



Case Report

Breast Imaging in Liponecrosis in KAAH – A Pictorial Essay

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Introduction

Fat necrosis or Liponecrosis is a benign, non-supportive inflammatory process as a result of aseptic fat saponification. It has a multitude of imaging findings, sometimes mistakenly diagnosed as carcinoma or infectious pathologies, leading to unnecessary patient anxiety and biopsies. Thus, imaging plays a vital role in the diagnosis and management of these lesions.

Fat necrosis in the breast is fairly common. The incidence of fat necrosis of the breast is estimated to be 0.6% in the breast, representing 2.75% of all breast lesions. Fat necrosis is found to be 0.8% of breast tumors and 1% in breast reduction mammoplasty cases. The average age of patients is 50 years [1].

We present 4 cases of fat necrosis of breast, 3 of which are biopsy proven and the 4th had characteristic imaging findings, hence not biopsied and is stable on 6months of followup. The lesions showed varying presentations on mammogram, ultrasound and mri, highlighting the wide spectrum of imaging manifestation of fat necrosis.

Etiology

Fat necrosis can occur secondary to accidental injury, blunt or penetrating trauma, surgery, Biopsy, lumpectomy, flap reconstruction, reduction mammoplasty, breast augmentation, Post lumpectomy adjuvant radiation therapy, Direct silicone injection, Chemical irritation, Ruptured cyst or ectatic ducts, Cholesterol crystals, Plasma cell mastitis.

Spontaneous development has been reported in patients with diabetes or collagen vascular disease. In about 35-50% of patients, there is no history of prior trauma or surgery in 35-50% [2].

Pathogenesis

Fat necrosis is a result of aseptic fat saponification going through several stages. Acutely, the adipocytes (fat cells) are disrupted, and this is accompanied by hemorrhage and histiocytic infiltration. Over time, a lymphoplasmacytic infiltrate develops around the degenerating adipocytes, and histiocytes engulf the lipids released by the adipocytes; such lipid-laden histiocytes (macrophages) are referred to as Lipophages. Multinucleated giant histiocytes are commonly found admixed in the inflammatory response.

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Cysts containing gelatinous material may develop in the center of the degeneration. Calcification and stromal fibrosis become prominent. Fibrosis and calcification may produce a firm masslike lesion that, on clinical examination, can be suspected for carcinoma, though the size of such lesions typically is small (on the order of 1 or 2 cm) [3].

Imaging Findings

There are multiple various imaging manifestations of fat necrosis depending upon the stage of evolution

1. Acute Stage

Within days of event.

Mammographic Findings

Assymetrical density without architectural distortion or microcalcifications.

May appear normal.

Ultrasonographic Findings

Edema of breast fat, increased echogenicity, may show vascularity in the tissues.

MRI Findings

T1 and T2 WI –fat signal in the mass. Surrounding edema may show high signal on T2 and low on T1.

T2 WI Fat suppression—loss of fat signal in mass.

Post contrast T1FS-thin rim of peripheral enhancement may be seen.

2. Subacute Stage

Mammographic Findings

- Round, oval, or lobulated lucent mass
- Oil cyst(s) when round, oval

Ultrasound Findings

Complex cystic phase

- Ill-defined complex cystic areas within edematous fat: Mixed hyper- and hypo- to anechoic mass
- Thin echogenic cyst wall develops: May be multi-loculated
- Diffuse low level internal echoes
- Posterior enhancement
- May see flow in granulation tissue within 6 months of surgery
- Hyperemia post-radiation therapy persists till one year

MRI Findings

T1 and T2 WI –fat signal in the complex mass. Layered fat and fluid level. T2 WI Fat suppression—loss of fat signal in mass. T1 WI may show reduced signal if any hemorrhage is present in the fat necrosis.

Post contrast T1FS—thin rim of peripheral enhancement may be seen. Enhancement of the mass sparing the fat component. If multiloculated, complex wall enhancement.

3. Late Stage

18 months or more from event.

