Hepatosteatosis as a risk factor for development of breast cancer: a single center experience

Bulent Citgez, MD, FACS[1]; Banu Yigit, MD, FACS[2]; Esat Namal, MD[3]

[1]Halic University, Memorial Hospital General Surgery, Istanbul, Turkey [2]Bagcilar Training and Research Hospital General Surgery, Istanbul, Turkey
[3]Memorial Hospital Oncology, Istanbul, Turkey

San Antonio Breast Cancer Symposium
December 9-12, 2025

Background

Hepatosteatosis is frequently observed in breast cancer patients due to shared risk factors such as obesity, metabolic syndrome, and advanced age. In patients newly diagnosed with early-stage breast cancer, prognostic assessment traditionally relies on classical clinicopathological parameters, including age, tumor size, lymph node involvement, tumor morphology, histological grade, peritumoral lymphovascular invasion, and molecular subtypes. Beyond these well-established factors, an increasing body of evidence highlights the role of energy balance in breast cancer development and outcomes. Positive energy balance, driven by weight gain, sedentary behavior, poor dietary quality, and the metabolic disturbances associated with insulin resistance syndrome, has been consistently linked to reduced overall and cancer-specific survival at the time of diagnosis. In this context, hepatosteatosis may represent a clinically useful surrogate marker, reflecting both unhealthy lifestyle patterns and underlying insulin resistance, thereby serving as an early warning signal for clinicians. The aim of this study is to quantitatively evaluate the association between hepatosteatosis and early-stage breast cancer by examining routine abdominopelvic computed tomography (CT) images obtained for staging purposes in breast cancer patients.

Methods and Materials

The imaging and histopathology reports of patients who presented to Memorial Hospital for breast screening or diagnostic imaging were reviewed retrospectively. Patients with advanced-stage breast cancer, additional malignancies, or significant comorbidities were excluded from the study. A total of 129 patients (Group 1) who underwent surgery for early-stage breast cancer between January 2017 and January 2025 were included in this retrospective analysis.

Liver attenuation values on abdominopelvic CT, as well as serum transaminases (AST, ALT), gamma-glutamyl transferase (GGT), alkaline phosphatase (ALP) and total bilirubin levels were recorded and compared with those of the control group. Hepatosteatosis was evaluated using a four-point scale ranging from 0 to 3, where higher grades reflect greater degrees of lipid accumulation in the liver tissue.

Results

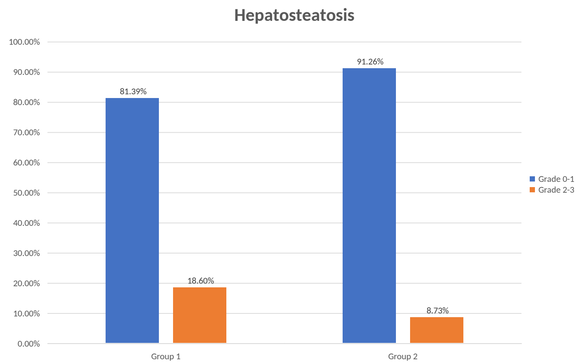
There were no statistically significant differences between Group 1 and Group 2 in terms of age, AST, ALT, GGT, ALP, or total bilirubin levels (all p > 0.05) (Table 1). When analyzed in detail, the mean age of the patients was similar between the two groups (54.36 ± 13.08 years in Group 1 vs. 53.37 ± 10.95 years in Group 2; p = 0.529), showing no significant age-related bias in hepatosteatosis distribution.

Table 1. Comparison of age and biochemical parameters between the groups.

	Group 1		Group 2		p
	Mean±Sd	Median (Min-Max)	Mean±Sd	Median (Min-Max)	
Age	54.36±13.08	53 (27-88)	53.37±10.95	54 (27-85)	0.529
AST (IU/ml)	18.52±6.85	17 (8-53)	19.19±7.61	17 (10-69)	0.471
ALT (IU/ml)	17.33±10.39	14 (4-77)	18.84±11.87	15 (7-84)	0.286
GGT (IU/ml)	25.49±48.75	16 (7-536)	22.07±21.61	16 (5-159)	0.729
ALP (IU/ml)	81.24±34.81	78 (39-346)	75.08±26.75	68 (32-187)	0.100
Total bilirubin (mg/dL)	0.51±0.26	0.45 (0.14-1.52)	0.48±0.27	0.44 (0.14-1.44)	0.308

