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Editorial commentary: Pericardiocentesis: No more a subspecialty technique!☆

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Percutaneous pericardiocentesis was introduced during the 19th century. Frank Schuch first described the procedure in 1840. Nowadays it is the preferred technique for the treatment of cardiac tamponade and pericardial fluid collection when clinically indicated for both therapeutic and diagnostic purposes. Although it is essential and life-saving in cardiac tamponade, it is often forgotten in training programs and should be well incorporated in educational programs for all cardiologists, not only interventionalists.

On this basis, the present review [1] in this issue of the Journal is welcome to provide a contemporary look at pericardiocentesis and its role in cardiovascular medicine.

Pericardiocentesis was first developed as a blinded or ECG guided technique by a subxyphoid approach. Nowadays, due to the high possible complication risk, pericardiocentesis should no longer be blind or ECG guided, and essentially it can be performed by echocardiographic guidance to assess the place where the size of pericardial effusion is largest and closest to the thoracic surface or by fluoroscopic guidance especially when cardiac tamponade occurs in the cath lab as a complication of a diagnostic or therapeutic interventional technique [2,3].

Main indications for pericardiocentesis [2–5] include:

1. Cardiac Tamponade (therapeutic and diagnostic pericardiocentesis);
2. Moderate to Large, symptomatic pericardial effusion not responding to medical therapy (therapeutic and diagnostic pericardiocentesis) [6].
3. Suspicion of bacterial or neoplastic etiology of pericardial effusion (diagnostic pericardiocentesis), since the definite diagnosis would require the isolation of the etiological agent in pericardial fluid (or tissue).

The standard technique for pericardiocentesis is guided by echocardiography or fluoroscopy under local anesthesia. Blind procedures must be not be used to avoid the risk of laceration of the heart or other organs, except in very rare situations that are immediately life threatening. An experienced operator and staff should perform pericardiocentesis in a facility equipped for radiographic, echocardiographic, hemodynamic and ECG monitoring.

For **echo-guided pericardiocentesis** the entry site is defined by echocardiography that allows identifying the point of the body surface where the pericardial fluid collection is maximal and closest to the thorax. Use of specific devices may allow monitoring the procedure during all the time (**echo-monitored pericardiocentesis**) [5].

For **fluoroscopic guided pericardiocentesis,** the entry site is sub-xyphoid and the lateral angiographic view provides the best visualization of the puncturing needle, its relation to the diaphragm and the pericardium [4].

To verify the position of the needle or if hemorrhagic fluid is aspirated, it is possible to inject agitated saline during the echo-guided procedure, or a few millilitres of contrast medium under fluoroscopic control to verify the correct position of the needle.

Regardless of the guidance technique, the needle is inserted at the entry site and advanced with gentle aspiration into the pericardial space until fluid is obtained. Then a soft J-tip guidewire is introduced and after dilatation exchanged for a multi-hole pigtail catheter, through which the evacuation of the fluid is done. It is generally recommended not to evacuate a large amount of fluid in order to prevent a rare, but potentially fatal complication of fast pericardiocentesis, named the ***cardiac decompression syndrome*** and manifested by paradoxical hemodynamic deterioration, ventricular dysfunction and pulmonary edema after pericardiocentesis [7]. In order to prevent the complication, it is appropriate to drain pericardial fluid until resolution of the cardiac tamponade (may be assessed by echocardiography or hemodynamic pressures recording) and in any case no more than 500 mL, then to keep pericardial drainage until a daily return <25–30 mL [7].

Pericardiocentesis should be performed by experienced operators and carries a variable risk of complications from 4 to 10% depending on type of monitoring, skills of the operator, and setting (emergency vs. urgent vs. elective). Most common complications include: arrhythmias, coronary artery or cardiac chamber puncture, hemothorax, pneumothorax, pneumopericardium, and hepatic injury [2,4].

Pericardiocentesis is a more dangerous procedure when pericardial fluid is not free and in lateral or posterior located or <10 mm. In these cases, a surgical approach might be safer depending on local expertise and availability [2,4].

Interventional procedures and cancer are growing causes of pericardial effusions and cardiac tamponade. Aging of the popula-

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tion and the widespread use of interventional techniques are main factors contributing to iatrogenic and neoplastic pericardial effusions. On this basis, the demand for pericardiocentesis is growing and this technique should no longer be considered as a subspecialty technique but an essential procedure to be known and performed by all cardiologists as well as cardiac surgeons.

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