

The eL18-4 PureWave linear array transducer with MicroFlow Imaging and AI Breast in the assessment of lesion detection in dense breast tissue

eL18-4 PureWave linear array transducer

Category

Breast assessment

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Overview

Ultrasound is commonly used for lesion detection in dense breasts.¹ The technique has proven limitations for visibility of microcalcifications.^{2,3} However, recent breakthrough ultrasound features support finer detail resolution and confident diagnosis.

Patient history

A 74-year-old patient with hormone replacement therapy and no family history of breast cancer had been through a screening mammography protocol with tomosynthesis. The architectural distortion was classified BIRADS (Breast Imaging Reporting and Data System) 5, and the patient underwent additional ultrasound.

Protocol

Mammography showed dense breasts, an architectural distortion and a new cluster of microcalcifications in the upper outer quadrant of the right breast (**Figure 1**).

For confident diagnosis, an ultrasound scanning proceeded with the Philips eL18-4 transducer. The image quality of the transducer enabled detection of dilated ducts with echogenic foci potentially related to the cluster of microcalcifications seen at mammography. The sonographic abnormalities also included a 5 mm cystic and solid mass, allowing for an ultrasound-guided biopsy with specimen radiography. Presence of microcalcifications in the ultrasound-guided specimen radiographs confirmed our observations. Histopathology diagnosed a ductal carcinoma *in situ* (DCIS), grade 2 (**Figure 2**).



The Philips eL18-4 PureWave linear array transducer is our first high-performance transducer featuring ultra-broadband PureWave crystal technology with multi-row array configuration, allowing for fine-elevation focusing capability.

