ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 6 | June - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# PERICARDECTOMY—FIRST OPTION FOR TREATMENT OF PERICARDITIS WITH CONSTICTION

Cardiology

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## ABSTRACT

**Objectives**

- To study the profile of patient with Pericarditis referred to CT Surgery department of Gandhi Hospital.
- To study the treatment options of Pericarditis.
- To study the indications and timing of pericardectomy
- To study the importance of pericardial biopsy and pericardectomy for the long-term management of Pericarditis.

**Materials and Methods:** 33 patients who underwent pericardectomy were studied, who presented themselves in various stages of Pericarditis to the department of CT surgery Gandhi Hospital.

**Conclusion:** Pericardectomy done early decreases the morbidity and mortality of patients and gives a chance for etiological diagnosis and specific treatment.

## KEYWORDS

## INTRODUCTION

Medical writings on the pericardium began with the description of the normal pericardium by Hippocrates. Greeks noted the Characteristics of the heart in certain battle field heroes, describing it as "hairy". Galen recognized the protective function of the pericardium. In the early 17th century Rondelet described Pericarditis and pleuritis. Jean Riolan in 1649 suggested the trephining of sternum of perform pericardectomy as the treatment of Pericarditis. In 1667 John Mayor described constriction of Pericarditis and its physiological consequences before its recognition as pick's disease 200 years ago. In 1819 Romeo performed the first successful pericardectomy. In 1840 Franz Schesh performed the first blind pericardiocentesis. Cheevers pointed out that Contractions of fibrous tissues around the heart interfered with the cardiac functions and produced symptoms of constrictive Pericarditis. In 1873 Kussmaul identified Pulsus paradoxus. Rhen in 1913 and saurbruch in 1925 described the pericardial resection.

### Pericardium

Parietal pericardium is composed of an outer serosa and inner fibrosa. The visceral pericardium is a monocellular serosal layer comprising of the epicardium of cardiac surface. The visceral and parietal layers fuse over the great vessels and pulmonary veins. The fibrosa of the parietal pericardium continues up over the arch of the aorta where it blends with the deep cervical fascia.

- Pericardium is innervated by the phrenic and vagus nerves.
- Arterial supply originates from small aortic branches dorsally and from pericardio-phrenic vessels branching from the internal thoracic arteries.
- Venous drainage occurs from corresponding veins.
- A Superficial pleuxes of cardiac lymphatic's drains into the tracheal and bronchial lymph nodes.

Fibrosa of the parietal pericardium is loosely anchored by the ligamentous structures to the sterna membranes and xiphoid process. It is firmly attached to the central tendon of the diaphragm. Serosa is composed of inter-digitating mesothelial cells. Fibrosa is composed of fibro-collagenous tissues containing elastic fibers that decrease in density with age.

Normally 15-50 ml of serous fluid is present between the visceral and parietal pericardia.

### Physiology Functions of pericardium

- Pericardium protects the heart from external frictions and provides barrier to infection.
- Through its attachments to the diaphragm and sternum it maintains the cardiac position. Mechanoreceptors are present which contract the spleen and elevate blood pressure.
- Neuro-receptors operating through feedback mechanism can cause vagal response to lower blood pressure and heart rate.
- Pericardial fluid contains prostacycline synthetase that regulates the coronary vasomotor tone.

### Pericarditis

It refers to many inflammatory diseases that affects the pericardium. The diseases may be a primary process involving the pericardium. Secondary process could be a contagious disease, abscess from the lungs or myocardium or from the diaphragm. A septicemia may invade the pericardial space. Pericarditis may be morphologically charcterised accordingly as dry transudative, effusive, hemorrhagic, fibrinous exudative. Purulent constrictive or effusive constrictive.

It is acute inflammatory stages Pericarditis is frequently accompanied by a chest pain which is pleuritic radiating to the trapezium muscle, accompanying cardiac, and bronchopulmonary and pleural disease produced dyspnoea. Low grade fever is not unusual and anorexia is common. Physical examination may reveal a pericardial friction rub. Hematological parameters vary with the disease process.

ECG changes are not specific. Echocardiography shows increased pericardial fluid. Chronic Pericarditis is more likely to be symptomatic because it is accompanied by accumulation of pericardial fluid or the development of pericardial constriction. Constrictive Pericarditis is a condition in which chronic fibrosis and thickening of the pericardium impair the diastolic filling of the heart, and may occasionally follow almost any of the identified causes of the Pericarditis. It involves both parietal and visceral pericardia. Sometimes it may occur in association with effusion, producing effusive constrictive Pericarditis.

