LETTER TO EDITOR

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Lipid-Rich Carcinoma of the Breast: A Rare but Aggressive Mammary Malignancy

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Dear Editor,

Breast cancer is a complex and heterogeneous disease encompassing various morphologic and molecular subtypes (1). Invasive ductal carcinoma of no special type is the most common morphologic subtype of breast cancer. Within this subtype, the World Health Organization classification of breast cancers recognizes several rare morphologic patterns, including the lipid-rich variant of breast carcinoma (LRBC) (1). It is characterized by the neoplastic proliferation of cells enriched with neutral lipids in their cytoplasm, irregular nuclei exhibiting marked atypia, and frequent mitoses (1). LRBC appears to be extremely rare, with only around 100 cases published up to mid-2025 (2-4).

Based on the Surveillance, Epidemiology, and End Results (SEER) analysis up to 2021, we identified 15 new LRBCs among approximately three million breast cancer patients, corresponding to ~0.001% of all breast cancer cases. Table 1 summarizes the demographic features, tumor characteristics, treatment details, and survival outcomes of the LRBC cohort.

Notably, most patients were between 50-79 years of age, and 58% of those with available data had high-grade cancers. In line with its aggressive clinical behavior (2), lymph node involvement was also common (57%) (Table 1). The mean survival was 114.7 months, with 33% cancer-specific mortality among evaluable patients.

Our findings from the SEER cohort align with previously published case series and reviews, further underscoring the distinct clinical and pathologic profile of LRBC. A recent comprehensive review by Zhang et al. (2) analyzed 98 published cases and found that LRBC predominantly affected women in their 50s, consistent with the mean age of 62.2 years in our SEER cohort.

Hormone receptor status of LRBC has shown variability in the published literature (5, 6). Zhang et al. (2) reported estrogen receptor (ER) negativity in approximately 65%, progesterone receptor (PR) negativity in around 68%, and human epidermal growth factor receptor 2 (HER2) positivity in ~57% of cases. Shi et al. (7) also reported the predominant absence of ER and PR expression, with >70% exhibiting HER2 expression in LRBC. In contrast, our SEER data revealed 50% ER positivity, 25% PR positivity, while all cases lacked HER2 expression but it is important to note that data were available for only 4/15 patients (27%). This discrepancy, particularly the lack of HER2-positive cases in SEER, may reflect the small number of reported cases and limitations of registry-based data or regional/pathologic heterogeneity in diagnostic interpretation of HER2 expression. Still, it highlights the importance of recognizing the variability in receptor expression, which may impact therapeutic decision-making.

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Table 1. Demographic and clinicopathologic characteristics of the lipid-rich carcinoma cohort from the SEER database

Variable	Lipid-rich breast carcinoma n (%)
Age	
18–49	1 (6.7)
50–79	14 (93.3)
≥80	0 (0.0)
Age mean ± standard deviation	62.2±9.9
Race	
Black	2 (13.3)
White	11 (73.3)
Other	2 (13.3)
N/A	0 (0.0)
Tumor grade	
I	0 (0.0)
II	5 (41.7)
III	7 (58.3)
N/A	3
Tumor stage	
I	1 (14.3)
II	2 (28.6)
III	1 (14.3)
IV	2 (28.6)
N/A	9
Tumor size	
<2 cm	3 (42.9)
2–5 cm	3 (42.9)
>5 cm	1 (14.3)
N/A	8 (53.3)
Lymph node involvement	
Yes	4 (57.1)
No	3 (42.9)
Unknown	8
Distant metastases	
Yes	2 (28.6)
No	5 (71.4)
Unknown	8
Estrogen receptor	
Positive	2 (50.0)
Negative	2 (50.0)
N/A	11
Progesterone receptor	
Positive	1 (25.0)
Negative	3 (75.0)
N/A	11
Human epidermal growth factor receptor 2	
Positive	0 (0.0)
Negative	4 (100.0)
N/A	11
Surgery performed	
No	0 (0.0)
Yes	9 (100.0)
Unknown	6
Adjuvant chemotherapy	
No	4 (40.0)
Yes	6 (60.0)
Unknown	5
Radiotherapy	
No	4 (44.4)
Yes	5 (55.6)
Unknown	6
Survival months (mean ± standard deviation)	114.7 (105.4)
All-cause mortality (%)	
Alive	5 (55.6)
Dead	4 (44.4)
Unknown	6 (40.0)
Cancer-specific mortality (%)	
Dead	3 (33.3)
Alive or dead from another cause	6 (66.7)
Unknown	6 (40.0)

More than 50% of patients in our cohort received adjuvant chemo- and/or radiotherapy (Table 1), while neoadjuvant treatment status was not available in SEER. The data on chemo- and radiotherapy use for LRBC are comparable with those reported by Zhang et al. (2), who also reported neoadjuvant treatment in one patient. Finally, survival data from our SEER cohort suggest relatively prolonged outcomes, with a mean survival of 114.7±105.4 months, compared to the 26.5±46.8 months reported by Zhang et al. (2) in their pooled analysis. This substantial difference may reflect variations in data sources; SEER provides long-term, population-based survival tracking, while the review by Zhang et al. (2) was based primarily on case reports/case series, which often represent more aggressive or complex presentations and may have limited follow-up. Despite the longer mean survival in SEER, the observed 33% cancer-specific mortality and 44% overall mortality among patients with known outcomes underscore the aggressive nature of LRBC, consistent with prior reports.

While the small sample size and missing data in our cohort limit definitive conclusions, the findings collectively support the view that LRBC is a biologically aggressive morphological subtype of breast cancer that warrants early recognition and possibly intensified treatment strategies.

Footnotes

Authorship Contributions

Surgical and Medical Practices: O.T., G.R.B., S.V.; Concept: O.T., G.R.B., S.V.; Design: O.T., G.R.B., S.V.; Data Collection or Processing: O.T., G.R.B., S.V.; Analysis or Interpretation: O.T., G.R.B., S.V.; Literature Search: O.T., G.R.B., S.V.; Writing: O.T., G.R.B., S.V.

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