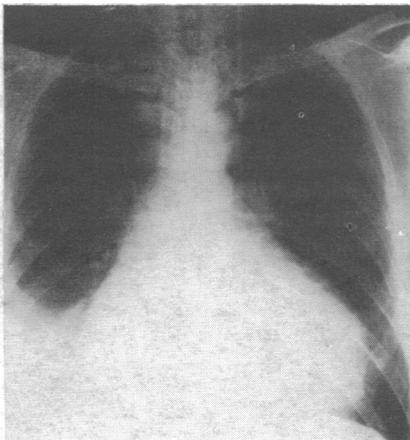


## PERICARDIAL ASPIRATION



Pericardial aspiration is seldom indicated, and many doctors will neither have witnessed the procedure during training nor have performed it later in their careers. It is a potentially hazardous procedure and should not be performed except in emergencies unless facilities for resuscitation are available. Before inserting a needle into the pericardium there must be good evidence that an effusion is present.

### Diagnosis of effusion

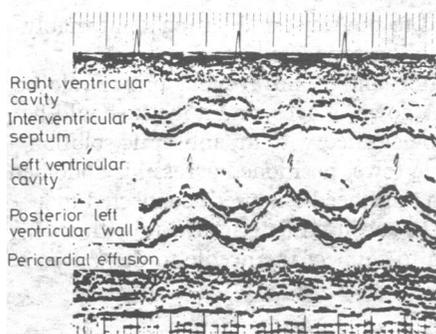


*Clinical signs*—Clues on examination may or may not be present. Three indications are pulsus paradoxus, in which the pulse pressure diminishes during inspiration and increases during expiration; raised jugular venous pressure on inspiration (Kussmaul's sign); and muffled heart sounds.

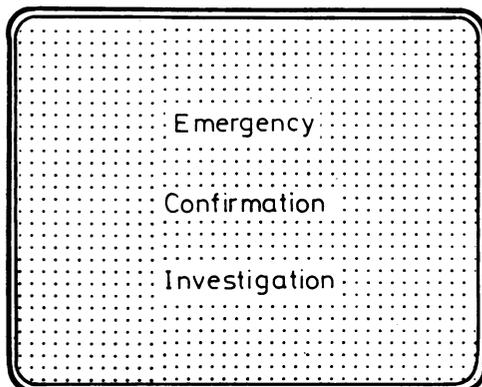
*Chest x-ray films*—In acute tamponade (for example, haemorrhage from trauma) the chest film may show little or no cardiac enlargement. When time has permitted stretching of the pericardium the cardiac silhouette may be grossly enlarged and appear pear-shaped with bulging over the right atrium and apex.

*Echocardiography* is the most reliable method of proving a pericardial effusion, but the results require skilled interpretation. The ultrasonic beam shows a space between the pericardium and the anterior right or posterior left ventricular wall.

*Cardiac catheterisation and angiography* are no longer justifiable for showing an effusion.

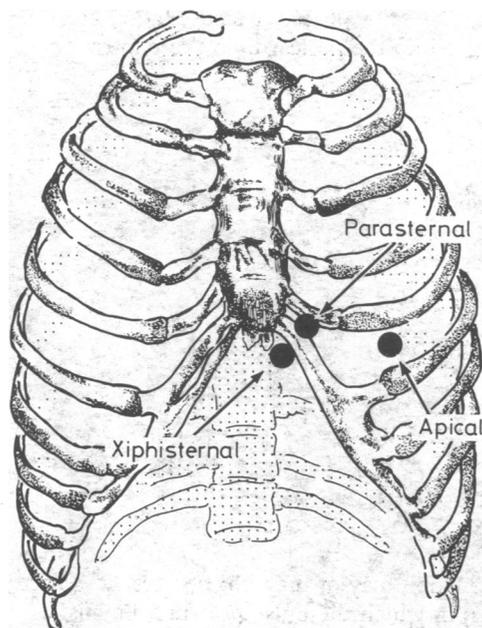


## Indications



- (1) As an emergency procedure to relieve cardiac tamponade.
- (2) To confirm the presence of a pericardial effusion. The availability of echocardiography in most centres has rendered the procedure unnecessary for this purpose.
- (3) To obtain samples of pericardial fluid for analysis—for example, culture, cytology.

## Routes

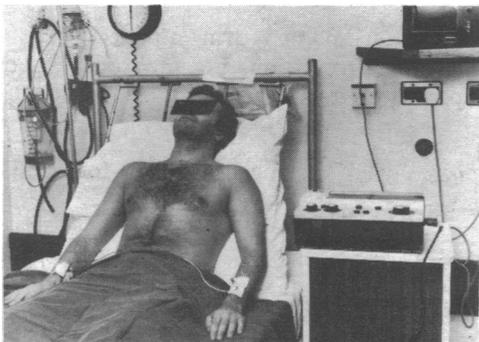


*Xiphisternal route*—The safest route is through the angle between the xiphoid process and the left costal margin. The needle is aimed upward at an angle of  $45^\circ$  to the skin and backward towards the spine between the scapulae. The needle passes through the membranous portion of the diaphragm and enters the pericardium at the inferior surface of the heart over the right ventricle.

