

AMSER Case of the Month

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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?

ACR Appropriateness Criteria

Variant 2: Suspected pulmonary embolism. Intermediate probability with a positive D-dimer or high pretest probability.

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

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

*Relative Radiation Level

These imaging modalities were ordered by the ER physician

DVT study was negative



Findings (unlabeled)

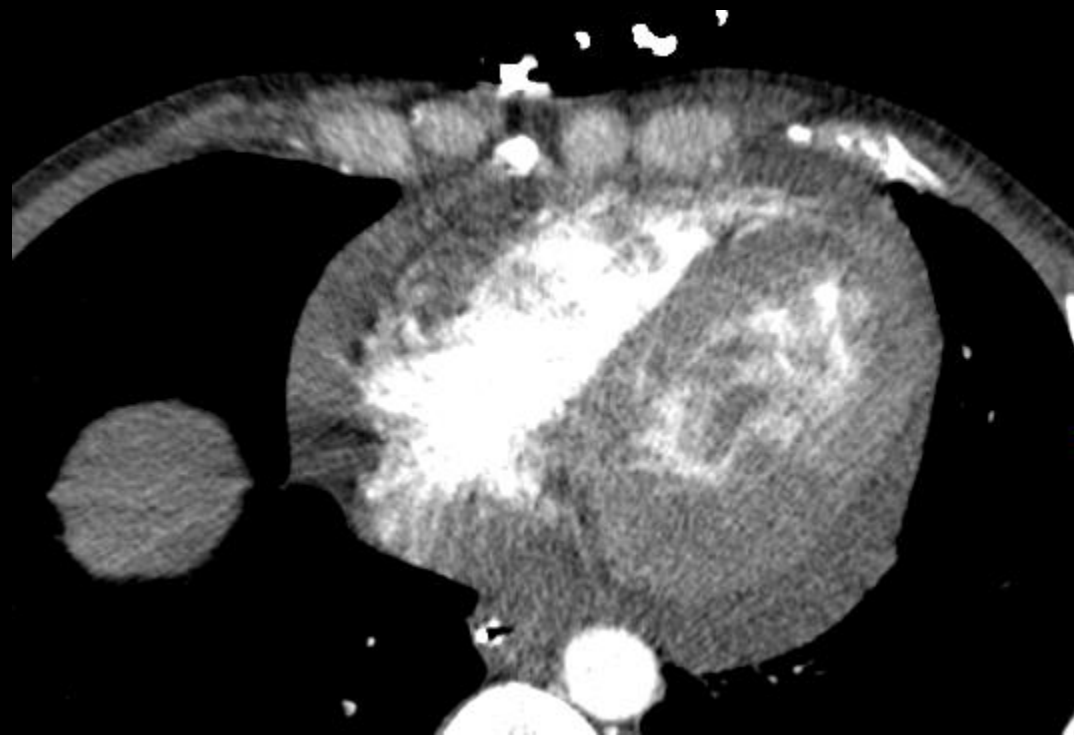


Findings (labeled)



