

Therapeutic Hypothermia

*Therapeutic Hypothermia can be beneficial to the neurological recovery of patients who suffer cardiac arrest **and** have a return of spontaneous circulation (ROSC). When practical, EMS Personnel should initiate it in patients who meet **all** the eligibility criteria.*

*Patients who do not meet **all** the eligibility criteria should **not** have Therapeutic Hypothermia initiated without Online Medical Consultation. **OMCP***

CAUTION: *If pulses are lost, or complex dysrhythmias develop at any time after initiation, discontinue cooling efforts and initiate appropriate Emergency Cardiovascular Care.*

CAUTION: *Once ROSC is established, minimize scene time. If possible, initiate Therapeutic Hypothermia during transport. **Keep scene time as short as safely possible.***

Therapeutic Hypothermia is an intentional lowering of core body temperature to **32-34° C**.

Inclusion Criteria

- **Non-traumatic, non-hemorrhagic cardiac arrest with ROSC and post-arrest comatose state.**
- Age is known, or strongly suspected, to be ≥ 18 years.
- Palpable pulses are present.
- Destination Hospital is MHSB or SJRMC.

Exclusion Criteria

- **Traumatic or hemorrhagic cardiac arrest** (including traumatic brain injury (TBI)).
- Semi-purposeful response to verbal or noxious stimulation (vigorous sternal rub).
- Pregnancy.
- Known coagulopathy or current warfarin (Coumadin[®]) therapy.

Procedure

1. **I** If not already completed prior to ROSC, intubate the trachea.
I If possible, place a gastric tube to reduce gastric insufflation.

*Drug-assisted intubation for the initiation of Therapeutic Hypothermia, if necessary, **may** be performed without Online Medical Consultation (see Airway Management). **P***

*If unable to intubate the trachea, **do not** initiate Therapeutic Hypothermia.*

2. **I** Use capnography to monitor end-tidal carbon dioxide (ETCO₂). Ventilate the patient to maintain ETCO₂ at ~ 35-40 mm Hg—do not hyperventilate. Titrate FiO₂ to maintain SaO₂ of 94-96%—do not hyperoxygenate.

*Both hyperventilation **and** hyperoxygenation may be harmful in the post-cardiac arrest period.*

*Be aware of the contraindications to succinylcholine (see Airway Management). If contraindicated, **do not** administer succinylcholine and **do not** continue Therapeutic Hypothermia.*

3. **F** If not already done, remove all patient clothing; underwear may be left on. Cover patient with a single sheet.
4. **F** Apply cold packs to each side of the neck and groin, and to each axilla.

5. **A** Administer a cold (4° C) saline bolus of 30 ml/kg, up to 2 L, IV.

*Administration of cold saline through two peripheral IV sites is preferred. Do **not** administer IO.*

6. **P** **Monitor patient for shivering.** If shivering occurs or sedation is necessary, administer etomidate 0.3 mg/kg, up to 60 mg, IV.

*If necessary to maintain sedation, an additional dose of etomidate may be administered. No more than **two (2)** doses of, including any dose used during drug-assisted intubation, may be administered during any patient encounter without Online Medical Consultation. **P OMCP***

7. **P** If necessary, administer fentanyl 50-100 µg IV as analgesia. Fentanyl may be repeated every 10-15 min if necessary and tolerated. **Monitor BP closely.**
8. **P** If shivering recurs or persists, administer succinylcholine 1-1.5 mg/kg, up to 150 mg, IV.

*If necessary to treat recurrent or persistent shivering, an additional dose of succinylcholine may be administered. No more than **two (2)** doses, including any dose used during drug-assisted intubation, may be administered during any patient encounter without Online Medical Consultation. **P OMCP***

*If a succinylcholine is required, ensure that adequate sedation is administered. Etomidate may be used (see above) or consider midazolam 5-10 mg IV if the patient is not hypotensive. Obtain Online Medical Consultation if necessary but do **not** paralyze the patient without sedation. **P***

9. **I** Perform a 12-lead ECG as soon as possible (**≤ 10 min after ROSC**).

CAUTION: *If the 12-lead ECG demonstrates a pattern of acute injury (ST segment elevation in two or more associated leads, often with reciprocal ST segment depression in several other leads) notify the Destination Hospital immediately. **P***

10. **P** If necessary, administer dopamine 5-10 µg/kg/min IV to maintain a mean arterial pressure (MAP) of 90-100 mm Hg.

$$MAP = 2/3 SBP + 1/3 DBP = (SBP + 2 \times DBP) / 3$$

Key Considerations

- Therapeutic Hypothermia is the **only** therapy applied in the post-cardiac arrest setting that has been shown to increase survival rates.
- The optimal window for initiation of Therapeutic Hypothermia has not been established, but data suggests that **earlier is probably better**.
- EMS initiation of Therapeutic Hypothermia is focused on victims of **primary** cardiac arrest who remain comatose after ROSC.
- **Most out-of-hospital cardiac arrests are related to acute coronary syndrome.** Hypothermic patients can undergo percutaneous coronary intervention (PCI).
- The value of Therapeutic Hypothermia in pediatric post-cardiac arrest syndrome has **not** been established.
- Therapeutic Hypothermia has **not** been shown to be beneficial in patients with TBI and is potentially harmful in pediatric patients with TBI.
- Every case is different. If not initiated by EMS Personnel, Therapeutic Hypothermia may be initiated in the hospital; this does **not** suggest that optimal care was not delivered.