

# **Pericardial Diseases**

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# Contents

<b>List of abbreviations</b> .....	--
<b>List of tables</b> .....	--
<b>List of figures</b> .....	--
<b>Introduction</b> .....	١
<b>Aim of the essay</b> .....	٣
<b>Chapter (١):</b>	
Anatomical and physiological considerations of the pericardium.....	٤
<b>Chapter (٢):</b>	
Acute pericarditis.....	١١
<b>Chapter (٣):</b>	
Pericardial effusion.....	٣٨
<b>Chapter (٤):</b>	
Cardiac tamponade.....	٥٨
<b>Chapter (٥):</b>	
Pericardial constriction.....	٨٠
<b>Summary</b> .....	١٠٧
<b>References</b> .....	١١٠
<b>Arabic summary</b> .....	--

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## *List of tables*

Table	Subject	Page
(١)	Causes of pericarditis	١٢
(٢)	Phases of electrocardiographic abnormalities in acute pericarditis	٢٠
(٣)	Clinical characteristics of acute pericarditis versus acute ischemia	٢١
(٤)	Electrocardiographic manifestations in acute pericarditis versus myocardial infarction and early repolarization	٢٢
(٥)	Indications for hospitalization in acute pericarditis	٢٦
(٦)	Medical therapy for acute pericarditis	٣١
(٧)	Tapering regimen for prednisone	٣٢
(٨)	Causes of pericardial effusion	٣٨
(٩)	Causes of cardiac tamponade	٥٨
(١٠)	Causes of pericardial constriction	٨٠
(١١)	Diagnostic approach to differentiate between constrictive pericarditis and restrictive cardiomyopathy	٩٩

## *List of figures*

<b>Fig</b>	<b>Subject</b>	<b>age</b>
(١)	A diagram of the long axis of the heart at right angles to the outlets shows the arrangement of the pericardium	٦
(٢)	Pressure-volume curve of the normal pericardium	٧
(٣)	Pericardial pressure–volume (or strain–stress) curves	٨
(٤)	Overview of management of acute pericarditis	١٥
(٥)	Electrocardiogram in acute pericarditis	١٩
(٦)	Two-dimensional transthoracic echocardiogram showing the parasternal long-axis view in a patient diagnosed as having acute pericarditis.	٢٤
(٧)	Short-axis cardiac magnetic resonance imaging with delayed gadolinium enhancement in a patient with acute pericarditis	٢٥
(٨)	Gross anatomic features of reccurent pericarditis	٣٣
(٩)	Cardiac computed tomography (CT) and cardiac magnetic resonance imaging in reccurent pericarditis	٣٥
(١٠)	Relationship between intracardiac filling pressures and intrapericardial pressure and cardiac output in cardiac tamponade	٤٠
(١١)	Water bottle heart in pericardial effusion	٤٥
(١٢)	Sinus tachycardia with electrical alternans	٤٦
(١٣)	Fast semiquantitative evaluation of pericardial effusion by transthoracic echocardiography.	٤٨
(١٤)	Computed tomography of a pericardial effusion	٥٠
(١٥)	Triage of pericardial effusion for clinical practice	٥٢
(١٦)	Right atrial pressure waveform (٥٠ mm Hg scale) in a patient with cardiac tamponade showing a blunted Y-descent	٦٤
(١٧)	Overview of management of cardiac tamponade	٦٥
(١٨)	Two-dimensional echocardiographic features of cardiac tamponade.	٦٩
(١٩)	Doppler echocardiographic features in cardiac tamponade	٧١

(٢٠)	MRI in patient with cardiac tamponade ١٠ days following late rescue PTCA for anterior myocardial infarction.	٧٢
(٢١)	Hemodynamics of acute cardiac tamponade by cardiac catheterization	٧٤
(٢٢)	Overview of management of pericardial constriction	٨٤
(٢٣)	Pericardial calcification on chest radiography in a case with pericardial constriction	٨٨
(٢٤)	Examples of constrictive pericarditis. The transthoracic apical four chambers (top) and the transesophageal four chambers view (bottom)	٨٩
(٢٥)	Schematic diagram of Doppler echocardiographic features in constrictive pericarditis vs restrictive cardiomyopathy.	٩١
(٢٦)	Tissue Doppler imaging: prominent Ea-wave (peak early velocity of longitudinal axis expansion) in case of CP (top) and diminutive Ea-wave in case of restrictive cardiomyopathy (bottom).	٩٢
(٢٧)	Increased pericardial thickness (arrows) can be visualized on computed tomogram in pericardial constriction	٩٣
(٢٨)	Cardiac MRI: uniform pericardial thickening over right and left ventricle in case of CP	٩٤
(٢٩)	Tracing from a patient with mild constrictive pericarditis shows prominent y descent which becomes deeper during inspiration. P SVC and Q SVC represent the pressure and velocity recorded from the superior vena cava.	٩٦
(٣٠)	High fidelity left ventricular pressure tracing from a patient with severe calcific constrictive pericarditis	٩٧

