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Case Report

Case report: Poorly differentiated breast carcinoma presenting as a breast abscess ☆☆☆

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ABSTRACT

We report a case of 31-year-old female with no past medical history who presented with sudden onset discharging skin ulcer in left inframammary fold with erythema and swelling immediately after she came back from holiday for which she presented to the breast one stop clinic and underwent ultrasound-guided aspiration of the detected cystic lesion in the left breast with impression of breast abscess. Afterwards, as the result of cytology reporting as C5, ultrasound-guided Core-Needle Biopsy was performed, which confirmed poorly differentiated carcinoma of breast. Furthermore, similar necrotizing masses were found in axillary lymph nodes and Liver. The final diagnosis was concluded as poorly differentiated breast carcinoma with metastasis to axillary lymph nodes and the liver. This case reports a very uncommon presentation of breast carcinoma in a young patient with no past medical history, presenting with cystic necrotizing mass which is extremely rare in breast cancer. At the time of presentation, carcinoma had spread to the liver and axillary nodes.

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Background

Breast cancer is the most common type of cancer in the UK. Most women diagnosed with breast cancer are over the age of 50, but younger women can also get breast cancer. In England, there were 48,387 new cases of breast cancer with 9525 breast cancer recorded deaths in 2019 [1]. The vast majority of these breast cancer deaths were due to metastatic breast cancer

(MBC). It is estimated that less than 10% of females with breast cancer have liver metastases at presentation. With an average survival of 1–14 months, liver metastasis has been found to be an adverse independent prognostic factor [2]. The early and precise detection of metastases preferably at the time of diagnosis or early stages of treatment is extremely crucial in determining the optimal treatment plan [3].

Centrally necrotizing carcinoma (CNC) is a rare and recently identified variant of breast carcinoma. It is distin-

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guished by the presence of a substantial central necrotic zone, encompassing at least 70% of the tumor's cross-sectional area. This central necrotic zone is encircled by a narrow rim of actively proliferative tumor cells, which are most likely invasive ductal carcinomas [4,5]. The clinical and pathological characteristics of this particular subtype of breast cancer are not fully comprehended and have not yet been officially recognized by the World Health Organization (WHO) [5]. CNC is reported in 2%-3% of all breast cancers and predominantly affects middle-aged and older women, with an average age of 51.8 years [6]. The nature of the necrotic tissue, whether representing true metastasis or just nonviable tumor cells, is still unknown [7].

Case presentation

We present a case of a 31-year-old female who attended the under 35 breast clinics in May 2022, complaining of localized breast oedema, erythema, and a spontaneously discharging ulcer in her lower left breast, accompanied by diffuse induration. Onset of these symptoms occurred abruptly following her return from vacation, prompting her to seek further investigation the next day. The patient had an unremarkable medical history and was not on regular medications, but she did have a positive family history of breast cancer, with her mother diagnosed at 53, and her grandmother also having the disease. She had not undergone any previous breast ultrasound (US) scans or mammograms.

Clinical examination revealed evident swelling, increased warmth, and erythema in the inferior aspect of the left breast, with associated superficial ulceration and discharge. Palpation identified a solid mass spanning the entire lower half of the left breast, in addition to the presence of a palpable lymph node in the left axilla. The patient denied any reports of fever, and no elevated temperature was noted during the examination.

Considering these clinical findings, US scan and mammogram of the left breast was recommended. The Ultrasound scan demonstrated a 75 × 33 mm thick-walled cavitory lesion containing internal floating debris in the lower central region of the left breast. US-guided aspiration yielded 60 mL of yellowish turbulent fluid which eventually became blood-stained. The appearance strongly suggested an infective process; however, it was essential to exclude the possibility of malignancy considering her positive family history for breast cancer. As a result, the sample was sent for culture, sensitivity and cytology testing. Additionally, scan of the left axilla demonstrated a single enlarged node measuring 48 × 26 mm with cystic center, mirroring the features of the breast lesion.

