Research finds high mortality in cardiogenic shock despite extracorporeal life support

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The use of active mechanical circulatory support is growing rapidly around the world. The hope is that these systems will improve survival after the most severe form of acute heart failure, cardiogenic shock.

A recent clinical trial led by heart specialist Professor Holger Thiele has shown that extracorporeal life support (ECLS) does not reduce 30-day mortality after cardiogenic shock. The finding is likely to influence future guidelines. The trial was recently presented at the Annual Congress of the European Society of Cardiology and published alongside an additional meta-analysis in *The Lancet* and the *New England Journal of Medicine*.

Cardiogenic shock occurs when the heart cannot pump enough blood and is often caused by a heart attack, or myocardial infarction. The heart is no longer able to maintain circulation. The risk of death within 30 days after acute myocardial infarction with cardiogenic shock is almost 50%.

For more than a decade, patients have often been treated with venoarterial extracorporeal membrane oxygenation (VA-ECMO), which is also called extracorporeal life support (ECLS). This mechanical circulatory support helps the diseased heart to pump blood around the body. ECLS can theoretically take over the function of the heart and lungs for a period of time. However, because of the large cannulae used, this type of therapy can also lead to complications such as bleeding or lower limb ischemia, a sudden restriction in the blood supply to the leg.

Professor Holger Thiele, Medical Director of the Heart Center Leipzig

at Leipzig University and President of the German Cardiac Society, has now conducted a large clinical trial involving a total of 420 patients at 44 centers in Germany and Slovenia. In patients with acute myocardial infarction and subsequent cardiogenic shock, ECLS therapy plus intensive care unit optimal medical therapy was compared with optimal medical therapy at the intensive care unit alone.

Commenting on the main findings of the trial, Professor Thiele says, "Contrary to our hypothesis, ECLS does not reduce 30-day mortality. In contrast to standard therapy, mortality was not statistically significantly different at 47.8% versus 49%. There were actually even more complications, such as severe bleeding or lower limb ischemia, in the ECLS group. This suggests that we need to change our approach and routine ECLS is surely not the way to go. Our new focus should be on reducing the bleeding induced by the mechanical systems as well on reducing the additional inflammatory stimulus. In the situation when cardiogenic shock has developed, less is probably more."

The results were further confirmed by an individual patient-based meta-analysis comparing the results of all four previous studies involving mechanical cardiovascular support with venoarterial extracorporeal membrane oxygenation versus control. Again, ECLS did not improve survival, but it was associated with more complications.

"The results of the trial show that there is a need to reduce the frequency of ECLS therapy in Germany and internationally. It is likely that future guidelines will soon take this into account and downgrade the recommendation for active mechanical circulatory support devices or even stop recommending it altogether in routine practice," says Professor Thiele.

The heart specialist is planning many more follow-up trials, including a one-year follow-up to see if there are any differences over time. "Our

goal remains to reduce the very high mortality rate from cardiogenic shock. We can only show this through innovative trials," says Professor Thiele.

More information: Holger Thiele et al, Extracorporeal Life Support in Infarct-Related Cardiogenic Shock, *New England Journal of Medicine* (2023). DOI: 10.1056/NEJMoa2307227

Uwe Zeymer et al, Venoarterial extracorporeal membrane oxygenation in patients with infarct-related cardiogenic shock: an individual patient data meta-analysis of randomised trials, *The Lancet* (2023). DOI: 10.1016/S0140-6736(23)01607-0

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