Mammographic Findings

- Develop peripheral rim Ca++
- Oil cyst showing peripheral wall rim calcification or coarse central and peripheral calcifications or totally calcified mass
- May show mass with speculated borders
- Isolated calcifications
- Fine linear or pleomorphic Ca++
- Early manifestation—May be confused with ductal carcinoma in situ or lipoma

Ultrasound Findings

- Wall calcifies: Posterior enhancement changes to intense shadowing
- May well look thick-walled or even solid
- If post-surgical, may have angular margins

MRI Findings

- T1 and T2 WI –fat component in the complex mass, may be reduced and surrounded by the complex mass, which may be of low signal due to fibrosis and/or calcification. May show speculated borders. Can be mistaken for malignancy.
- T2 WI Fat suppression—loss of fat signal in mass if fat component is present.
- Post contrast T1FS—Variable pattern of mass like Enhancement of the mass sparing the fat component, may show speculated borders. Kinetic enhancement curves are not reliable can show type 1, 2 or type 3 curves.
- Thin rim of peripheral enhancement may persist upto 18 months post trauma/surgery
- Rarely, fat necrosis will enhance years later [2,4].

Differential Diagnosis

The varying imaging findings can raise the possibility of other fat containing lesions such as lipomas, fibroadenolipomas and galactocele. However, these can be differentiated based on the clinical history and characteristic mammographic and ultrasound appearance.

An important consideration is the possibility of infiltrating ductal or lobular carcinoma or recurrence/residual ca in post-operative breast. For this, we need to review the old images as well as take the clinical history. If doubt persists, then proceed to biopsy [2].

When fat necrosis cannot be confidently established as the diagnosis on the basis of imaging, biopsy should be pursued to confirm histology. Patient factors may also affect decision making; for example, patients at high risk for recurrence or who present with palpable complaints may require biopsy. Biopsy is especially critical for genetically high-risk and known cancer patients who may be considering mastectomy [5].

Case 1

55 years old female, post-menopausal status, with right breast pain since 20 days, showing skin redness, swelling and tenderness. No history of trauma or previous surgery. No fever.



Figure 1: Mammogram-bilateral CC and MLO views showing focal asymmetrical density in the inferior and posterior region of right breast with no microcalcifications

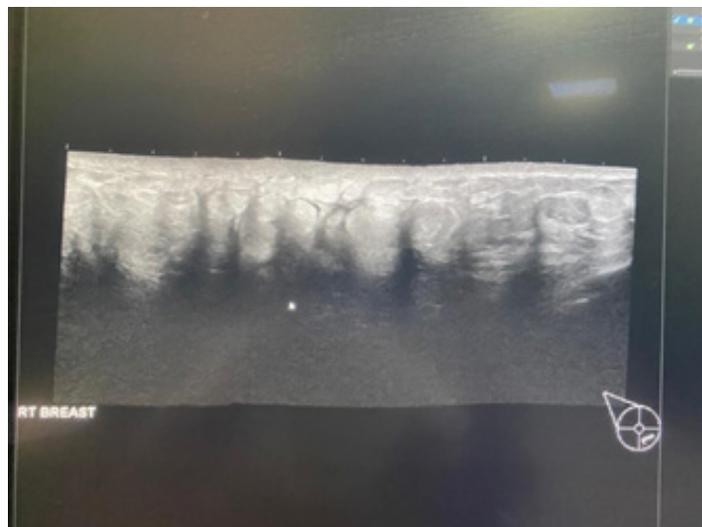


Figure 2: Ultrasound panoramic view showed diffusely altered echogenicity of the right lower inner quadrant with hyperechoic and intervening hypoechoic areas, posterior acoustic shadowing. No obvious collection noted. No internal vascularity

