Letter to the Editor

eISSN 2005-8330
https://doi.org/10.3348/kjr.2025.1790
Korean J Radiol 2026;27(2):191-193

Korean Journal of Radiology
KJR

Evolving Role of Contrast-Enhanced Mammography–Guided Biopsy: Clinical Value and Limitations

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Keywords: Contrast enhanced mammography; CEM; CEM-guided biopsy; Strengths; Limitations

I read with great interest the recent review by Nissan et al., "Contrast-Enhanced Mammography: Advances, Challenges, and Case-Based Insights," in the *Korean Journal of Radiology* [1]. The authors comprehensively outlined the expanding applications of contrast-enhanced mammography (CEM), particularly its role in imaging women with dense breasts, its robust negative predictive value, and its value as a functional imaging modality when MRI is contraindicated. One of the most promising developments related to this technology is the emergence of CEM-guided biopsy—a natural and practical extension that enables targeted sampling based on functional enhancement.

CEM has rapidly gained acceptance as an alternative to MRI in several clinical indications previously dominated by MRI [2]. With its broader accessibility, shorter acquisition time, and lower cost, CEM is increasingly used as a functional imaging tool with performance comparable to MRI [3]. A major gap, however, was the inability to biopsy lesions visible only on CEM but occult on mammography and ultrasound. These lesions were traditionally referred for MRI-guided biopsy, a procedure limited by restricted access, technical complexity, higher cost, longer scheduling delays, and patient discomfort, especially in claustrophobic or elderly patients [4,5]. The recent introduction of CEM-guided biopsy directly addresses these limitations and aligns functional imaging with accessible intervention.

Technically, CEM-guided biopsy mirrors stereotactic biopsy workflows, using recombined contrast-enhanced image pairs for lesion localization after iodinated contrast administration [6]. This allows radiologists to perform targeting within a familiar stereotactic environment, requiring minimal workflow adaptation. Early data have demonstrated high technical success and reliable tissue retrieval, making CEM-guided biopsy a promising option for centres that lack MRI-guided biopsy capabilities [7]. Despite these advantages, challenges remain, such as timing between contrast administration and lesion targeting, limitations of two-dimensional localization, and the need for platform-specific validation as different vendors adopt this capability.

The following two cases illustrate both the clinical utility and the practical limitations of this evolving technique.

CASE 1

A woman with dense breast tissue and previous right breast–conserving surgery underwent routine surveillance. Mammography and ultrasound were unremarkable, yet CEM revealed a focal enhancing lesion in the surgical breast. CEM-guided biopsy successfully yielded ductal carcinoma in situ (Fig. 1). This case highlights the clinical strength of CEM in high-risk or dense-breast populations, where its ability to depict angiogenic activity surpasses that of conventional imaging. The availability of CEM-guided biopsy enabled same-visit histologic confirmation, thereby preventing delays and reducing patient anxiety. This example emphasizes how the integration of functional imaging with accessible biopsy capability can facilitate early diagnosis of recurrence not visualized by standard modalities.

