

INTERNET NEWS

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CLINICAL NEWS | WOMENS IMAGING

AI-supported mammography is safe and effective in real-world settings

Amerigo Allegretto

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- AI-supported mammography screening is effective in a nationwide, real-world setting, according to research published January 7 in *Nature Medicine*.
- A team led by Nora Eisemann, PhD, from the University of Lübeck in Germany, found that compared with standard double reading, AI-supported double reading led to more breast cancers being detected without leading to significantly higher recall rates.
- “Our findings substantially add to the growing body of evidence suggesting that AI-supported mammography screening is feasible and safe and can reduce workload,” the Eisemann team wrote.
- Retrospective studies continue to highlight AI’s potential in radiology departments, including for breast imaging. Research has also suggested that the technology can be integrated into clinical workflows and aid radiologists in completing tasks. However, few prospective studies are available, which is one of the main critiques of AI in imaging studies.
- One such prospective study, PRAIM (PRospective multicenter observational study of an integrated AI system with live Monitoring), is an observational, multicenter, real-world, noninferiority, implementation study. It seeks to compare the performance of AI-supported double reading to standard double reading among women ages 50 to 69. The women underwent organized mammography screening at 12 sites in Germany. Radiologists in the PRAIM study voluntarily chose whether to use the AI system (Vara MG, Vara).
- Eisemann and colleagues described the initial results of the PRAIM study, for which 119 radiologists screened 463,094 women between 2021 and 2023. Of the total women, 260,739 were screened with AI support.

- The team reported that AI-supported double reading led to more cancers being detected, recall rates being lower, and positive predictive values (PPVs) for recall and biopsy being higher.

Comparison between AI-supported, standard double reading of screening mammograms		
Measure	Standard double reading	AI-assisted double reading
Cancer detection rate (per 1,000)	5.7	6.7
Recall rate (per 1,000)	38.3	37.4
PPV (recall)	14.9%	17.9%
	59.2%	64.5%

The authors highlighted that with these results in mind, AI-supported double reading can improve mammography screening metrics. They called for “urgent” efforts to be made toward integrating AI-supported mammography into screening guidelines and promoting widespread adoption of AI in mammography screening programs.

The researchers did not directly assess the extent of reading workload reduction with AI integration. However, they reported that radiologists in the AI group spent less time interpreting exams deemed normal by the AI system compared with exams with no confident predictions and exams with a safety net.

“In a post hoc analysis assuming that all examinations tagged normal were not read by radiologists and were not forwarded to a consensus conference, we observed a 56.7% reduction in the reading workload,” they wrote. “Interestingly, this resulted in a significantly lower recall rate [−15.0%] while still improving the [cancer detection rate] by 16.7%.”

The team called for future studies to examine the downstream effects of AI-supported screening on overall program performance. These include interval cancer rates and stage-at-diagnosis distribution at subsequent screening rounds.



