

CASE OF THE MONTH

A 66-Year-Old Woman with Severe Back Pain

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PRESENTATION

A 66-year-old African American female presented to her primary care physician with sudden-onset back pain. She was treated conservatively with analgesics but the pain gradually worsened along with progressive weakness of lower extremities, fever, chills, and generalized malaise. Magnetic resonance imaging (MRI) of the lumbar spine done at an outside facility was suggestive of epidural abscess, so the patient was admitted for further evaluation and treatment. Her medical history was notable for a deep dental cleaning a few days prior to onset of current symptoms and left total hip arthroplasty few years ago. She was a nonsmoker and did not consume alcohol or illicit drugs.

On arrival to the hospital, the patient was hypotensive and was started on 8 mcg/min of norepinephrine. Subsequently, her vital signs were heart rate 128 bpm, blood pressure 106/68 mm Hg (on norepinephrine), temperature 101°F, and SpO₂ 99% on 2L oxygen. Physical examination was otherwise unremarkable.

LAB TESTS AND RESULTS

Laboratory results were as follows:

Sodium 136 mEq/L

Potassium 5.6 mEq/L

Chloride 96 mEq/L

CO₂ 12 mEq/L

Bun 76 mg/dL

Creatinine 2.5mg/d

Lactic acid 12.6mmol/L

White blood cell count 13.09 K/uL, hemoglobin 11.1 g/dL, and platelet count 466 K/uL

A 12-lead electrocardiogram (Figure 1) showed sinus tachycardia. Portable anteroposterior chest x-ray (Figure 2) was interpreted as enlarged cardiac silhouette with no pleural effusion or infiltrates.

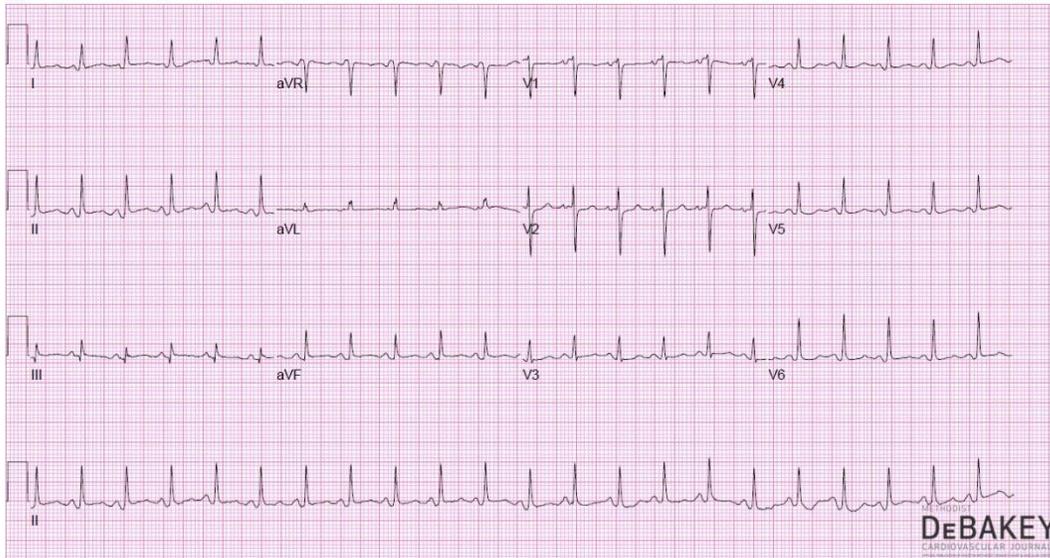


Figure 1. A 12-lead electrocardiogram shows sinus tachycardia.

