Machine-learning to predict right ventricular heart failure in LVAD patients

By Roxanna Van Norman

A Stanford study found using a deep learning system could predict right ventricular failure after cardiac surgery, significantly outperforming a team of human experts conducting the same evaluation.

While a heart transplant remains the gold standard for treating patients with end-stage heart failure, an alternative is receiving an LVAD, a battery-powered mechanical pump implanted in the patient. Unfortunately, a third of all patients implanted with LVADs develop a clinically significant degree of RV failure soon after the procedure. “We wanted to know if there is a way to figure out, before we even take anybody into the operating room, which patients are more likely to suffer from these right-sided heart problems,” said William Hiesinger, MD, senior author on the study.

The research team looked at various clinical scoring systems to identify patients at risk for RV failure in LVAD candidates. The team then compared the performance of their AI system against clinical risk scores. By training their artificial intelligence (AI) system to identify abnormal motions in the heart videos, it could conclude who was more likely to suffer from right heart failure after surgery. “What excites me the most is thinking about where we can go from here and how we can design deep learning systems that can better represent these complex diseases,” said Dr. Rohan Shad, lead author on the study. This study was published in *Nature Communications*.