

Surgical Management of Pericardial Diseases

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Tuberculosis and purulent pericarditis are the most common causes of pericardial effusion and constriction. Chronic constrictive pericarditis is a chronic inflammatory process that involves both fibrous and serous layers of the pericardium and leads to pericardial thickening and compression of the ventricles. The resultant impairment in diastolic filling reduces cardiac function. Pericardiectomy remains the treatment of choice for chronic constriction. A review of 72 cases at department of Cardiothoracic Surgery, Lady Reading Hospital is presented. There was a mortality of 12% and a morbidity of 20%. Forty seven of the 72 cases were tuberculous. The surgical excision of pericardium remains the only available curative treatment for constrictive pericarditis, while open pericardial drainage is required for cardiac tamponade resulting from pericardial effusion.

Key words: Pericarditis, surgical management, tamponade

Constrictive pericarditis is a chronic fibrous thickening of the pericardium that prevents the normal diastolic filling of the heart. Surgery is the only satisfactory treatment. Many factors associated with the development of constrictive pericarditis have been identified, such as infection, post heart surgery, post mediastinal irradiation. In endemic areas, however, TB remains the most common cause of constrictive pericarditis and pericardial effusion. The first formal account of chronic constrictive pericarditis was reported by Lower in 1869¹. In 1896, three patients with chronic constrictive pericarditis were described by Rick². Well in 1895³ and Delorme in 1889⁴ suggested that Pericardiectomy be used as treatment for this condition. Schmeiden and Fischer in 1926⁵ reported a series of successful cases as did Churchill in 1929⁶ and Beck in 1931⁷. By 1941 Blalock and Burwell⁸ were able to report surgical treatment of 28 patients. Since then Pericardiectomy has evolved as the only curative treatment available. A review has been done of the pericardiectomies carried out by the cardiothoracic team at Lady Reading Hospital to (i) audit the results, (ii) identify etiology, (iii) draw conclusions / recommendations based on local results.

Material and methods:

We retrospectively analyzed computerized data of 72 patients who underwent surgery for pericardial disease. Between June 2002 to April 2006 a total of 72 pericardial surgical intervention were done by Department of Cardiothoracic Surgery at Lady Reading Hospital Peshawar. Male to female ratio was 34:38 with an age range of 12-65 years. All patients had routine preoperative workup along with Chest X-ray and echocardiography. Where diagnosis was in doubt CT Thorax was done to establish extent of thickness of pericardium. Cardiac catheterization was done due to the costs and logistics involved. Subxiphoid pericardial window approach was used for pericardial intubation while Median sternotomy

was used as a standard approach for constrictive pericarditis. All patients had pericardium excised anterolaterally and from diaphragmatic surface upto both phrenic nerves. Twenty patients had varying amount of pleural effusions sucked out at surgery. All patients needed peri-operative inotropic support of Dobutamine. Twelve patients with postoperative low urinary output needed renal dose of Dopamine as well.

Results:

Forty patients presented with exertional dyspnea. Cough and palpitation were present in 10 and 16 patients respectively. On clinical examination 40 (55%) patients had evidence of elevated venous pressure and hepatomegaly in 15 (20%) patients (Table I).

Table I: Preoperative data of patients (n=72)

Variable	=n	%age
Sex		
Male	34	47.2
Female		
Age (years)		
31-20	12	16.6
21-30	20	27.7
31-40	25	34.7
41-50	15	20.8
Symptoms		
Exertional dyspnoea	40	55.5
Dyspnoea at rest	16	22.2
Palpitation	06	08.3
Cough	10	13.8
Sign		
Peripheral edema	07	9.7
Raised JVP	40	55
Hepatomegaly	15	20
Ascites	10	13

Five out of 72 patients had developed severe constriction within 2 months of starting anti-tuberculous treatment for large tuberculous pericardial effusion. Pericardial intubation for effusion resulting in tamponade was done in

47(65.2%) patients and Pericardiectomy in 25(34.7%) patients (Table II). This study showed a mortality of 12%. Low cardiac output was seen in 10(13.8%), haemorrhage in 4(5.5%), sternal wound infection in 2(2.7%) patients (Table III).

Table II: Surgical procedures

Variable	=n	%age
Pericardial intubation	47	65.2
Pericardiectomy	25	34.7

Table III: Mortality and morbidity

	=n	%age
Mortality		
Pericardiectomy	03	12
Pericardial intubation	Nil	Nil
Morbidity (complications)		
Low cardiac output	10	13.8
Haemorrhage	04	5.5
Sternal wound infection	02	2.7

Discussion:

The most common identifiable causes of pericarditis are tuberculosis, viral infection, purulent and rheumatic fever. Tuberculous pericarditis may be secondary to manifest pulmonary tuberculosis or the primary source may not be detectable. An effusion usually develops resulting in compression of the heart requiring left saving urgent pericardial intubation. The subsequent course is insidious and the pericardium may become thick and unyielding. This is primarily a mechanical problem and rapid improvement is usual if surgical resection of the pericardium is performed.

The interval between an aetiological occurrence and the onset of clinical evidence of constriction varies between a few months and many years¹. In our study 47(65%) cases were tuberculous and the interval between aetiological occurrence and onset of constriction was in months rather than years.

Somerville has estimated that once the signs and symptoms of chronic constrictive pericarditis develop, only a semi invalid life can be led for upto 5 years^{9,10}. When the clinical syndrome include ascities, progression is more rapid, particularly in children¹¹.

