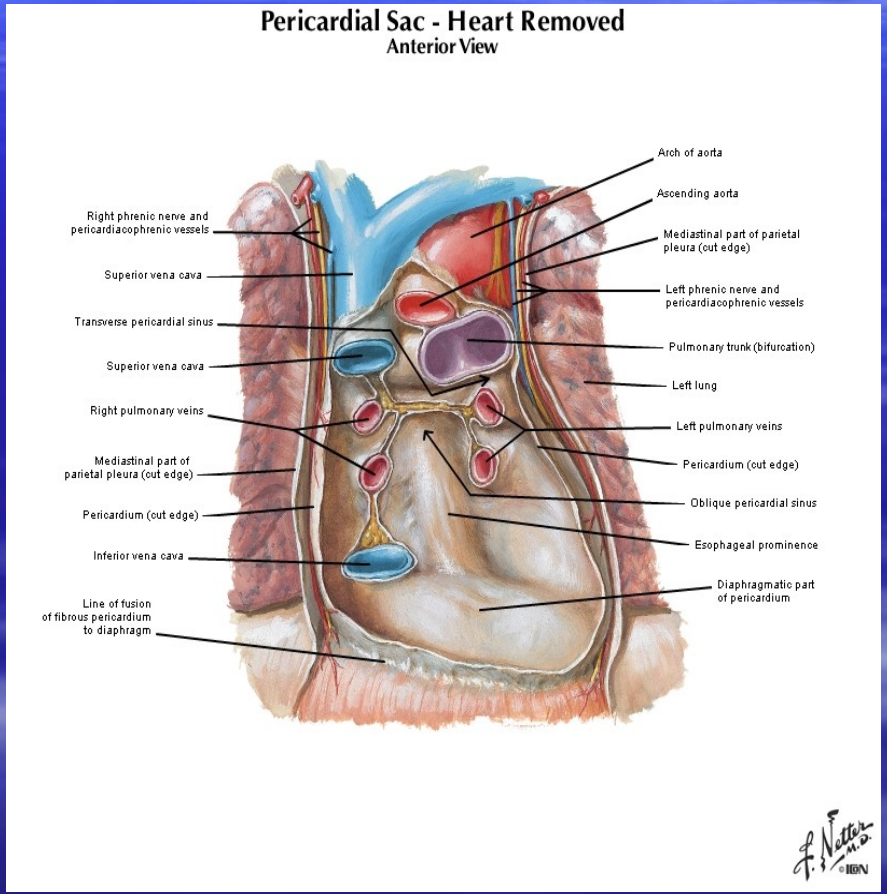
Pericardial disease

Somshekar ganti

Anatomy& histology

2 layers
visceral &parietal
parietal
serous
fibrinous
histology
squamous epithelium and connective tissue
attachments to great vessels , sternum, diaphragm
15-30ml fluid



Function of pericardium

- to limit or prevent acute pathological distension of the heart
- The pericardial attachments maintain the heart in its normal position.
- act as a physical barrier to infections from surrounding organs

Pericardial disease

- Congenital defects
- Pericarditis (dry, effusive, constrictive)
  - infective
  - autoimmune systemic diseases
  - type 2 immune process (post cardiotomy)
- Neoplastic
- Pericardial cysts

congenital defects

- rare 1:10000 autopsy studies
- partial left defects (70%) > right (17%)
- bilateral /complete rare
- complications
  - herniation
  - strangulation
  - might need repair (dacron /gortex)

pericarditis

- acute

  fever, malaise, chestpain, myalgia, SOB
- chronic
  - Effusive
  - constricitve
- causes:
  - infective(viral/bacterial/fungal/parasitic)
  - systemic immune diseases(SLE)
  - Type2 immune process(rheumatic fever,dresslers, post cardiotomy)
  - systemic diseases(uremia,hypothyroidism)
  - radiation injury
  - trauma (direct&indirect)
  - malignant

pericardial effusion

incidence of pericardial effusion post caridac surgery
50-85%
peak incidence at endof 1st post op week

Pericardial effusion after cardiac surgery: incidence, site, size, and haemodynamic consequences.