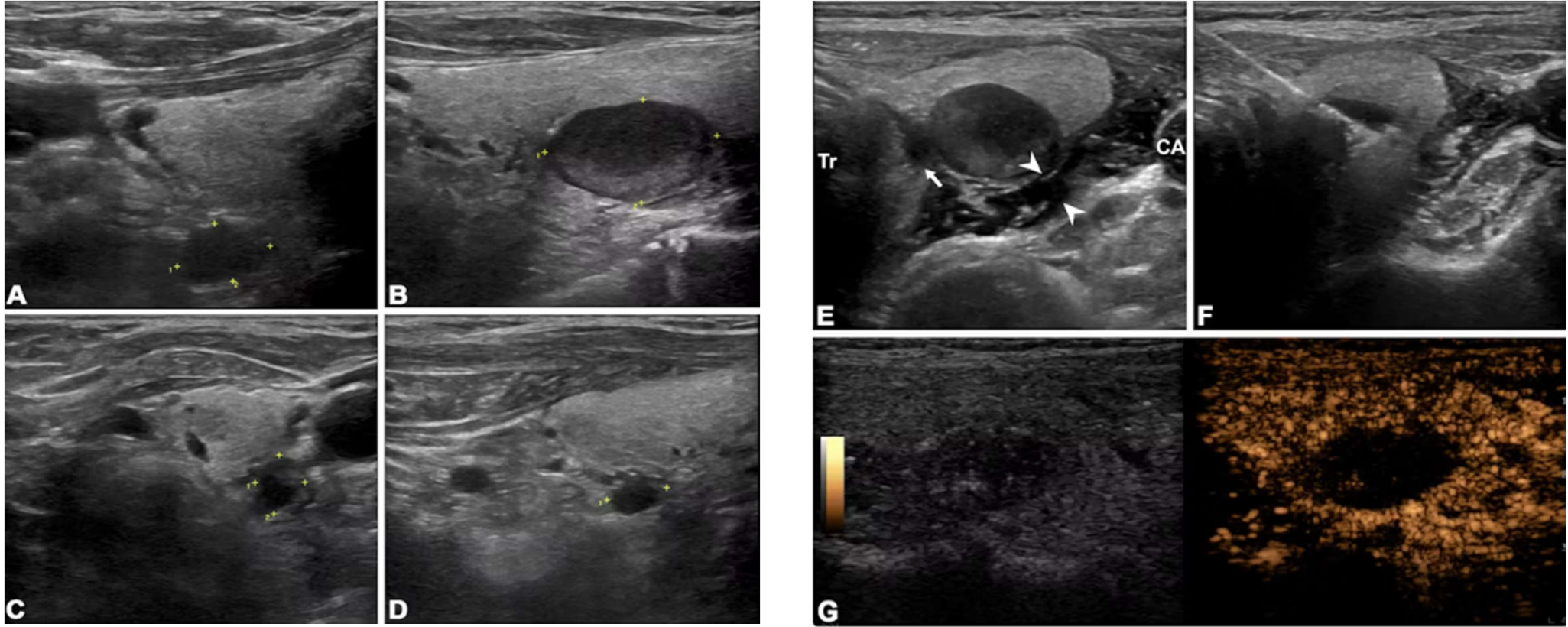
CLINICAL NEWS | ULTRASOUND

Ultrasound ablation is effective for treating hyperparathyroidism

Amerigo Allegretto

Jan 7, 2025

- Ultrasound-guided thermal ablation techniques are safe and effective in treating patients with secondary hyperparathyroidism, suggest findings published January 7 in *Radiology*.
- Researchers led by Yang Liu, MD, from the Chinese PLA General Hospital in Beijing found that both microwave ablation (MWA) and radiofrequency ablation (RFA) reduced parathyroid hormone levels along with calcium, phosphorus, and alkaline phosphate levels.
- “At the end of the follow-up period, 85.1% of ablation-treated participants had achieved the target [parathyroid hormone] level,” Liu and co-authors wrote. “Treatment with ultrasound-guided MWA and RFA was generally well tolerated.”
- In recent years, researchers have been exploring the efficacy and safety of image-guided ablation techniques. Previous reports indicate that both MWA (which uses microwaves) and RFA (which uses radio waves) fit both criteria. And interest in applying these interventional techniques in patient care continues to rise.
- However, the investigators noted that ablation outcomes in patients with secondary hyperparathyroidism have not been well characterized.
- Liu and colleagues studied how ultrasound-guided MWA and RFA affect parathyroid hormone, calcium, phosphorus, and alkaline phosphatase levels. They also assessed the safety of these treatments in secondary hyperparathyroidism patients.
- The study included 215 patients with a median age of 53 years who had confirmed secondary hyperparathyroidism between 2017 and 2022. The target parathyroid hormone level was set to less than or equal to 585 pg/mL. The researchers studied parathyroid hormone, calcium, phosphorus, and alkaline phosphate levels before ablation and time points for follow-up assessments after ablation (these included two hours, one day, one month, three months, six months, and then every six months after that). They also developed a risk-based prediction model based on independent risk factors and their corresponding parameter estimates.



Ultrasound images depict a 63-year-old man who underwent radiofrequency ablation (RFA) for the treatment of secondary hyperparathyroidism. (A–D) 2D images show four hyperplastic parathyroid glands on the right and left sides (marked with crosshairs). The numbers near the crosshairs represent the number of measured trails. (E) Ultrasound-guided infusion of isolation fluid (arrowheads) around the hyperplastic parathyroid gland to protect vital organs such as the trachea (Tr), carotid arteries (CA) and recurrent laryngeal nerve pathway area (arrow). (F) Ultrasound-guided RFA of the hyperplastic parathyroid gland. (G) Immediate postoperative contrast-enhanced ultrasound shows no contrast enhancement in the ablation area. The ablation procedures for the other three parathyroid glands were the same as those described above. Image courtesy of the RSNA,

- Of the total patients, 183 (85.1%) achieved target parathyroid hormone levels. Compared with baseline levels, the researchers reported an 85.9%, 6.3%, 15.3%, and 37.4% reduction in parathyroid hormone, calcium, phosphorus, and alkaline phosphate levels at 24 months after ablation, respectively.
- One patient experienced persistent hoarseness, while 74 experienced severe hypocalcemia. After adjustments, the researchers found that the following predictors were tied to treatment failure: pre-ablation parathyroid hormone level (adjusted odds ratio [OR], 3.78; $p = 0.03$), maximum tumor volume (adjusted OR, 5.02; $p = 0.003$), and the number of glands ablated (adjusted OR, 0.32; $p = 0.046$).
- Finally, the prediction model showed good discriminatory ability in the development and validation cohorts. This included area under the receiver operating characteristic curve (AUROC) values of 0.78 for the development cohort and 0.73 for the validation cohort.
- Liu and colleagues called for prospective controlled study designs to be considered for future studies to further compare ultrasound-guided ablation and a surgical procedure at the same time.
- In an accompanying editorial, Joseph Gemmete, MD, from the University of Michigan in Ann Arbor wrote that such techniques present “an exciting, minimally invasive option” for managing secondary hyperparathyroidism in patients with chronic kidney disease.
- “Although further research is needed to confirm its long-term efficacy and safety, this technique has the potential to transform [secondary hyperparathyroidism] management, expanding treatment options for patients who face substantial challenges with current therapeutic approaches,” Gemmete wrote.