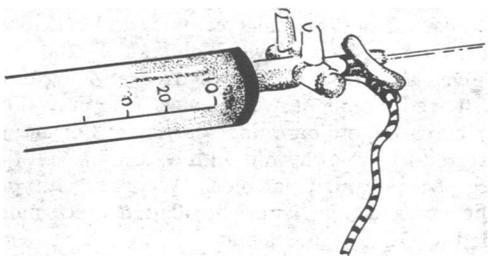
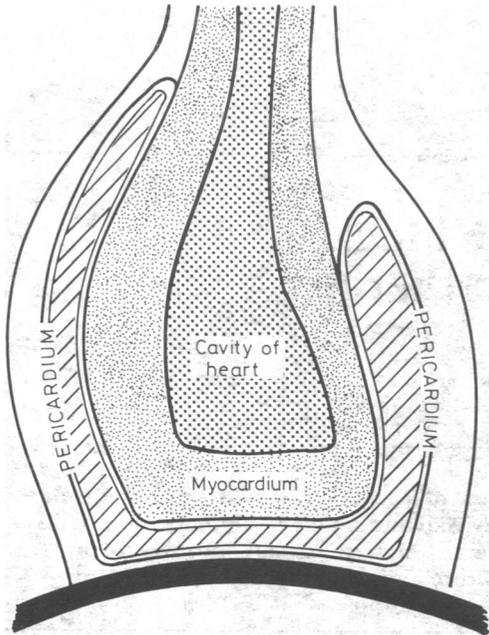
*Apical route*—The needle is introduced at the cardiac apex in the fourth or fifth intercostal space 2 cm medial to the lateral edge of cardiac dullness. It is aimed at right angles to the skin (that is, slightly medially) and slightly upward. This route carries a greater risk of injury to the coronary arteries and contamination of the pleural space when the pericardial fluid is purulent.

*Parasternal route*—The needle is introduced in the fifth left intercostal space just to the left of the sternum and aimed straight backward. The internal mammary artery lies about 2 cm lateral to the sternal edge and the needle must pass medial to this; laceration of the artery is the main complication of this route.

## Procedure



The patient should be undressed to the waist and sitting comfortably in bed at an angle of  $45^\circ$ . He should be connected to an electrocardiograph (ECG) or monitor, and an intravenous line should be inserted for administering drugs. A gown, gloves, and a mask should be worn. The patient's chest should be cleaned with an antiseptic solution—for example, iodine—and a sterile towel positioned across his abdomen and legs. An 18-gauge lumbar-puncture needle is used, connected to a 30-ml syringe via a three-way tap. A sterilised length of wire with an "alligator" clip at each end is used to connect the needle to the V lead of the ECG.



The skin and deep tissues in the direction of the route to be used are infiltrated with 10 ml of lignocaine 2%. The needle is introduced and advanced slowly, aspiration being carried out at frequent intervals, until the pericardial sac is entered and fluid, if present, is drawn into the syringe. If the needle is advanced too far the myocardium will be felt knocking against the tip or will cause the needle to waggle. If this occurs, withdraw the needle—never advance it further.

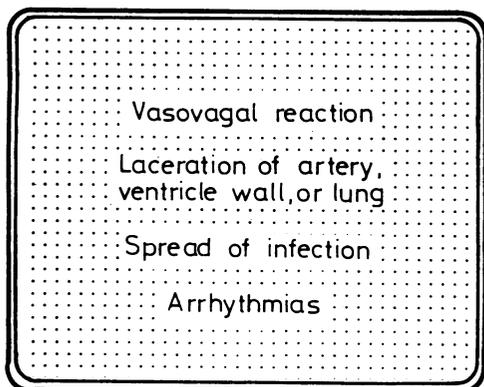
A pair of Spencer-Wells forceps is then clamped to the needle next to the skin to prevent further inadvertent penetration. By using the syringe and three-way tap fluid is aspirated; samples are sent for culture, cytology, and so on.

A bloody effusion may be distinguished from blood aspirated from the heart by placing a sample in a glass specimen bottle. A bloody effusion will not clot.

In cases in which repeated aspiration may be necessary a large needle may be used and a soft plastic cannula passed through this. The needle is then withdrawn, leaving the cannula in the pericardial space.

*The ECG*—The monitor attached to the needle will show a complex like the normal V1 complex until the needle comes into contact with the heart. Contact with the ventricle may cause an injury pattern with ST elevation to appear. Contact with the myocardium may cause ectopic beats, which may be atrial or ventricular in origin depending on the area of the heart that has been touched.

## Complications



Vasovagal reaction (bradycardia, hypotension) may occur after entry of the needle into the pericardium.

Laceration of a coronary artery.

Laceration of the left internal mammary artery.

Laceration of the ventricle wall.

Laceration of the lung.

Spread of infection locally from a purulent effusion.

Arrhythmias.