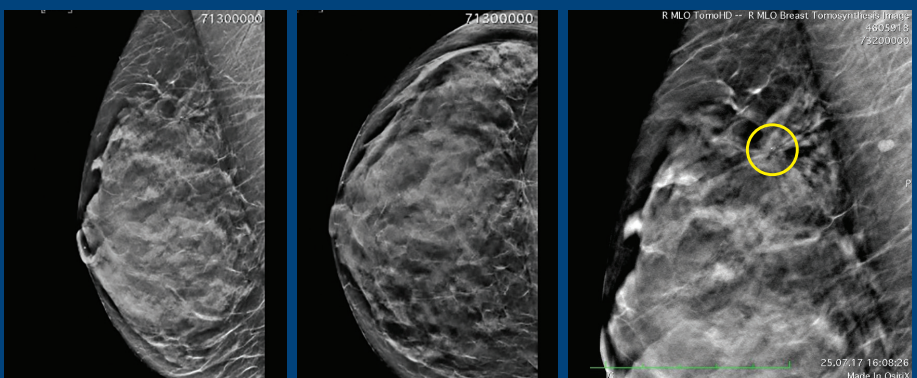
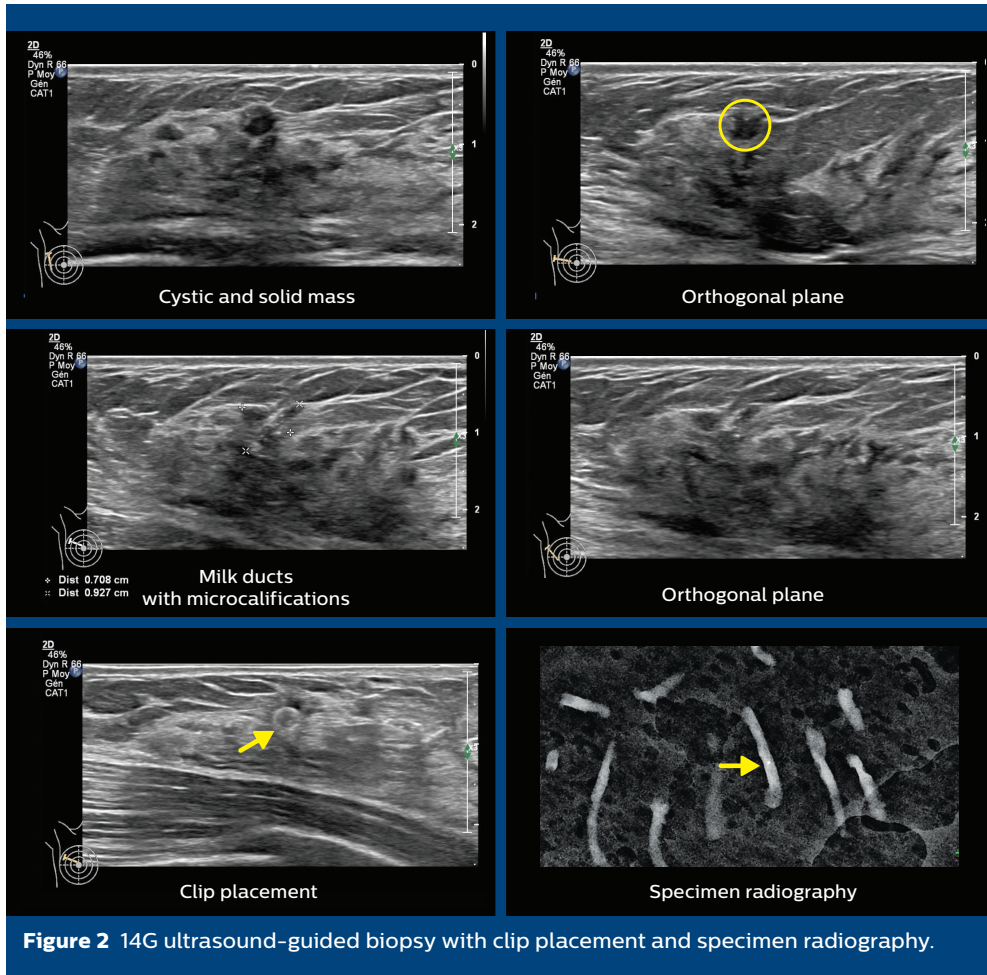
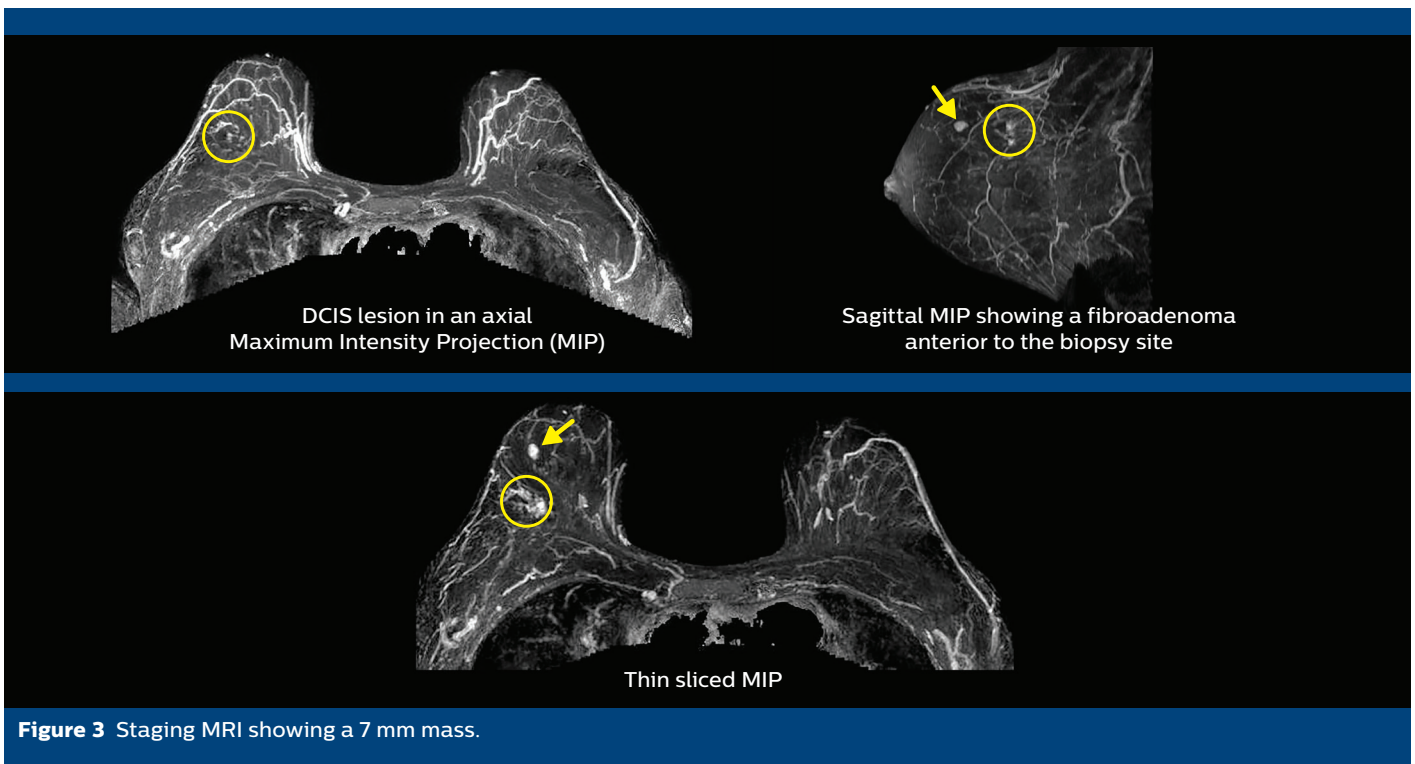


Figure 1 Mammography with architectural distortion and microcalcifications.



