



# Acute Cardiac Tamponade: A Medical Emergency

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## Background

### Cardiac Tamponade – What is it?

A life-threatening emergency categorized by the accumulation of an abnormal amount of fluid in the pericardial sac, causing compression of the heart and subsequent cardiogenic shock.

#### Rapid

- Trauma (penetrating wound)
- Ventricular wall rupture (post-MI)
- Less fluid tolerated
- Hemopericardium

#### Slow

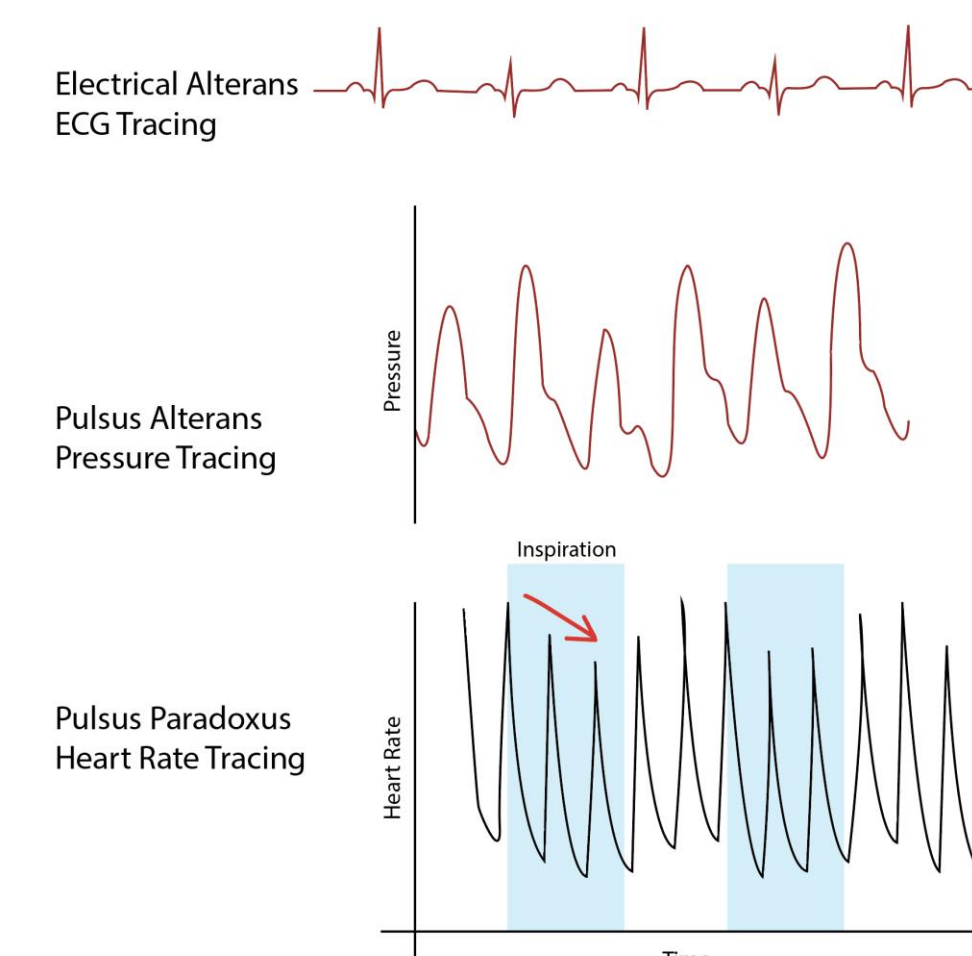
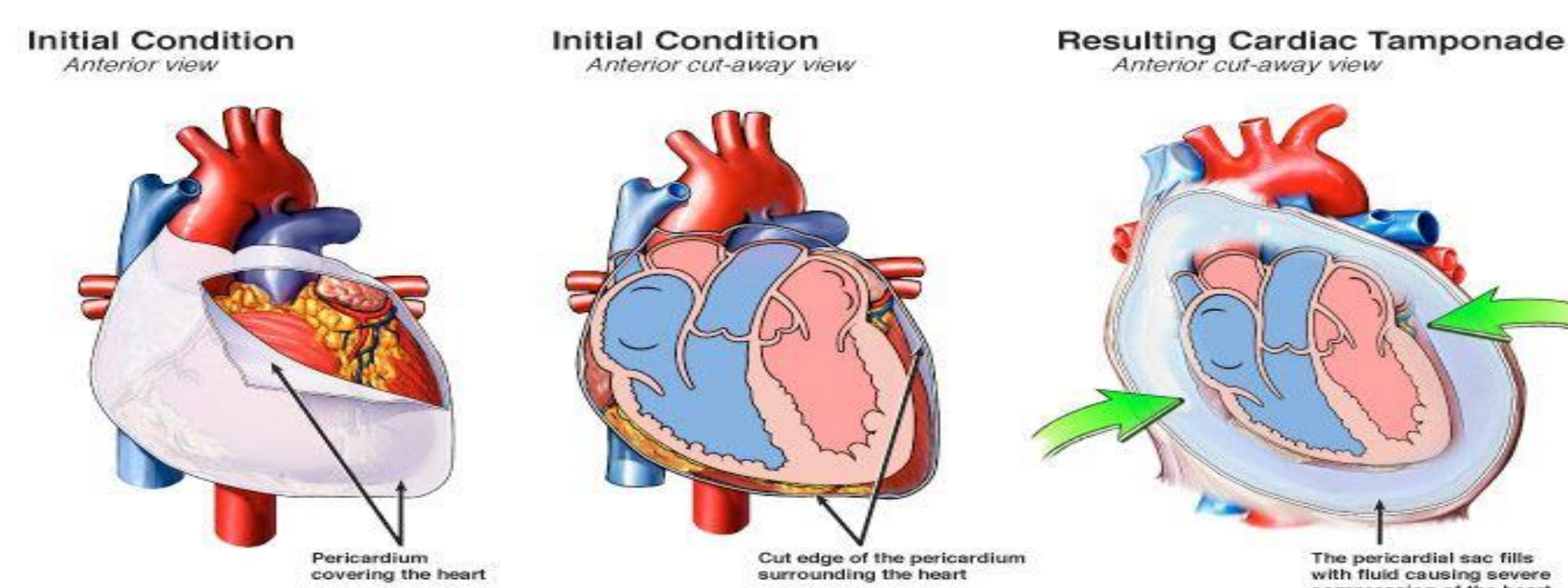
- Autoimmune diseases (Lupus)
- Malignancy
- Infection (TB, myocarditis)
- More fluid tolerated
- Exudate/transudate