M Pepi, M Muratori, P Barbier, E Doria, V Arena, M Berti, F Celeste, M Guazzi and G Tamborini

Heart 1994;72;327-331

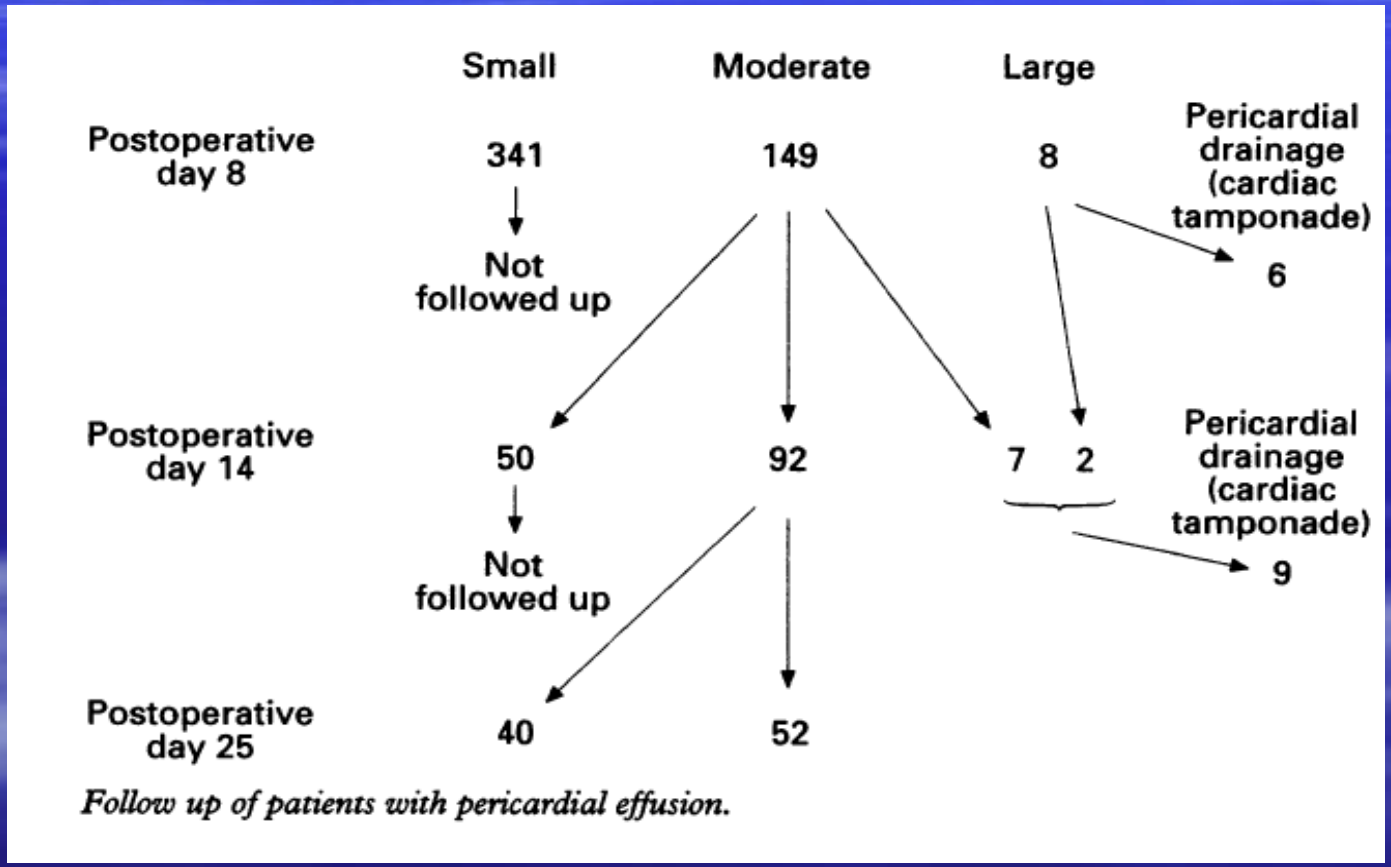
Table 1 Incidence and size of pericardial effusion