## *List of abbreviations*

AIDS	quired immunodeficiency syndrome
ANA	Antinuclear antibody
AO	Aortic pressure
AP	Acute pericarditis
BNP	Brain natriuretic peptide
CABG	Coronary artery bypass graft
CEA	Carcino embryonic antigen
CK	Creatine kinase
CMR	Cardiac magnetic resonance
CMV	Cytomegalo virus
COPE	<b>Col</b> chicin for acute <b>pericarditis</b>
CORE	<b>Col</b> chicin for <b>recurrent pericarditis</b>
C P	Constrictive pericarditis
C-RP	C-reactive protein
CT	Computed tomography
CYP	Cytochrome P
CXR	Chest-X ray
DT	Deceleration time
EBV	Ebstein barr virus
ECG	Electrocardiogram
ESC	European society of cardiology
ESR	Erythrocyte sedimentation rate
EXP	Expiration
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
HP	Hepatic vein
HU	Hounsfield unit
INSP	Inspiration
IVC	Inferior vena cava
LA	Left Atrium
LDH	Lactic acid dehydrogenase



LV	Left ventricle
LVEDP	Left ventricular end diastolic pressure
MI	Myocardial infarction
MV	Mitral valve
NSAIDs	Nonsteroidal anti inflammatory drugs
PCR	Polymerase chain reaction
PCWP	Pulmonary capillary wedge pressure
PE	Pericardial effusion
RA	Right atrium
RV	Right ventricle
RVEDP	Right ventricular end diastolic pressure
SLE	Systemic lupus erythematosus
SVC	Superior vena cava
TEE	Transesophageal echocardiography
TTE	Transthoracic echocardiography
VATS	Video assisted thorathic surgery

# INTRODUCTION

The pericardium is a bilayered, flask-shaped sac structure, containing the heart and roots of great blood vessels (*Goldstein, २००३*).

The pericardium serves many important, subtle functions. It limits overdistention of the cardiac chambers and facilitates interaction and coupling of the ventricles and atria. It prevents excessive torsion and displacement of the heart, minimizes friction with surrounding structures, and is an anatomical barrier to the spread of infection from contiguous structures (*Hoit, २००४*).

Pericardial diseases can present clinically as acute pericarditis, pericardial effusion, cardiac tamponade, and constrictive pericarditis. Patients can subsequently develop chronic or recurrent pericarditis. Structural abnormalities including congenitally absent pericardium and pericardial cysts (*Khandaker et al, २०१०*).

The clinical syndrome of pericarditis results from inflammation of the pericardium. It is diagnosed in approximately ०,१% of hospitalized patients and in ० % of patients admitted to the emergency department with non cardiac chest pain (*Khandaker et al, २०१०*).

The pericardial sac contains approximately २० ml to ๔๐ ml of serous fluid. Pericardial effusion defines the presence of an abnormal amount and /or character of fluid in the pericardial space

and can be occur as a result of almost any pericardial disorder (*Christie and Sawatzky, १००१*).

Cardiac tamponade is a life-threatening hemodynamic condition resulting from pericardial effusions that increase intra pericardial pressure sufficiently to externally compress and restrict cardiac chamber filling, constrain cardiac output and induce backward failure (*Goldstien, १००३*).

Pericardial constriction occurs when the fibrotic pericardium impedes normal diastolic filling because of loss of elasticity. Usually the pericardium is considerably thickened, but it can be of normal thickness in up to १० % of cases (*Imazio et al, १००१*).

## AIM OF THE ESSAY

The aim of the essay is to provide a review of different pericardial diseases including classifications, causes and management.

## ANATOMICAL CONSIDERATIONS OF THE PERICARDIUM

The pericardium is a bilayered, flask-shaped sac structured of an inner visceral layer made up of a thin elastic membrane of mesothelial cells and a thick, stiff outer parietal layer consisting predominantly of collagen and elastic fibers (*Goldstein, २००६*).

Between the two pericardial layers is a potential “space” that normally contains a small (approximately २० to ๔๦ ml) amount of pericardial fluid which physiologically resembles an ultrafiltrate of plasma. The pericardium envelops the cardiac chambers but does not directly attach to them at any point. Instead, at the base of the heart, the serous pericardium reflects up and around the great vessels, forming the pericardial sinuses and recesses, as shown in Figure १ (*Hurst, १९९८*).

