INTERVIEW

Using Artificial Intelligence to Diagnose Pulmonary Embolism

An Interview With Patrick Muck, MD

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At the 2024 VEITH Symposium, vascular surgeon Patrick Muck, MD, from TriHealth Heart & Vascular Institute in Cincinnati, Ohio, gave a presentation entitled "AI Use in Diagnosing Pulmonary Embolism". *Vascular Disease Management* spoke with Dr Muck about how artificial intelligence (AI) enhances the speed and accuracy of a pulmonary embolism (PE) diagnosis and what the future may hold for the use of AI to diagnose other vascular diseases.

For more information, see Dr Muck and colleagues' publication in the *Methodist DeBakey Cardiovascular Journal*: Shapiro J, Reichard A, Muck PE. New diagnostic tools for pulmonary embolism detection. *Methodist DeBakey Cardiovasc J.* 2024 May 16;20(3):5-12.

How has AI enhanced the speed and accuracy of diagnosing PE in clinical practice?

The benefit of AI to patients with pulmonary emboli is great. A patient goes from the ER or the floor to the computed tomography (CT) scan, they get their CT scan, then they get transported back. It takes time for radiologists to read the scan and finalize the report. The ER doctor or the attending doctor then has to look for the reading, or call and communicate with the radiologist to get that reading and institute anticoagulation. The whole process to diagnose a PE can take about 50 to 90 minutes. Now, with AI, all the CT angiograms are uploaded to the cloud, AI reads it within 6 minutes and if there is a significant pulmonary embolus, we get notified on the Viz.ai app on our phones. Often, the patient is not even back to the room or in the ER or on the floor and we've already not only got a diagnosis from AI, but we have also already communicated the plan with the other teams. Our publication showed AI led to quicker time to anticoagulation, which leads to decreased morbidity and mortality from PE. Granted, the numbers in our study are low because it's an early experience, but AI has been shown to decrease morbidity and mortality.

Can AI tools be used to tailor therapies for PE based on patient-specific risk factors and comorbidities?

That remains to be seen. Right now, AI just notifies us of the diagnosis, so it provides quicker diagnosis and communication then a quicker start of anticoagulation, and then development of a plan. As of now, AI cannot dictate what therapy to do, but it can give you an accurate diagnosis, the right-ventricle-to-left-ventricle ratio, and then the team can import the biomarkers such as B-type natriuretic peptide and high-sensitivity troponin as well. So you have all this information in the app on your phone and then you can communicate HIPAA compliant with the pulmonologist, intensivist, and cardiologist. You don't have to call the intensive care unit and try and figure out who is on call. It's all right there, including the actual CT scan images, on your phone.

What are the biggest challenges in integrating AI into vascular practice?

Cost. But with that being said, centers that already have stroke teams have some AI systems. We use Viz.ai, so it was natural to implement it since we already had the stroke service. There is an added cost, but the return on investment that you get with a quicker diagnosis and quicker communication is clearly worth it for the patient.

How do you envision AI evolving in the next 5 to 10 years for treating PE or other vascular diseases?

With PE diagnosis, AI is pretty much where we want it currently. Where I see AI expanding and being helpful is with aortic work. Right now Viz.ai can diagnose the aortic dissections and abdominal aortic aneurysms (AAA). The future will be not only the size of the AAA, but the size of the neck, the length of the aortic neck, and the access site vessels' dimensions as well. Ultimately, I believe AI will even be able to size the needed stent graft for aortic pathologies. ■