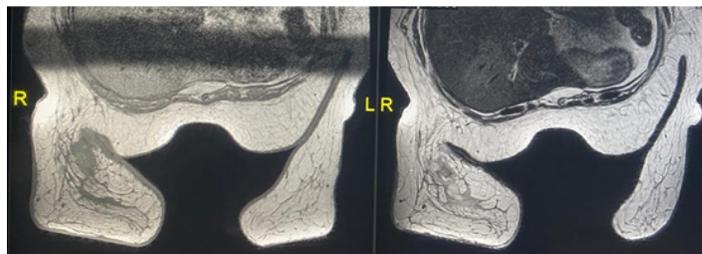


Figure 3: MRI-Axial T1 and T2 WI showing irregular area in the right breast posteriorly appearing fairly bright on T1 and T2 WI, following fat signal. Some areas low signal on T1 WI indicating blood products

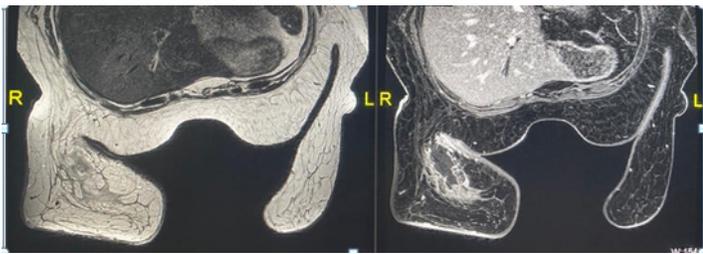


Figure 4: MRI-T2 WI with post contrast Fat suppressed T1 WI images showing loss of signal on fat suppression and peripheral contrast enhancement—impressive of fat necrosis. Subacute stage



Figure 7: Ultrasound showed diffuse altered echogenicity and multiple round hypoechoic areas with echogenic centers and no internal vascularity in the lower inner quadrant of the left breast

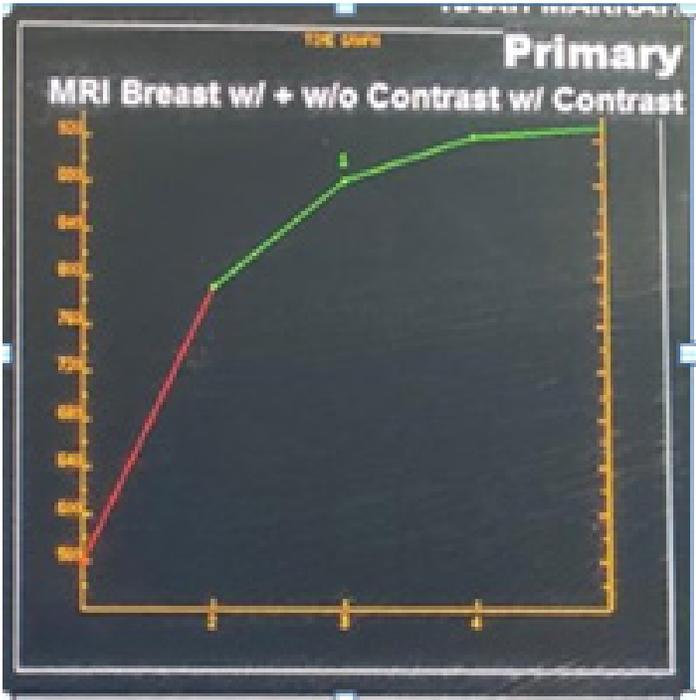


Figure 5: MRI time-intensity kinetic enhancement curve shows type II plateau. Biopsy results showed fat necrosis. No malignant pathology

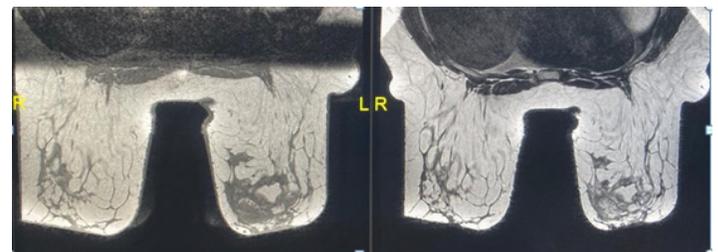


Figure 8: MRI-Axial T1 and T2 WI showing irregular area in the left breast inner quadrant appearing fairly bright on T1 and T2 WI, following the fat signal. Some areas low signal on T1 WI indicating blood products