	Total (%)	*CABG (%)*	*Valve replacement (%)*	*Other (%)*
Number	780	413	324	43
No effusion	282 (36)	104 (25)*	155 (48)	23 (53·5)
Effusion:	498 (64)	309 (75)*	169 (52)	20 (46·5)
Small	341 (68·4)	196 (64)†	128 (76)	17 (85)
Moderate	149 (30)	109 (35)†	38 (22)	2 (10)
Large	8 (1·6)	4 (1)	3 (2)	1 (5)

CAGB, coronary artery bypass grafting. *P < 0·001 compared with valve replacement group and other group. †P < 0·005 compared with valve replacement group and other group.

803 patients :430 CABG, 330 Valves 43 others
echo : preop and 8 days post op
498(64%) had effusion
more in CABG
small (68%),moderate (29.8%), large (1.6%)
loculated (57.8%)>diffuse(42.2%)
7 moderate effusions developed into large effusions
cardiac tamponade15(1.9%) more in valve surgery

post op effusion



Follow up of patients with pericardial effusion.

cardiac tamponade

- rare complication
- assocaiated with high morbidity and mortality
- incidence 0%-8.8%
- more common after valve surgery
- early and late
- Beck’s Triad,pulsus parodoxus
- echo signs :diastolic collapse of RA,RV,LV,dilated IVC
- Urgent surgical intervention needed

caridac tamponade

Postoperative Cardiac Tamponade in the Modern Surgical Era

Jeffrey T. Kuvin, MD, Nibal A. Harati, MD, Natesa G. Pandian, MD, Robert M. Bojar, MD, and Kamal R. Khabbaz, MD

Department of Medicine, Division of Cardiology, and Department of Surgery, Division of Cardiothoracic Surgery, Tufts New England Medical Center Hospitals, Tufts University School of Medicine, Boston, Massachusetts

4561 consecutive patients in Boston, MA
First time cardiac surgery
48 patients with moderate to large effusions
36 signs of tamponade

Table 1. Characteristics of Patients With Cardiac Tamponade After Open Heart Surgery[a]

Characteristic	Value
Postoperative cardiac tamponade patients, n	36
Age, y	61 ± 3
Gender, n (%)	
Male	16 (45)
Female	20 (55)
Cardiac tamponade, postoperative day	10 ± 1
"Early" cardiac tamponade, n (%)	8 (22)
"Late" cardiac tamponade, n (%)	28 (78)
Preoperative heparin/warfarin, n (%)	17 (47)
Type of heart surgery, n (%)	
CABG	9 (24)
Valve ± CABG	26 (73)
Other	1 (3)
Incidence of cardiac tamponade, %	
CABG	0.2
Valve ± CABG	0.6
Other	0.1

[a] Mean ± standard error.

CABG = coronary artery bypass grafting; Other = aorta, congenital, transplant surgery; Valve = mitral, tricuspid, aortic replacement/repair.

Table 2. Surgical and Postoperative Parameters in Patients With Cardiac Tamponade[a]

Parameter	Value
Prior open heart sugery, n (%)	0 (0)
Timing of surgery, n (%)	
Elective	17 (47)
Emergent	19 (53)
Duration of bypass machine, min	143 ± 9
Cross-clamp time, min	87 ± 6
Lowest systemic temperature, °C	27 ± 1
Surgical use of anti-fibrinolytic agents, n (%)	34 (95)
Heparin/warfarin within postoperative day 3, n (%)	30 (84)
Total chest-tube drainage, cc	711 ± 70
Time to postoperative chest-tube removal, h	40 ± 4

[a] Mean ± standard error.