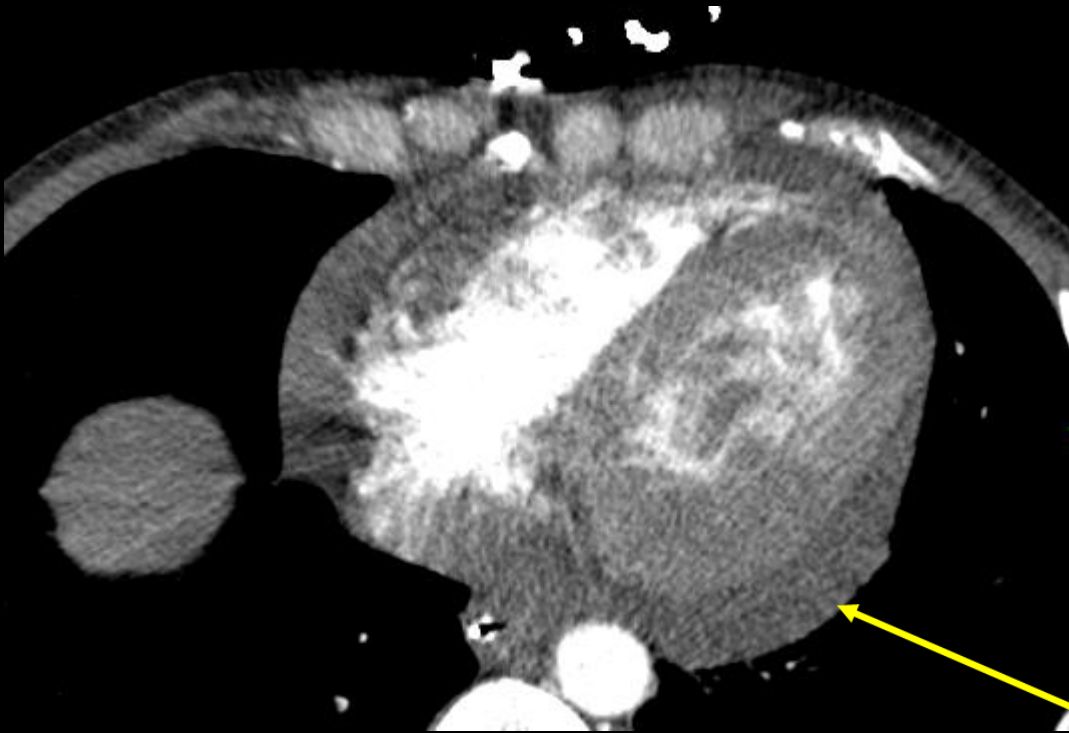
CT PE showing a filling defect in the subsegmental pulmonary arterial branch consistent with a pulmonary embolism

Findings (unlabeled)



Findings (labeled)