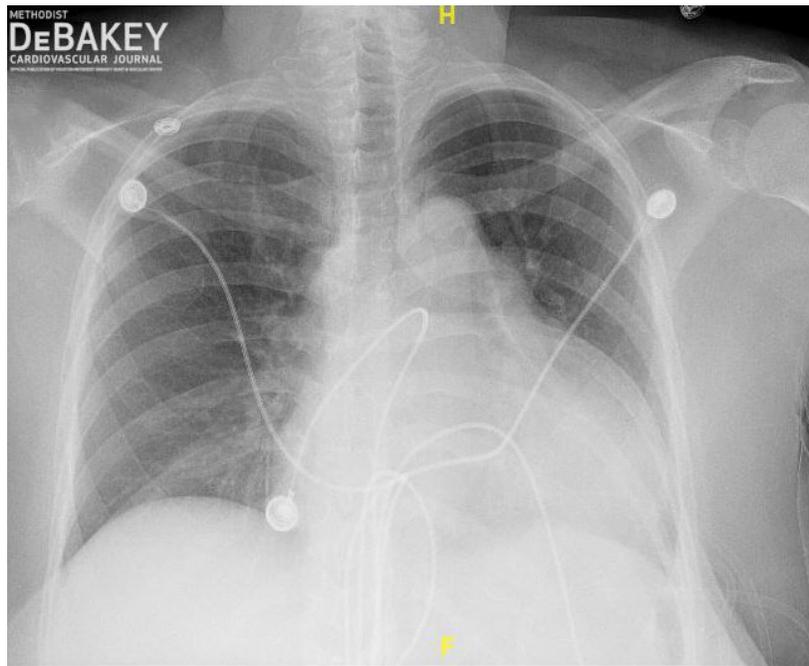


Figure 2. Anteroposterior chest x-ray shows enlarged cardiac silhouette with no pleural effusion or infiltrates.

QUESTION 1: Which of the following would you do next?

- a) Neurosurgery consult for drainage of epidural abscess
- b) Computed tomography (CT) of the chest, abdomen, and pelvis without IV contrast
- c) 2D echocardiogram with Doppler
- d) Whole-body positron-emission tomography (PET) scan

ANSWER

B: CT of chest abdomen and pelvis without IV contrast

Although choices B, C, or D are appropriate options, given the overall presentation and signs suggestive of sepsis, a CT of chest, abdomen, and pelvis without IV contrast will provide a rapid assessment and guide further testing. However, the presence of hypotension with an enlarged cardiac silhouette suggested a pericardial effusion with possible tamponade; thus, an echocardiogram would also be a good answer. In fact, both tests were ordered by the admitting physician, with the CT done first. The procedure showed a large pericardial effusion; multiple prominent enlarged mediastinal lymph nodes; hyper density within the gallbladder, consistent with biliary sludge with pericholecystic fluid; and subcentimeter retroperitoneal lymph nodes. No ascites, fluid collections, or destructive bony lesions were observed.

CASE CONTINUED

A 2D echocardiogram with Doppler was done with findings as shown below (Figures 3-4, Videos 1-2).