Pericardial biopsy is an integral part of pericardial intubation to reach histologic diagnosis of aetiology. Pericardiectomy via median sternotomy remains the only curative treatment available. The hospital Mortality (12%) after Pericardiectomy for chronic constrictive pericarditis does not approach zero even in the current era. In an earlier era the hospital mortality was 10 – 15%¹²⁻¹³. In more recent eras hospital mortality has been about 5%^{14,15,16}. Thus our hospital mortality of 12% does not compare unfavorably with international figures. Three deaths out of twenty five patients in our study were due to low cardiac output. This is in keeping with the literature which reports 75% of deaths in hospital are due to cardiac

failure¹³. Postop haemorrhage and respiratory failure are the other modes of early death.

All surviving patients had marked clinical improvement within 3 months after operation. This compares favorably with literature which states that 5% patients continue to have chronic congestive cardiac failure after recovery from a satisfactory Pericardiectomy.

Forty seven out of 72 cases were tuberculous and 41 / 72 cases were Afghan refugees. This is in keeping with the high prevalence of tuberculosis in this population and the delay in getting proper medical attention which afflicts this unfortunate populace. All patients needed perioperative inotropic support and ICU care. All patients with low cardiac output responded well to inotropes, rather than intra-venous fluids which would only further strain the thin walled right ventricle^{15,16}.

Conclusion:

Pericardial effusion causing tamponade needs urgent attention. Chronic constrictive pericarditis is not an uncommon problem presented to the Cardiothoracic unit. Tuberculosis is the most common cause in our part of the world. This aetiology should be taken into consideration in endemic areas in diagnostic surveys. Untreated it has a very high morbidity and a fairly high mortality. Pericardiectomy remains the only curative treatment available. Pericardiectomy in proper hands, in a well equipped unit has an acceptable mortality of 12% for an otherwise debilitating and ultimately fatal disease. The median sternotomy approach provides good exposure for complete pericardial resection and in this series cardiopulmonary bypass was not used routinely. Low cardiac output, commonly seen after this operation should be treated with inotropes rather than IV fluids, to protect usually thin walled right ventricle.

References

1. Robert Fu-Chean Chen, Cha-Po Lai. Clinical Characteristics and Treatment of Constrictive Pericarditis in Taiwan. *Circulation Journal* April 69: 458-60, 2005.
2. Bertog SC, Thambidorai SK, Parakh K, Schoenhagen P, Ozduran V, Houghtaling PL, et al. Constrictive pericarditis: Etiology and cause specific survival after pericardiectomy. *J Am Coll Cardiol* 2004; 43:1445- 1452.
3. Bozluga N, Erentug V, Eren E, Erdogan HB, Kirali K, Antal A, et al. Pericardiectomy for chronic constrictive tuberculosis pericarditis: Risks and predictors of survival. *Tex Heart Inst J* 2003; 30: 180- 185.
4. Pankuweit S, Ristic AD, Seferovic PM, Maisch B. Bacterial pericarditis: diagnosis and management. *Am J Cardiovasc Drugs*. 2005;5(2):103-12
5. Hokschi B, Weber T, Beshay M, Stein R, Schmid R. Pericardial empyema due to oropharyngeal infection -- a rare entity. *Zentralbl Chir*. 2005 Aug;130(4):375-8.
6. Oshima K, Sato Y, Takahashi T, Mohara J, Fukusato T, Ishikawa S, Morishita Y. Pericardiectomy to treat constrictive pericarditis in a patient with hyperbilirubinemia: report of a case. *Surg Today*. 2003; 33(12):925-7.

7. Troughton RW, Asher CR, Klein AL. Pericarditis. *Lancet*. 2004 Feb 28;363 (9410): 717-27.
8. Scarfone RJ, Donoghue AJ, Alessandrini EA. Cardiac tamponade complicating postpericardiotomy syndrome. *Pediatr Emerg Care*. 2003 Aug; 19(4):268-71.
9. Talreja DR, Edwards WD, Danielson GK, Schaff HV, Tajik AJ, Tazelaar HD, et al. Constrictive pericarditis in 26 patients with histologically normal pericardial thickness. *Circulation*. 2003 Oct 14; 108(15):1852-7. Epub 2003 Sep 29.
10. Bozbuga N, Erentug V, Eren E, Erdogan HB, Kirali K, Antal A, et al. Pericardiectomy for chronic constrictive tuberculous pericarditis: risks and predictors of survival. *Tex Heart Inst J*. 2003; 30(3):180-5.
11. Steel K, Duming SJ, DeMott C, Haigney M. Symptomatic pericardial constriction without active pericarditis. *Mil Med*. 2005 Aug; 170(8):668-71.
12. Madershahian N, Franke U, Bruhin R, Wahlers T. Reoperation for calcific constrictive pericarditis 43 years after pericardiectomy. *J Card Surg*. 2005 Nov-Dec; 20(6):549-51.
13. Chowdhury UK, Subramaniam GK, Kumar AS, Airan B, Singh R, et al. Pericardiectomy for constrictive pericarditis: a clinical, echocardiographic, and hemodynamic evaluation of two surgical techniques. *Ann Thorac Surg*. 2006 Feb; 81(2):522-9.
14. Eltzschig HK, Sugarbaker DJ, Felbinger TW. Effusive-constrictive pericarditis. *N Engl J Med*. 2004 May 27; 350(22):2310-2.
15. De Valeria PA. Current indications, risks and outcome after Pericardiectomy. *Anu Thoracic Surgery* 1991; 52: 219.
16. Viqueswaran WT. Pericardiectomy *J. R Coll Surg. edin* 1985; 30: 150.