs of pericarditis at autopsy and this diagnosis accounts for approximately 1/1000 of hospital admissions.[3] The management of patients with pericarditis can be challenging. Whereas some patients may be managed successfully with medication, there is a subset of patients with pericardial constriction or medically refractory effusive/chronic relapsing pericarditis who benefit from surgical intervention.[3,4] Despite having vastly different pathophysiology—constriction with loss of pericardial compliance and resultant diastolic heart failure and effusive/chronic relapsing pericarditis with recurrent chest pain and pericardial effusion—both benefit from removal of the pericardium to achieve symptomatic relief and improvement in functional status.[3-9] Although, there are many reports validating the benefit of pericardiectomy, there remains a poor understanding of which patients derive the most benefit from surgery,[4,10-13] what comorbid conditions contribute most to postoperative morbidity and mortality, the superiority of a particular surgical approach, or, most importantly, the long-term outcomes after intervention.

This study sought to evaluate outcomes in a large cohort of patients undergoing isolated pericardiectomy and to analyze indication, comorbid conditions, surgical approach, extent of resection, early morbidity, and mortality, as well as long-term freedom from relapse. Our goal was to elucidate the factors predicting worse outcome in order to enable counseling of patients preoperatively and anticipate clinical outcomes postoperatively.

PATIENTS AND METHODS

The Mayo Foundation Institutional Review Board approved this study, and all patients or their families gave written informed consent. Demographic and other patient-related data were obtained from Mayo Clinic medical records and our prospective clinical database. Follow-up information was obtained from subsequent clinic visits, written correspondence from local physicians, and mailed questionnaires to patients or families. Early operative mortality was defined as death occurring within 30 days of operation or any time during the index hospitalization. Late mortality was defined as death occurring after index hospitalization dismissal and during the follow-up period.

Patients

From January 1993 to December 2013, 938 patients underwent pericardiectomy at our institution. In order to establish a homogeneous population to analyze the impact of isolated pericardiectomy, patients with prior chest radiation, malignancy, and concomitant valvular or coronary procedures were excluded. We identified 521 patients who underwent isolated pericardiectomy; of these, 513 patients gave consent to be included in the study.

Preoperative Data

Median age at operation was 57 years (range, 18-84 years) and 363 patients (71%) were men. Indication for pericardiectomy was constriction in 355 patients (69%) and effusive/chronic relapsing in 158 patients (31%). Causes of pericarditis in the constriction group included idiopathic in 205 (58%), prior cardiac surgery in 110 (31%), chronic pericarditis in 10 (3%), infectious in 16 (5%), and other in 14 (4%). Patients with effusive/chronic relapsing pericarditis were further subclassified into specific indication for surgery: pain in 81 patients, constriction in 54, and effusion in 23. The hemodynamic effects of effusive/chronic relapsing pericarditis were also noted. There were no hemodynamic perturbations in 91 patients, constrictive physiology was present in 54, and tamponade in 7. Prior pericardial window or other drainage procedure was performed in 24/158 (15%) patients in the chronic relapsing/effusive group, with 2 having undergone prior incomplete pericardiectomy.

Prior cardiac surgery was performed in 105 patients (20%), with 84 patients having undergone coronary artery bypass grafting (CABG) and 28 having undergone previous pericardiectomy. New York Heart Association