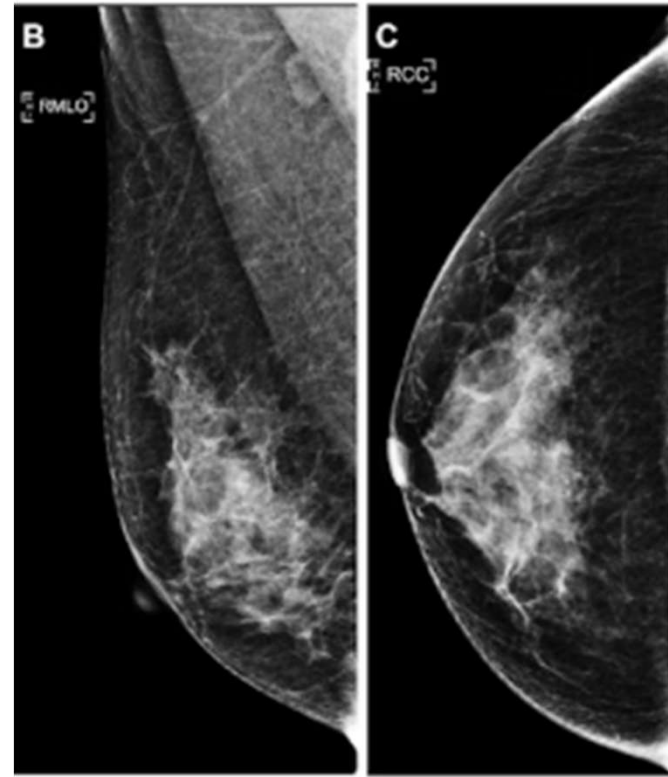
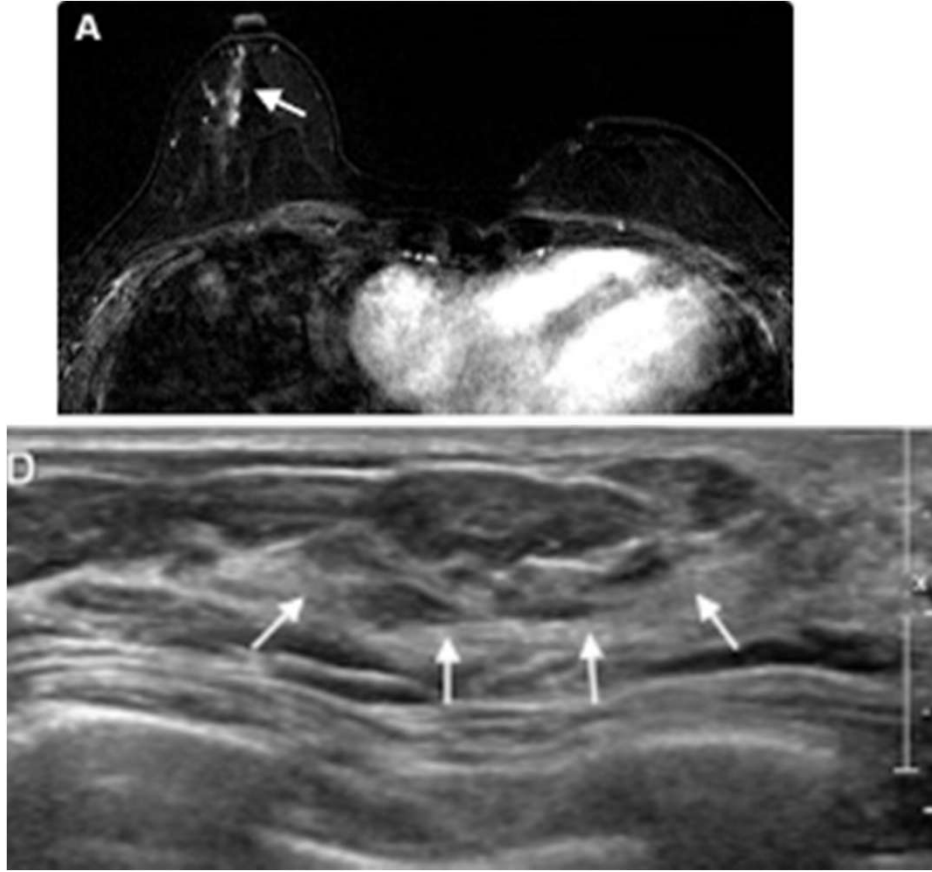
CLINICAL NEWS | MRI