### Pathophysiology

↑ pressure of accumulated fluid → compression + ↓ diastolic filling

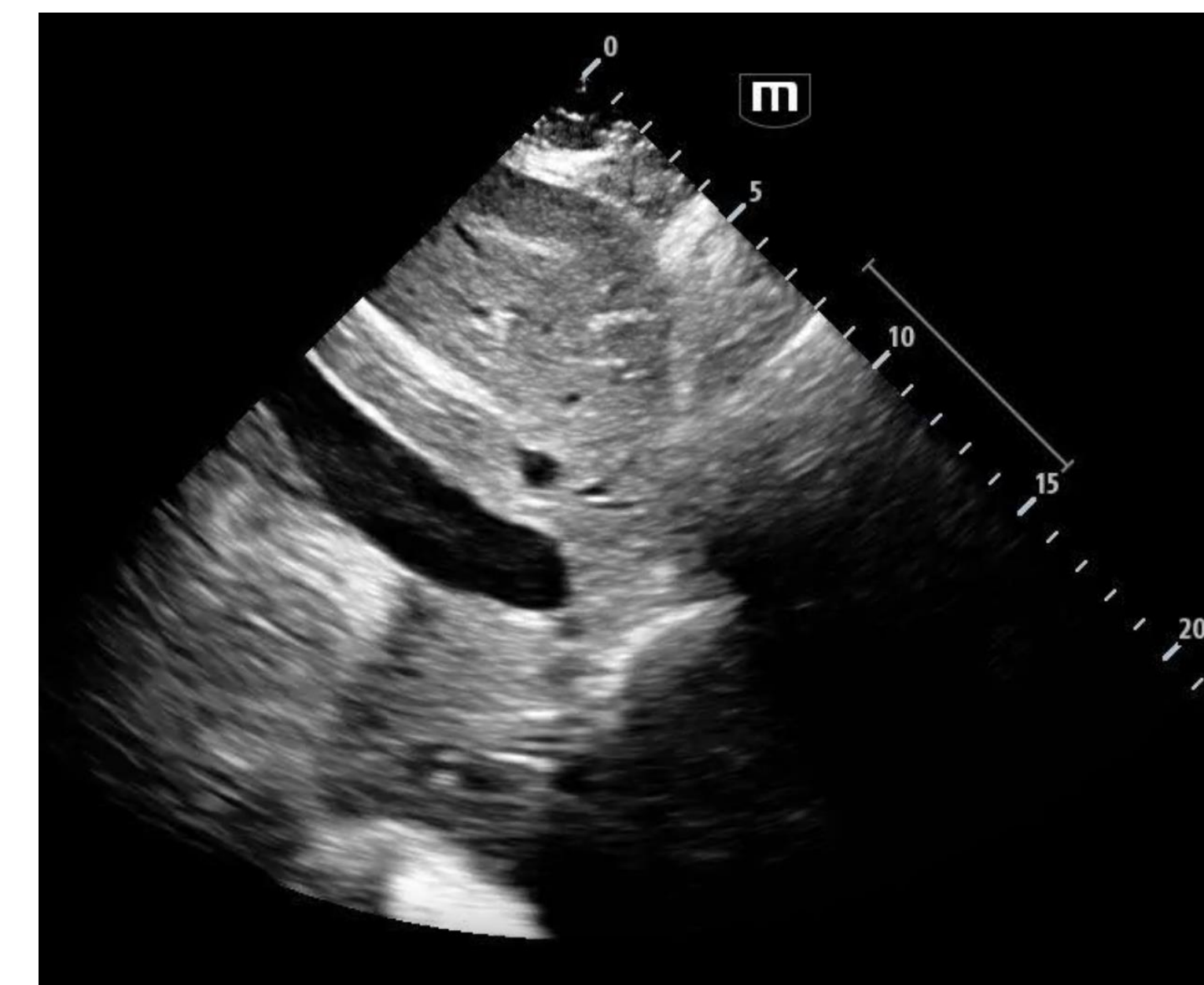