Received: November 27, 2025 **Accepted:** December 1, 2025
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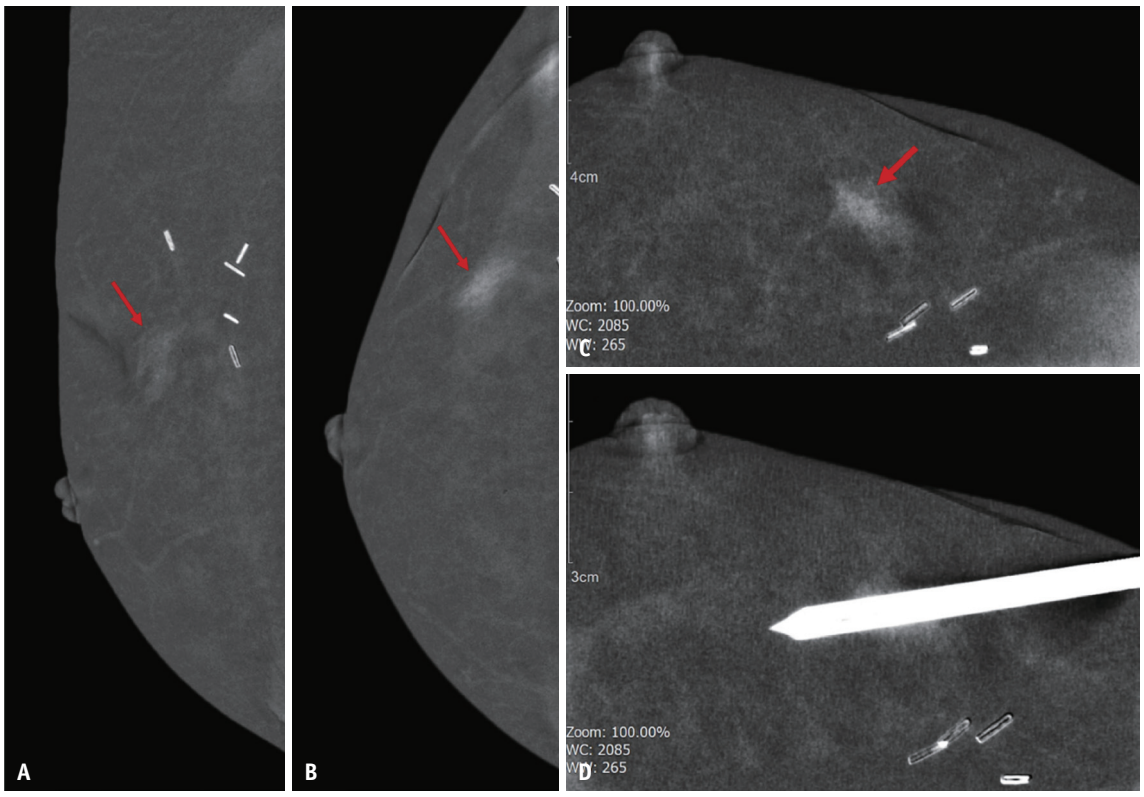

Fig. 1. A 45-year-old woman with a history of right breast–conserving surgery. **A, B:** CEM demonstrates focal non-mass enhancement in the upper outer quadrant of the ipsilateral breast (arrows). **C, D:** As no sonographic correlate was identified, a CEM-guided biopsy was performed for the enhancing non-mass lesion (arrow). Histology confirmed intermediate-grade ductal carcinoma in situ. This case highlights the value of CEM and CEM-guided biopsy as functional imaging tools for the early detection of breast cancer; especially in higher-than-average risk women. CEM = contrast-enhanced mammography

CASE 2

Another patient with prior breast-conserving surgery underwent CEM surveillance, which demonstrated non-mass enhancement in the contralateral breast at the 6 o'clock position. No ultrasound correlate was detected. CEM-guided biopsy was performed via a medial-to-lateral approach. Post-biopsy imaging revealed that the marker clip was positioned at the 12 o'clock location (Fig. 2), suggesting wrong targeting or misregistration during targeting. This outcome underscores a known limitation of CEM-guided biopsy: its intrinsic two-dimensional localization, in contrast to the volumetric targeting available with MRI-guided biopsy. This case highlights the importance of meticulous technique and careful post-biopsy verification to ensure accurate sampling, especially for non-mass or subtle enhancing foci.

Together, these examples reflect both perspectives of CEM-guided biopsy: its significant value as an accessible functional targeting method, and its current technical constraints during early implementation. Continued refinement in equipment design, localization algorithms, and potentially the incorporation of CEM-specific three-dimensional or tomosynthesis-based guidance may help address issues related to depth perception and spatial accuracy.