The mammogram of both breasts revealed a mixed density background with a BI-RADS (Breast Imaging Reporting and Data System) B classification. An irregular mass measuring approximately 80 × 50 mm was identified in the lower inner quadrant of the left breast (Fig. 1). An enlarged node was partially visible on the left medio-lateral-oblique (MLO) view. The right breast was unremarkable. (Right breast reported as M1 and Left breast as M3 on mammogram)

Following the result of cytology, which was reported as category C5 (indicating malignancy), the patient was referred again to the breast clinic for US-guided Core needle biopsy (CNB) of the left breast lesion. During the procedure, a partially collapsed cystic mass consistent with the findings from the previous scan was observed in the lower inner left breast. Approximately 50 mL of blood-stained fluid was aspirated again. Additionally, CNB was performed, and ribbon marker was inserted into the lesion. The thick-walled irregular mass in the left axilla was not biopsied.

Subsequently, the patient's case was discussed at multi-disciplinary team meeting (MDT), following which, a decision was made to perform an extended CT scan of thorax, abdomen and pelvis with contrast to rule out any distant metastasis. This is in accordance with UK guidelines, which recommend CT staging for patients at high risk of metastatic disease, considering factors such as the size and grade of the primary tumor [8].

CT-scan showed an irregular cystic lesion with enhancing thick wall and internal hypo-attenuation in keeping with central necrosis measuring 68 × 40 × 77 mm in the lower left breast (Fig. 2). Another similar appearing lesion measuring 15 × 5 × 12 mm, is also seen abutting the left pectoralis major muscle along with two level I enlarged pathologic nodes with central necrosis in the left axilla, largest of which measured 32 × 27 mm.

In the liver multiple irregular enhancing thick-walled cystic lesions were seen, with the largest lesion located in segment VIII, measuring 65 × 75 × 65 mm. These lesions demonstrate peripheral enhancement in the arterial phase and rapid wash-out on the porto-venous phase. No intra-thoracic or bony metastasis is identified.

Following the CT scan result and the detection of multiple liver lesions, MRI liver with contrast was recommended for further evaluation, in which numerous large masses distributed across both lobes of the liver, with peripheral T2 hyper-signal intensity and central T2 hypo-signal intensity. The largest lesion in segment 8 measured approximately 80 × 73 mm. There was mild central restricted diffusion on DWI/ADC map images and peripheral contrast enhancement, suggesting the presence of multifocal liver metastases (Figs. 3–5).

The final pathology result of core biopsy revealed widespread infiltration of a poorly differentiated epithelioid malignant tumor with a basaloid appearance in the breast tissue. Immunohistochemistry analysis of the tumor showed positive staining for AE1 AE3, CK7, GATA3, and moderate to strong positivity with E cadherin in a significant proportion of cells, although some of the cells displayed relatively reduced expression or partially staining. The tumor tested negative for LCA, S-100, Oct 3/4, SALL4, CDX 2, TTF-1, Napsin-A, ER (Q score = 0), mammaglobin, GCDFP, PAX8, Synaptophysin, Chromogranin and CD 56 (with scattered cells highlighting, likely lymphocytes). The tumor was negative for Estrogen receptor (ER), progesterone receptors (PR) and human epidermal receptor 2 (HER2) overexpression.

In conclusion, the tumor was identified as triple negative poorly differentiated carcinoma with an immune profile that was not specific for breast origin, as it can also be observed in tumors from other sites. However, considering the tumor

