Pulmonary embolism with incidental findings

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Patient Presentation

• 43-year-old male with a past medical history of metastatic melanoma with peritoneal, omental, and cerebral metastases presented to the emergency department with shortness of breath.

• PMH: No other pertinent history

• Physical exam: Unremarkable

• Prior CT guided abdominal biopsy revealed metastatic melanoma positive for s100, melanin-A, and HMB45.
Pertinent Labs

- Troponin elevated to 161
- EKG showed non-specific ST and T wave abnormalities
What Imaging Should We Order?
### Variant 2: Suspected pulmonary embolism. Intermediate probability with a positive D-dimer or high pretest probability.

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray chest</td>
<td>9</td>
<td></td>
<td>☑️</td>
</tr>
<tr>
<td>CTA chest with IV contrast</td>
<td>9</td>
<td>This procedure should be optimized for pulmonary circulation. Its sensitivity is unknown.</td>
<td>☑️</td>
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<tr>
<td>CT chest with IV contrast</td>
<td>9</td>
<td>This procedure may be an alternative to CTA, but both should not be performed.</td>
<td>☑️</td>
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<tr>
<td>Tc-99m V/Q scan lung</td>
<td>7</td>
<td>This procedure may be an alternative to CTA, but both should not be performed.</td>
<td>☑️</td>
</tr>
<tr>
<td>US duplex Doppler lower extremity</td>
<td>7</td>
<td>This procedure may be an alternative to CTA, but both should not be performed.</td>
<td>☑️</td>
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<tr>
<td>MRA chest without and with IV contrast</td>
<td>6</td>
<td></td>
<td>☑️</td>
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<tr>
<td>CTA chest with IV contrast with CT venography lower extremities</td>
<td>5</td>
<td></td>
<td>☑️</td>
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<tr>
<td>Arteriography pulmonary with right heart catheterization</td>
<td>3</td>
<td></td>
<td>☑️</td>
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<tr>
<td>US echocardiography transthoracic resting</td>
<td>3</td>
<td></td>
<td>☑️</td>
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<tr>
<td>CT chest without IV contrast</td>
<td>2</td>
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<td>☑️</td>
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<tr>
<td>CT chest without and with IV contrast</td>
<td>2</td>
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<td>☑️</td>
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<tr>
<td>MRA chest without IV contrast</td>
<td>2</td>
<td>This procedure has limited sensitivity and may be indicated for rare situations or certain contraindications for a specific patient.</td>
<td>☑️</td>
</tr>
<tr>
<td>US echocardiography transesophageal</td>
<td>2</td>
<td></td>
<td>☑️</td>
</tr>
</tbody>
</table>

*Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

These imaging modalities were ordered by the ER physician. DVT study was negative.
Findings (unlabeled)
Findings (labeled)

CT PE showing a filling defect in the subsegmental pulmonary arterial branch consistent with a pulmonary embolism.
Findings (unlabeled)
Contrast CT showing a moderate pericardial effusion

Contrast CT showing a mass within the right ventricle

- These findings prompted a cardiac MRI
Findings (unlabeled)
Findings (labeled)

T1-weighted gradient-echo, delayed post-contrast four chamber view showing heterogenous delayed enhancement of the LV septum and lateral wall likely indicating metastatic involvement.

T2-weighted 2D FIESTA four chamber view showing a mass within right ventricle.
Final Dx: Pulmonary embolism with cardiac metastasis from melanoma
Case Discussion

• Melanoma has a high propensity for metastatic disease
  • Roughly 30% of patients will develop metastases

• Median survival of patients with widespread metastases is 6-9 months or a 15-20% five-year survival

• Primary cardiac malignancy is exceedingly rare, with metastatic spread to the heart being 30 times more likely

• Melanoma has the highest incidence of cardiac metastases and may occur in up to 65% of patients according to post-mortem studies

• Antemortem diagnosis is rare as patients often do not have cardiac symptoms
Case Discussion

• Involvement of the right side of the heart is most common, as was observed in this patient

• ECG-gated MRI is the gold standard due to high resolution and ability to easily contrast between tissue types
  • EKG gating can be either retrospective or prospective
  • Echocardiography will often be obtained prior to MRI

• Masses will typically be T1 hyperintense due to the presence of melanin

• Masses will also typically show contrast enhancement

• Biopsies are not routinely performed when metastatic disease is already present and imaging findings are consistent with metastatic melanoma
Outcome

• Patient was started on immunotherapy and subsequently discharged after resolution of symptoms


