May 2018 Critical Care Case of the Month

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Chief Complaint
Shortness of breath

History of Present Illness
The patient is a 44-year-old woman who was admitted with a history of “pericarditis”. She has a several years history of progressive shortness of breath, abdominal distention and lower extremity edema.

Past Medical History, Social History and Family History
She has a history of obesity, poorly controlled type 2 diabetes, uterine fibroids and hypertension. She does not smoke but does have 1-2 alcoholic beverages per day. Family history is noncontributory.

Physical Examination
- Vital signs: pulse 96 beats/min, blood pressure 110/85 mm Hg, temperature 37° C, respirations 18 breaths/min.
- Neck: there is jugular venous distention with a positive hepatojugular reflux.
- Lungs: rales at both bases.
- Heart: regular rhythm without murmur.
- Abdomen: Distended. Shifting dullness is present.
- Extremities: 2-3 pretibial pitting edema.

Chest Radiography
Chest x-ray shows a small right pleural effusion with mild vascular congestion at the bases. Heart size is normal.

Which of the following ***should be performed***?

1. Abdominal CT scan
2. Echocardiography
3. Thoracic CT scan
4. 1 and 3
5. All of the above

Correct!
5. All of the above

Although she has a diagnosis of pericarditis, acute pericarditis does not fit her clinical picture. She does not have any chest pain and her symptoms have persisted for some time. CT scans of her chest and abdomen and an echocardiogram are indicated because of her symptoms and physical findings and a cardiac origin seems likely as the origin. Her routine laboratory is remarkable for a hemoglobin of 12.2 gm/dL, hemoglobin A1C 8.3%, and a random blood sugar of 180 mg/dL.

Thoracic CT shows a thickened and calcified pericardium with a small right pleural effusion. Abdominal CT shows peritoneal fluid with splenomegaly and uterine fibroids. The cardiac ultrasound shows:

- Findings consistent with constrictive pericarditis. Thickened and calcified pericardium, especially posterior.
- Normal left ventricular chamber size (low normal). Calculated ejection fraction 52%. Normal right ventricular size with mildly reduced systolic function.
- Estimated right ventricular systolic pressure 45 mmHg (systolic blood pressure 118 mmHg).
- Mild−moderate tricuspid valve regurgitation.
- Mildly dilated inferior vena cava with no inspiratory collapse
- Cirrhotic-appearing liver

Which of the ***following are indicated***?

1. Diuresis
2. Tight control of her diabetes
3. Thoracic surgery consult
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

She has constrictive pericarditis due to chronic inflammation of her pericardium resulting in poor ventricular filling and congestive heart failure. Improvement will likely require a pericardiectomy performed by cardiac surgery. Diuresis is indicated because of her fluid overload at the present time but should not be excessive because of her likely upcoming pericardiectomy. Although the health benefits of tight-control of diabetes are debatable, achieving a blood sugar below 110 mg/dL is probably not advisable just before a planned operation because of the risk of hypoglycemia (1).

While awaiting thoracic surgery consult the patient suddenly develops a rapid pulse and becomes increasingly short of breath. An ECG is performed (Figure 1).