Similarly, GGT values (25.49 ± 48.75 vs. 22.07 ± 21.61 IU/ml; p = 0.729), ALP levels (81.24 ± 34.81 vs. 75.08 ± 26.75 IU/ml; p = 0.100), and total bilirubin concentrations (0.51 ± 0.26 vs. 0.48 ± 0.27 mg/dL; p = 0.308) did not reveal significant intergroup differences. The rate of patients with moderate to severe hepatosteatosis (grades 2–3) was significantly higher in Group 1 than in Group 2, whereas the rate of patients with grade 0–1 hepatosteatosis was significantly higher in Group 2 than in Group 1 (18.6% vs. 8.73% and 91.26% vs. 81.39%, respectively; p= 0.033) (Chart 1). Despite the biochemical similarities, a distinct pattern emerged in terms of hepatosteatosis severity. Patients in the breast cancer cohort more frequently exhibited grade 2–3 hepatosteatosis compared with controls, highlighting a possible association between more advanced fatty liver changes and the presence of breast cancer. Conversely, grade 0–1 hepatosteatosis predominated among controls, suggesting a healthier hepatic profile in individuals without malignancy.

Chart 1. Comparison of hepatosteatosis grades between groups .



Conclusions

The study results indicated an increased prevalence of hepatosteatosis in early-stage breast cancer patients when compared to control group. Hepatosteatosis can often be evaluated on contrast-enhanced abdominal CT images obtained for various indications in daily practice. In patients with low liver density measurements on abdominal CT, further evaluation in terms of breast cancer may be warranted. Lifestyle modifications, weight loss, increased regular physical activity, and a healthy diet help reduce hepatosteatosis and insulin resistance, thereby preventing the progression of non-alcoholic fatty liver disease. Considering the evidence suggesting that hepatosteatosis may increase the risk of breast cancer development, clinicians should keep in mind the importance of planning and implementing preventive strategies in this patient group.

References

1. Click Park JH, Choi IS, Han KD, Park H, Kim KH, Kim JS. Association Between Fatty Liver Index and Risk of Breast Cancer: A Nationwide Population-Based Study. Clin Breast Cancer. 2020 Aug;20(4):e450-e457. doi: 10.1016/j.clbc.2020.02.004.
2. Nseir W, Abu-Rahmeh Z, Tsipis A, Mograbi J, Mahamid M. Relationship between Non-Alcoholic Fatty Liver Disease and Breast Cancer. Isr Med Assoc J. 2017 Apr;19(4):242-245. PMID: 28480679.
Taroeno-Hariadi KW, Putra YR, Choridah L, Widodo I, Hardianti MS, Aryandono 3. T. Fatty Liver in Hormone Receptor-Positive Breast Cancer and Its Impact on Patient's Survival. J Breast Cancer. 2021 Oct;24(5):417-427. doi: 10.4048/jbc.2021.24.e41.
4. Kus T, Cinkir HY, Aktas G, Abali H. Hepatosteatosis may predict late recurrence of breast cancer: A single-center observational study. Curr Probl Cancer. 2019 Dec;43(6):100461. doi: 10.1016/j.currproblcancer.2019.01.002.
5. Kwak MS, Yim JY, Yi A, Chung GE, Yang JI, Kim D, et al. Nonalcoholic fatty liver disease is associated with breast cancer in nonobese women. Dig Liver Dis. 2019 Jul;51(7):1030-1035. doi: 10.1016/j.dld.2018.12.024.
6. Lee YS, Lee HS, Chang SW, Lee CU, Kim JS, Jung YK, et al. Underlying nonalcoholic fatty liver disease is a significant factor for breast cancer recurrence after curative surgery. Medicine (Baltimore). 2019 Sep;98(39):e17277. doi: 10.1097/MD.0000000000017277.
7. Roopashree PG, Shetty SS, Shetty VV, Nalilu SK. Medium-Chain Fatty Acids and Breast Cancer Risk by Receptor and Pathological Subtypes. Nutrients. 2022 Dec 16;14(24):5351. doi: 10.3390/nu14245351.

Contact

Name-surname: Bulent Citgez
Organization: Halic University, Memorial Hospital General Surgery, Istanbul, Turkey
Email: bcitgez@yahoo.com
Phone: +90(505)2376847

This presentation is the intellectual property of the author/presenter. Contact them at bcitgez@yahoo.com for permission to reprint and/or distribute.

© POSTER TEMPLATE BY GENGRAPHICS® 1.800.790.4001 WWW.GENGRAPHICS.COM