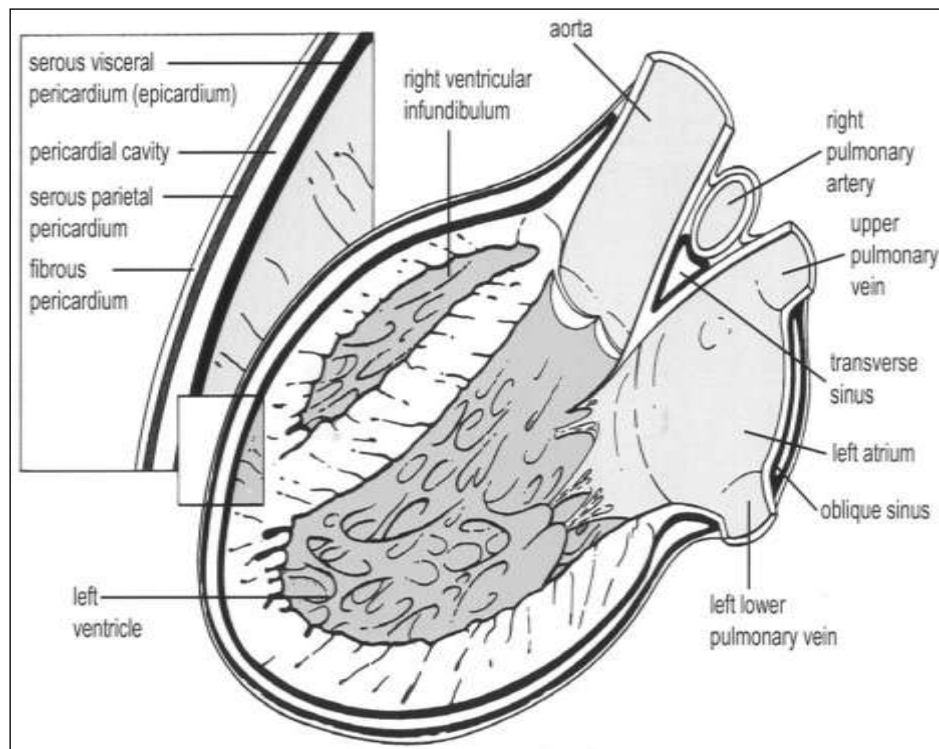
The pericardium is in the shape of an inverted U and the blind pouch, which is enclosed between the limbs of the U shape of the pericardium and lies behind the left atrium, is known as the oblique sinus. The passage between the venous and arterial mesocardia, that is, between the aorta and pulmonary trunk anteriorly and the atria posteriorly, is the transverse sinus (*Goldstein, २००६*).

The transverse sinus, is a small tubular recess reflecting the pericardial outpouchings necessary to allow entrance of the superior

vena cava and exit from the pericardium of the pulmonary trunk and aorta. The oblique sinus is a larger pericardial outpouching in which the pericardium splits to permit passage of the four pulmonary veins and the vena cavae (*Spodick, १००१*).

It is noteworthy that the left atrium (LA) is not entirely an “intrapericardial” structure. The pericardium has important ligamentous attachments to surrounding thoracic structures. The external fibrous layer of the pericardium is anchored to the diaphragm by the pericardiophrenic ligament and to the sternum by the variable sternopericardial ligaments. Posteriorly, the fibrous pericardium is bound by loose connective tissue to the structures of the posterior mediastinum. These connections provide structural support for the heart within the thoracic cage and thereby limit excessive cardiac motion, particularly with changes in body position (*Goldstein, १००४*).

The main arterial supply of the pericardium is the pericardiophrenic artery, a branch of the internal thoracic artery. Venous drainage occurs by way of pericardiophrenic veins which are tributaries of the brachiocephalic veins. Sensory innervation is provided by the phrenic nerves with vasomotor innervation from the sympathetic trunks (*Spodick, १००१*).



**Fig. (1):** A diagram of the long axis of the heart at right angles to the outlets shows the arrangement of the pericardium (*Hurst, 1994*).

### **Physiological considerations of the pericardium**

The pericardium is not vital for life, as no major adverse consequences follow congenital absence or surgical removal of the pericardium. However, the pericardium serves many important, subtle functions. It limits distention of the cardiac chambers and facilitates interaction and coupling of the ventricles and atria, such that changes in pressure and volume on one side of the heart influence pressure and volume on the other side. Limitation of cardiac filling volumes by the pericardium may also limit cardiac output and oxygen delivery during exercise (*Hoit, 2004*).