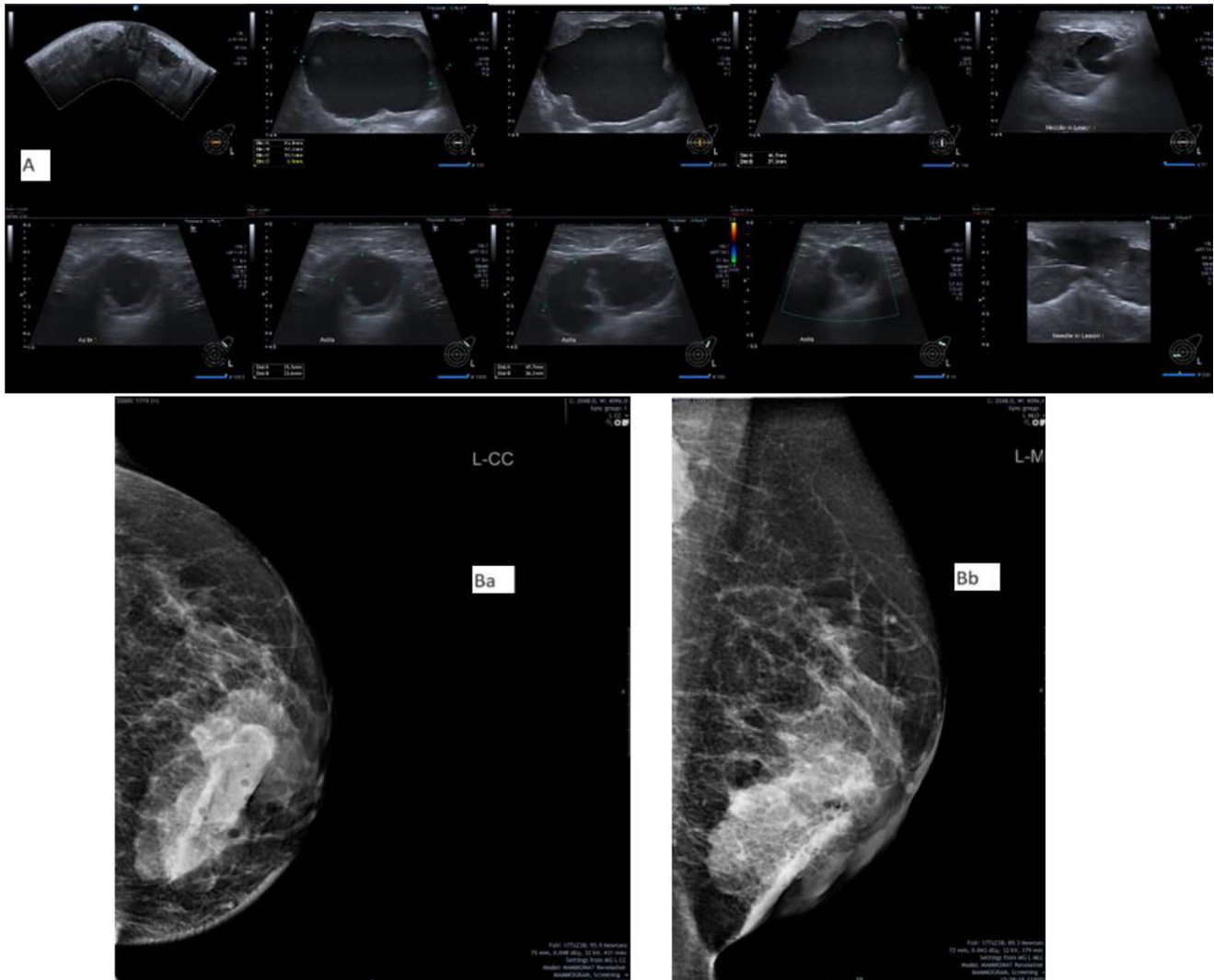


Fig. 1 – The left breast lesion in (A) ultrasound and (B) mammogram. A; Ultrasound showed an irregular thick wall cystic lesion mimicking breast abscess. B; Mammogram: Craniocaudal (CC) view (Image Ba) and mediolateral oblique (MLO) view (image Bb) revealed BIRADS-B density. A lesion in the lower inner quadrant is observed, accompanied by an enlarged axillary node visible solely on the MLO view.

morphology and immune-profile, breast origin remains compatible possibility.

The patient's case was presented and discussed during an oncology meeting to assess the appropriate treatment plan.

Discussion

This case presents an exceptionally rare presentation of breast cancer, characterized by a necrotizing cystic mass in breast with cystic metastases to liver and axillary lymph nodes. Metastatic breast cancer at the age of 31 is highly uncommon, and the occurrence of necrotic metastases in the axillary and liver regions originating from the breast is also exceedingly rare. Due to its rarity, the initial clinical impression in this case was that of breast abscess, leading to the choice of fluid aspiration instead of performing US-guided CNB.

In a previous case study by Hernanz et al in 2012, a similar case of centrally necrotizing breast carcinoma (CNC) was reported. The patient, a 53-year-old woman, presented with a painful mass 17 months after being diagnosed with breast cancer and receiving mastectomy with adjuvant chemo radiotherapy. Despite multiple biopsies, the obtained samples were necrotic, and imaging tests such as mammography, tumor markers, and MRI were inconclusive. The mass rapidly increased in size, leading to the decision of radical mastectomy due to severe pain. The final diagnosis, confirmed after surgical removal, was centrally necrotizing breast carcinoma. This case highlights the difficulty in diagnosing CNC, as it can be missed despite extensive investigations [4].

