PHILIPS

Ultrasound

Clinical case study

Working together to reach clinical care pathways quicker with the tools at hand

eL18-4 PureWave linear array transducer

Who
Posy Seifert, DO
Kamie Chevalier, RDMS (AB, BR)

Where
Elizabeth Wende Breast Care, LLC
Rochester, NY

Challenge
Diagnostic confidence, even for technically difficult patients, is essential to quickly developing an effective care plan.

Solution
Scanning with the Philips eL18-4 PureWave linear array transducer enhances clinical confidence to speed diagnostic decision-making and care plans for patients.

Powerful diagnostic tools to enhance patient care

The eL18-4 transducer is specifically designed for the body's small parts without sacrifice to image quality or tissue uniformity. PureWave crystal technology provides high detail resolution and extended depth-of-field performance for even technically challenging patients. The power of the eL18-4 transducer combines amazing image quality with advanced capabilities such as MicroFlow Imaging (MFI), tissue specific presets and MaxVue and trapezoid imaging, demonstrated in the following cases

Dr. Seifert was one of the first to use the advanced capabilities of the Philips eL18-4 PureWave linear array transducer in clinical practice. She has found it aids her ability to reach diagnosis quickly for prompt and appropriate care pathways.

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.

Elizabeth Wende Breast Care

Excellence in breast care since 1975.
Since 1975, Elizabeth Wende Breast Care (EWBC) has been serving the greater Rochester, NY area with superior breast imaging technology and patient care. As the first dedicated breast clinic in the USA, EWBC is a committed leader in the field of breast imaging and breast cancer diagnosis.

Case 1

Exceptional image quality reveals an irregular lesion, confirming the need to biopsy

Patient history

A 59-year-old female was seen for her annual screening mammogram. Architectural distortion was noted in the subareolar region in her left breast, which prompted additional assessment under ultrasound.

Findings

The original breast ultrasound was completed at an EWBC satellite facility by an EWBC sonographer, with a L 12-5 MHz transducer, which identified a vague area of attenuation, 1 cm from the nipple in the area of concern **(Figure 1).** The patient did have prior benign surgery in this area. One week later, the ultrasound exam was repeated by a physician using the eL18-4 transducer to assess if the area warranted biopsy. Clinical images revealed a definitive, abnormal area of attenuation/mass. Imaging characteristics immediately confirmed the need for biopsy with the eL18-4 images **(Figure 2)**.

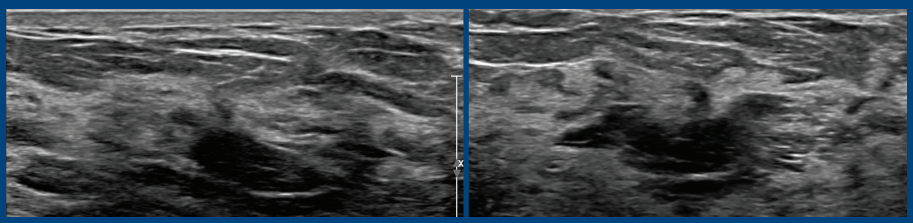

Figure 1 A vague area of attenuation is noted while imaging with the L12-5 MHz transducer. This lesion is later re-assessed with the eL18-4 transducer (Figure 2)

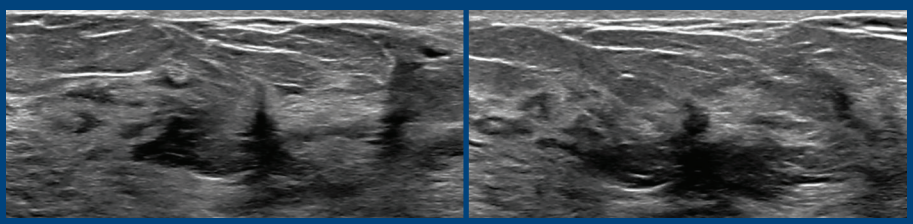

Figure 2 Imaging with the el18-4 transducer reveals an irregular lesion in the area of concern, surrounded by fibrous tissue.

Results

Pathology confirmed invasive ductal carcinoma (IDC), and the patient was subsequently scheduled for surgery.

Conclusion

The clinical confidence derived from the outstanding image quality resulted in a prompt and appropriate care plan.

> "The eL18-4 images showed better anatomic detail and conspicuity. Biopsy was necessary for histologic diagnosis."
>
> Posy Seifert, DO

Case 2

MFI helps to characterize a mass based on low velocity blood flow patterns

Patient history

A 38-year-old female was seen for a diagnostic breast ultrasound exam due to a palpable mass and nipple discharge involving the left breast.