Table 3. Echocardiographic Characteristics of Pericardial Effusions in Patients With Postoperative Cardiac Tamponade[a]

Characteristic	Value
Size of effusion, n (%)	
Small	2 (6)
Medium	21 (58)
Large	13 (36)
Estimated volume of effusion, cc	570 ± 37
Location of effusion, n (%)	
Circumferential	16 (46)
Posterior	18 (49)
Other	2 (5)

[a] Mean ± standard error.

Table 6. Management and Outcome of Patients With Postoperative Cardiac Tamponade

Variable	n (%)
Treatment of cardiac tamponade	
Supportive medical therapy	3 (8)
Percutaneous drainage	14 (39)
Surgical intervention	19 (53)
Patient outcome	
Hospital discharge	35 (97)
In-hospital death	1 (3)

Conclusions. CT after OHS is more common following valve surgery than CABG alone and may be related to the preoperative use of anticoagulants. Females appear to be at higher risk for developing early postoperative CT. When diagnosed and treated promptly, postoperative CT should not significantly increase mortality.

management of pericardial effusion

- Percutaneous catheter drainage
- Subxhiphoid pericardiostomy
- VATS pericrdial window
- Resternotomy
- Conservative management

Management

- **Subxiphoid Drainage**
  - 5 cm upper abdomen midline incision
  - Through linea alba, excising xiphisternum
  - Excise 3+ cm piece of pericardium
  - Insert drain and close
  - can create a pericardioperitoneal window
  - Advantages :under LA, supine, unstable patient

Pericardial Effusion: Subxiphoid Pericardiostomy Versus Percutaneous Catheter Drainage

Keith B. Allen, MD, L. Penfield Faber, MD, William H. Warren, MD, and Carl J. Shaar, PhD

Department of Cardiovascular and Thoracic Surgery, Rush-Presbyterian-St. Lukes Medical Center, Chicago, Illinois

117 patients with Cardiac Tamponade
subxhipoid pericardiostomy (94)
percutaneous drainage in (23)
malignant effusions 75(64%):benign 42(36%)

Table 2. Results of Subxiphoid Pericardiostomy and Percutaneous Catheter Drainage[a]

Variable	Subxiphoid Pericardiostomy (n = 94)	Percutaneous Catheter Drainage (n = 23)	*p* Value (χ^2 analysis)
Mortality rate	0 (0/94)	4.3% (1/23)	< 0.042
Complication rate	1.1% (1/94)	17.3% (4/23)	< 0.001
Recurrence rate	1.1% (1/94)	33.3% (7/21)	< 0.000

[a] Data presented are percent (number) of patients.

Table 3. Subxiphoid Pericardiostomy for Pericardial Effusions

Study [ref no.]	Date	No. of Patients	Mortality Rate (%)	Morbidity Rate (%)	Recurrence Rate (%)
Moores et al [18]	1995	155	0	0	2.5
Okamoto et al [17]	1993	51	0	0	3.9
Chan et al [16]	1991	22	5	0	9.1
Park et al [15]	1991	10	0	10	0
Sugimoto et al [14]	1990	28	0	0	7.1
Palatianos et al [13]	1989	41	0	0	2.4
Reitknecht et al [12]	1985	46	0	0	4.5
Ghosh et al [10]	1985	108	2	5.5	4.6
Levin and Aaron [9]	1982	28	0	7.0	7.0
Prager et al [8]	1982	25	1	0	0
Santos and Frater [6]	1977	46	0	0	0

ref = reference.