Furthermore, in our study, the size of the liver lesions did not correspond to what would typically be expected in the case of necrosis. Additionally, the patient had no history of chemotherapy prior to undergoing investigations, further adding to the exceptional nature of this case. CNC is

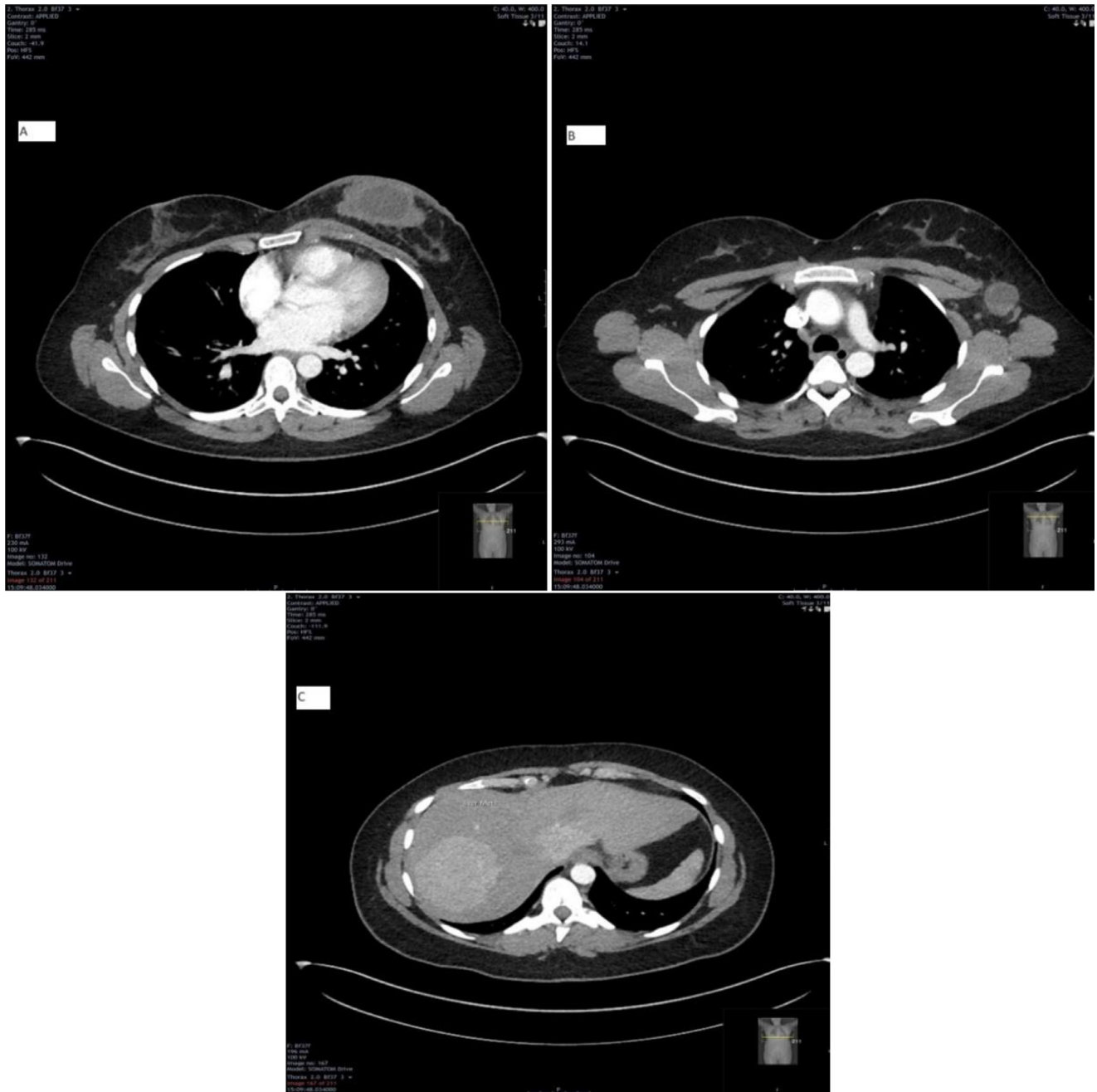


Fig. 2 – CT scan of the chest, abdomen, & pelvis with contrast: A peripherally enhancing lesion with central necrosis is observed in the left breast. (Image A). A necrotic node in the left axilla at level I (image B). Multiple enhancing lesions within both liver lobes, suspicion of metastasis. (Image C).