In countries in which tuberculosis remains endemic it continues to be a leading cause of constrictive Pericarditis. Other causes are cardiac surgery, radiation therapy, Viral or unknown. Patients with constrictive Pericarditis usually present themselves with a progressive dyspnoea and fatigue. Physical findings include peripheral oedema, ascites and hepatomegaly. These is usually a raised JVP which increases with inspiration. Cardiac examination reveals is a wide inspiratory splitting of the first heart sound. A third heart sound or pericardial knock may be heard. Pulsus paradoxus is seen in some times patients. ECG may show AF, flattened T waves ST elevations and low voltages QRS complexes

in all the leads. X-ray chest reveals pericardial calcifications and pleural effusion. Echo signs are thickening of the left ventricle, early closure of mitral and pulmonary valves, and paradoxical motion of the septum.

Cardiac catheterization shows a dip and plateau of the right ventricular pressure i.e.

Square root sign. LVEDP=RVEDP.

Both the atrial pressures are also high.

**Pericardectomy**

The management of constrictive Pericarditis is primarily surgical. Usually pericardectomy should be performed leaving the fringes of pericardium along the phrenic nerves. Pericardectomy is most often approached by either left anterolateral along the phrenic nerves. Pericardectomy is most often approached by either left anterolateral thoracotomy or a median sternotomy. Left anterolateral thoracotomy provides an easy access to the left ventricle including area posterior to the phrenic nerve. Exposure to the right ventricle is adequate but right atrium and vena cave are difficult to approach. (Ref-2,3) Median sternotomy allows better access to these areas but not to the area posterior to phrenic nerves. There are chances of sterna wound infection. (Ref-7)

**Complications of pericardectomy**

**Per-operative:**

- Bleeding from the chambers.
- Arrthymias.
- Pulmonary oedema if the right ventricle is freed first.
-

**Post-operative:**

- Arrthymias
- Low cardiac output shock-syndrome.
- Phrenic nerve injury.

A study from Stanford University revealed operative mortality of

| | |
|---|---|
| 15% if RVEDP is 16 mmHg | 20 |
| 10% if RVEDP is 20 mmHg | 10 |
| 30% if RVEDP is 30 mmHg | 4 |

**MATERIALS AND METHODS:**

Eleven patients had come with constrictive Pericarditis at various stages. These patients were investigated, evaluated and surgery was done for ten of these patients. One patient had refused the operation. These patients were studied in detail regarding the etiology of constriction and the postoperative duration in which their vital parameters returned to the normal values.

**Table-1 Incidence related to Age**

| AGE GROUP | No of Patients |
|---|---|
| 0-10 | NIL |
| 11-20 | 12 |
| 21-30 | 12 |
| 31-40 | 3 |
| 41-50 | 3 |
| 51-60 | 3 |
| 61-70 | NIL |

**Table-2 Incidence related to sex**

| | |
|---|---|
| Male | 30 |
| Female | 3 |

**Table-3 Etiological incidence**

| | |
|---|---|
| Tuberculosis | 18 |
| Non specific | 12 (Idiopathic) |
| Biopsy not done | 3 |
| Total | 33 |

**Table-4 Incidence related to Smoking:**

| | |
|---|---|
| Smoker | 21 |
| Non Smoker | 12 |

**Table-5 Incidence related to Stages:**

| | |
|---|---|
| Effusive contrictive Pericarditis | 12 |
| Constrictive Pericarditis | 6 |

**Table-6 Incidence related to BCG status:**

| | |
|---|---|
| Vaccinated | 27 |
| Non Vaccinated | 6 |

**Table-7 Incidence related to Mantoux:**

| | |
|---|---|
| Positive | 21 |
| Negative | 12 |

**Table-8 Incidence related to JVP**

| | |
|---|---|
| Raised | 30 |
| Not raised | 3 |

**Table-9 Incidence related to Liver Enlargement**

| | |
|---|---|
| 1+ | 3 |
| 2+ | 21 |
| 3+ | 6 |
| 4+ | 0 |

**Table-10 Incidence related to Oedema of Feet**

| | |
|---|---|
| Not present | 18 |
| Mild | 3 |
| Moderate | 12 |
| Severe | 0 |

**Operative approach**

| | |
|---|---|
| Median sternotomy | 22 |
| Anterolateral Thoracotomy | 10 |
| No of patients refused operative procedure | 1 |

The most common approach was median sternotomy

**Intra-operative morbidity**

| | |
|---|---|
| Bleeding | 8 |
| Arrhythmias | 10 |
| Delayed recovery | 4 |
| On Ventilation | 10 |
| Operative mortality | Nil |