Findings

Color Doppler and MicroFlow Imaging (MFI) on the eL18-4 transducer were used to interrogate a well-defined solid lesion that was seen superficially at 3:00, 2 cm from the nipple. MFI is a proprietary mode designed to detect slow and weak blood flow anatomy in tissue, overcoming many of the barriers associated with conventional methods to detect small vessel flow, with high resolution and minimal artifacts.

MFI clearly demonstrated flow inside the lesion as well as irregular borders, which confirmed the need for biopsy. Pathology confirmed a benign papilloma. Because of the large size of the papilloma, surgery was recommended **(Figures 3-4)**.

Results

Surgical pathology at excision revealed a papilloma surrounded by ductal carcinoma in situ (DCIS).

Conclusion

MFI added important diagnostic information about the irregular borders of the lesion, as well as the flow within it.

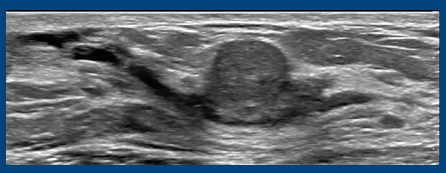

Figure 3 Ultrasound helps to characterize a palpable mass in the left breast.

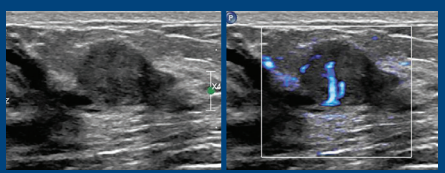

Figure 4 MFI helps to further characterize the mass based on blood flow in the small vessels.

Case 3

Imaging preset and MFI help to overcome visualization challenges in dense breast tissue

Patient history

A 44-year-old female presented with a palpable mass in the left breast at 6:00. The mammogram was normal. An imaging preset optimized for dense breast tissue (Philips Dense Breast TSP) was used while imaging under ultrasound.

Findings

Using the preset, a well-circumscribed, heterogeneous lesion was identified in the left breast at 6:00, 1 cm from the nipple in the area of concern **(Figures 5 and 6).**

Results

MFI was also used, which demonstrated internal flow that fed into the lesion. A biopsy was performed, aided by MaxVue imaging. MaxVue offers 38% more display area, which resulted in a definitive diagnosis of fibroadenoma.

Figure 5 Imaging preset for dense breast tissue reveals the lesion.

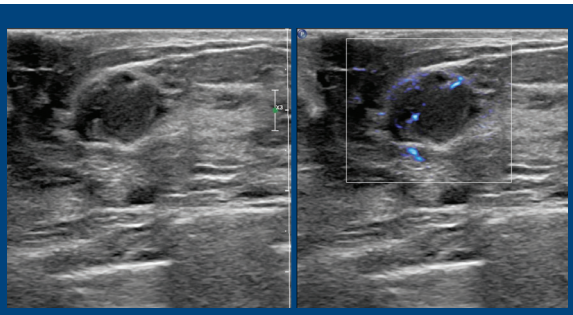

Figure 6 MFI helps characterize blood flow within the lesion.

Conclusion

MFI demonstrates its sensitivity in detecting low-velocity flow, giving additional confidence on the decision to perform a biopsy. The biopsy itself was aided by MaxVue.

Case 4

Trapezoid imaging in MaxVue provides remarkable visualization of a large lesion

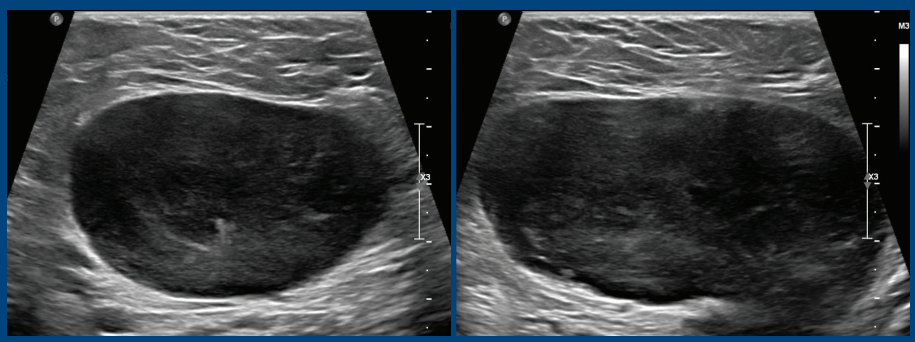

Figure 7 Trapezoid imaging offers a wide observation area while maintaining excellent image quality, allowing for an uninterrupted view during the clinical exam.