an uncommon subtype of breast carcinoma that exhibits distinct clinicopathologic features, predominantly characterized as basal-like type. The tumor displays high level of cellular proliferation, and demonstrates a highly aggressive biological behavior, leading to high rates of recurrence and metastasis.

Considering these unique features, it is suggested that CNC should be recognized as a novel class of breast carcinoma. Promoting awareness about this newly identified subtype is crucial for enhancing its diagnosis and management process [5].

Over the last 25 years, new treatment options for breast cancer have significantly evolved. In a study conducted by Sundquist et al, 784 cases diagnosed with disseminated breast cancer between 1985 and 2014 were followed until 2016. The findings revealed that the median survival of patients increased progressively from 13 to 33 months. Additionally, the 5-year survival rate rose from 10% to 27%. Patients with high-grade primary tumors initially had the shortest postrecurrence survival time, but their median survival showed a sig-

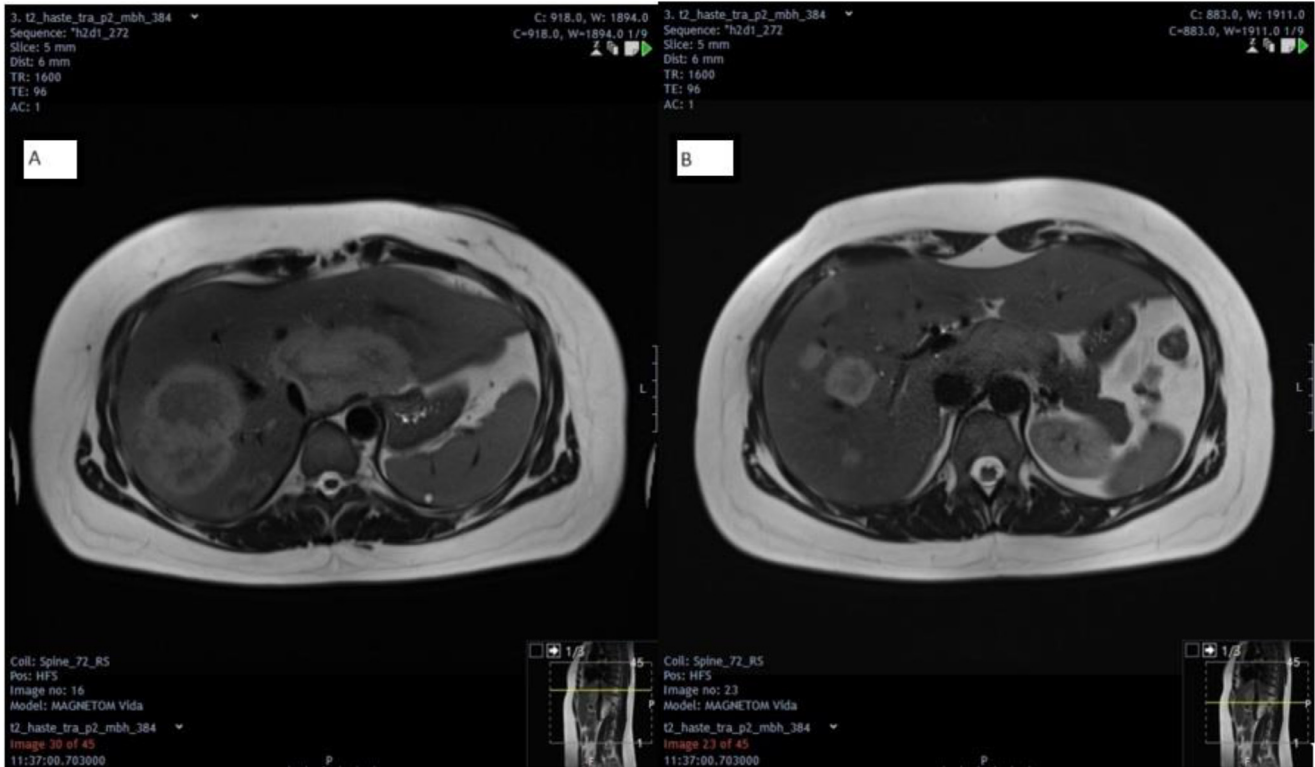


Fig. 3 – MRI Liver. Axial T2W images; lesions with peripheral hyper-signal intensity and central hypo-signal intensity. Image A depicts an upper slice from the MRI scan, while image B shows a lower slice.

