

A 27-year-old female has collapsed at home. She develops a (narrow complex) PEA arrest enroute to hospital. The Paramedics are performing CPR as the patient arrives in the ED.

Your team will utilize ultrasound during CPR and the rhythm check to determine possible causes of the cardiac arrest.

a. List four (5) potentially reversible causes of a PEA cardiac arrest for this patient, that could be identified by ultrasound. For each of your causes, list two (2) ultrasound findings (without repetition) that could be seen. (15marks)

Reversible causes for PEA cardiac arrest (4 marks)	Possible ultrasound findings in cardiac arrest (8 marks)
Cardiac tamponade	Significant pericardial effusion
	Dilated IVC
	Compressed right atrium and/or ventricle
Massive PE	RV dilation, RV:LV > 1:1 (early in arrest as RV dilation occurs with prolonged CPR)
	D shaped RV on PSAX
	Right heart thrombus
	Deep vein thrombosis
	Clot in pulmonary artery / bifurcation / saddle
Tension pneumothorax	Absent lung sliding (during ventilation)
	Linear/linear (Stratosphere/barcode) finding on M mode scanning during assisted ventilation
	Collapsed / Underfilled ventricles
	Dilated IVC
Hypovolaemia/trauma/ectopic/sepsis/anaphylaxis <i>These could be counted separately provided the ultrasound features are not repeated. For sepsis a Specific finding of eg pneumonia plus collapsed IVC</i> Also accepted Aortic dissection but not ruptured AAA or AMI	Underfilled ventricles
	Unable to visualise the IVC / Collapse of IVC
	Pleural effusion
	Free peritoneal fluid
	Empty uterine cavity (if known positive pregnancy test)
	Presence of adnexal mass

Other US features of cardiac tamponade are not present in cardiac arrest; repetition of findings in more than one condition will not be counted.

Pseudo-PEA is essentially a severe shock state and is distinct from true electro-mechanical dissociation

b. List 3 ways that Pseudo-PEA can be detected in the absence of a palpable pulse (3marks)

- Pseudo-PEA can be detected in the absence of a palpable pulse by:
 - arterial line placement during cardiac arrest (identified by the presence of a blood pressure)
 - high ETCO₂ readings in intubated patients
 - echocardiography or Doppler ultrasound demonstrating cardiac pulsatility

