

# AMSER Case of the Month

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26 y.o. male with right breast mass

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# Patient Presentation

- HPI: 26-year-old male patient presented with non-tender, enlarging right breast mass for past month
  - PMHx: AML (in remission) s/p chemotherapy followed by allogenic stem cell transplant 1 year prior, chronic GVHD
  - PSHx: 10 pack year history
  - FHx: No family history of breast cancer
  - Recent outpatient labs
    - ALK PHOS 240\*
    - ALT/AST 102/61\*
    - WBC 5.54
    - **RBC/Hgb 3.81/11.9**
    - CBC otherwise unremarkable
- \*baseline elevation due to chronic GVHD

What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

**Variant 3:**

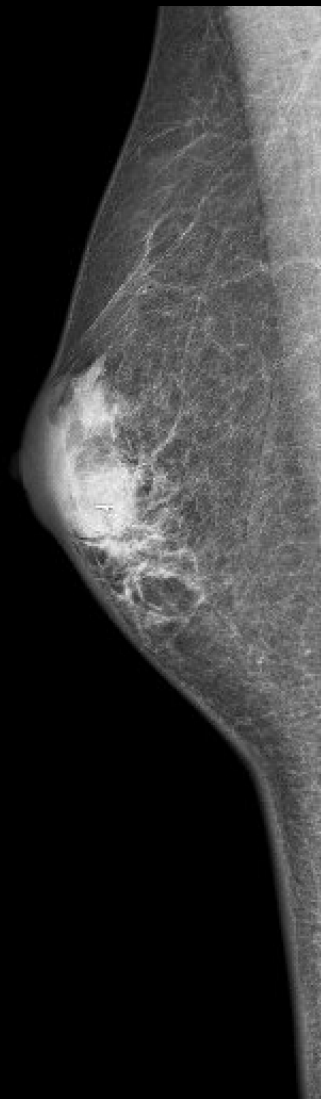
**Male 25 years of age or older with indeterminate palpable breast mass. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Mammography diagnostic	Usually Appropriate	☼☼
Digital breast tomosynthesis diagnostic	Usually Appropriate	☼☼
US breast	May Be Appropriate	○
MRI breast without and with IV contrast	Usually Not Appropriate	○
MRI breast without IV contrast	Usually Not Appropriate	○

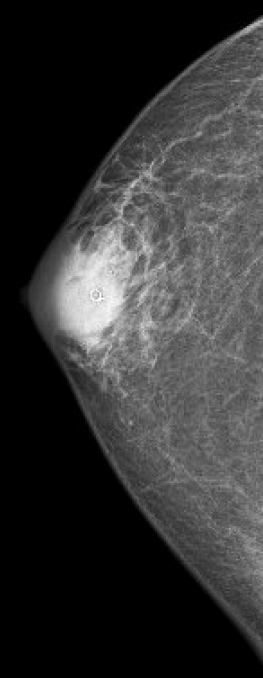
This imaging modality was ordered by the physician