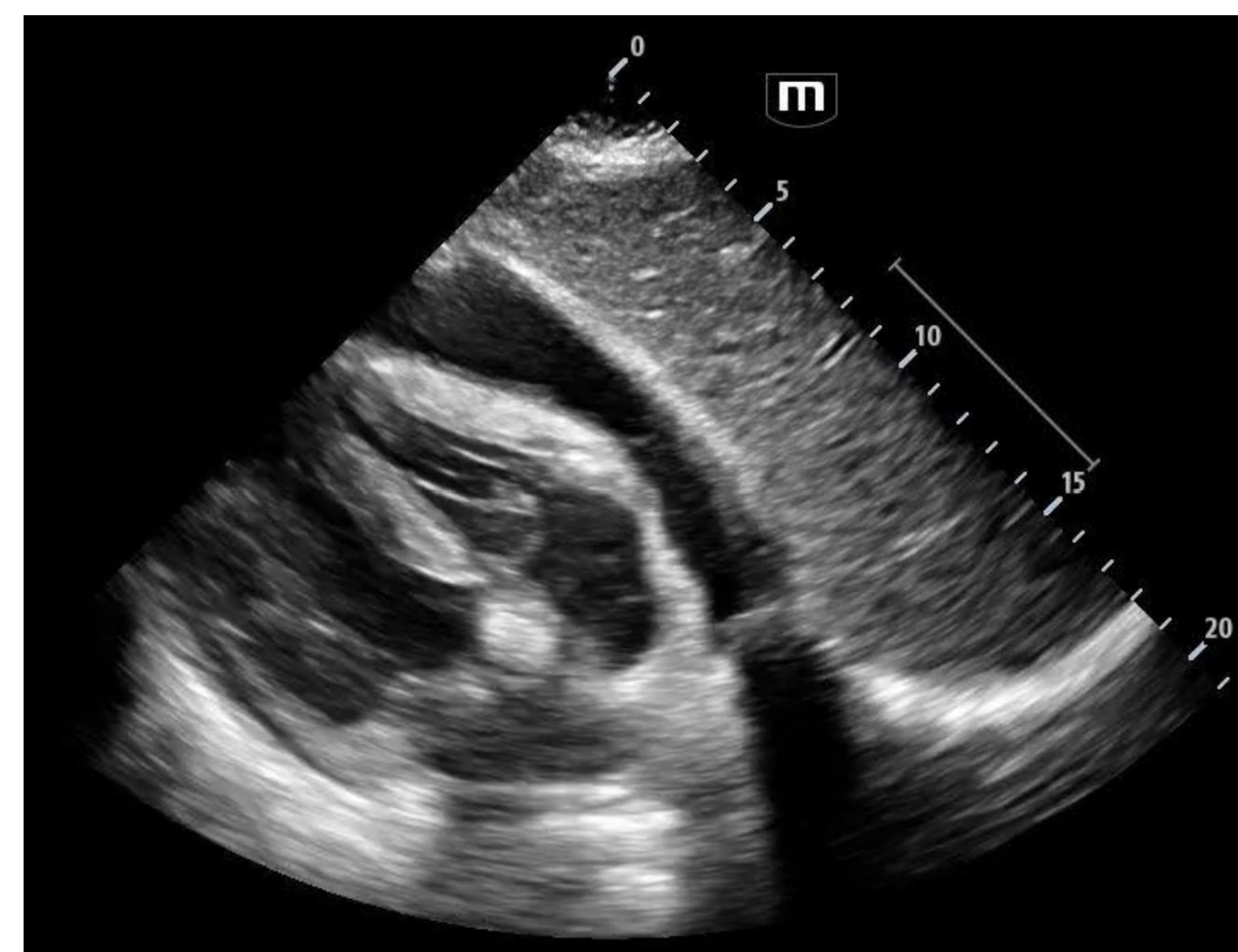
- Leads to reduced cardiac output and *Beck's Triad*: hypotension, JVD, and muffled heart sounds