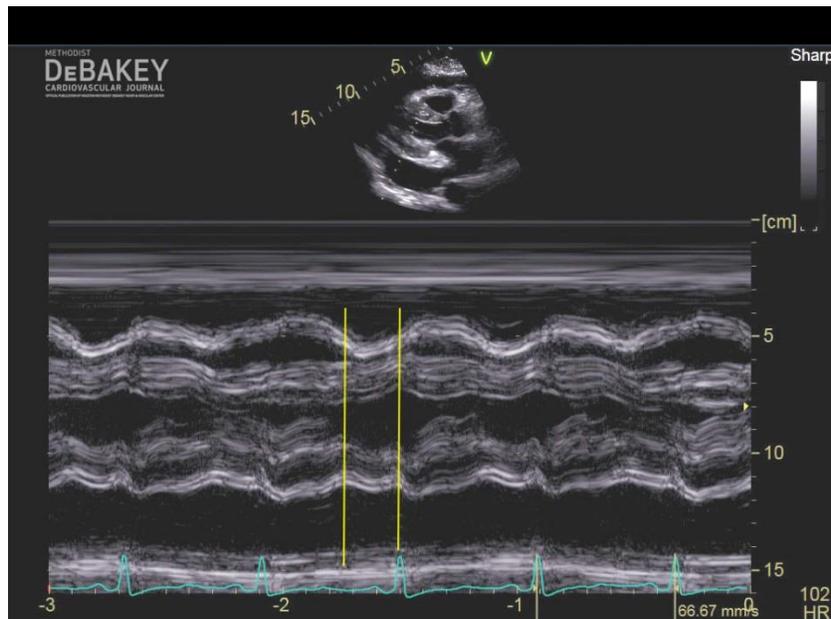


Figure 3. 2D echocardiogram with Doppler.

Video 1. <https://youtu.be/dLoXPp64BsI>



Figure 4. 2D echocardiogram with Doppler. INS: inspiration; EXP: expiration

Video 2. <https://youtu.be/RhqvQwWVOWE>

QUESTION 2: What is the diagnosis?

- a) Idiopathic pericarditis with cardiac tamponade
- b) Hemorrhagic pericarditis with cardiac tamponade
- c) Purulent pericarditis with cardiac tamponade
- d) Idiopathic pericarditis without cardiac tamponade

ANSWER

C: Purulent pericarditis with cardiac tamponade

Video 1 shows a large circumferential pericardial effusion with RV diastolic collapse which is further confirmed in the M-mode tracing shown in Figure 3. Figure 4 illustrates mitral inflow pattern variation with respiration; E velocity peaks at the beginning of expiration and declines with inspiration, suggestive of high pericardial pressure.

Video 2 shows a subcostal view of the effusion. Note the multiple echo densities (smoke-like) seen within the effusion, which are suggestive of a hemorrhagic or purulent effusion. Given the clinical presentation of an epidural abscess with signs of sepsis, purulent pericarditis with cardiac tamponade is the most likely choice.

QUESTION 3: What is the next best step in management?

- a) Emergent bedside pericardiocentesis
- b) Emergent pericardiocentesis in the catheterization lab
- c) Pericardial drainage, washout, and window in the operating room
- d) Continue antibiotics

ANSWER

B: Emergent pericardiocentesis in the catheterization lab

The patient was emergently taken to the cath lab where 300 cc of frank pus was drained. She was then taken to the surgical OR for pericardial washout and window and another 600 cc of frank pus was drained (Figure 5). The pericardium was irrigated with normal saline and pericardial drains were placed. Transesophageal echocardiogram during the procedure showed complete evacuation of the pericardial fluid, and no vegetations were seen on the valves.



Figure 5. Frank pus is drained from the pericardium.

OTHER PERTINENT TEST RESULTS

Blood cultures on admission were positive for *Streptococcus pneumoniae*. Pericardial biopsy showed inflammatory cells and was negative for malignancy.

HOSPITAL COURSE

The patient was closely monitored in the intensive care unit on IV antibiotics. Septic shock resolved, renal function recovered, and her clinical status continuously improved. She did have some transient lower extremity edema that resolved with oral furosemide. A repeat echocardiogram performed after the initial drainage was removed demonstrated the findings shown below (Video 3, Figures 6-7).