# Findings: (unlabeled)

R-ML

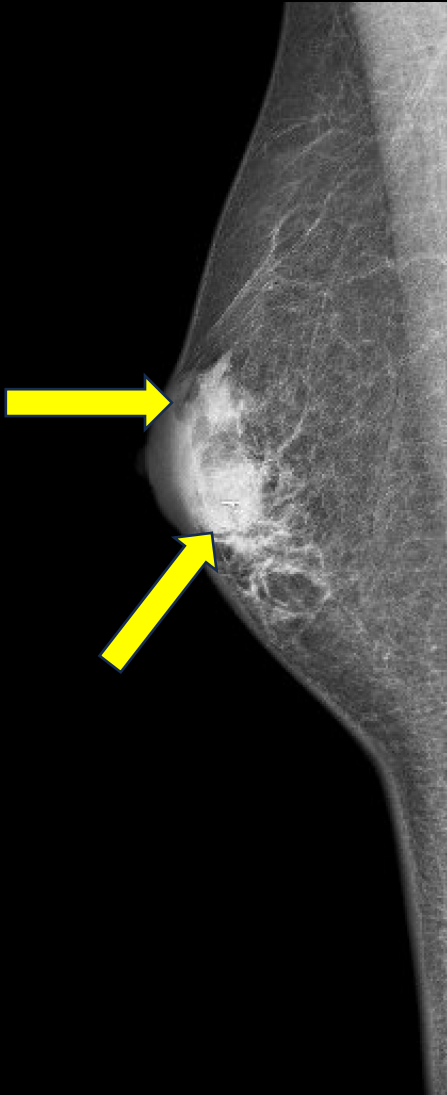


R-CC

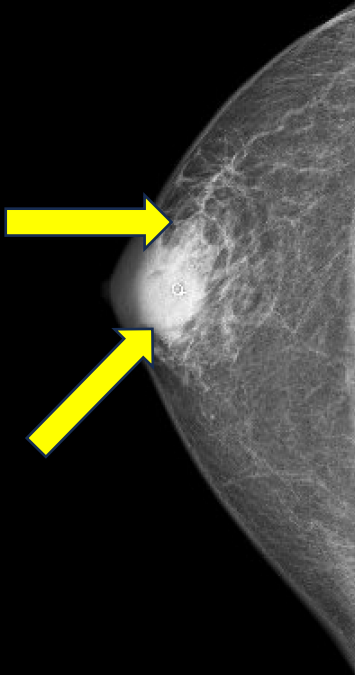


# Findings: (labeled)

R-ML



R-CC



Oval high density mass with circumscribed margins in the right subareolar region

No other masses or calcifications

Overall, indeterminate on mammography

# Select the applicable ACR Appropriateness Criteria

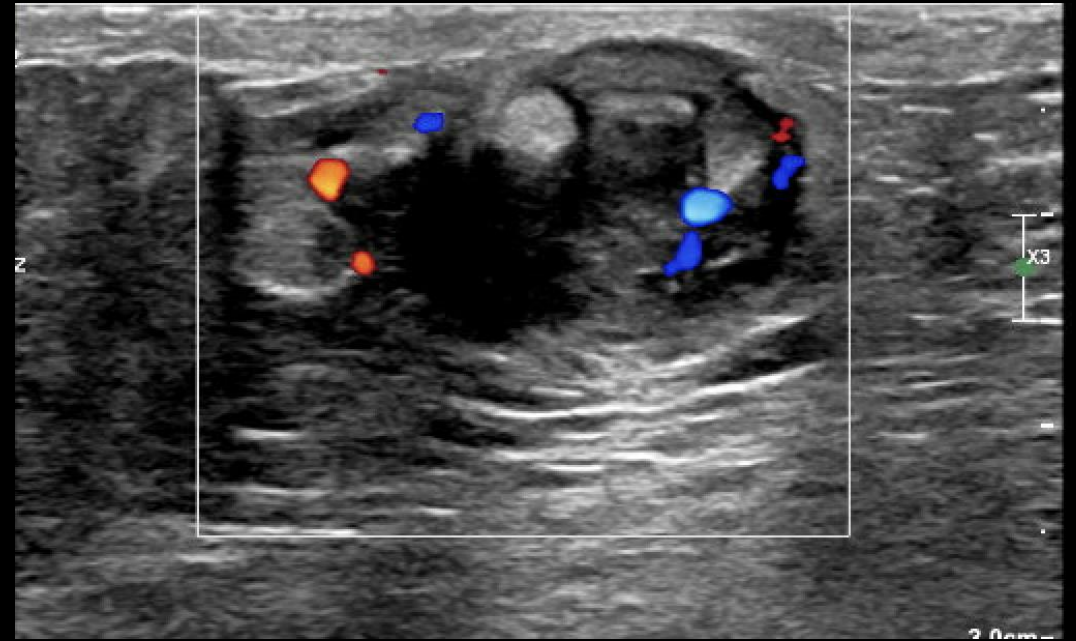
**Variant 4:**

**Male 25 years of age or older with indeterminate palpable breast mass. Mammography or digital breast tomosynthesis indeterminate or suspicious.**

