Dear Editor,

Sudden cardiac arrest occurs in an average of 375,000 people every year in Europe (1). Cardiac arrest lasting five minutes or longer results in cerebral injury (1). In order to achieve better neurological results and improve outcomes, targeted temperature management (TTM) protocols have been developed, following clinical trials that showed good outcomes in out-of-hospital cardiac arrest (1,2). TTM protocols have been recommended in European guidelines (3).

There are three phases of brain injury in cardiac arrest: ischemic injury during arrest (irreversible damage may occur if prolonged), reperfusion injury and post reperfusion injury. TTM targets these three phases. Hypothermia may provide neurological protection in various ways. Hypothermia decreases cerebral oxygen consumption by reducing cerebral blood flow. Decreasing cerebral metabolism protects the brain from secondary damage (2-4). Hypothermia prevents inflammation and free radical production. Hypothermia also reduces brain edema caused by a destroyed blood-brain-barrier and increased vascular permeability (4).

Various protocols for TTM have been suggested and evaluated in clinical trials (1,2). The comprehensive and multidisciplinary protocol that we have established and used is one of the recommended protocols in the European Society of Intensive Care Medicine (ESICM) website’s TTM library (5). Our protocol targets a temperature of 33
°C with the goal of reaching this within 4 hours. Unlike other protocols in the ESICM TTM library, in our protocol NaCl solution of +4 °C that is used for hypothermia is given according to the patient’s weight. Central venous pressure (CVP) measurement is performed every 6 hours. The target CVP value is 8-12 mmHg and fluid resuscitation is performed below this value. Propofol and remifentanil infusion is administered for sedation, which allows early neurological evaluation. If shivering develops, 20 mg IV pethidine is administered. If shivering persists, MgSO\(_4\) infusion prepared according to the protocol is performed. MgSO\(_4\) infusion is another important element that separates our protocol from the others in the ESICM TTM library. However, MgSO\(_4\) infusion is not performed if the patient is anuric. There is no neuromuscular blocker in the protocol to prevent chronic illness myopathy. The body temperature is increased by 0.5 °C if severe bradycardia (HR <45/min) occurs after reaching the target temperature. The patient is kept at the target body temperature for 24 hours.

Neurological evaluation has an important role in our protocol and detailed neurological analysis is performed. Electroencephalogram monitoring and brain stem reflex monitoring with the coma recovery scale are performed on the first and third days. A detailed neurology consultation is carried out with the results of these tests. Our protocol is multidisciplinary: cardiology evaluation is performed in addition to neurology consultation.

The normothermia target is 36.5 °C and slow heating (0.25 °C/hour) is performed to prevent postreperfusion injury (4). If the patient is still unconscious, they are kept at the target temperature for 72 hours. If the patient has a body temperature of >37 °C 1 g paracetamol IV is administered every 4 hours, if liver function tests are normal.

In conclusion, we have used our TTM protocol following cardiac arrest for five years, it is suggested as a reference protocol in ESICM TTM library.

**Ethics**

**Informed Consent:** Consent form was filled out by all participants.

**Peer-review:** Externally peer-reviewed.

**Authorship Contributions**


**Conflict of Interest:** No conflict of interest was declared by the authors.

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References


