

New model for predicting kidney injury after common heart procedure

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Chenxi Huang (left), first author of a new study in *JAMA Network Open*, and Harlan Krumholz, the study's senior author and director of the Yale Center for Outcomes Research and Evaluation. Credit: Dan Renzetti

A Yale-led group of doctors has developed a new mathematical model that can predict the risk of acute kidney injury (AKI) in patients undergoing a common heart procedure.

For patients treated with [percutaneous coronary intervention](#) (PCI), commonly known as angioplasty, exposure to [contrast](#) agents—material used in the procedure to help visualize blood vessels—can harm the kidneys.

The new tool will enable doctors to make better pre-procedure estimates of risk and provide more personalized estimates for how much contrast material can safely be used when inserting stents in blocked or narrowed [blood vessels](#) near the heart, the researchers said. A new study describing the research appears in the journal *JAMA Network Open*.

"The previous models assumed that the exposure to contrast produced the same risk for everyone, but it is not one-size-fits-all. There are [individual differences](#)," said Harlan Krumholz, M.D., cardiologist and director of the Yale Center for Outcomes Research and Evaluation (CORE).

For the new study, the researchers developed a machine learning [model](#), a type of artificial intelligence, for estimating patients' risk of AKI before their heart procedure, while also accounting for the complexity of associations between contrast levels and AKI in different risk groups. The new model was then able to predict AKI risk injury more accurately than previous models, the researchers said.

Previous tools to estimate risk have not employed modern mathematical approaches or included information about the patients and their contrast exposure, they noted.

"We determined that their associations with the risk of kidney injury are quite complex. The range of contrast levels you're considering matters, and the baseline risk level for a particular patient matters, too," said Chenxi Huang, an associate research scientist at Yale and first author of the study.

More information: Chenxi Huang et al, Development and Validation of a Model for Predicting the Risk of Acute Kidney Injury Associated With Contrast Volume Levels During Percutaneous Coronary Intervention, *JAMA Network Open* (2019). [DOI: 10.1001/jamanetworkopen.2019.16021](https://doi.org/10.1001/jamanetworkopen.2019.16021)

Provided by Yale University

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