Video 3. <https://youtu.be/RhqvQwWVOWE>

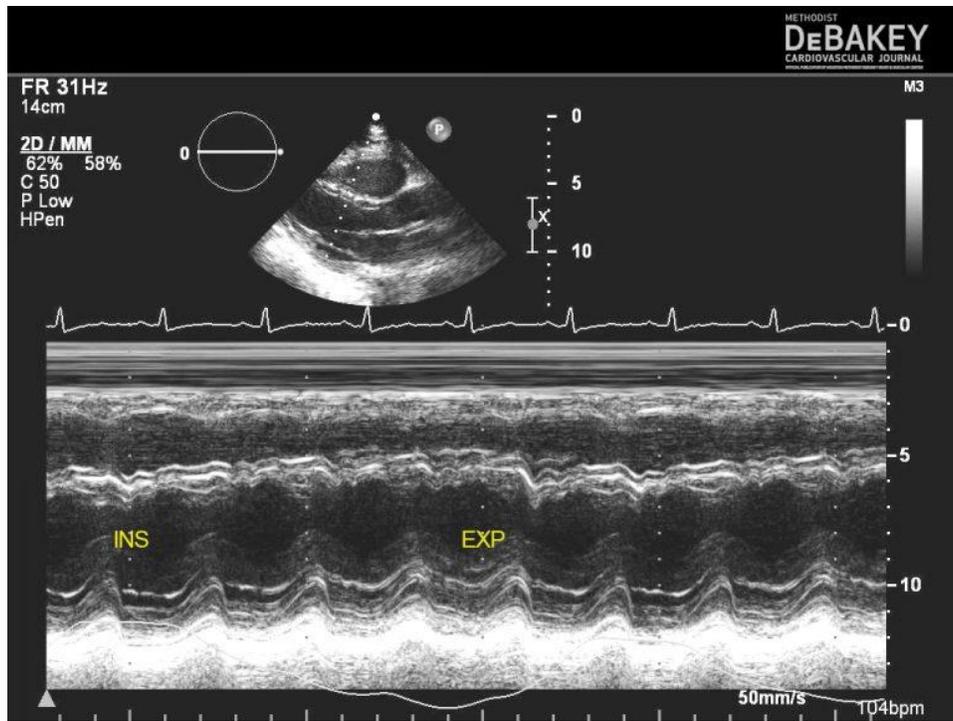


Figure 6. INS: Inspiration; EXP: expiration

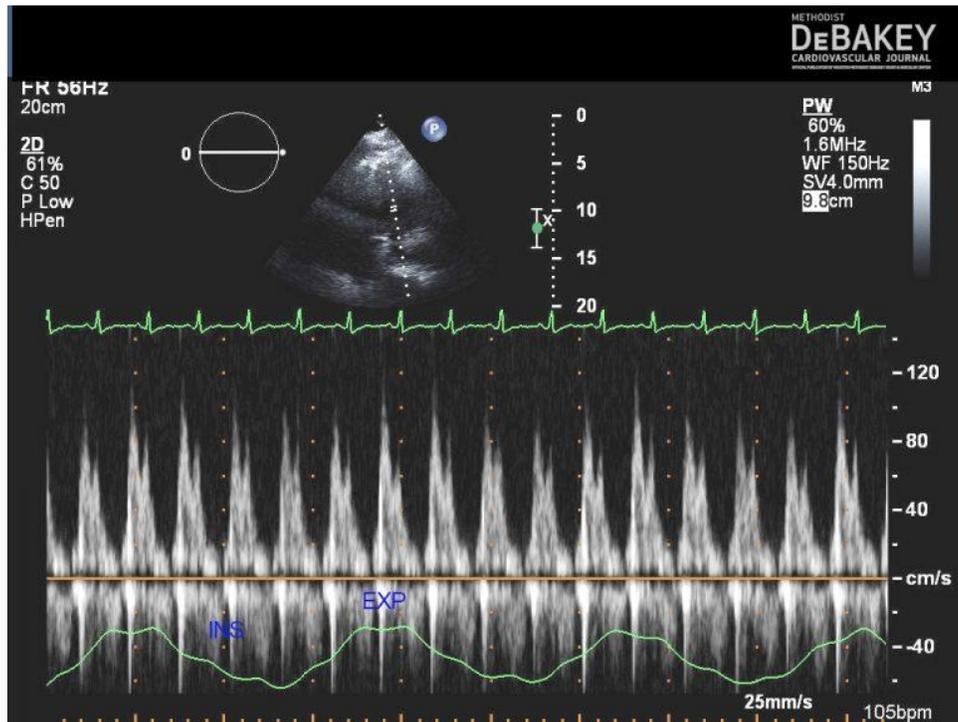


Figure 7. INS: Inspiration; EXP: expiration

QUESTION 4: What is the diagnosis?