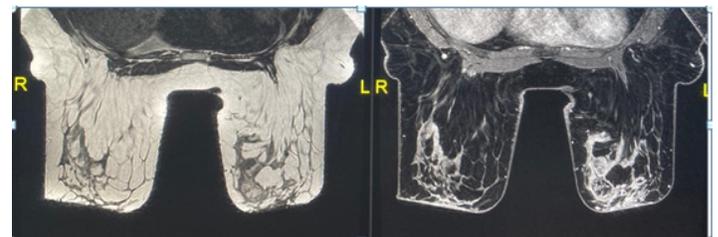


Figure 9: MRI-T2 WI and corresponding post contrast Fat suppressed images showing loss of signal on fat suppression with peripheral contrast enhancement—impressive of fat necrosis. Subacute stage

Case 2

44 years old lady, presented with left breast pain and tenderness in the inner quadrant of left breast since 3 weeks. No history of trauma or previous surgery. No fever. On examination, it was firm and tender.

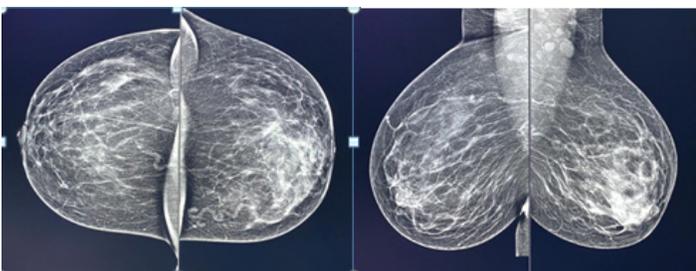


Figure 6: Mammogram-bilateral CC and MLO views showing focal asymmetrical density in the lower inner quadrant and retroareolar region of the left breast with interspersed fat and no architectural distortion

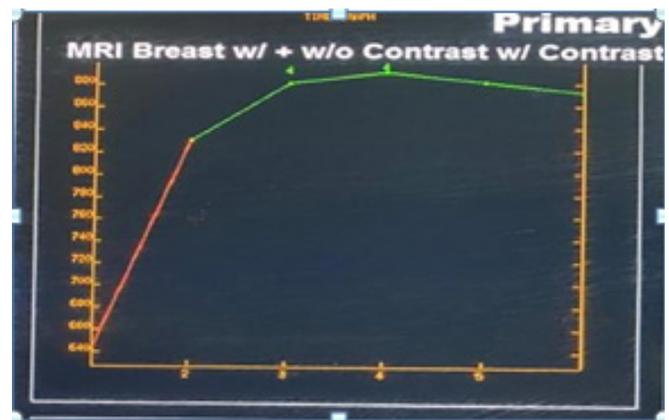


Figure 10: MRI time-intensity kinetic enhancement curve shows wash out - type III curve. Biopsy results were consistent with fat necrosis

Case 3

42 years old lady, came for follow up post lumpectomy in right breast for ca, 3 yrs back. No complaints. On examination, no abnormality detected except for the post op findings

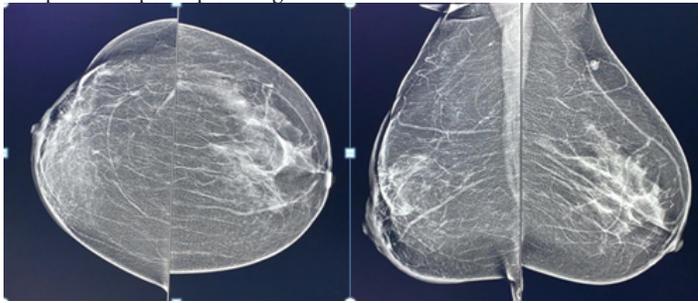


Figure 11: Mammography revealed post op skin thickening with architectural distortion in right breast. No significant abnormality in left breast