Procedure	Appropriateness Category	Relative Radiation Level
US breast	Usually Appropriate	0
MRI breast without and with IV contrast	Usually Not Appropriate	0
MRI breast without IV contrast	Usually Not Appropriate	0

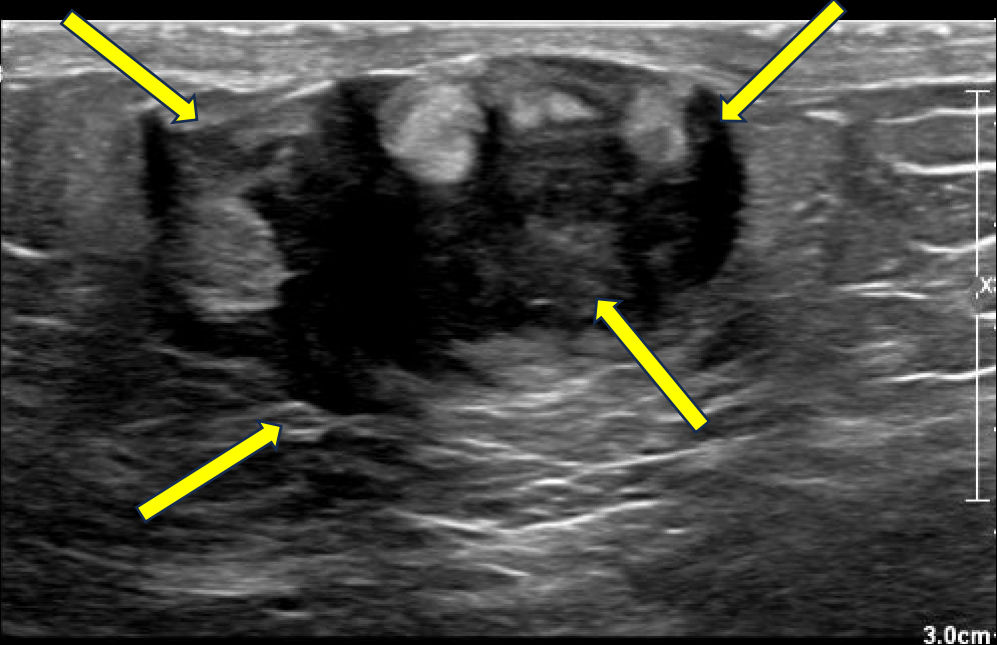
This imaging modality was ordered by the radiologist

