

Artificial intelligence helps diagnose cardiac infections

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Mayo Clinic researchers say that "teachable software" designed to mimic the human brain may help them diagnose cardiac infections without an invasive exam. Those findings are being presented today at the Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC) in San Francisco.

Endocarditis -- an infection involving the valves and sometimes chambers of the heart -- can be a problem in patients with implanted medical devices. It is serious and can be deadly. The mortality rate can be as high as one in five, even with aggressive treatment and removal of the device. With additional complications, the mortality could be over 60 percent. Diagnosis usually requires transesophageal echocardiography, an invasive procedure that also has risks. It involves use of an endoscope and insertion of a probe down the esophagus.

The [software program](#) is called an "artificial neural network" (ANN) because it mimics the brain's cognitive function and reacts differently to situations depending on its accumulated knowledge. That knowledge or training is provided by researchers, similar to how a person would "train" a computer to play chess, by introducing it to as many situations as possible. In this case, the ANN underwent three separate "trainings" to learn how to evaluate the symptoms it would be considering.

"If, through this novel method, we can help determine a percentage of endocarditis diagnoses with a high rate of accuracy, we hope to save a significant number of patients from the discomfort, risk and expense of

the standard diagnostic procedure," says M. Rizwan Sohail, M.D., a Mayo Clinic [infectious diseases](#) specialist and leader of the study.

The team studied 189 Mayo patients with device-related endocarditis diagnosed between 1991 and 2003. The ANN was tested retrospectively on the data from these cases. When tested on cases with known diagnosis of endocarditis, the best-trained ANN was correct most of the time (72 of 73 implant-related infections and 12 of 13 endocarditis cases) with a confidence level greater than 99 percent.

Researchers say that, when used on an overall sample that included both known and unknown cases, the ANN accurately excluded endocarditis in at least half of the cases, thus eliminating half the cohort from a needless invasive procedure.

Source: Mayo Clinic

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