**Duration for return to normal values of parameters**

| | |
|---|---|
| Immediate | 7 |
| 15 days | 13 |
| 1 Month | 6 |
| 3 Months | 3 |
| 6 Months | 3 |

**RESULTS**

The number of patients suffering from Pericarditis was 33 out of which only three were females. Youngest patient was a 13 years old. The incidence was found to be maximum in the age group 10-30 year's i.e.72 percent. The percentage of smoker was 63 and the patients with BCG scars were 72 percent. In this study almost the patients presented with fatigue and breathlessness on exertion. The duration was ranging from 1-3 months and continuous chest discomfort was present in 21 of those patients. JVP was raised more than 10 cm in 30 of them in the pre-operative period. Calcified contrictive Pericarditis was present in only six of them i.e. 18 percent. Only one patient had an associated right pleural effusion. Mantoux test was positive in twenty one of them i.e.63.6% Except three, all the patients had a mild-moderate liver enlargement. Oedema of feet was present in 5 of them i.e. 45%. Liver Function tests were abnormal in twenty seven patients mild to moderate range i.e. 82%. Pericardectomy was done for 32 of them. 22 patients were operated by a median sternotomy and 10 by left anterolateral thoracotomy. All the ten patients operated by anterolateral thoracotomy were suffering from effusive contrictive Pericarditis. Technical operative difficulty was encountered in case of long standing constrictive Pericarditis with an operative morbidity of bleeding and arrhythmias. All the patients who were operated in the early stages of constrictive and effusive Pericarditis were stable during immediate post operative period and were extubated in the operation theater only. 12 patients who underwent the long standing constrictive Pericarditis were kept on ventilation for twenty for hours. Three patients had sustained a liver injury while placing the pericardial drains and was operated for haemo-peritoneum. Three patient on the second post- operative day suffered from a cardiac arrest during ventilation and was recovered by cardiac massage. Tuberculosis Pericarditis was proved by histopathology in eighteen of them and all of them were treated with ant tuberculosis was provided by histopathology in eighteen of them and all of them were treated with ant tuberculosis

drugs. Hence it is proved in our study that Tuberculosis was the leading cause of Pericarditis in our patients. Histopathology of nine patients who put on anti-tuberculosis drugs, proved a non- specific Pericarditis.

So this proves that documented histopathological evidence is required before subjecting any patient to anti-tuberculosis treatment. Hence early biopsy is advised in all the cases of Pericarditis. Twelve patients were subjected to anti-tuberculosis treatment after aspiration of the pericardial effusion fluid it could not prevent the constrictive from and the ultimately required a pericardectomy to get relieved of the symptoms. This proves that conservative treatment has a very limited role in case of constrictive Pericarditis. All the twelve patients who were operated in the effusive stage had no complications during the post-operative period.

## DISCUSSION

This study of 11 patients shows that the most common etiology of Pericarditis is tuberculosis i.e. 68%, where as at other centers like. UAB series of 27 patients and surgical experience of GLH from 1960-1984 of 52 patients, it is idiopathic.

| Study | Patients | Tuberculosis Etiology |
|---|---|---|
| UAB series | 27 | 1 |
| GLH series(1960-1985) | 52 | 2 |
| Study at Gandhi Hospital | 11 | 5 |

Nearly all our patients presented with breathlessness on exertion i.e. 100% of 1-3 months duration where as in UAB series only 15 of the 27 patients i.e. 55.5% presented with breathlessness on exertion. Five of the elevn patients complained ofchest pain of 1-3 months duration i.e.45%

### Comparative Study

| SYMPTOMS | OUR STUDY | UAB SERIES |
|---|---|---|
| Breathlessness on exertion | 100% | 56% |
| Chest pain | 51% | Not mentioned |
| Fever | 54% | Not mentioned |
| Edema legs | 64% | 65% |
| Abdominal distension | 46% | 78% |
| Hepatomegaly | 82% | Not mentioned |
| Pulsus paradoxus | 17.2% | 36% |
| Kussmaul sign | 82% | Not repoted |
| Pericardial Knock | 56% | Not reported |
| Raised JVP=15cms | 91% | Not mentioned |
| X-ray chest: Calcified | 18% | 40% |
| ECG low voltage | 82% | 40% |
| Mantoux test | 46% | Not reported |

| Echo Findings | Our Study | UAB Series |
|---|---|---|
| Thickened Pericardium | 100% | Not reported |
| IVC dilation | 46% | Not reported |
| Septal bounce | 36% | Not reported |
| Effusive constrictive Pericarditis | 46% | Not reported |

The distribution in UAB series is similar to that of McCaughan and colleagues at the Mayo's clinic. From our study it appears that pulsus paradoxus is not a frequent sigh in constrictive Pericarditis. Also breathlessness on exertion, raised JVP, hepatomegaly , are the most frequent symptoms and signs seen in more than 80% of the patients. Low voltage waves on ECG, thickened pericardium on echo-cardiogram and elevated serum bilirubin are the frequent laboratory signs of constrictive Pericarditis.