# Findings (unlabeled)

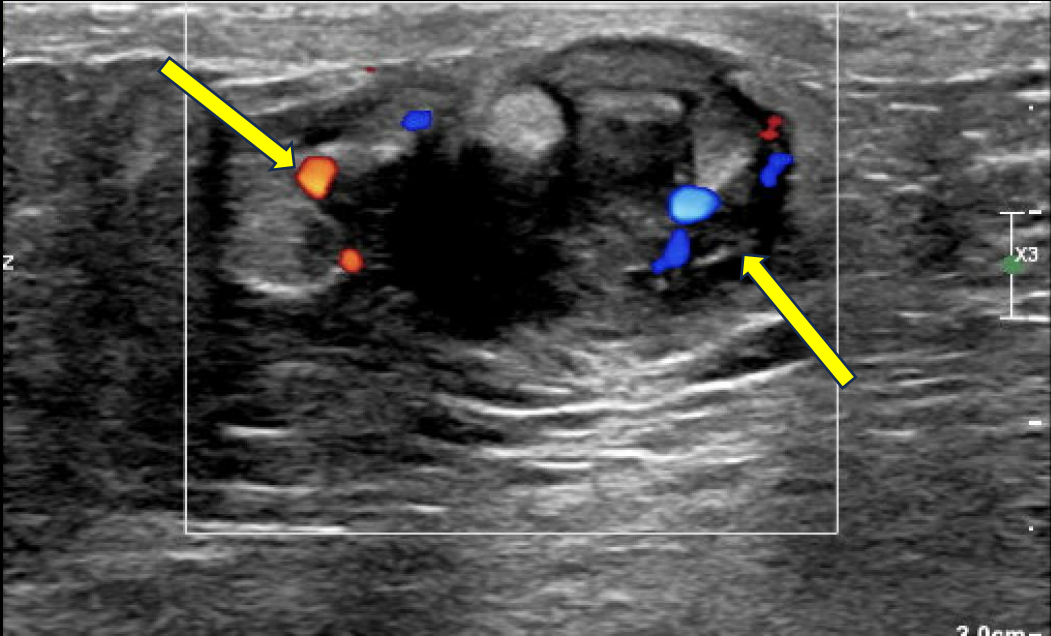




# Findings (labeled)



3 x 3.1 x 1.7 cm irregularly shaped mass, of mixed echogenicity with indistinct borders at 7 o'clock anterior depth 1 cm from nipple



Color flow demonstrates internal and peripheral vascularity

# Other Findings

- US guided biopsy was performed
  - Histologic sections showed diffuse infiltrate of intermediate-sized cells with fine chromatin, scant cytoplasm and irregular nuclear contours
  - Flow cytometry showed myeloid blast population
- Bone marrow biopsy and CSF analysis were without evidence of leukemia
- PET CT was ordered by radiation oncologist to evaluate for other areas of involvement. Appropriate indications for PET-CT in this case include:
  - Restaging in the setting of relapse
  - Guiding radiation therapy planning

# PET/CT Findings

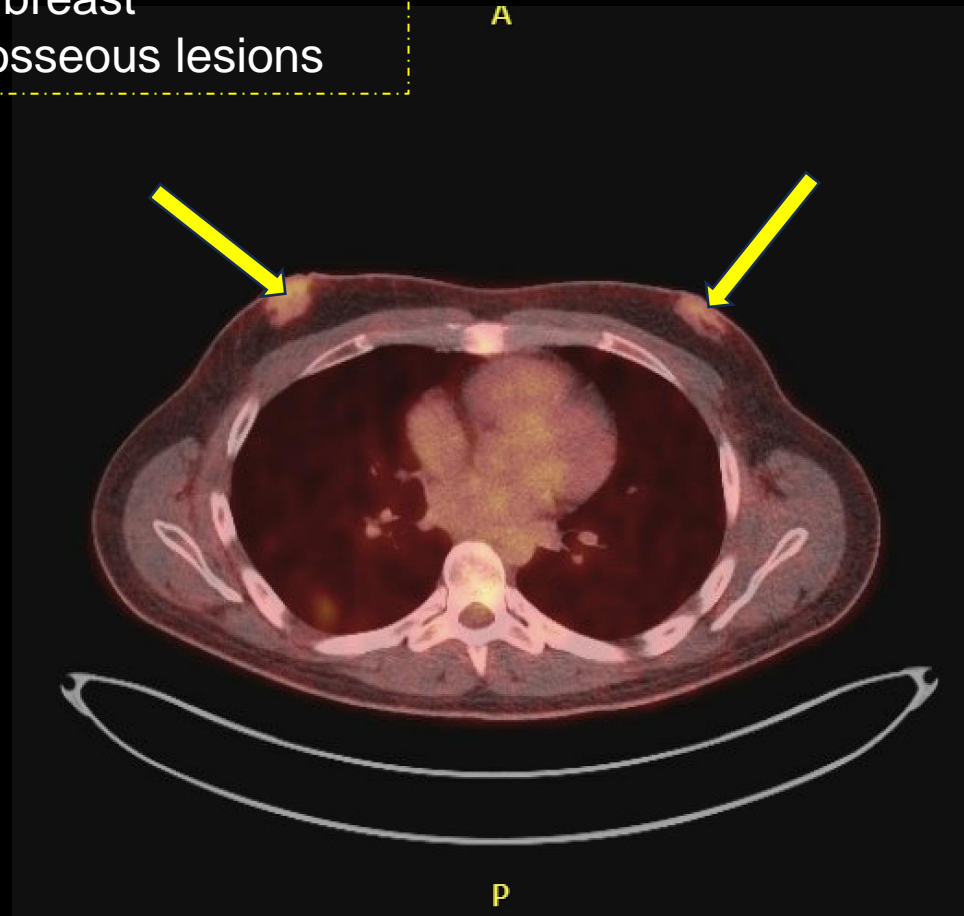
Hypermetabolic right breast chloroma  
Elevated FDG activity in left breast  
No other hypermetabolic masses or osseous lesions