Contrast CT showing a moderate pericardial effusion

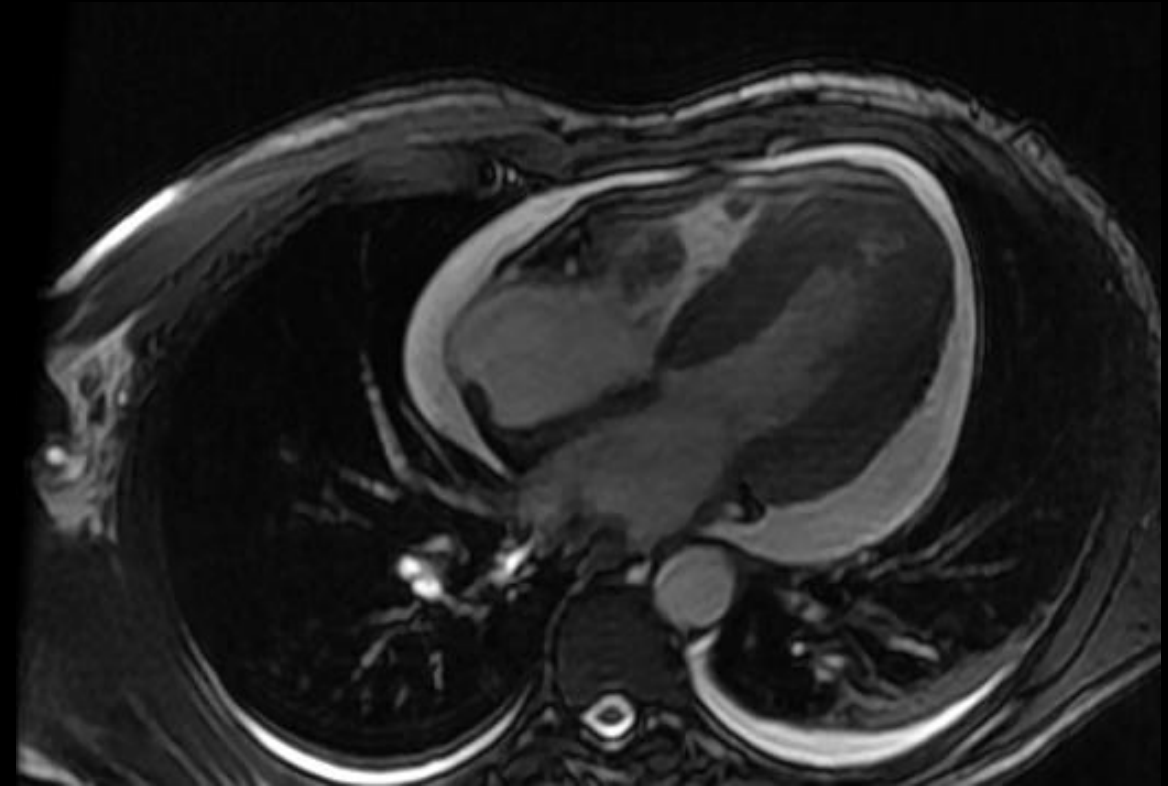
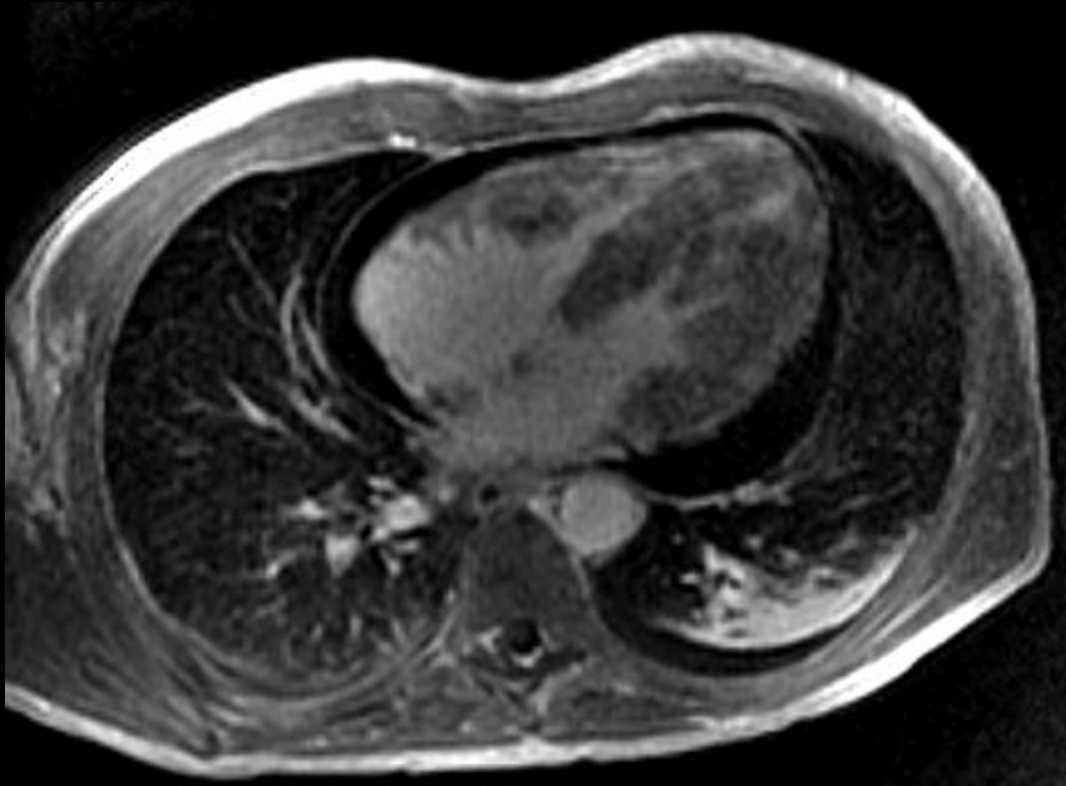


