

Improving Patient Outcomes in Advanced Molecular Imaging

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Putting patients at the center of every Philips innovation also extends into the latest development efforts and collaborations in Advanced Molecular Imaging (AMI). Here, Philips and clinicians are working together to simplify the path to critical decision-making and improve clinical outcomes for patients. This means seeing small things sooner – with more assurance and accuracy for the radiologist, and less dose and scan time for the patient.

“Advanced Molecular Imaging is so much more than another diagnostic test,” says Piotr Maniawski, Director of Clinical Science for CT and AMI at Philips. “It’s also a therapeutic tool for therapy planning and monitoring.” Because of the unique clinical insight it provides, molecular imaging plays a critical role in addressing treatment effectiveness in complex disease cases. And with the expansion of agents available for use, the benefits of AMI imaging are now available to a broader set of patients.

Indeed, AMI carries significant weight on the patient care continuum, not only supporting confident diagnostic decisions but also guiding patient treatment pathways; when done faster and more accurately, both capabilities hold the potential to improve outcomes and reduce costs.

Increasing lesion detectability

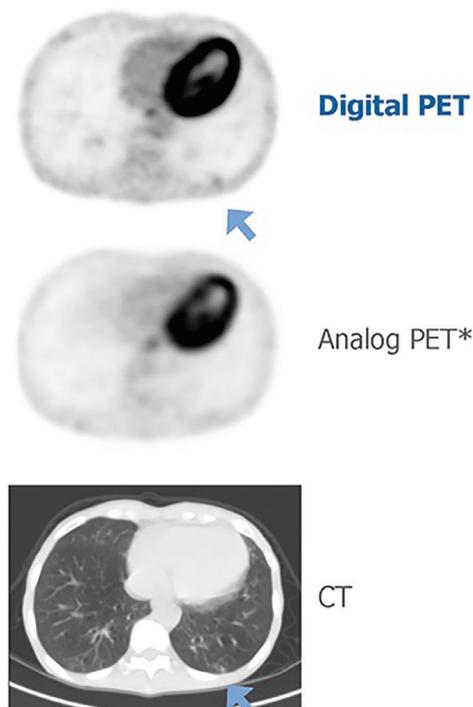
The patient-centered goals driving Philips’ innovation efforts in AMI are to increase lesion detectability, improve quantification and, always important, to reduce patient radiation exposure.

As advances in AMI afford clinicians the opportunity to detect ever smaller lesions, Philips’ team, together with their clinician collaborators, are striving to document how these technical innovations are translating into better patient care.

“Working directly with our customers, we are developing and implementing new applications as well as conducting studies on our commercially released products,” Maniawski said. “We have proven with our digital PET that better spatial resolution improves lesion detectability. So, we are working with the team at Ohio State University to conduct a clinical evaluation of our digital PET/CT. We know that we can detect smaller lesions. So, the next question we’re asking is, ‘What is changing because of it?’”

FDG whole-body PET is approved for reimbursement and is being utilized today in oncology primarily for initial and subsequent tumor staging and to locate metastatic disease for a number of clinical indications that, in Maniawski’s opinion, are still quite limited. To support further expansion of AMI into more clinical areas, Philips integrated the powerful data and analytics available in its molecular imaging applications into the IntelliSpace Portal to facilitate disease visualization, diagnosis and communication. The Portal is the means by which interdisciplinary clinical teams can use advanced data sharing, multi-modality tumor tracking, and characterization applications to assess complex cases.

“Sharing this information is very relevant for referring physicians. They’re getting a quicker,



Vereos, the world's first and only fully digital PET/CT, provides improved detectability and characterization of small lesions.¹ In a case study performed at The Ohio State University, researchers compared analog to digital PET images. These images show improved detectability of small lesions with digital PET/CT relative to the same patient acquired on analog PET/CT.

¹GEMINI TF 16

1. Hussain T, Nguyen QT. *Molecular Imaging for Cancer Diagnosis and Surgery. Advanced drug delivery reviews.* 2014;66:90-100. doi:10.1016/j.addr.2013.09.007.

and more confident diagnosis of their patient's disease, and more accurate staging of that disease," Maniawski explains. "The definitive result we're looking to validate is that AMI provides clinicians with better guidance, and informs more effective therapy choices for patients, thus enhancing the potential for improved clinical outcomes."

Improving quantification

Clinicians can monitor and assess therapy effectiveness via multiple imaging studies. One major challenge preventing AMI's more widespread utilization is a lack of quantification within

the modality. Nuclear medicine physicians and physicists can collaborate with other clinicians through Philips' Intellispace Portal as part of an interdisciplinary approach, but the variability in AMI quantification continues to impede AMI's broader utilization over more traditional imaging modalities, such as CT, for monitoring therapy.

In PET, some of that variability stems from the Standard Uptake Value (SUV) quantification, which carries with it a significant error of measurement. Maniawski mentioned that several studies have been looking into what factors influence the SUV value, and that Philips is moving forward with innovations in this area.

"While most of what influences the SUV comes from the system itself, the other influence on SUV is patient preparation," he explained. "Managing the patient during study preparation and the imaging itself is as important as the PET system performance."

Reducing exposure

Considering that many of the patients sent for AMI studies are very ill, Philips innovations in molecular imaging are focused on effectively limiting the radiation exposure.

"To really advance the value of AMI for patients, we are tasked with the triple challenge of improving lesion detectability and standardization decreasing scan times and lowering dose," Maniawski explained. "Our technology itself really needs to address all of these. The main benefit of moving to digital PET detection with improvements in our Time of Flight (TOF) technology was to be able to do this and keep patient dose to a minimum. As indications evolve, we're going to see more disease-specific protocols that will reduce the scan time with more targeted scanning, as opposed to today, where 93 percent of clinical exams are FDG whole-body PET."

Using more specific indications, or imaging protocols, he said, will allow clinicians to tailor patient protocols better and further reduce radiation exposure. For both patients and clinicians, that's meaningful innovation.