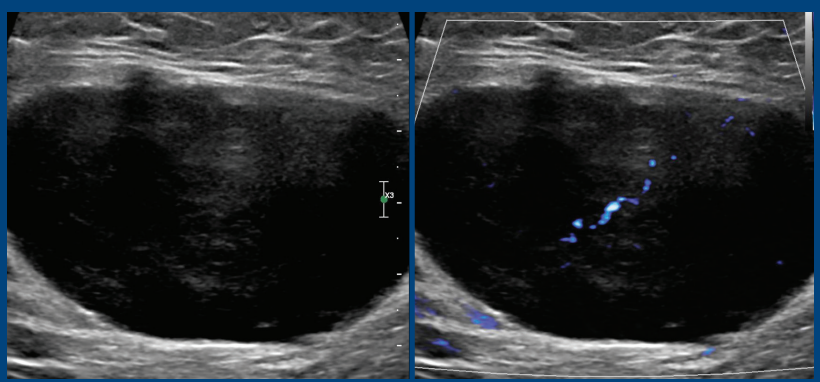

Figure 8 Internal vascularity is assessed with MFI.

Patient history

A 40-year-old female presented with a left axillary lump and was referred for a diagnostic breast ultrasound exam.

Findings

Imaging revealed a heterogeneous, hypoechoic mass measuring 5.5 cm x 6.7 cm **(Figure 7)**.

Results

Due to the size of the mass, the MaxVue trapezoid mode was used to capture the entire lesion in the field of view. Color power angio (CPA) and MFI were then used to assess internal vascularity. Subsequent ultrasound-guided biopsy led to diagnosis of lymphoma **(Figure 8)**.

Conclusion

Trapezoid imaging with MaxVue, which offers 38% more viewing area, was preferred because it enabled a full view of a large lesion with limited degradation in image quality deep to the lesion or lateral edges of the imaging field.

An additional look at MFI

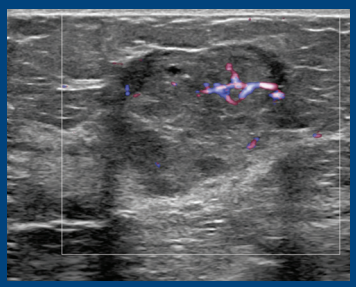

Figure 9 MFI offers enhanced sensitivity compared to CPA.

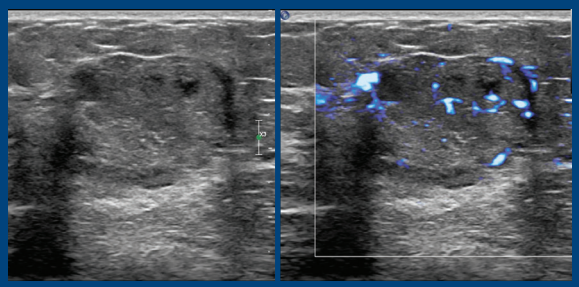

Figure 10 MFI offers the sensitivity and detail for blood flow assessment with limited compromise to frame rate or image quality.

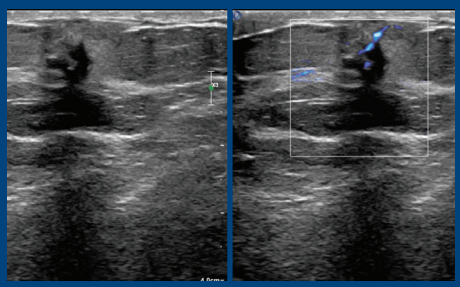

Figure 11 Images demonstrate MFI sensitivity and flow into a lesion.

Summary

The eL18-4 PureWave linear array transducer combines exceptional imaging with tailored clinical tools such as MFI, Dense Breast TSP and trapezoid imaging to elevate confidence in breast imaging for fast diagnosis and to accelerate appropriate care paths.

"MFI is extremely sensitive in showing flow within a lesion. It is another tool to help prove the lesion is solid."

Posy Seifert, DO

Posy Seifert, DO

Dr. Seifert joined EWBC in 2002. Previously, she was chief resident at Overlook Hospital in Summit, NJ, an affiliate of Columbia University. She completed her fellowship in Women's Imaging and Body Imaging at Case Western Reserve University in Cleveland, OH. After her fellowship, she was an associate radiologist at Southern Illinois University, where she focused on breast imaging and intervention in addition to body imaging. Dr. Seifert sits on advisory boards for imaging technology companies and also on local advisory boards. She lectures locally and nationally in the field of breast imaging and intervention. She holds an interest in research and is a principal investigator of past and ongoing research projects in breast MRI and cone beam breast CT, as well as breast ultrasound, and is a peer reviewer for radiology journals. She is published in local publications and peer review journals, and has authored several chapters in books on the subject of breast imaging.

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

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