

# Immediate Surgical Outcome of Pericardiectomy in Constrictive Pericarditis: Mayo Hospital six year experience

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## ABSTRACT

**Objective:** To determine immediate postoperative surgical outcome of pericardiectomy in constrictive pericarditis (CP).

**Patients and method:** From May 2006 through April 2012, a total of 44 patients diagnosed with CP undergoing pericardiectomy in Department of Cardiac Surgery, Mayo Hospital, King Edward Medical University, Lahore were included in the study.

**Results:** During 6 years period, out of 44 patients, 24(54%) were male and 20 (46%) were female. All patients underwent total pericardiectomy by median sternotomy. Among these patients, 19 (43%) had tuberculous constrictive pericarditis, 24 (54%) had idiopathic pericarditis, and 1 (2%) had previous cardiac surgery. Intra operative pericardial abscess were seen in 4 patients (9%). Early Postoperative CVP was dropped from 21 to 11 mmHg. Our mortality was 11% (5 patients), 4 patients died of low cardiac output and one from respiratory complication. Other early post operative complications were atrial fibrillation, Hemorrhage; and Sternal wound infection.

**Conclusions:** Early diagnosis and surgical treatment of constrictive pericarditis are important to reduce mortality. Adjunctive medical therapy and surgery has better outcome in tuberculous pericarditis.

**Keywords:** constrictive pericarditis, pericardiectomy, tuberculous pericarditis

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## INTRODUCTION

Constrictive Pericarditis is rare cause of crippling heart failure resulting from chronic fibrous thickening of the pericardium. Tuberculosis (TB) and idiopathic inflammation are still most common causes of CP in south east Asia; However, in last two decade there has been a shift in the causes of constrictive pericarditis: radiation, uremia, postoperative, and neoplastic pericarditis are the prime causes of CP in the Western world<sup>1,2,3,4</sup>.

In chronic constrictive pericarditis, there is an increase in left and right ventricular end-diastolic pressures and a decrease in end diastolic volume and eventually reduced cardiac output and backward failure. In addition, calcified pericardium frequently comes into direct contact with the myocardium, decreasing the heart muscle's contractility and disrupting the coordination of diastolic filling of the ventricles.

In tuberculosis patients, fibrosis and Calcification of the pericardium occurs densely and rapidly

mandating surgery within a year if low mortality is desired<sup>4</sup>. Today, pericardiectomy is a safe procedure with variable techniques and should be performed promptly for better outcome.

This retrospective study was conducted to determine immediate surgical outcome of CP, primarily hemodynamic improvement; in addition we also investigated the causal factors of CP, morbidity and mortality rates.

## PATIENTS AND METHODS

This study was conducted from May 2006 through April 2012, a total of 44 patients diagnosed with CP undergoing pericardiectomy in Department of Cardiac Surgery, Mayo Hospital, King Edward Medical University, Lahore were included in the study. All the patients were referred from department of cardiology, Mayo Hospital for Surgical management. The diagnosis of constrictive pericarditis was confirmed by clinical presentation, chest X-ray, echocardiographic study, and chest computed tomographic (CT) scan was rarely needed. Informed consent was obtained from all the patients.

All the pericardial specimen and fluid were sent to pathology department for histopathological examination. TB was diagnosed on basis of clinical background, histopathological features, and bacteriologic studies using the polymerase chain

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reaction (PCR) test on the pericardial fluid or tissue for evidence of mycobacterium tuberculosis.

**Intervention and Assessment:** Our routine procedure includes left radial arterial line and a central venous line inserted through right internal jugular vein. We do not use Swan ganz catheter routinely because of its cost, unless it is deemed necessary. Central Venous pressure was noted before median sternotomy.

All patients were approached via median sternotomy. We start dissection from diaphragm followed by left and right ventricle, both superior and inferior vena cava, and finally aorta and pulmonary artery. Anterior pericardium was resected from phrenic nerve to phrenic nerve. Pleura were opened if pleural effusion was noted in the per operative chest x-ray.

Pericardial abscess was found in 4 patients. In one patient Left anterior descending artery (LAD) was injured, which was successfully repaired without major cardiac events. We found dense adhesions with calcific plaques in 2 patients, and could not find dissection plane; however, we were able to relieve constriction with waffle procedure (multiple incision of epicardium). No patient required cardiopulmonary bypass due to severe calcification or adhesion.