Contrast CT showing a mass within the right ventricle



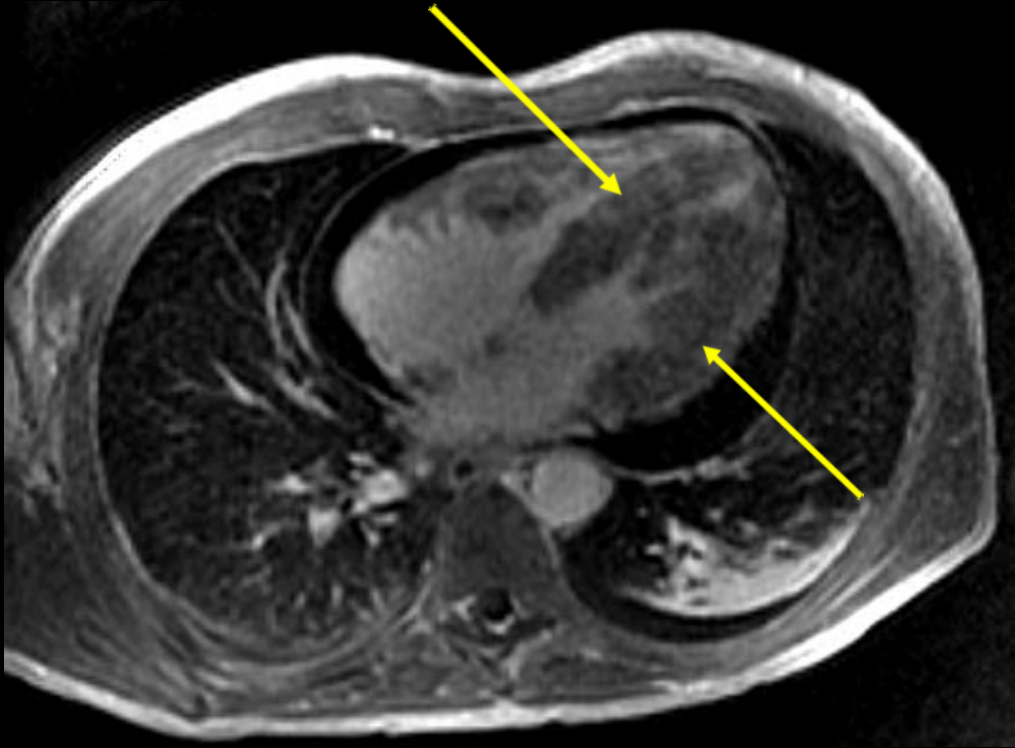
- These findings prompted a cardiac MRI

Findings (unlabeled)

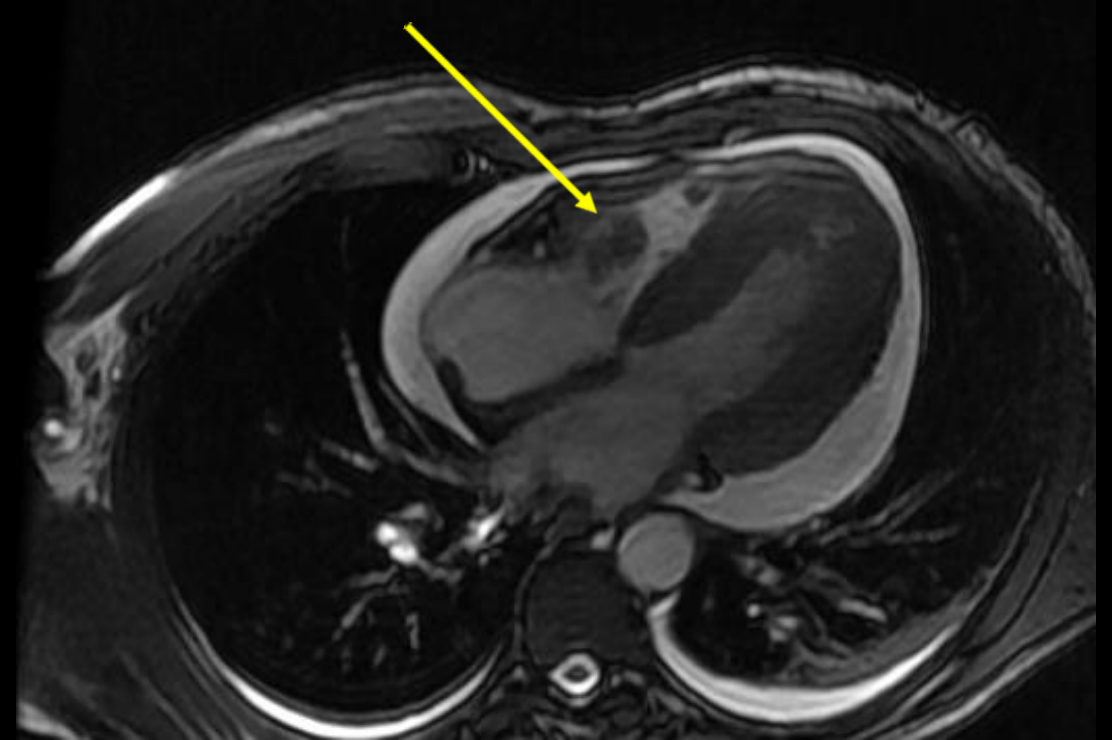


Findings (labeled)

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

References:

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