Type 1 aortic dissection presenting as acute pericarditis: the roles of POCUS and transthoracic echocardiography

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Abstract

Clinical Presentation: A 59 year old male presented with a 1 day history of non-exertional chest pain that was pleuritic in nature and aggravated by lying flat. His chest pain symptoms were preceded by a one week history of “flu-like” symptoms. Physical exam demonstrated a blood pressure of 114/55 mmHg, heart rate of 75 bpm, and a normal oxygen saturation on room air. Cardiac examination revealed a bicuspid pericardial rub vs. and-to-fr murmur. EKG demonstrated diffused ST-elevation and PR depression consistent with acute pericarditis. Laboratory findings revealed a normal WBC of 11.2x10^9/L and hsTnT of 78 ng/L. Imaging Findings: A point of care ultrasound (POCUS) assessment demonstrated mild aortic insufficiency with a dilated ascending aorta with no pericardial effusion or wall motion abnormalities. An expedited transthoracic echocardiography (TTE) confirmed a bicuspid aortic valve with moderate aortic insufficiency. The aortic root and ascending aorta were dilated at 50 and 52 mm, respectively. There was evidence of an aortic dissection flap prolapsing across the left ventricular outflow tract. A dissection flap was also visualized within the abdominal aorta consistent with a Type 1 aortic dissection. Computed tomography of the aorta confirmed the Type 1 aortic dissection and the patient underwent an urgent valve-sparing aortic root replacement procedure. Discussion Points: Despite a typical clinical presentation for acute pericarditis, any unexpected physical exam or laboratory findings should lead to a POCUS assessment. This case demonstrates a rare presentation of aortic dissection which could have been easily missed without a POCUS assessment. Here we propose an algorithm for a POCUS examination in setting of pleuritic chest pain consistent with pericarditis.

Clinical Presentation

A 59 year old male presented with a 1 day history of non-exertional chest pain that was pleuritic in nature, aggravated by lying flat, and improved with sitting up. His chest pain symptoms was preceded by a one week history of “flu-like” symptoms with subjective chills. He denied shortness of breath, paroxysmal nocturnal dyspnea, or lower extremity edema. Home medication included allopurinol and tamsulosin. On physical exam, his blood pressure was 114/55 mm Hg, heart rate of 75 bpm, and a normal oxygen saturation on room air. Cardiac examination revealed a normal S1 and S2 with a bicuspid pericardial rub vs. a to-and-fro murmur. EKG demonstrated diffused ST-elevation and PR depression consistent with acute pericarditis (online Figure S1A). Chest X-ray was normal (online Figure S1B). Laboratory revealed a normal WBC of 11.2x10^9/L (Normal 3.5-10.5x10^9/L) and high sensitivity TnT of 78 ng/L (Normal <15 ng/L) (Table 1).

Imaging Findings

A point of care ultrasound (POCUS) operated by a PGY-6 Cardiology resident (Using a GE VscanTM with single probe for 2D imaging and Doppler flow), demonstrated on a parasternal long, apical 3 chamber, and apical 5 chamber views (images not available) visually mild aortic insufficiency with a dilated ascending aorta with no pericardial effusion. Using the reference ruler on the GE Vscan, the ascending aorta was estimated at approximately 5 cm in size. This triggered an expedited transthoracic echocardiography (TTE) confirming a bicuspid aortic valve with moderate aortic insufficiency and no pericardial effusion (Figure 1A-B, online Video S1 and S2). The aortic root and ascending aorta were dilated at 50 and 52 mm (Figure 1C), respectively, with evidence of an aortic dissection flap prolapsing across the left ventricular outflow tract (Figure 2A-C, online Video S3, S4 and S5). A dissection flap also visualized within the abdominal aorta (Figure 2D) (online Video S6). Computed tomography of the aorta confirmed the Type 1 aortic dissection (Figure 3, online Video S7). Patient underwent an urgent valve-sparing aortic root replacement procedure.

Table 1. Laboratory findings.

<table>
<thead>
<tr>
<th>Electrolytes</th>
<th>Normal</th>
<th>WBC</th>
<th>Hemoglobin</th>
<th>Platelets</th>
<th>hsTnT</th>
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<tr>
<td>Urea</td>
<td>9.8 mmol/L</td>
<td></td>
<td>140 g/L</td>
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<tr>
<td>Creatinine</td>
<td>132 μmol/L</td>
<td></td>
<td></td>
<td>115x10^9/L</td>
<td></td>
</tr>
<tr>
<td>CRP</td>
<td>113 mg/L</td>
<td></td>
<td></td>
<td></td>
<td>78</td>
</tr>
</tbody>
</table>

Figure 1. Parasternal long axis demonstrating a dilated aortic root (A) with mild-to-moderate aortic insufficiency on colour Doppler (B), and ascending aorta measuring 5.2 cm (C).
Case Report

Discussion Points

Despite a typical clinical presentation for acute pericarditis, a quick POCUS exam should be conducted to evaluate for a concomitant pericardial effusion. If any unexpected physical exam or laboratory findings are present, including new regurgitant murmurs or elevated cardiac biomarkers, a more detailed POCUS assessment by a trained professional should be performed to rule out high-risk features. Specifically, the presence of a large pericardial effusion with tamponade physiology or wall motion abnormalities suggesting myocarditis should be evaluated. This case demonstrates a rare presentation of an aortic dissection which could have been easily missed without a detailed POCUS assessment. We propose an algorithm for a POCUS examination in setting of pleuritic chest pain consistent with pericarditis (Figure 4).

Conclusion

This case demonstrates the role of POCUS as a powerful tool for a rapid assessment of cardiac abnormalities in setting of pericarditis, in order to rule out high risk features. This is not a new feature and has been used in other specialties including emergency care and trauma with Focused Assessment with Sonography for Trauma (FAST) evaluation [1]. As the portable hand held scanners have become more versatile and part of standard care, cardiologists and other trained professionals are performing rapid cardiac assessment to evaluate pericardial effusion [2] and to provide clues for evaluation of dyspnea or chest pain either in the clinic or in the acute hospital setting [3-5]. Some argue that POCUS will become part of a standardized bedside physical examination and improve bedside diagnosis [6].

References


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