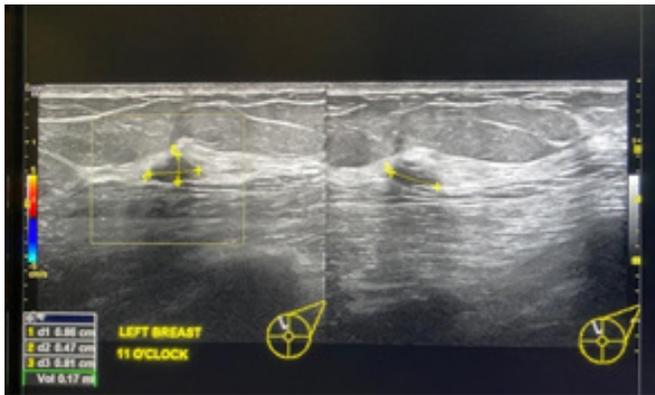


Figure 12: Ultrasound of the left breast showed a hypoechoic lesion in the 11-12 o'clock position with no internal vascularity

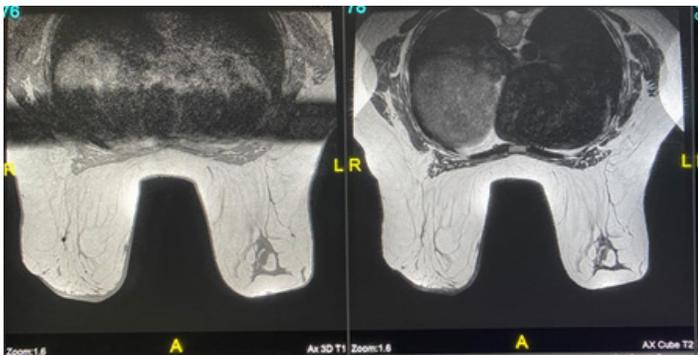


Figure 13: MRI-Axial T1 and T2 WI showing irregular area in the left breast at 12 o'clock position, showing low signal on T1 and T2 WI and intervening small areas following fat signal



Figure 14: MRI-T2 WI with Fat suppressed images showed heterogenous

enhancement. Suspicious appearance –difficult to rule out malignancy

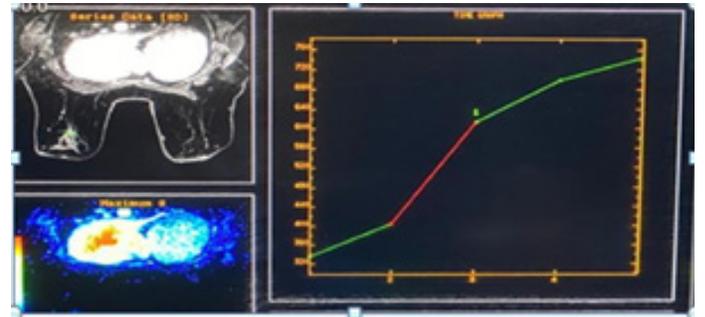


Figure 15: MRI time-intensity kinetic enhancement curve shows persistent- type I curve. Biopsy was consistent with fat necrosis, with areas of fibrosis—indicative of fat necrosis in Late stage

Case 4

42 years old lady, came for follow up post lipofilling in both breasts, for checkup.

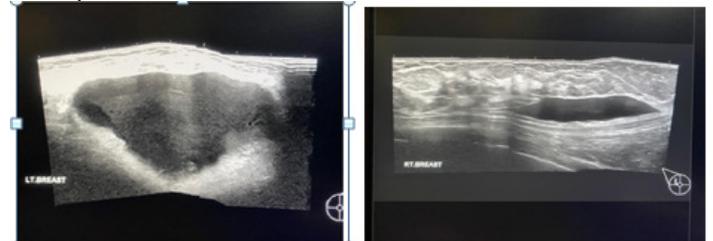


Figure 16: Ultrasound showed Fluid filled lesions in the both breasts, showing fluid-fluid level in left