Table 4. Percutaneous Catheter Drainage of Pericardial Effusions

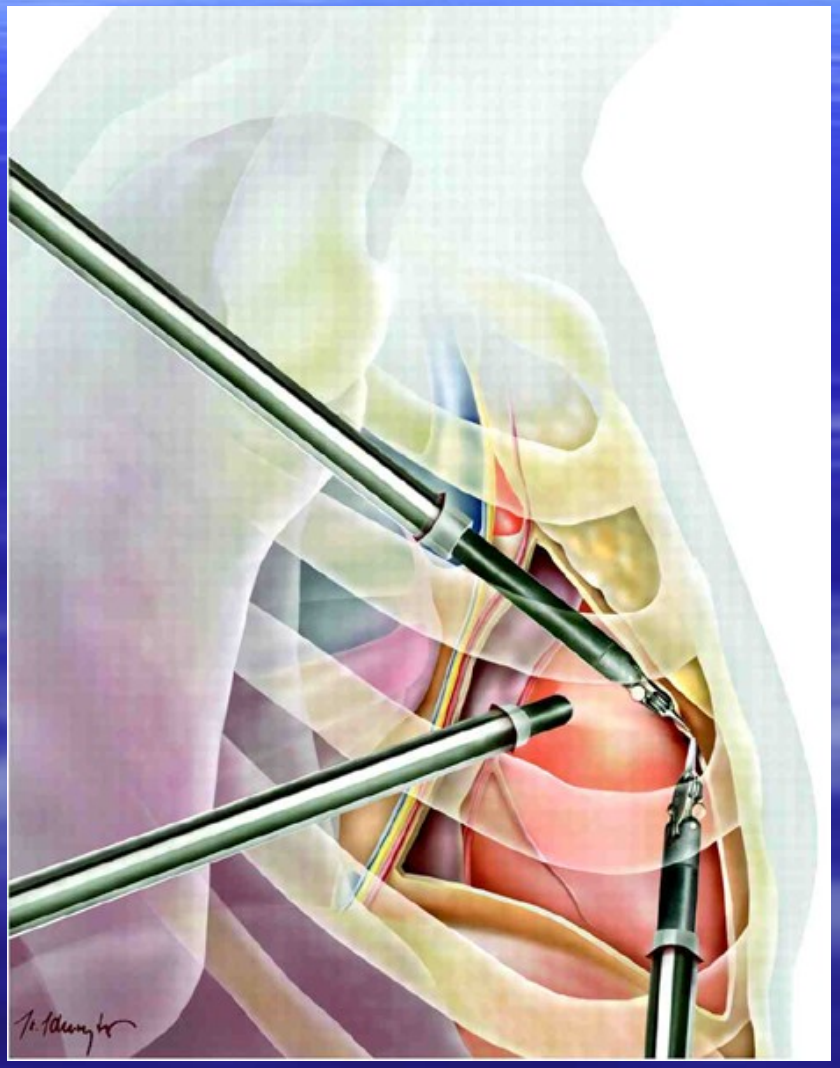
Study [ref no.]	Date	Technique	No. of Patients	Mortality Rate (%)	Morbidity Rate (%)	Recurrence Rate (%)
Allen	Present series	Catheter	23	4.3	17.4	33.3
Celermajor et al [22]	1991	Catheter	36	3.0	5.6	19.4
Kopecky et al [23]	1986	Catheter	42	0	2.4	24.0
Shephard [27]	1987	Catheter/sclerosis	58	0	10.3	17.0
Davis [28]	1984	Catheter/sclerosis	33	0	0	0
Ziskind et al [24]	1993	Balloon/pericardiostomy	50	2.0	20.0	4.0
Lemmon and Ziskind [25]	1993	Balloon/pericardiostomy	81	0	14.0	11.0
Di Segni et al [26]	1995	Balloon/pericardiostomy	8	0	12.5	0

ref = reference.

overall mortality 4.3%
complication 17.4%
recurrence rate 33%

VATS Pericardial Window

- ***Advantages***
  - Longer lasting drainage
  - Concurrent intrathoracic procedures
- ***Disadvantages***
  - Lateral decubitus
  - Single lung ventilation



VATS vs Subxiphoid

Comparative Study of Subxiphoid Versus Video-Thoracoscopic Pericardial "Window"

Patrick K. H. O'Brien, MD, John C. Kucharczuk, MD, M. Blair Marshall, MD, Joseph S. Friedberg, MD, Zhen Chen, PhD, Larry R. Kaiser, MD, and Joseph B. Shrager, MD

