

Media release

June 24, 2021

Research

Cardiac arrest: cooling alone brings no advantage

The international research consortium TTM2 recently published a study in the *New England Journal of Medicine* on managing the temperature of comatose patients admitted to the emergency unit after cardiac arrest. The Cardiac Arrest Center Bern, the first certified center for cardiac arrest in Switzerland, played a major role in the development of the study, which was able to prove that targeted hypothermia does not increase the probability of survival relative to targeted normothermia.

Death after cardiac arrest is the most common cause of death, ahead of cancer and stroke. In Switzerland, it is estimated that approximately 8000 to 10,000 deaths occur each year. The topic of cardiac arrest came to public attention at the 2021 European Championship when the Danish soccer player Christian Eriksen collapsed on the field without any impact from an opposing player.

Although cardiac diseases have been extensively studied as risk factors of cardiac death, there are still gaps in knowledge regarding immediate medical intervention and treatment measures. This has to do with, among other things, the enormous time pressure on all those involved in treating cardiac arrest and the considerable difficulty in establishing a well-documented database compatible with the needs of high-quality research projects.

This was the starting point for the study discussed here: international guidelines prescribed cooling temperature management (hypothermia treatment) for patients in coma admitted to the emergency unit after cardiac arrest. A solid evidence base for hypothermia treatment at approximately 33° Celsius was lacking. The study therefore reviewed the guidelines and came up with surprising results.

Identical probability of survival for hypothermia and normothermia

The TTM2 study demonstrates that targeted cooling of comatose patients to approximately 33° Celsius did not result in any advantage in terms of survival rates. Dr. med. Anja Levis, co-author of the study, clarifies: "As in the comparison group, whose body temperature was kept in the normal range below fever, about half of the patients died in the first 6 months after the incident. However, the hypothermia group performed significantly worse in terms of cardiac arrhythmias."

A brief review of how the recommendation came about puts these results into perspective: cooling plays a role in numerous medical practices that require suppressing cardiac activity. The original

study in 2002 compared two small groups of patients, one with hypothermia management and one without. Prof. Hänggi explains: “Retrospectively, we can say the 2002 study showed that a better outcome was achieved in patients who received intensive care. TTM2 has now shown that what is needed above all is a proper setting for cardiac arrest patients, and this cannot be considered solely in terms of temperature.”

TTM2 study: evidence thanks to solid design in international cooperation

The TTM2 study aimed to establish an evidence-based foundation for treatment after cardiac arrest. It included 1,900 (1,850 evaluable) patients from 14 countries in 61 hospitals. The consortium was led by Lund University Hospital in Sweden. Sixty-eight patients were hospitalized at Inselspital, led by Dr. med. Anja Levis (Department of Anesthesiology) and Prof. Dr. med. Matthias Hänggi (Department of Intensive Care).

Patients were randomly divided into two groups: the “hypothermia” group and the “normothermia” group, with 925 cases each. The primary outcome to be assessed was “survival at 6 months”. In addition, numerous standardized parameters were collected, e.g. on post-cardiac arrest limitations.

Cardiac Arrest Center Bern, Inselspital

The Cardiac Arrest Center, Inselspital, Bern University Hospital is Switzerland’s first certified CA Center. Thanks to the CA Center team’s active initiative, Inselspital participated significantly in the international study and took a leading role among the Swiss study centers.

TTM2 has underscored the importance of certification. Manuela Iten MD emphasizes: “If the entire care system is consistent – from early recognition of cardiac arrest to early resuscitation measures and rapid defibrillation, followed by competent initial care during transport and admission, professional intensive care measures, correct prognosis and finally proper rehabilitation – then almost half of the patients survive with a good outcome, and temperature is only one factor in this whole structure.”

This close cooperation between the clinics of the CA Center within the University Hospital and with the region’s emergency services not only serves the patients, but also strengthens Bern as a health care location.

A great deal of work for the CA Center Bern

Evidence-based treatment of cardiac arrest lags considerably behind other comparable conditions.

Prof. Hänggi explains further: “The continuous certification of the CA Center Bern required considerable effort, which other large centers still have to accomplish. Furthermore, structures like the clearly, uniformly regulated levels of care for cerebral stroke are still missing. Thanks to the carefully documented processes, however, more research can now be initiated to further improve the evidence in cardiac arrest treatment.”

In addition to local implementation, the processing of the study results within the European guidelines is still pending. Although revised at the beginning of 2021, hypothermia treatment is still listed.

Experts:

- Dr. med. Anja Levis, Senior Physician, Department of Anesthesiology and Pain Therapy, Inselspital, Bern University Hospital

- Prof. Dr. med. Matthias Hänggi, Senior Attending Specialist, Department of Intensive Care, Inselspital, Bern University Hospital
- Dr. med. Manuela Iten, Senior Physician, Department of Intensive Care, Inselspital, Bern University Hospital

Links:

- Original publication: doi/10.1056/NEJMoa2100591
<https://www.nejm.org/doi/10.1056/NEJMoa2100591>
- Editorial: <https://www.nejm.org/doi/full/10.1056/NEJMe2106969> [Translating Targeted Temperature Management Trials into Postarrest Care | NEJM](#)
- [TTM2 Improving evidence based care in cardiac arrest](#)
- [Cardiac Arrest Center Bern, Inselspital, University Hospital Bern](#)
- [University Department for Intensive Care, Inselspital, Inselspital, University Hospital Bern](#)
- [University Department for Anesthesiology, Inselspital, University Hospital Bern](#)

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