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Elucid Brings Personalized Imaging Diagnostics To Cardiology

by Barnaby Pickering

Elucid has developed machine learning models that can interpret a patient's risk of stroke or cardiovascular events from angiography images.

Elucid has developed a way to predict stroke and cardiovascular event likelihood from CT angiography images and recommend the best therapy available on a patient-by-patient basis.

Blake Richards, CEO of Elucid told Medtech Insight that this technology could address major problems facing current diagnostic methods which are highly subjective and can fail to identify at-risk patients.

Currently, doctors trying to predict patients' risk of strokes or other cardiovascular events look at key parameters like age, weight, smoking status and general lifestyle, as well as consider previous history with embolisms.

"One-size-fits-all approaches fail to identify patients who are truly at high risk." – Blake Richards

"One-size-fits-all approaches fail to identify patients who are truly at high risk," he said, explaining that even when a diagnostic – typically measuring quantities of inflammatory biomarkers – works, the resulting therapy is just "trial and error."

Moreover, some therapies, like stents, are usually only delivered after an investigatory procedure done in a catheter laboratory. "Half of these trips don't result in a stent," said Richards. "That's

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over two and a half million [unnecessary] procedures a year in the US."

Elucid's software, Elucid PlaqueIQ Technology, works instead by analyzing images obtained through CT angiography.

This analysis characterizes the plaque contained in patient's arteries, using a machine learning model that compares a patient image to previous patient data taken from case studies and physical analysis in a pathology lab. Richards said that Elucid's software "compares a patient's images to thousands of other patients, giving them a relative index of where they sit in terms of risk."

"By better understanding where the plaque is, we're able to predict the likelihood of it rupturing and causing events," he said. "We derive gold-standard measurements that decide whether or not a patient needs revascularization… it's a significantly better predictor than what's being done today."

The company boasts impressive results. Compared to current stenosis-based guidelines, ElucidVivo can predict 87% of major adverse cardiac events and is 40% more effective at predicting stroke.

He also revealed that by comparing a patient's angiography to tissue sample data, the company has made some progress in developing a method that could detect gene expression and patients' response to specific drugs.

Changing Care Pathways And Patient Behavior
Richards is confident in Elucid's ability to change how cardiovascular care is delivered and perceived.

"We can look at a patient's CT scan from now and three years ago," said Richards. "We can see if they've been responding to the drugs they've been given, see if they're making the lifestyle changes they need to make."

"Ten percent of the population won't take a pill every day even if it meant significantly reducing their heart attack risk. They don't understand the risk." – Blake Richards

Richards highlighted PCSK9 inhibitors (evolocumab and alirocumab) as an example of a treatment that can be highly effective in the right patients, but an incredibly expensive mistake in others. By monitoring their response, doctors can make informed decisions between these more expensive drugs, and cheaper ones like statins.

Presenting this data to patients also improves engagement. "Ten percent of the population won't take a pill every day even if it meant significantly reducing their heart attack risk. They don't understand the risk."

"Our technology, rather than showing patients a black and white image they would have trouble interpreting, puts patients at the center of their disease management."

Commercial Impetus

The potential to change how care is delivered is different from actually changing it. For companies like Elucid that are trying to sell software, providing proof to potential customers is crucial.

Richards explained that interest in Elucid's software has been high thanks to the company's hard work on _academic research_ prior to commercialization which has demonstrated not only that its software works, but also that it changes outcomes for patients.

"Elucid PlaqueIQ is the culmination of nine years of effort following six years of independent research, all built into our initial FDA clearance," he said.

Getting physicians involved from an early stage has helped the company refine its software and identify areas of potential improvement and further research.

"We're very pleased with the results we've been getting," he said. "There's a lot of enthusiasm stemming from the results we provide."

A Hungry Market

"We believe there is so much opportunity to improve the way we are treating cardiovascular disease. Everybody is on the same page," Richards said. "Everybody that is involved sees this opportunity to treat patients on the individual level. It's that promise of precision medicine that's talked about but is often not reality."

This demand for change is recognized by payers and advocates. "There have been big changes in the market, particularly in relation to _guidelines_ from the American Heart Association and the American College of Cardiology that support the use of CT angiography as standard of care for patients," said Richards.

Payers have also been accepting of the value Elucid provides. "They recognize the value this delivers and have been providing the economics needed to make it work."

Together, these support groups and the demand developed have meant Elucid has escaped the worst of any macroeconomic dampeners throughout 2022, said Richards.

"Our software does good for patients, good for physicians, good for providers and good for health care facilities," he said. "There are challenges other companies face in the market, but we're a software only company. We're evergreen, in demand, and do not get impacted in the same ways."