Breast MRI surveillance reduces disease recurrence

Kate Madden Yee

Jan 7, 2025

- Postoperative MRI surveillance appears to lower the odds of advanced second breast cancer in women with a personal history of the disease, researchers have reported.
- "In women with a personal history of breast cancer, [we found that] postoperative surveillance breast MRI was associated with lower odds of advanced second breast cancer before and after propensity score matching," wrote a team led by Jiyoung Yoon, MD, PhD, of Yonsei University College of Medicine in Seoul. The group's study findings were published January 7 in *Radiology*.
- Women with a personal history of breast cancer are at higher risk for developing second breast cancers -- either local recurrences or new disease in the ipsilateral or contralateral breast, the authors explained. MRI demonstrates the highest sensitivity for detecting breast cancer compared with other imaging modalities and is recommended as a supplemental screening exam for women with a personal history of the disease or those with dense breast tissue. But research on the association between surveillance breast MRI in women with a personal history of breast cancer and advanced second breast cancer is lacking, they noted.
- Yoon and colleagues conducted a study that investigated the association between postoperative surveillance breast MRI and advanced second breast cancer in women with a personal history of the disease using propensity score matching (this is a statistical method that balances the distribution of known biases and confounders between groups and thus achieves comparability similar to random assignment in a randomized trial).



Images in a 40-year-old woman who underwent breast-conserving surgery for left breast cancer and a surveillance breast MRI examination 25 months after surgery. (A) Axial T1-weighted contrast-enhanced subtraction MRI scan shows a newly developed nonmass enhancement (arrow) in the right central breast. (B) The right mediolateral oblique (RML) and (C) right craniocaudal (RCC) mammograms, obtained on the same day, show heterogeneously dense breast tissue that was assessed as being negative for cancer. (D) MRI-directed US image in the radial plane shows a corresponding 14-mm nonmass lesion (arrows) in the right lower outer breast, which was confirmed estrogen receptor-positive, progesterone receptor-positive, and human epidermal growth factor receptor-2-negative T1N0 mucinous carcinoma. Image and caption courtesy of the RSNA.

The research included 3,688 women who underwent breast cancer surgery between January 2009 and December 2014. The team defined second breast cancer as ipsilateral or contralateral disease diagnosed at least one year after surgery; it defined advanced second breast cancer as second breast cancer as either grade T2 or higher or lymph node-positive or T1c triple-negative or human epidermal growth factor receptor 2-positive. Of the total patient cohort, 2,130 underwent postoperative surveillance breast MRI and 1,558 did not. The median interval between surgery and the first surveillance breast MRI was 31 months.

The authors reported the following:

- Advanced second breast cancer proportions for non-MRI and MRI groups were 1.7% and 0.4% before propensity score matching and 1.6% and 0.7% after it.
- Surveillance MRI was associated with lower odds of advanced second breast cancer before propensity score matching (odds ratio [OR], 0.21, $p < 0.001$) and after it (OR, 0.41, $p = 0.048$).
- The proportion of symptomatic second breast cancers was higher in the non-MRI group before propensity score matching (25% vs. 6.4%, $p = 0.01$) and after it (21% vs. 3.2%, $p = 0.003$).

The findings are promising, but more research is needed, according to the authors.

"Surveillance breast MRI has the potential to improve prognosis in women with a personal history of breast cancer ... [but] further larger multicenter studies are necessary to validate these findings and assess their generalizability," they concluded.



CLINICAL NEWS | CT

Head CT offers insight into old strokes

Kate Madden Yee

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- They conducted a study that included 21,985 head CTs performed in three emergency departments between July and December 2023. Of these, 4% (869) identified old strokes. Of these old strokes, 43% (372) were previously unknown, Kenny-Howell and colleagues found. Old strokes were characterized by the following factors: Older age, single site, and location in the gangliocapsular region or cerebellum.

Odds ratio for unknown stroke characteristics	
Characteristic	Odds ratio (with 1 as reference)
Older age	1.03
Single site of old stroke	2.7
Smaller strokes	1.8
Gangliocapsular location	2.8
Cerebellar location	2.1

"Incidental unknown strokes may be particularly suited to 'opportunistic screening, i.e., systematically leveraging imaging findings to impact population health," Kenny-Howell and colleagues wrote.

"More than a third of old strokes on head CT imaging are unknown to patients and clinicians," they concluded. "Capturing this opportunity for secondary prevention could benefit 100,000 to 200,000 patients per year in the U.S., based on trends in emergency department care."