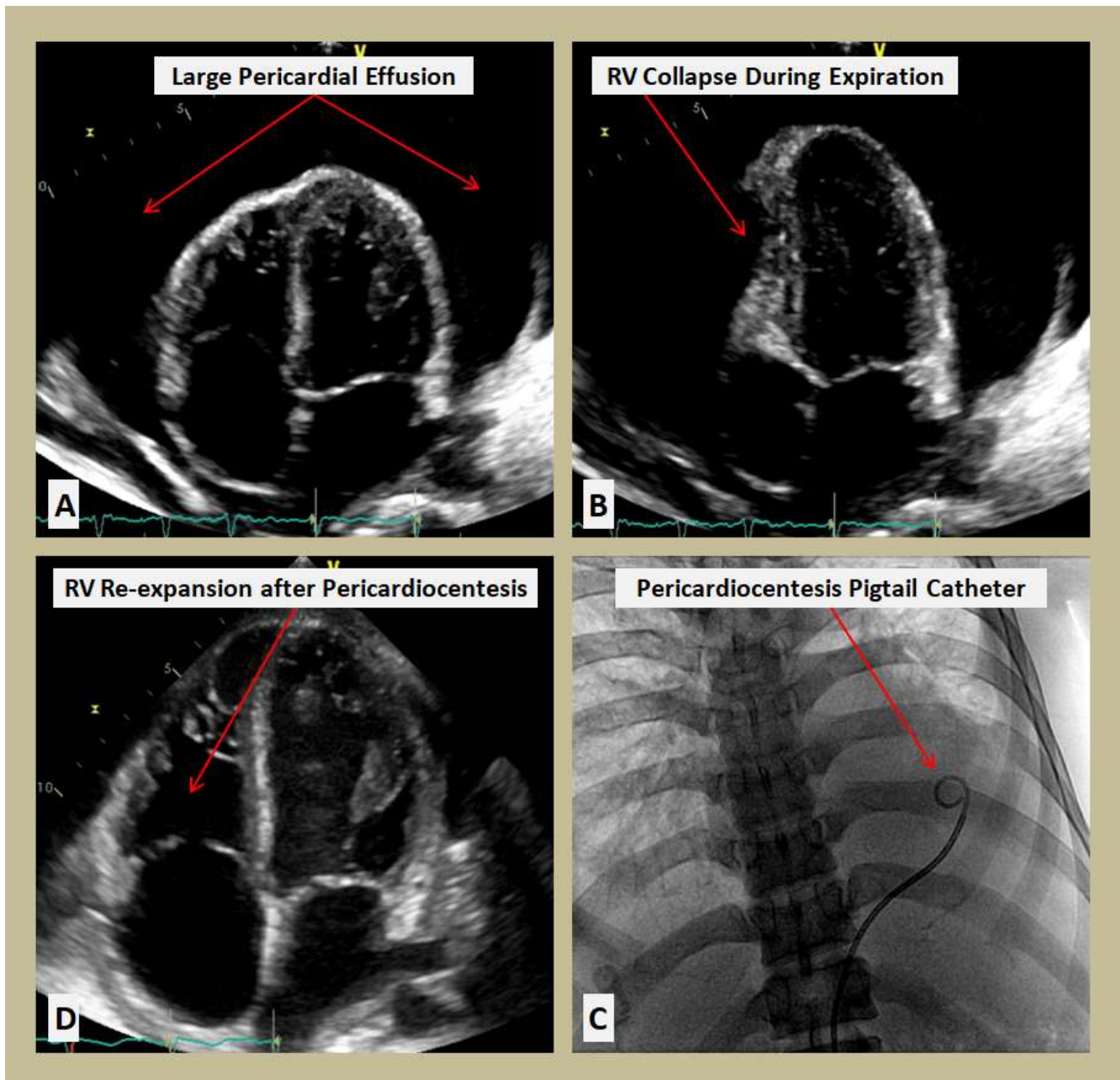


Cardiac Tamponade – *Respirophasic Right Ventricular Collapse!*

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Description

Figure A is a two-dimensional (2-D) transthoracic echocardiography (TTE) image in the apical 4-chamber view, showing a large pericardial effusion. In Figure B, the right

ventricle (RV) is seen completely collapsed during expiration. Figure C demonstrates pericardiocentesis using a Pigtail catheter for drainage. In figure D, the RV is re-expanded following removal of pericardial fluid.

Discussion

The pericardium is a double walled pouch containing the heart and great vessel roots. The visceral and serosal layers of the pericardium form the pericardial space containing a physiologic amount of pericardial effusion, which provides lubrication and protection to the heart. Cardiac tamponade happens when a pericardial effusion increases and becomes large enough, or accumulates rapidly enough, to cause collapse of the right ventricle [1].

The most common causes of cardiac tamponade are pericarditis [2], postprocedural [3], and malignancy [4]. Less frequent causes include endocrine and autoimmune diseases [5, 6], trauma [7], and post myocardial infarction [8]. Infections or purulent pericarditis, especially in immunocompromised patients may progress to tamponade [9].

Adaptive stretching of the pericardium dictates the effects of tamponade. The pericardial space usually contains 50 mL of serous fluid. Rapid accumulation with an extra 100 mL of fluid can lead to critical cardiac compression. During inspiration, negative intrathoracic pressure augments right heart filling, while decreasing left heart filling leads to pulsus paradoxus (greater than 10 mmHg decrease in systolic blood pressure during inspiration). During expiration, however, the intrapericardial pressure overcomes the right ventricular pressure causing right ventricular collapse as shown above [10].

Symptoms of cardiac tamponade can include chest pain, tachypnea, dyspnea, dizziness and collapse. The classic physical findings of cardiac tamponade include Beck's triad of hypotension, jugular venous distention, and muffled heart sounds. Additional clinical signs include tachycardia and pulsus paradoxus [11]. Electrocardiography can reveal decreased voltage with electrical alternans [12].

Several modalities can help with the diagnosis of cardiac tamponade, and multimodality imaging is often needed for optimal characterization of the etiology and pathophysiology of pericardial effusion [13]. Echocardiography, including point of care ultrasound, is most common and convenient initial test with well-established criteria to diagnose tamponade [14]. Cardiac computed tomography (CCT) and cardiac magnetic resonance imaging (CMR) may be used as second line imaging in cases of complex or loculated effusions or for further evaluation of extracardiac diseases [15, 16].

Treatment of cardiac tamponade is drainage with preferably needle paracentesis guided by imaging [17]. If there is intrapericardial bleeding or infection, surgical drainage with pericardiotomy or pericardial window may be needed [18]. For mild cases of tamponade without hemodynamic compromise, such as in idiopathic pericarditis or connective tissue/ inflammatory diseases, nonsteroidal anti-inflammatory drugs (NSAIDs) and colchicine, or steroids, may be used [19].

Conclusion

Cardiac tamponade is a highly morbid condition which requires a high index of suspicion and prompt testing with cardiac imaging, especially echocardiography, to establish the diagnosis and implement prompt life-saving therapies [20].

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