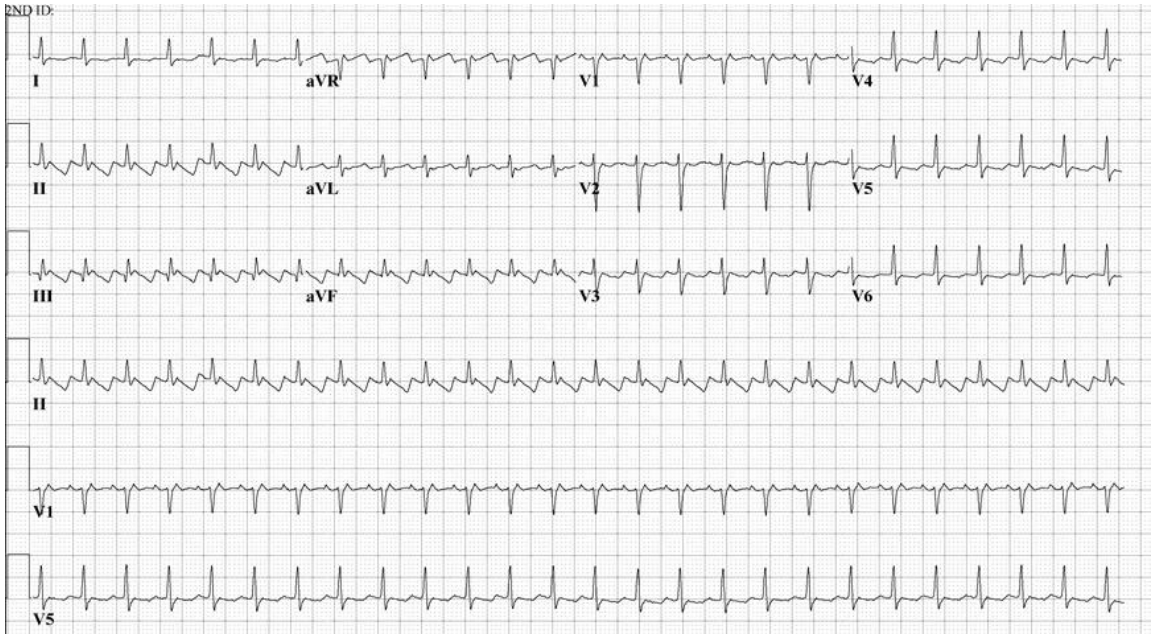

Figure 1. ECG performed after sudden onset of shortness of breath.

Which should be ***done at this time***?

1. Transesophageal echocardiogram (TEE)
2. Anticoagulation
3. Electrical cardioversion
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

The ECG shows atrial flutter with 2:1 block. Since an operation is planned shortly, correction to normal sinus rhythm would be ideal and cardioversion is the quickest way to accomplish this. However, not until a TEE is performed to ensure that no clot is present in the heart which could be released with cardioversion.

A TEE was performed which revealed no potential thrombi. Cardioversion successfully converted the patient to normal sinus rhythm with resolution of her symptoms.

Cardiac surgery recommended a pericardiectomy which was performed. Thick calcified pericardium containing chalk-like fluid was found. She returned to the ICU in stable condition. However, approximately 1 hour after returning to the ICU the patient became more unstable with tachycardia, hypotension, and worsening urine output.

Which of the following ***should be done***?

1. Point of contact ultrasound
2. Pulmonary artery catherization
3. Repeat hemoglobin and hematocrit
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

It is unclear what is the cause of her hypotension. Although placing a pulmonary artery catheter is not necessarily wrong, point of contact ultrasound can often reveal the source of hypotension in the ICU (2). The patient had hyperdynamic underfilled ventricles and a collapsible IVC. While providing ongoing aggressive volume resuscitation plus escalating vasoactive support and the patient's hemoglobin returned which was 4 gm/dL.

Which of the following should be ***done at this time***?

1. Abdominal CT scan
2. Thoracic CT scan with pulmonary embolism protocol
3. Transfuse with packed red blood cells
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

The point of contact ultrasound suggests hypovolemia as the cause of her hypotension and not a large pulmonary embolism which would raise the right-sided and inferior vena cava pressures. She was given 6 units of packed red blood cells while an abdominal CT was performed (Figure 2).

Figure 2. Representative image from the abdominal CT scan.

Which of the following should be ***done next***?

1. Abdominal exploration
2. Antibiotics for presumed sepsis
3. Begin intra-aortic balloon pump
4. 1 and 3
5. All of the above

Correct!
1. Abdominal exploration

The abdominal CT scan shows a large intra-abdominal hematoma (Figure 3).