In conclusion, CEM-guided biopsy represents an important step forward in extending CEM from diagnostic assessment to intervention. It offers a pragmatic and cost-effective bridge between conventional stereotactic workflows and MRI-guided biopsy, with potential to broaden access to biopsy of contrast-only lesions—particularly in regions where MRI-guided biopsy remains limited. As real-world experience expands, multicenter validation, workflow standardization, and technical optimization will be essential to ensure reproducibility and safety. The two cases presented here illustrate both the promise and the practical nuances of this emerging technique, reinforcing its meaningful contribution to the evolving landscape of functional breast imaging.

https://doi.org/10.3348/kjr.2025.1790

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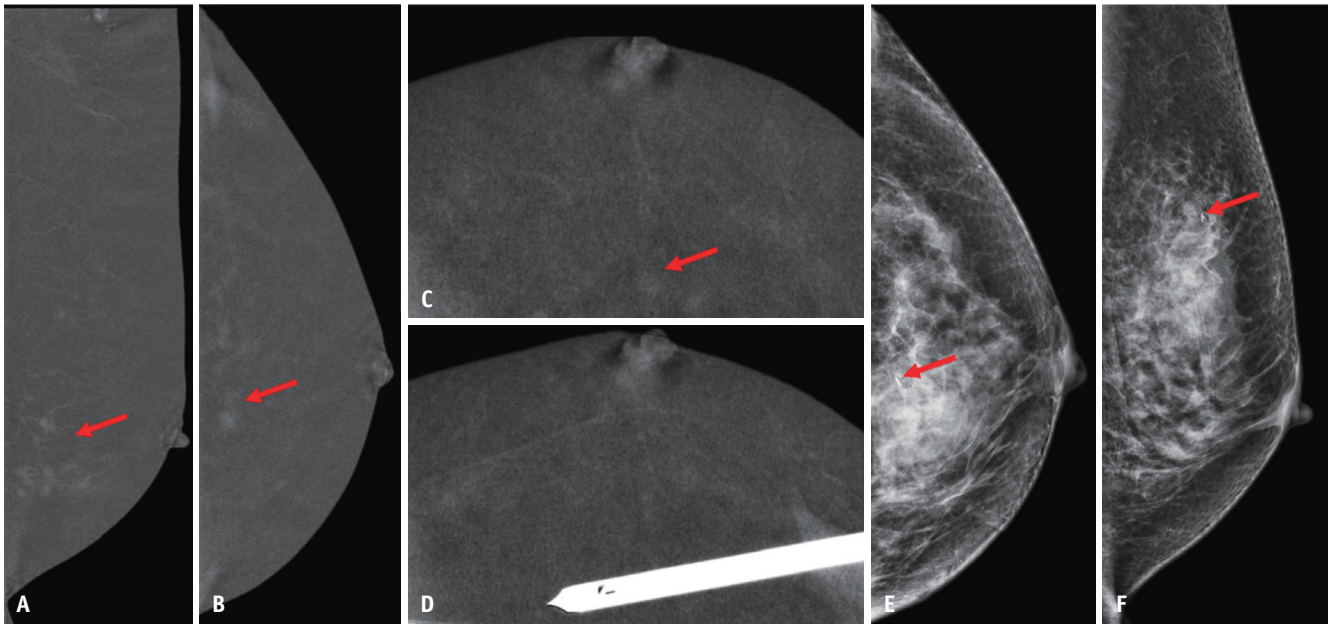

Fig. 2. A 48-year-old woman with a history of right breast–conserving surgery. **A, B:** Surveillance CEM demonstrates focal non-mass enhancement in the lower central aspect of the contralateral breast (arrows). **C, D:** In the absence of a sonographic correlate, a CEM-guided biopsy was performed for the enhancing lesion (arrow) using a horizontal arm, medial-to-lateral approach. **E, F:** The post-biopsy check mammogram showed the marker clip (arrows) in the upper central left breast, confirming mistargeting. This case illustrates an intrinsic limitation of CEM-guided biopsy—its reliance on a two-dimensional modality—compared with the precise three-dimensional targeting achievable with MRI-guided breast interventions. The patient subsequently underwent MRI-guided biopsy, which revealed fibrocystic change. CEM = contrast-enhanced mammography

Conflicts of Interest

The author has no potential conflicts of interest to disclose.

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Funding Statement

None

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