In addition to the irregular linear enhancement corresponding to DCIS at staging MRI, a 7 mm enhancing mass was detected 3 cm anterior to the initial biopsy site (**Figure 3**).



During a second-look ultrasound, the mass detected at staging MRI was visualized and the MicroFlow Imaging (MFI) feature available on the eL18-4 confirmed the solid nature of the mass by showing a central vessel. Differential diagnosis included a fibroadenoma versus an intra-mammary lymph node. The ultrasound-guided biopsy confirmed a fibroadenoma (**Figure 4**).

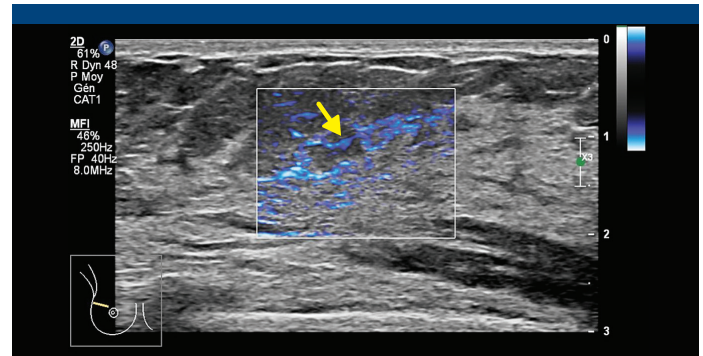


Figure 4 MFI showing a central vessel confirming the solid nature of the lesion.



Figure 5 The AI Breast feature automatically located a mass at 10:00 in the right breast and 5 cm from the nipple, corresponding to MRI results.

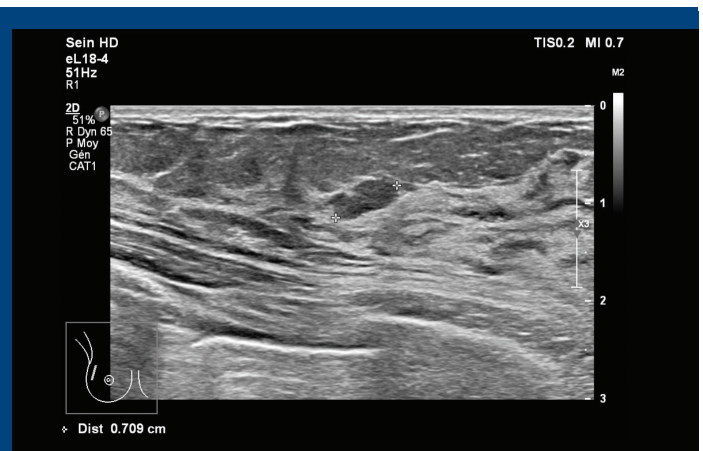


Figure 6 The ultrasound confirmed a 7 mm mass, concordant with MRI results.

Figure 7 CAD table

Distance (cm) edge	Nipple	4.8
	Skin	1.2
Size	Diameters	0.71x0.43x0.56 cm
	Angio volume	0.11 cc
Recommendation	Biopsy	

The Anatomical Intelligence for Breast (AI Breast) feature used during the second-look ultrasound, helped to confirm the concordance with the localization of the additional mass detected at staging MRI. With ultrasound, a mass at 10:00 in the right breast and 3 cm away from the initial biopsy site, was identified. The lesion measured 7 mm and was located 5 cm from the nipple using the AI Breast feature. This location corresponded to the distance of the nipple calculated by the CAD MRI (**Figures 5-7**).

Conclusion

Excellent lesion detection in dense breast tissue thanks to breakthrough and complementary features

The image quality of the transducer allowed detection of ductal carcinoma *in situ*, which is usually accompanied by poor sonographic visibility of microcalcifications. Ultrasound-guided biopsy with specimen radiography instead of stereotactic biopsy was made possible.

MFI during a second-look ultrasound confirmed the solid nature of a mass initially detected at a staging MRI.

The AI Breast feature during the second ultrasound helped to confirm the concordance between the localization of the additional mass detected at the staging MRI and the solid mass at ultrasound.

References

- 1 Houssami N, Lord SJ, Ciatto S. Breast cancer screening: emerging role of new imaging techniques as adjuncts to mammography. *Med J Aust.* 2009;190:493-497.
- 2 Soo MS, Baker JA, Rosen EL. Sonographic detection and sonographically guided biopsy of breast microcalcifications. *AJR Am J Roentgenol.* 2003;180(4):941-8.
- 3 Hooley RJ, Scoutt LM, Philpotts LE. Breast ultrasonography: state of the art. *Radiology.* 2013;268:642-659.

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