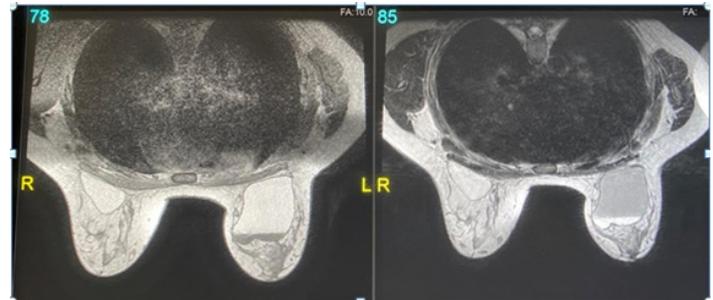


Figure 17: MRI-Axial T1 and T2 WI showing fluid filled lesion in both breasts showing fat signal. And in the left breast, there is fat-fluid level

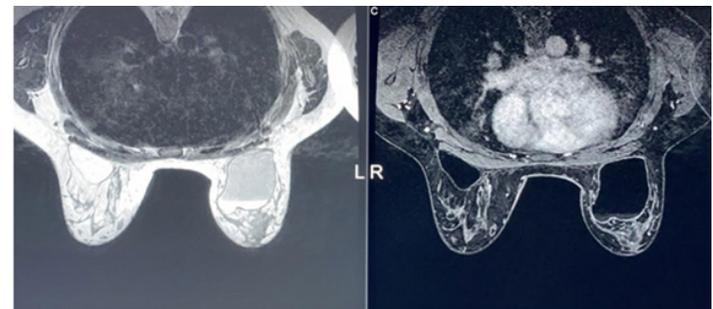


Figure 18: MRI-T2 WI with Fat suppressed images showing loss of signal on fat suppression. And peripheral contrast enhancement—impressive of fat necrosis

On followup ultrasound after 7 months, the patient showed a stable course.

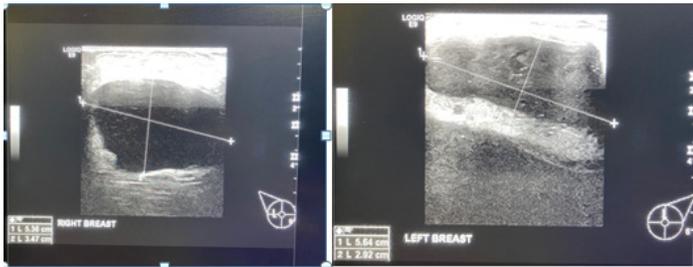


Figure 19: Followup ultrasound after 7 months showing no significant interval change

Thus as can be seen by the cases described above, fat necrosis is a great mimic of both benign and malignant pathologies. The kinetic enhancement curves can be type 1 to type 3, therefore not much help in diagnosing fat necrosis. Even the morphology and contrast enhancement pattern can give suspicious appearance. The clue to the diagnosis lies in the fat signal of the mass. Also the clinical history of the patient will give additional confidence in our diagnosis.

Conclusion

Thus, clear understanding of these wide various presentations in different modalities will help to improve the interpretive skills of breast imaging radiologists. Many patients would be relieved from unnecessary anxieties

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and painful biopsies. Fat necrosis or Liponecrosis is therefore, an important consideration to be kept in mind during diagnosis of breast lesions.

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The authors have no potential conflicts of interest to disclose.

References

1. PH Tan, LM Lai, EV Carrington, et al. (2006) "Fat necrosis of the breast—a review," *The Breast* 15: 313-318.
2. Wendie A Berg, et al. *Diagnostic imaging. Breast.* 1st ed, Amirsys 2006: 355-360.
3. Daneil B Kopans. *Breast Imaging.* 3rd ed. Philadelphia, PA: Lippincott Williams and Wilkins. 2007: 54-55.
4. William D Kerridge, Oleksandr N Kryvenko, Afua Thompson, Biren A Shah (2015) Fat Necrosis of the Breast: A Pictorial Review of the Mammographic, Ultrasound, CT, and MRI Findings with Histopathologic Correlation. *Hindawi Radiology research and practice* 2015: 1-8.
5. Caroline P Daly, Barbara Jaeger, David S Sill (2008) Variable appearance of fat necrosis on Breast MRI. *AJR* 191: 1374-1380.

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