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BREAST IMAGING

LETTER TO THE EDITOR

Letter to the editor: perinodal signal in breast magnetic resonance imaging: flare sign and extracapsular spread

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Dear Editor,

We read with great interest the study by Özgür et al.[1] entitled "Diagnostic value of the flare sign in predicting extracapsular extension in metastatic axillary lymph nodes and nodal status on breast magnetic resonance imaging," which proposes the "flare sign" as a promising imaging marker for extracapsular extension (ECE) on breast magnetic resonance imaging (MRI). The authors should be acknowledged for systematically characterizing this novel radiological feature and evaluating its predictive accuracy in a pathologically confirmed cohort of axillary metastases.

The concept of T2 hyperintense perinodal signal has been sporadically discussed in previous studies under various terminologies, such as "perinodal edema" or "perifocal signal abnormality." For example, Baltzer et al.[2] described perifocal edema on MRI as a specific but low-sensitivity indicator of nodal malignancy, while Kim et al.[3] reported strand-like or circumferential T2 signal increases around axillary nodes but without histopathological ECE correlation. Moreover, in head and neck cancer imaging, Hiyama et al.[4] employed the term "flare sign" to describe perinodal spread, suggesting its potential utility in evaluating extranodal invasion. However, to the best of our knowledge, the study by Özgür et al.[1] represents the first application of the "flare sign" as a specifically defined, histopathologically validated diagnostic feature of ECE in metastatic axillary lymph nodes on breast MRI.

Despite this strength, we believe several methodological aspects warrant further clarification. First, the average interval of 48 days (range: 4–92) between MRI and surgery raises concerns regarding the temporal stability of imaging findings, especially for dynamic features, such as perinodal edema. Importantly, perinodal and peritumoral edema are more commonly observed in biologically aggressive tumors, such as triple-negative and human epidermal growth factor receptor 2 (HER2)-positive subtypes, or in high-grade lesions.[5] Therefore, this extended preoperative interval may have introduced bias due to the rapid progression of nodal infiltration or signal changes, particularly in these aggressive phenotypes. Furthermore, while the authors presented molecular subtype distributions (e.g., HER2-positive, triple-negative), they did not investigate the association between the flare sign and tumor biology. Histopathologic or molecular subtype stratification (e.g., ductal vs. lobular carcinoma) may have elucidated differential patterns of perinodal signal, especially considering that invasive lobular carcinomas are known to spread differently and more diffusely.[6]

Second, the study lacks interobserver agreement metrics (e.g., kappa statistics), which are essential to establish the reproducibility of flare sign interpretation.

Third, although the authors excluded patients who received neoadjuvant therapy, they did not report whether other perinodal pathologies (e.g., extranodal tumor deposits, extranodal vascular emboli) were assessed histologically, factors that may contribute to T2 signal elevation and potentially confound the flare sign.[7,8]

Additionally, the omission of ECE extent (e.g., ≤2 vs. >2 mm), which has shown prognostic and therapeutic relevance,[9] limits further stratification of risk. Finally, although the authors state that 35 patients underwent sentinel lymph node biopsy only, they do not elaborate on

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how the known false-negative rate of sentinel lymph node biopsy (approximately 8.3%) may have impacted the detection of ECE in this subset.

Furthermore, the generalizability of the findings is limited, as the study was conducted at a single institution using only a 1.5T MRI system. External validation across multiple centers and imaging platforms is essential to confirm the reproducibility of the flare sign as a reliable biomarker.

Finally, the imaging analysis was restricted to T2-weighted sequences; dynamic contrast-enhanced MRI parameters, such as peak enhancement, washout kinetics, or time–intensity curve types, were not included. A multiparametric MRI approach could provide a more comprehensive assessment and improve diagnostic performance by integrating functional and morphological information.

In conclusion, Özgür et al.[1] provide compelling preliminary evidence that the flare sign could serve as a high-specificity biomarker for ECE, with potential implications for surgical planning and axillary staging. Future prospective multicenter studies incorporating volumetric ECE assessment, multiparametric MRI features, and interobserver reliability analyses would be valuable to confirm and extend these findings.

Footnotes

Conflict of interest disclosure

The authors declared no conflicts of interest.

References

1. Özgür C, Sunal BS, Hereklioğlu S, Öznur M, Özkan Gürdal S. Diagnostic value of the flare sign in predicting extracapsular extension in metastatic axillary lymph nodes and nodal status on breast magnetic resonance imaging. *Diagn Interv Radiol*. 2025;31(4):333-339. [Crossref]
2. Baltzer PA, Dietzel M, Burmeister HP, Zoubi R, Gajda M, Camara O, Kaiser WA. Application of MR mammography beyond local staging: is there a potential to accurately assess axillary lymph nodes? evaluation of an extended protocol in an initial prospective study. *AJR Am J Roentgenol*. 2011;196(5):W641-647. [Crossref]
3. Kim WH, Kim HJ, Park CS, Lee J, Park HY, Jung JH, Kim WW, Chae YS, Lee SJ, Kim SH. Axillary Nodal Burden Assessed with Pretreatment Breast MRI is associated with failed sentinel lymph node identification after neoadjuvant chemotherapy for breast cancer. *Radiology*. 2020;295(2):275-282. [Crossref]
4. Hiyama T, Kuno H, Nagaki T, Sekiya K, Oda S, Fujii S, Hayashi R, Kobayashi T. Extra-nodal extension in head and neck cancer: how radiologists can help staging and treatment planning. *Jpn J Radiol*. 2020;38(6):489-506. [Crossref]
5. Park NJ, Jeong JY, Park JY, Kim HJ, Park CS, Lee J, Park HY, Jung JH, Kim WW, Chae YS, Lee SJ, Kim WH. Peritumoral edema in breast cancer at preoperative MRI: an interpretative study with histopathological review toward understanding tumor microenvironment. *Sci Rep*. 2021;11(1):12992. [Crossref]
6. Limaiem F, Khan M, Lotfollahzadeh S. Lobular breast carcinoma. 2023. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. [Crossref]
7. Yang YS, Feng F, Qiu YJ, Zheng GH, Ge YQ, Wang YT. High-resolution MRI-based radiomics analysis to predict lymph node metastasis and tumor deposits respectively in rectal cancer. *Abdom Radiol (NY)*. 2021;46(3):873-884. [Crossref]
8. Xu Q, Xu Y, Wang J, Sun H, Lin J, Xie S. Distinguishing mesorectal tumor deposits from metastatic lymph nodes by using diffusion-weighted and dynamic contrast-enhanced magnetic resonance imaging in rectal cancer. *Eur Radiol*. 2023;33(6):4127-4137. [Crossref]
9. Mamtani A, Barrio AV, Goldman DA, Wen HY, Vincent A, Morrow M. Extranodal tumor deposits in the axillary fat ındicate the need for axillary dissection among T1-T2cN0 patients with positive sentinel nodes. *Ann Surg Oncol*. 2020;27(10):3585-3592. [Crossref]