A

A



P



P

Final Dx:

Myeloid Sarcoma (AML relapse)

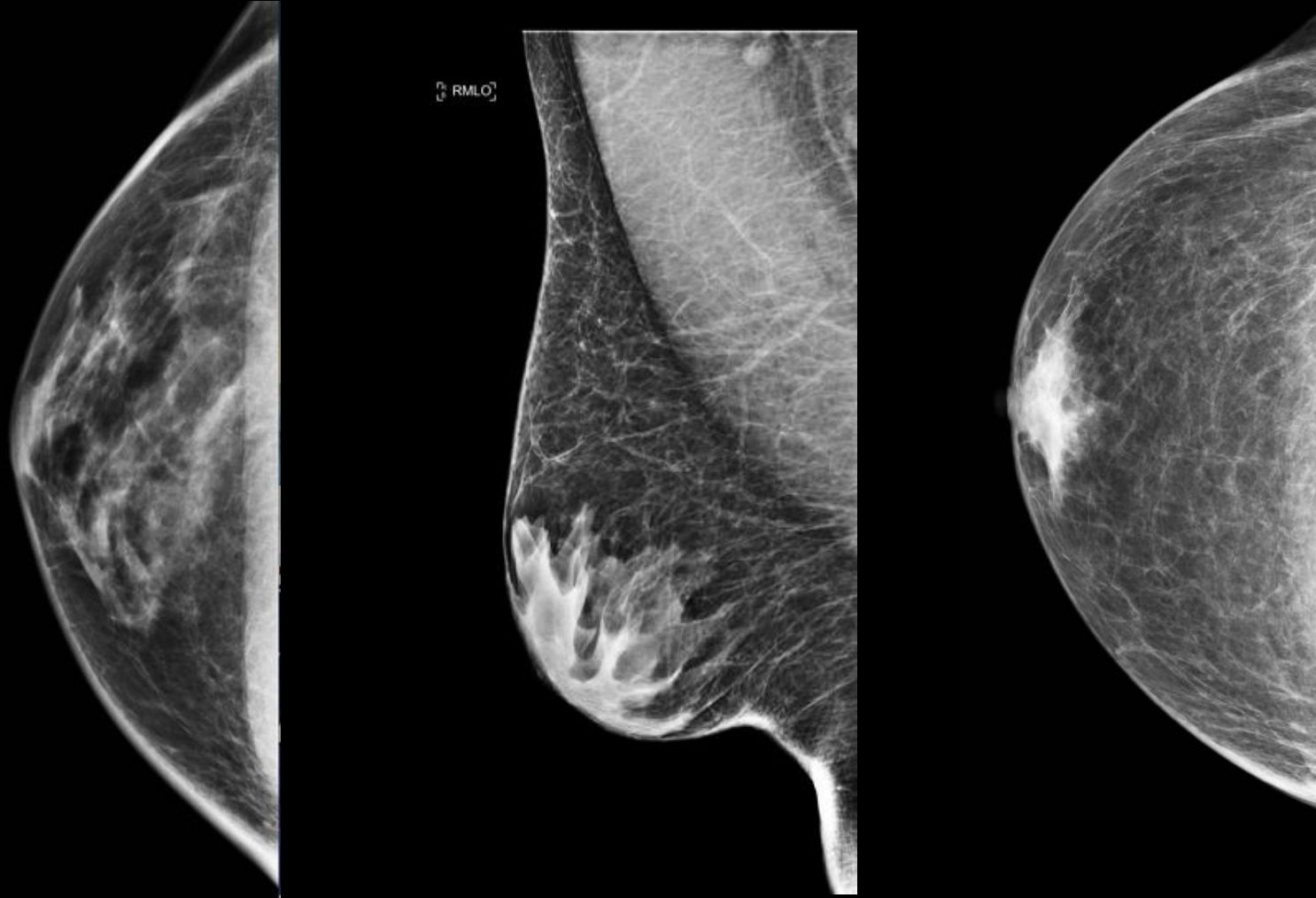
# Case Discussion

- Also identified as chloroma and granulocytic sarcoma, MS is an extramedullary manifestation of AML. It is an extramedullary mass of immature myeloid cells.
- It can occur concurrently or as a relapse of AML. A diagnosis of MS is equivalent to AML.
- MS occurs with incidence of 2-14% in AML. Most common sites of involvement are skin, lymph nodes, intestinal tract, bone and central nervous system. Isolated breast involvement is rare (8% of above cases). Majority of those cases are in females.
- Though not common, there has been an increase in MS presentations post-allo-SCT. It has also been postulated that extramedullary relapse may represent a reduced graft-vs-leukemia effect.

# Case Discussion

- Clinical presentation
  - Can be asymptomatic or tender lump
  - Usually not associated with other symptoms such as nipple discharge or inversion
- Diagnosis
  - Difficult to distinguish from other entities using mammography or ultrasound
  - Histopathological exam along with IHC staining is gold standard
  - MPO staining is strongly positive
- Management
  - No gold standard therapy but early chemotherapy and surgical resection are used
  - Radiation is controversial but this patient did receive radiation therapy along with chemotherapy

# Identifying Gynecomastia on Mammography



Gynecomastia is a common cause of breast enlargement in males. It is usually bilateral. On mammography, it can be diffuse (left), dendritic (middle), or nodular (right).

# Case Resolution

- Patient completed radiation therapy to right breast and started on chemotherapy
- Patient developed BL testicular masses a few months later which were revealed to be myeloid sarcomas; he had residual masses despite subsequent radiation
- Also developed maxillary sinus sarcoma