- Can also see *pulsus paradoxus*, a drop in systolic BP more than 10mmHg with inspiration, and *electrical alternans*, a classic finding due to swinging of the heart within the fluid-filled pericardium.



## Case Presentation

78 y/o male with PMHx T2DM, HTN, and HLD presented from OSH after undergoing a total hip arthroplasty, complicated by injury to the left profunda artery. Following transfer and revascularization, hospital course was complicated by HITT, recurrent arterial thrombi, and an AKI, requiring stay in the SICU. 2 weeks into admission, the patient was found difficult to arouse with mottled skin, agonal breathing, and a SBP of 50. He experienced cardiac arrest following intubation and ROSC was achieved after 1 round of CPR. POCUS was performed demonstrating very large pericardial effusion with obvious right atrial collapse and plethoric IVC. EKG showed possible electrical alternans. Patient's SaO2 at this time was in the 20s. Thoracic surgery was emergently consulted, and pericardiocentesis was attempted but was unsuccessful. Patient was transferred to OR where 700mL blood was evacuated from pericardial space with immediate improvement in hemodynamics. Pericardial window was created and patient was stable following surgery in PACU. Follow up TTE revealed no significant change from previous done 1 week earlier. Pericardial chest tube was removed POD5. Patient remained in intensive care and suffered shock liver but ultimately was successfully discharged to rehab.



## Discussion

Due to the bloody fluid evacuated in this case, the cardiac tamponade was believed to be secondary to anticoagulation in the setting of HITT. The patient had recently begun Argatroban, a direct thrombin inhibitor (DTI). Although extremely rare, spontaneous hemorrhagic cardiac tamponade can occur with the use of anticoagulants, which increase the risk of bleeding in any tissue including the pericardium. This leads to a fluid buildup that compresses the heart. The first compensatory sign is tachycardia, and without quick recognition and treatment, the condition is universally fatal. Evaluation includes POCUS to determine size of effusion and effect on cardiac function (RV diastolic collapse, RA systolic collapse, plethoric IVC), which can be done quickly at bedside. Ideally, POCUS would be done prior to intubation, as positive pressure ventilation increases intrathoracic pressure resulting in hemodynamic collapse and arrest in the presence of cardiac tamponade. The overall goal of treatment is to remove the fluid, via bedside pericardiocentesis and ultimately creation of a pericardial window in the OR. Treatment also includes stopping the offending agent, in this case Argatroban. Volume resuscitation and pressors may be helpful as temporary measures prior to definitive treatment.

## References

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