**Outcome parameters:** Primary outcome parameter was post operative hemodynamic improvement (CVP) and secondary parameters were causal factors of CP, morbidity and mortality rates, and progress in functional capacity after discharge.

**Statistical analysis:** Collected information was transferred to SPSS (Statistical Package for the Social Sciences) version 15.0 computer software programme and analyzed accordingly. Continuous or interval-related variables were expressed as mean+SD. The study variables were age, sex and data were stratified. Descriptive statistics were calculated. Frequency and percentage were calculated for in hospital mortality.

## RESULTS

From May 2006 through April 2012, a total of 44 consecutive patients, with mean age of 36 who underwent pericardiectomy for chronic constrictive pericarditis were included in the study. Twenty four patients (54%) were men and 20 were women (46%). Most common symptom was weight loss and frequent sign was raised JVP (Table 1). Intra operatively pericardial abscess were seen in 4 patients (9%). One patient has LAD injury which was repaired without complication. Variable amount of pleural and pericardial effusion was noted (Table-2).

Early Postoperative CVP was dropped from 21 to 11mmHg. Our mortality was 11% (5 patients), 4

patients died of low cardiac output and one from respiratory complication. Other early post operative complication were atrial fibrillation, Hemorrhage; Sternal wound infection (Table 3). Histopathology report showed TB in 19 patients (Table 4). All patients were taking diuretics and those with tuberculosis also receiving anti TB therapy.

Table: 1 Demographic and Sign/Symptoms (n=44)

Demographic	=n
Male	24(54)
Female	20(46)
Age (Average years)	36
Signs & symptoms	
Weight Loss	34(77)
Cough	29(65)
Fever	31(70)
Dyspnea	23(52)
Raised JVP	36(81)
Hepatomegaly	16(36)
Ascites	12(27)
Peripheral edema	19(43)

Table 2: Intra operative variables (n=44)

Variables	Amount (average ml)	=n
Right pleural effusion	941	26(59)
Left pleural effusion	733	19(43)
Pericardial effusion	142	12(27)
Pericardial Abscess	4(9)	-
LAD injury	1(2)	-
Dense Adhesions	2(4.5)	-

Table: 3 Hemodynamic and post operative variables (n=44)

Variables	Preop	Postop
CVP (mmHg)	21	11
Atrial Fibrillation	1(2)	4(9)
Hemorrhage	3 (6)	-
Sternal wound infection	2(4.5)	-
Low cardiac output	9(20)	-
Mortality	5(11)	-

Table 4: Diagnosis in patients with constrictive pericarditis (n=44)

Diagnosis	=n
Tuberculosis	19(43%)
Postpericardiectomy	1(2%)
Idiopathic disease	24(54%)

## DISCUSSION

TB pericarditis is still common cause of CP and currently, the incidence of idiopathic pericarditis has decreased, due to the improvement of diagnostic techniques<sup>5</sup>. In tuberculosis patients, fibrosis and Calcification of the pericardium occurs densely and rapidly<sup>6</sup>.

Median sternotomy is common approach, it enables exploration of the left and right ventricle, direct vision of the great vessels, and better cardiac hemodynamics can be achieved through a sternotomy than thoracotomy. Excision of anterior pericardium between the phrenic nerves is advised<sup>7</sup>.

Surgical removal of the pericardium has a significant operative mortality. In the Stanford series, the operative mortality was 12%; a lower mortality rate of about 6% has been noted in patients who underwent pericardiectomy between 1977 and 2000 at the Mayo Clinic, the Cleveland Clinic, the Johns Hopkins Hospital, or the All India Institute<sup>8,9</sup>. The risk is increased by heavy calcification and involvement of the visceral pericardium.

Antituberculous therapy should be initiated before surgery and continued afterward<sup>10</sup>. Diuretics and digoxin (in the presence of atrial fibrillation) are useful in patients who are not candidates for pericardiectomy because of their high risk of Surgery. CP with tuberculosis is crippling disease, and thus, early surgical intervention is indicated.

## CONCLUSIONS

Pericardial diseases resulting in constrictive pericarditis as well as purulent pericarditis requires pericardiectomy. Early diagnosis and surgical treatment of constrictive pericarditis are important to reduce mortality. Adjunctive medical therapy and surgery has better outcome in tuberculous pericarditis.

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