

Hypotension prediction algorithm doesn't reduce intraoperative hypotension

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Video Abstract

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Abstract

Low blood pressure, or hypotension, is common during surgery. Because hypotensive events are associated with worse outcomes, reducing the frequency, depth, and duration of intraoperative hypotension might be a way to help patients. Commercially available hypotension prediction algorithms can help physicians prevent potentially dangerous bouts of low blood pressure. But it's unknown how effective they are. To address this question, researchers with the Cleveland Clinic tested a prediction algorithm in a pilot randomized controlled trial. The trial found no difference in hypotension in patients using the algorithm versus unguided controls. In the trial, which included 214 non-cardiac surgical patients, about half had care from practitioners using the algorithm, which is based on arterial pressure waveform features. The algorithm provides the probability of hypotension as an index ranging from 0 to 100, with 85 serving as an alert. Hypotension is defined as a mean arterial pressure of less than 65 millimeters of mercury for a minute or more. The researchers did not find differences between the groups in the amount of hypotension, measured as the time-weighted average pressure less than 65 millimeters of mercury, nor were there differences at lower blood pressure thresholds. There were also no differences in any intraoperative and postoperative exploratory outcomes. The results run counter to the expectation that the algorithm will help reduce hypotension. Some of the trial data suggest the algorithm does predict hypotension. For example, when the index rose above 85, there were usually only a few minutes before hypotension developed. However, half the warnings did not result in any intervention. This could be because of the short warning time, the complexity of the treatment algorithm, or simply because doctors ignored the warning. A post-hoc analysis excluding hypotensive events when the clinical did not intervene revealed a decrease in hypotension among those using the algorithm. This suggests the algorithm can predict low blood pressure, but as currently used, it can't prevent hypotension. The authors hypothesize that a lower alert threshold might provide a longer predictive time to give physicians a better chance to provide treatment – and that the algorithm could work better if streamlined to emphasize prompt treatment. In the full trial, the researchers plan to use a lower alert threshold and a simpler treatment algorithm.