Section of General Thoracic Surgery and Department of Biostatistics and Epidemiology, University of Pennsylvania School of Medicine, and Department of Surgery, Philadelphia Veterans Affairs Medical Center, Philadelphia, Pennsylvania

retrospective study
single institute , 5 surgeons , study period 1992-2002
76 patients (71 included in the study)
56 subxiphoid :15 thoracoscopic
cardiac tamponade was present 80%

Table 3. Comparison of Perioperative and Postoperative Results[a]

	Thoracoscopic Pericardial Window (n = 15)	Subxiphoid Drainage (n = 56)	*p* Value
Anesthesia time (min)	117.1 ± 32.4	81.1 ± 25.5	< 0.001[b]
Extubated at the conclusion of the operation	15 (100%)	49 (91%)[c]	1.000
Additional procedure at pericardial drainage	10 (67%)	18 (32%)	0.020[b]
Duration of chest tube(s)	3.3 ± 1.4	4.0 ± 1.6	0.117
Pericardium sclerosed	0 (0)	5 (9)	0.577
Total amount drained (mL)	735 ± 742	433 ± 417	0.026[b]
Length of stay	12.4 ± 22.8	10.4 ± 12.2	0.640
Morbidity	7 (47)	29 (52)	0.777
Procedural morbidity	4 (27)	1 (2)	0.006[b]
Mortality	0 (0)	8 (14)	0.189

[a] Data are presented as mean ± standard deviation or number (percent). [b] *p* value < 0.05. [c] Excludes patients with ongoing respiratory failure.

Table 4. Crude Follow-Up, Survival, and Recurrence Data[a]

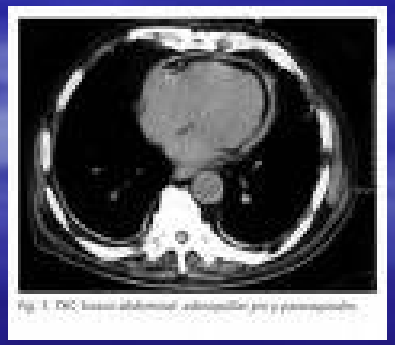
	Thoracoscopic Pericardial Window (n = 15)	Subxiphoid Drainage (n = 56)	*p* Value
Follow-up available	13 (87)	54 (96)	0.194
Mean follow-up (mo)	32.0 ± 41.5	19.3 ± 27.5	0.186
Recurrence of effusion	1 (8)	5 (9)	0.673
Median time to recurrence (mo)	21.7	8.0	0.160
Died	9 (60)	43 (77)	0.206

[a] Data are presented as mean ± standard deviation or number (percent).

conclusion:operative time and minor procedural morbidity higher with VATS but better long term results as compared to subxiphoid drainage

Constrictive pericarditis

- long-term consequence of either acute or chronic forms of pericarditis
- thickened fibrotic pericardium, of whatever cause, impedes normal diastolic filling
- Causes:
- idiopathic
- infectious
- radiation induced
- post surgical



symptoms

- due to decreased cardiac output (fatigue,hypotension,tachycardia)
- venous congestion(raised JVP, hepatomegaly,ascites ,oedema)
- pulmonary venous congestion(SOB, orthopnea,cough)

diagnosis

- CXR PA &lateral
- Calcified pericardium in 50%
- ECG :low QRS, Twave inversion, P mitrale
- ECHO
- CT and MRI more helpful

management

- progressive disease
  - Approach
  - **Sternotomy or thoracotomy**
- With or Without CPB
  - **Extent:**
  - ***Phrenic to phrenic***
  - ***Phrenic to left pulmonary vein***
  - ***Diaphragmatic***
  - ***In general: as much as you can***

Constrictive Pericarditis in the Modern Era

Evolving Clinical Spectrum and Impact on Outcome After Pericardiectomy

Lieng H. Ling, MBBS, MRCP; Jae K. Oh, MD; Hartzell V. Schaff, MD; Gordon K. Danielson, MD; Douglas W. Mahoney, MSc; James B. Seward, MD; A. Jamil Tajik, MD

