



# Emergency Case

## A stab in the dark

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A 64-year-old woman presented to our emergency department complaining of 3 days of weakness, upper abdominal pain, and dyspnea. She had undergone a two-vessel aortocoronary bypass 6 weeks earlier and had had, until then, an uneventful postoperative course. At presentation, she specifically denied having chest or back pain, fever or chills, nausea, emesis, or diarrhea.

Examination revealed marked tachypnea with a transcutaneous oxygen saturation of 99%, a heart rate of 155 beats per minute, and a systolic blood pressure of 70 mm Hg by palpation only. She was afebrile, her lungs were clear to auscultation, her heart sounds were faint, her abdomen was soft and nontender

with no masses, and her external jugular veins were distended.

Aggressive fluid resuscitation was initiated. Chest x-ray examination with a portable unit showed cardiomegaly and a small left pleural effusion. An electrocardiogram showed sinus tachycardia with a narrow QRS complex and non-specific ST-segment abnormalities.

Shortly after arrival, the patient was intubated for decreasing level of consciousness and refractory hypotension. Several minutes after intubation, she progressed to full cardiac arrest. She was treated with defibrillation and standard doses of epinephrine. After one shock, she progressed to pulseless electrical activity (PEA) with underlying sinus tachycardia.

### What is the most likely cause of her cardiac arrest from PEA?

1. Myocardial infarction
2. Pericardial tamponade
3. Septic shock
4. Hemothorax

### What procedure is immediately indicated?

1. Intraaortic balloon pump
2. Emergency angioplasty
3. Pericardiocentesis
4. Emergency thoracotomy

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## Answer to Emergency Case

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### 2. Pericardial tamponade

### 3. Pericardiocentesis

Upon development of PEA, this patient underwent rapid percutaneous needle pericardiocentesis. Sixty millilitres of serosanguineous fluid was removed, and there was an immediate return of spontaneous circulation. A bedside echocardiogram revealed a moderately sized residual pericardial effusion with good contractility. She was transferred to the intensive care unit, and, several days later, she underwent pericardiotomy for recurrent effusion. She was eventually discharged independent and neurologically intact.


Pulseless electrical activity refers to any organized electrical cardiac rhythm that should, but does not, result in a pulse. It is associated with many different conditions.<sup>1</sup> The American Heart Association's Advanced Cardiac Life Support provider course teaches a memory aid (the so-called "5Hs and 5Ts") for this condition (Table 1).

**Table 1. Most frequent causes of pulseless electrical activity**

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hyperkalemia or hypokalemia
Hypothermia
Tablets (drug overdose, accidental poisoning)
Tamponade, cardiac
Tension pneumothorax
Thrombosis, coronary (acute myocardial infarction)
Thrombosis, pulmonary (embolism)

Cardiac tamponade is one of the correctable causes of PEA. Beck's triad, indicative of tamponade, classically includes hypotension, jugular venous distension, and muffled cardiac sounds, but the triad is not always found.<sup>2</sup> Distended neck veins can be absent or overlooked, and heart sounds are often difficult to auscultate in a noisy resuscitation suite. Sometimes, physicians are left with a presumptive diagnosis based on the absence of other possible causes of hypotension or lack of pulse. Our patient did not have symptoms, signs, or diagnostic criteria consistent with the other diagnoses in the first question. She did have a history of recent cardiac surgery.

Pericarditis and effusion can develop after transmural myocardial infarction, cardiac injury, and cardiac surgery and are thought to be of autoimmune etiology.<sup>3</sup> Although the pericardial effusions are often large, tamponade is uncommon but not unknown.<sup>4-6</sup>

With a pulseless patient, it can be extremely difficult to differentiate among the various causes of PEA. Prompt treatment of correctable causes is essential: there might be no time for diagnostic certainty. If you suspect cardiac tamponade, you must treat it immediately. A "stab in the dark" saved this woman's life. 

### References

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