Beck’s Tetrad? Adding POCUS To The Clinical Exam For Pericardial Tamponade Improves Diagnostic Accuracy In Obstructive Shock

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Learning Objectives

- Pericardial disease is a frequent manifestation of SLE, but rarely leads to tamponade.
- Physical exam findings can increase suspicion for tamponade, but are often insufficient for accurate diagnosis.
- Bedside ultrasound offers a fast, non-invasive method for identifying pericardial effusion and tamponade.
- Assessment of IVC and RA/RV collapse can provide diagnostic clues.
- Studies have shown that physicians trained in bedside ultrasound can accurately diagnose pericardial effusions.

Case Presentation

History of Present Illness

- 27 year old woman with a history of SLE presenting to ED with sudden onset of fevers and worsening back pain.
- Pt admitted to hospital with working diagnosis of sepsis of unknown origin, started on broad spectrum antibiotics.
- On day 4, Echo obtained with improved LVEF but new, small pericardial effusion.
- On day 5, rapid response called due to rapidly worsening dyspnea, chest pain, HR up to 150s. Blood pressure started to fall.

Clinical Examination

- VS: Temp 36.9, HR 150, BP 80/50, RR 24 SaO2: 98%
- General: dyspneic, cyanotic woman in acute distress sitting upright in tripod position
- Pulm: increased work of breathing, LCATB
- CV: muffled heart sounds
- Extremities: cool, cyanotic, pulsus paradoxus present

Hospital Course

- Pt taken emergently to catheterization lab for pericardiocentesis. Echo with RA/RV collapse consistent with tamponade.
- Removed approximately 400 cc bloody fluid from pericardial sac with almost immediate improvement of hemodynamics. Pericardial drain was placed.
- Pericardial fluid analysis only impressive for predominance of RBCs.
- Pt was transferred out of the ICU the next day.
- Repeat Echo after pericardial fluid drainage demonstrated normal LVEF and resolution of RA/RV collapse. Small effusion present.
- Pericardial effusion thought to be most likely from lupus, as work up was unrevealing.

Discussion

SLE and Pericardial disease

- Cardiac involvement is thought to occur in >50% SLE patients [2], however tamponade is much rarer, with an estimated incidence of <1% [3].

Clinical Findings of Tamponade

- Tamponade is a clinical diagnosis, but exam findings (i.e. “Beck’s Triad”) are insufficient:
  - The vast majority of patients with tamponade with have dyspnea, tachycardia, distended neck veins or cardiomegaly on CXR, but these findings are nonspecific [4].
  - Beck’s Triad of hypotension, distended neck veins and distant heart sounds is more specific, but famously insensitive.
  - The presence of pulsus paradoxus improves sensitivity, but cannot exclude the diagnosis if absent [5].

Bedside Ultrasound enhances diagnosis

- Bedside ultrasound offers a fast, reliable and non-invasive method for identifying pericardial effusion and tamponade:
  - Absence of right atrial collapse has a 90% sensitivity [6]
  - Right ventricular collapse is 75-90% specific, but with lower sens. (48-60%) [7]
  - Absence of right atrial collapse has a 90% negative predictive value for tamponade [7].
  - With a short training course, physicians can be trained to diagnose pericardial effusions with a sensitivity of 96% and specificity of 98%[8]

Case Pearls

- Our patient did not improve with treatment for sepsis, requiring us to pursue an alternate diagnosis.
- Hemodynamic instability in an SLE patient should prompt evaluation for pericardial disease.
- Bedside ultrasound rapidly confirmed pericardial effusion causing tamponade, expediting pericardiocentesis.
- Timely recognition and prompt treatment is key to prevent cardiopulmonary arrest.

A quote...

“Probably no serious disease is so frequently overlooked by the practitioner. Post-mortem experience shows how often pericarditis is not recognized or goes on to resolution and adhesion without attracting notice.”
—Sir William Osler, 1892

References

1. Soni, N, et al. “Point of Care Ultrasound” 2020
2. Chapter 17, 145-155. Figure 17.3