61 y.o. F w/ subacute onset of heart failure

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Oncologic History

2015: Diagnosed with left shoulder high grade leiomyosarcoma which was resected

2017: Metastatic disease to the lungs treated with radiotherapy and surgical resections

2020: Due to progression of disease chemotherapy with doxorubicin and ifosfamide initiated

5/2020: Presents with new swelling, DOE, and heart racing

Axial CT chest w/ contrast showing bilateral pulmonary nodules (circles) due to metastatic disease
Pertinent Labs and Studies

**Labs:**
- Lipid panel: mildly elevated triglycerides
- Normal comprehensive metabolic panel
- Complete blood count was stable
- Normal brain natriuretic peptide (BNP)

**EKG:**
- Left bundle branch block (LBBB)

**Echocardiography:**
- Prior to starting doxorubicin, globally hypokinetic left ventricle, *Ejection fraction* (EF) 44%,
- 3 months later on doxorubicin, repeat EF decreased to 31%
Ordered next for evaluation for ischemic disease as other highly rated exams had been performed.

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<th>Radiologic Procedure</th>
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<th>RRL*</th>
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<td>X-ray chest</td>
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<td>US echocardiography transthoracic stress</td>
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<td>MRI heart with function and vasodilator stress perfusion without and with IV contrast</td>
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<td>CTA coronary arteries with IV contrast</td>
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<td>MRI heart with function and inotropic stress without IV contrast</td>
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<td>CT heart function and morphology with IV contrast</td>
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<td>CT coronary calcium</td>
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*Relative Radiation Level

Rating Scale: 1.2.3 Usually not appropriate; 4.5.6 May be appropriate; 7.8.9 Usually appropriate
Nuclear Medicine SPECT Stress Test Results

**IMPRESSION:**

1. Large sized, moderate severity, apical, anterior, anteroseptal, and septal, partially reversible defect consistent with impaired perfusion reserve, ischemia and infarction in the territory typical of the proximal to distal LAD. Based on defect tracer uptake in the rest images, defect reversibility, and regional wall function in the defect area, this defect is mostly viable.

Left heart catheterization negative for coronary artery disease.

Presentation felt 2/2 **doxorubicin cardiotoxicity** with stress test abnormality from LBBB
Doxorubicin was stopped. A follow up chest CT with contrast was performed.
Findings: Focal thickening of the interventricular septum.
Cardiac MR completed to evaluate the CT abnormality:

- 4 Chamber
- 4 Chamber
- Short axis

T1 weighted, Black blood
T2 weighted, Black blood
Delayed post contrast inversion recovery
Findings:

- 4 Chamber T1 weighted: Mass (arrow) isointense to surrounding myocardium
- 4 Chamber T2 weighted STIR: Heterogeneous, hyperintense
- Short axis delayed post contrast: Internal enhancement (arrow) of mass
Final Dx:

Metastatic leiomyosarcoma to the heart
Case Discussion

• Metastatic disease is significantly more common than primary cardiac tumors (20-40x more frequent)

• Can affect all parts of the heart
  • Sarcomas travel through the bloodstream leading to metastatic disease from the sarcoma to most commonly implant in the myocardium as in this case

• Presentation depends of site of metastatasis
  • Tumors in the ventricular walls can present like hypertrophic or restrictive cardiomyopathy
  • Tumors invading into the conduction pathway lead to arrhythmias

MR diagnosis of cardiac metastases:
• T1: variable appearance
• T2: typically hyperintense
• Post contrast: usually enhances
Does the cardiac metastasis or doxorubicin cardiomyopathy explain the patient’s symptoms?

- EF improved from 31% → 37% after stopping doxorubicin, but she was on medical management that could have led to improvement

**Doxorubicin cardiomyopathy:**

**Clinically:** mimics heart failure, can present w/ chest pain

**Timing:** usually acute (2-3d), or chronic (presenting years later)

**Dosage:** dose-dependent, 4% incidence at 500-550 mg/m² of total dose

**Diagnosis:** signs of overt heart failure, cardiomegaly, pulmonary venous congestion, elevated BNP.

**Our case:**

**Clinically:** heart failure symptoms, no chest pain

**Timing:** 3 months

**Dosage:** had received 300 mg/m² total dose at time of hold

**Diagnosis:** signs of heart failure, no cardiomegaly or pulmonary venous congestion. Normal labs.
References:


Thank you!