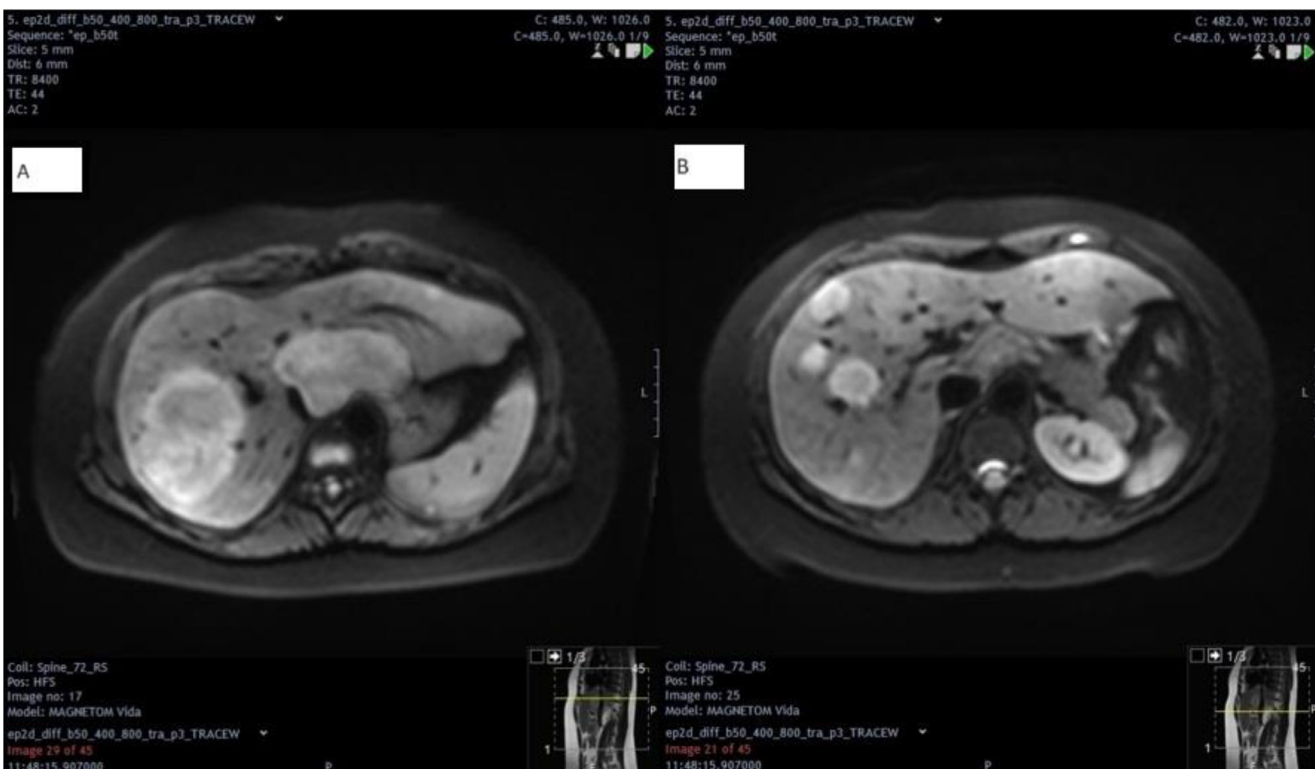


Fig. 4 – MRI Liver. Axial Diffusion weighted images; lesions with restricted diffusion. Image A depicts an upper slice from the MRI scan, while image B shows a lower slice.