- a) Resolution of pericardial effusion (PE)

- b) Resolution of PE with paradoxical septal motion secondary to cardiac surgery
- c) Resolution of PE with restrictive physiology
- d) Resolution of PE with pericardial constriction

ANSWER

D: Resolution of PE with pericardial constriction.

Video 3 is a short-axis view of left ventricle and Figure 6 is an M-mode in the PLAX view showing septal diastolic bounce suggestive of constrictive pericarditis. In addition, the M-mode tracing clearly demonstrates ventricular interdependence; the right ventricle dilates with inspiration at the expense of the left ventricle. Figure 7 shows variation in mitral inflow pattern with respiration. The variation is less than expected for constrictive pericarditis due to volume overload.

FURTHER CLINICAL COURSE

The patient was continued on IV antibiotics (ceftriaxone), and anti-inflammatory therapy with prednisone was initiated. Both were continued for several weeks following discharge. Two subsequent MRIs of the epidural abscess done during her hospital stay demonstrated continuous improvement in the fluid collection. The neurosurgery consultant elected to continue medical therapy under outpatient MRI surveillance. A repeat echocardiogram 6 weeks after discharge (Video 4) showed resolution of all signs of pericardial constriction.

Video 4. https://youtu.be/P1S6-f49_4U

DISCUSSION

Purulent pericarditis—defined as the presence of pus in the pericardial sac—is a fulminant infection with a high mortality rate. Galen first described it in a patient with posttraumatic pericarditis.¹ The incidence of purulent pericarditis has decreased after the advent of antibiotics. In a case series published by Klacksmann et al., the disease was more prevalent in middle-aged men. Gram-negative bacilli, *Staphylococcus*, and *Pneumococcus* were the most common causative agents.²

Purulent pericarditis usually occurs as a direct spread from intracardiac infection; contiguous spread from pulmonary, mediastinal infections; spread from subdiaphragmatic suppurative source; or seeding from systemic bacteremia. Advanced age, immunosuppressive therapy, or other systemic diseases causing immunosuppression are some of the predisposing factors to purulent pericarditis.¹

Fever is the most common sign on presentation. Classic signs of pericarditis are usually absent or masked by the underlying infection. A 12-lead electrocardiogram commonly shows sinus tachycardia and nonspecific ST changes, and an enlarged cardiac silhouette is seen on chest x-ray. Echocardiography is crucial for an early diagnosis and appropriate management in these patients.¹

Surgical drainage of the pericardial effusion and antibiotic therapy are the mainstay of management of purulent pericarditis. Pericardiostomy combined with antibiotics reduces the mortality by more than 50% compared to untreated patients.³ Initial empiric antibiotic therapy should be broad, covering the

most common causative agents, and can be adjusted further during clinical course depending on the microbiologic data. There are no guidelines available regarding the duration of antibiotic therapy; a 2-4 week regimen of IV antibiotics is recommended based on the available literature.

Early complications of purulent pericarditis include cardiac tamponade (as seen in our patient), myocarditis, mycotic aneurysms, and recurrent tamponade. Pericardial constriction is an important late complication of purulent pericarditis. Initial treatment with anti-inflammatory agents and/or steroids may be warranted, as in this case. Pericardiectomy is the ultimate treatment when medical therapy fails, with a mortality up to 8%.⁴

TAKE-HOME POINTS

- Purulent pericarditis is a rare but fatal infection with high mortality rates. A high index of suspicion is needed since classic signs of pericarditis may be absent in these patients.
- A combined medical and surgical approach is the cornerstone of treatment.
- Pericardial constriction is an important late complication of purulent pericarditis. Treatment with anti-inflammatory agents and/or steroids may be warranted, especially in patients with early signs of constriction.

REFERENCES

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