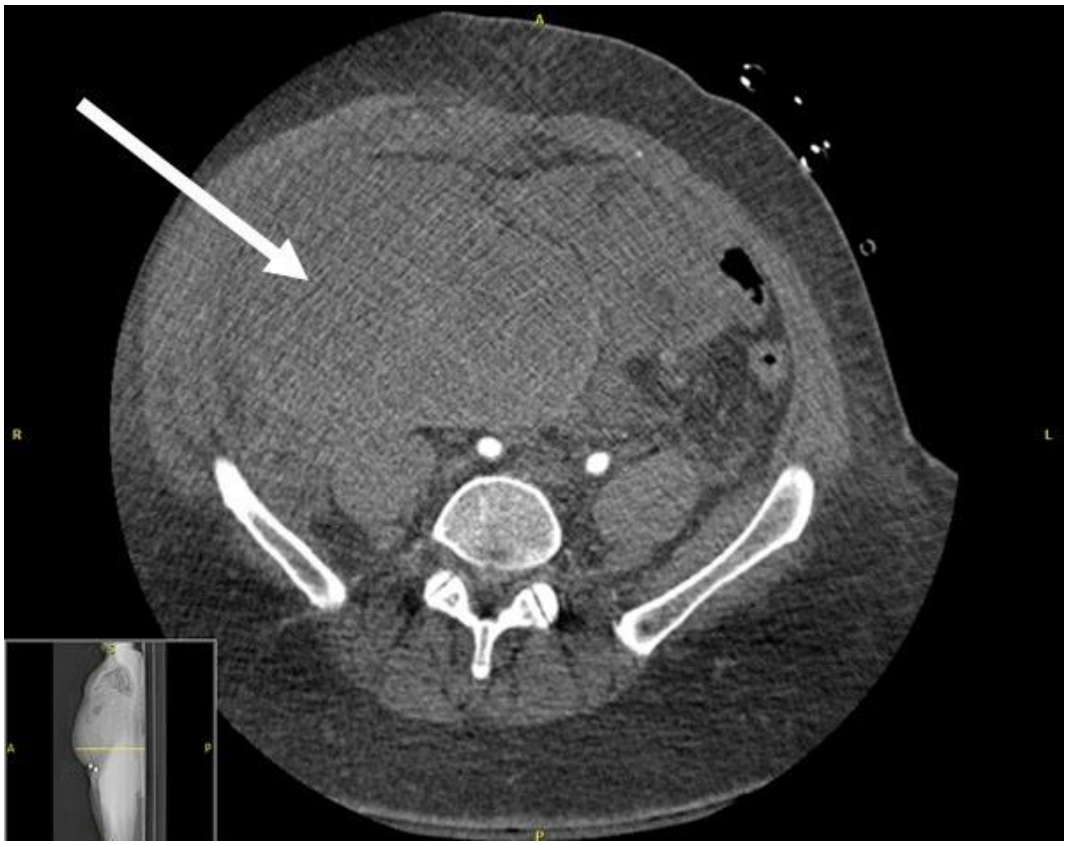

Figure 3. Representative image from the abdominal CT scan showing a large hematoma (white arrow).

A diagnostic abdominal aortogram was done which showed active extravasation from the right external iliac artery. A stent was placed and a decompressive laparotomy with opening of retroperitoneal hematoma performed. The patient made an uneventful recovery and was eventually discharged home.

References

1. Loh-Trivedi M. Perioperative management of the diabetic patient. Medscape. Nov 12, 2015. Available at: https://emedicine.medscape.com/article/284451-overview#a1 (accessed 4/14/18).
2. Mosier JM, Stolz L, Bloom J, Malo J, Snyder L, Fiorello A, Adhikari S. Resuscitative EChocardiography for the Evaluation and management of Shock: The RECES protocol. Southwest J Pulm Crit Care. 2014;8(2):110-25. [CrossRef]