- Had increasing blasts in peripheral blood consistent with AML relapse
- Received a second allogenic hematopoietic stem cell transplant from unrelated donor
- Had persistent disease post-transplant and was switched to palliative measures



# Learning Points

- There are no classic imaging findings of myeloid sarcoma in the breast.
- It can be misdiagnosed as gynecomastia (in males), primary breast malignancy, lymphoma, other inflammatory processes.
- Mammogram findings described in literature include large, noncalcified irregular masses with poorly defined margins.
- US findings include heterogeneous hypoechoic masses that are hypervascular on color doppler.
  - **Elastography:** While not performed in this case, can be useful. Malignant breast lesions generally have higher stiffness and appear larger on elastography. This is useful because MS of breast has the sonographic appearance of a breast hamartoma.
- Suspicion for myeloid sarcoma is very dependent on patient history

# References

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3. Huang, X., Li, Y., & Zhou, X. (2015). Granulocytic sarcoma of the breast: A case report. *Oncology Letters*, 10, 2447-2449. <https://doi.org/10.3892/ol.2015.3532>
4. Kim, S. J., & Kim, W. G. (2019). Sonographic Features of a Myeloid Sarcoma of the Breast as a Relapse of Acute Myeloid Leukemia After Stem-Cell Transplantation: A Case Report. *The American journal of case reports*, 20, 612–619. <https://doi.org/10.12659/AJCR.915453>
5. Naamo, S., Naamo, S., Sarker, S., Vasconez, M., & Froicu, M. (2022). Breast manifestation of extramedullary myeloid sarcoma: A case report. *Radiology case reports*, 17(12), 4660–4665. <https://doi.org/10.1016/j.radcr.2022.09.003>
6. Palpable Breast Masses - Appropriateness Criteria, [acsearch.acr.org/docs/69495](https://acsearch.acr.org/docs/69495),