- *366 patients from 1936 – 1995*
- *135 patients 1985-95*
- *Perioperative 30-day mortality 6%*
- *5 year survival 71%*
- *10 yr survival 52%*

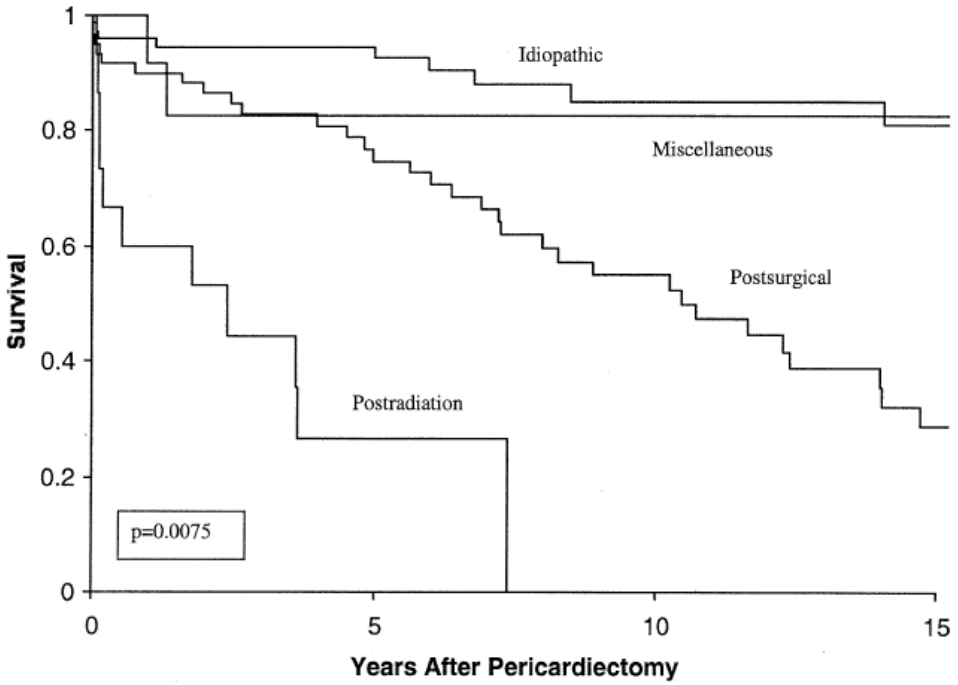
General Cardiology

Constrictive Pericarditis: Etiology and Cause-Specific Survival After Pericardiectomy

Stefan C. Bertog, MD,* Senthil K. Thambidorai, MD,* Kapil Parakh, MD,* Paul Schoenhagen, MD,* Volkan Ozduran, MD,* Penny L. Houghtaling, MS,† Bruce W. Lytle, MD, FACC,‡ Eugene H. Blackstone, MD, FACC,‡ Michael S. Lauer, MD, FACC,* Allan L. Klein, MD, FACC*

Cleveland, Ohio

single institution
163 patients
24 year study period
cuases :idiopathic 75(46%),
post cardiac surgery 60(37%)



Number at risk				
Idiopathic	75	48	30	21
Miscellaneous	12	10	10	5
Post-surgical	60	38	24	9
Post-radiation	15	6	0	0

Figure 1. Kaplan-Meier curves showing a significant difference (log-rank test, p = 0.0075) in overall survival of patients after pericardiectomy, based on the presumed cause of constrictive pericarditis.

pericardial cysts

most frequent benign "tumors"
incidental finding on a routine roentgenogram.
25 to 30 %of the patients will have chest pain, dyspnea, cough, or paroxysmal tachycardia.
occur in third or fourth decade of life
 incidence equall among men and women.
The right costophrenic location most common,
rarely does the cyst connect with the pericardial cavity
surgery only for symptoms

summary

- pericarditis
- pericardial effusion and cardiac tamponade
- surgical approaches to management
- literature review

thank you