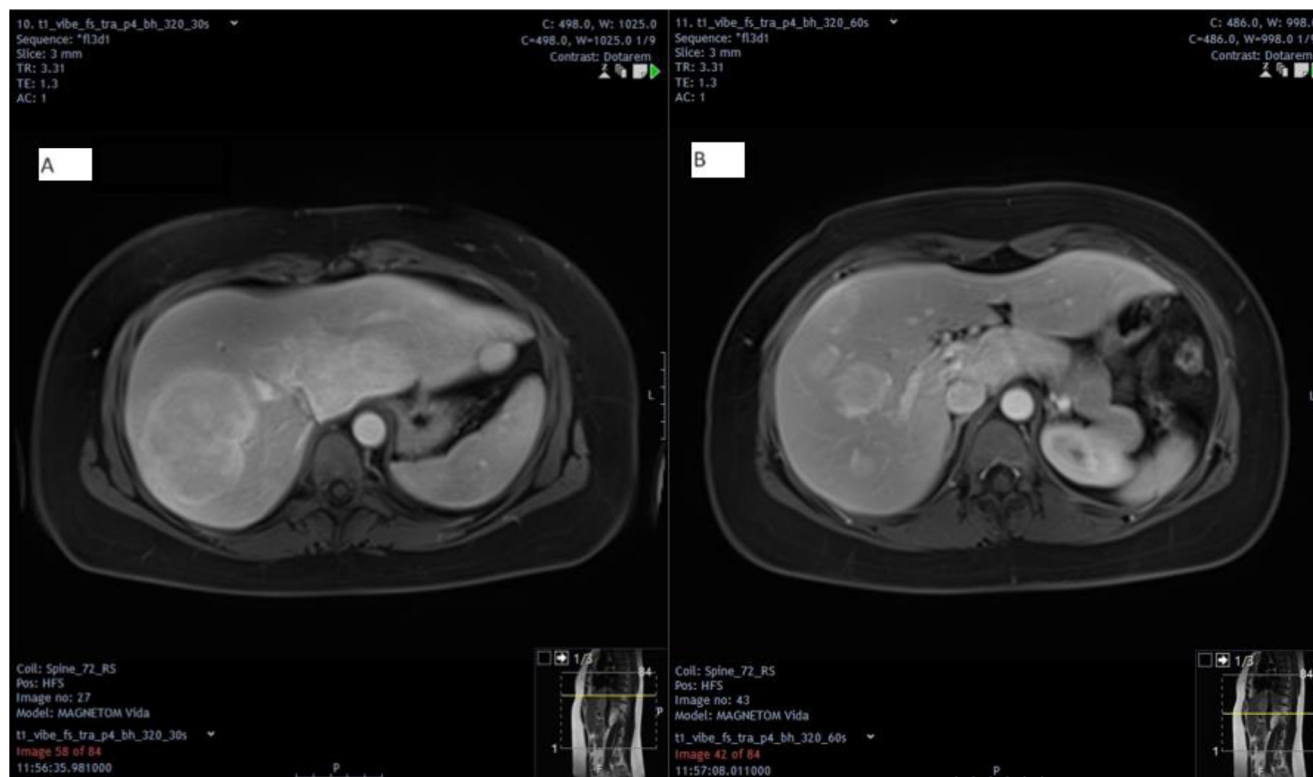


Fig. 5 – MRI Liver. Axial T1 Post contrast images; cystic lesions with peripheral enhancement. Image A depicts an upper slice from the MRI scan, while image B shows a lower slice.

nificant improvement over time, increasing from 12 to 30 months. The 3-year survival rate also increased from 16% to 38%, and the 5-year survival rate from 5% to 20%. On the other hand, patients with grade 2 tumors had a median survival of 2 years, which did not show any improvement. Only 47 patients had grade 1 tumors, and their median survival of 4 years remained unchanged. This study underscores the importance of early diagnosis and treatment of breast cancer and emphasizes the significance of optimal methods for early detection, leading to timely and effective treatment, resulting in improved overall survival rates [9].

Conclusion

Cystic necrotic lesions detected in the breast should not be automatically assumed as benign masses. Regardless of the patient's age, past medical history, or symptom presentation, it is vital to conduct initial and proper evaluation and investigation to exclude the possibility of malignant conditions in these cases.

Patient consent

Prior to the commencement of writing this case report, informed consent was obtained from the patient.

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