Two approaches have been used in our patients and the most common being the median sternotomy. In all the patients right ventricle was liberated first and none of them developed pulmonary oedema per operatively or post operatively. Only three patient went into a low cardiac output and required Ionotropic support. In UAB and GLH series operative mortality was 2%-16% and 1-9% respectively where as there was no operative mortality in our 33 cases, twelve of our patients returned with NYHA class I&II in 1st week and twenty one patients took two weeks to return to NYHA class II. Naormalisation of JVP one week for twelve patients, two weeks for three patient, two months for six patients, three months for three patient and six months for three patient. Delayed normalization for this patient was due to his delayed approach to the OPD and a late operation subsequently (Ref.9). There were eighteen patients whose Mantoux test was positive but only six of them did not have evidence of tuberculosis Pericarditis on their histopathology. There were nine patients who were subjected to anti tuberculosis treatment without HPE evidence who later provided to be cases of non-specific Pericarditis and their anti-tuberculosis regime was then discontinued. This suggests the importance of pericardial biopsy before treating the patients with anti-tuberculous drugs. There were nine patients who were subjected to anti-tuberculous treatment for tuberculous pericardial effusion in spite of which they developed constrictive signs and ultimately required pericardectomy.

Fatal bleeding caused by a tear in the right atrium or the venacavae during surgery performed through left anterolateral thoracotomy has been reported (Ref.3&4) but in our study we did not encounter any such problems. The debate over the extent of pericardectomy is more controversial. Naormalisation of cardiac haemodynamics has been reported after a radical pericardectomy (ref.4) as well as after decortications of the anterior surface (Ref.5). Culliford and colleagues (Ref.7).Suggested that delayed improvement and peristansces of symptoms of pericardial constriction are most commonly the results of incomplete decortications. However, Outcomes is related not only to the extent of surgery but also to the myocardial involvement like myocardial fibrosis and atrophy (Ref.8&9). In The study of university of Gottingen Robert Koch Germany of 71 patients who underwent only pericardectomy, CPB was used in only one case. But in our study no patient required a cardio pulmonary by pass.

## CONCLUSION

Pericarditis is a curable disease if diagnosed and treated in the early stages. If pericardectomy is done early it reverts the hemodynamic alterations due to constrictive Pericarditis and also establishes the diagnosis of specific disease like tuberculosis by histopathology. It avoids unnecessary treatment of non tuberculous patients with anti tuberculous drugs and their side effects.

Antero lateral thoracotomy is more useful with effusive variety of constrictive Pericarditis.

Last but not least early pericardectomy reduces the overall cost of treatment.

## REFERENCES


1. Omoto T, Minami K, Varvaras D, Bothing D, Kofer R. Radical pericardectomy for chronic constrictive Pericarditis.
2. Asian Cardiovasc thorac Ann 2001; 9:286-90.(Abstract/Full Text) Astudillo R, Ivert T. late results after Pericardectomy for constrictive Pericarditis via left thoracotomy. Scand J Thorac Cardiovasc Surg 1989; 23:115-9.(Medline).
3. McPhail JL, sukumar IP, Vytilingam KI, Cherian G, John S. Surgical management of constrictive Pericarditis. J Thorac Cardiovasc surg 1967; 53:360-5.(Medline).
4. Lazarides DP, Avgoustakis DG, Lekos D, michaelides GB. Evaluation of radical pericardectomy for constrictive Pericarditis. A clinical, hemodynamic, and electro-cardio graphic study of twenty cases. J Thorac Cardiovasc surg 1966;51:521-33.(midline).
5. Culiford AT, Lipton M, Spencer FC. Operation for chronic constrictive Pericarditis: Do the surgical approach and degree of pericardial resection influence the outcome significantly? Ann thorac surg 1980; 29:146-52.(Midline).
6. Levine HD. Myocardial fibrosis in constrictive Pericarditis. Electrocardiographic and pathologic observations. Circulation 1973; 48:1268-81.
7. Dines DE, Edwards JE, Burchell HB. Myocardial atrophy in constrictive Pericarditis. Staff meets Mayo Clin 1958; 33:93-9.