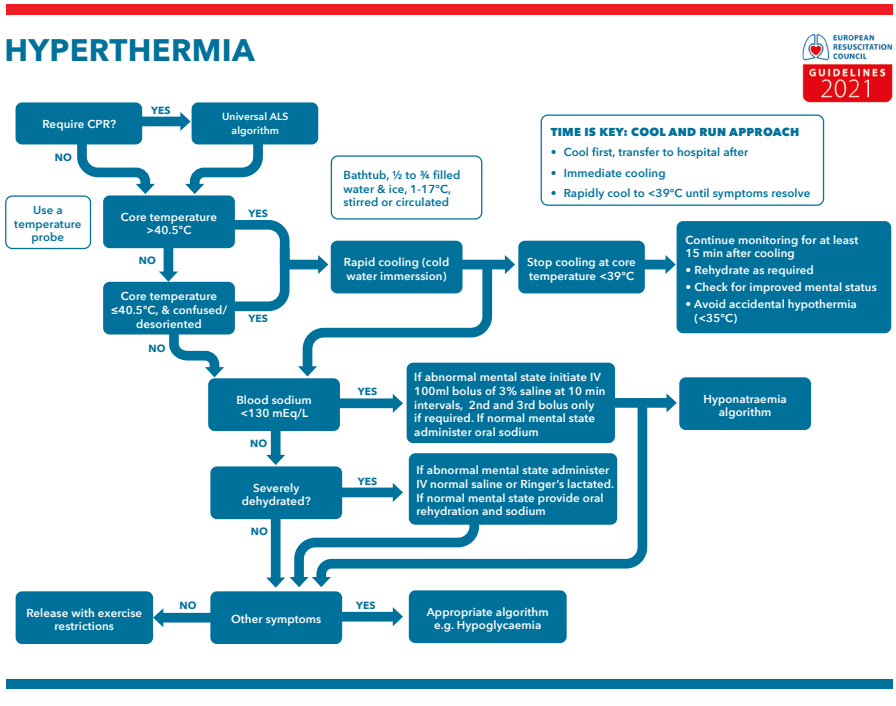
Advanced Life Support

ERC GUIDELINES 2021 EDITION

EUROPEAN RESUSCITATION COUNCIL

Figure 6.7 Hyperthermia algorithm



Thrombosis

Pulmonary embolism

Cardiac arrest prevention:

- Treat life-threatening hypoxia with high-flow oxygen.
- Consider pulmonary embolism (PE) in all patients with sudden onset of progressive dyspnoea and absence of known pulmonary disease (always exclude pneumothorax and anaphylaxis).
- Obtain 12-lead ECG (exclude acute coronary syndrome, look for right ventricle strain).
- Identify haemodynamic instability and high-risk PE.
- Perform bedside echocardiography.
- Initiate anticoagulation therapy (heparin 80 IU/kg IV) during diagnostic process, unless signs of bleeding or absolute contraindications.

- Confirm diagnosis with computed tomographic pulmonary angiography (CTPA).
- Set-up a multidisciplinary team for making decisions on management of high-risk PE (depending on local resources).
- Give rescue thrombolytic therapy in rapidly deteriorating patients.
- Consider surgical embolectomy or catheter-directed treatment as alternative to rescue thrombolytic therapy in rapidly deteriorating patients.
- Request information about past medical history, predisposing factors, and medication that may support diagnosis of pulmonary embolism:
  - Previous pulmonary embolism or deep venous thrombosis (DVT).
  - Surgery or immobilisation within the past four weeks.
  - Active cancer.
  - Clinical signs of DVT.
  - Oral contraceptive use or hormone replacement therapy.
  - Long-distance flights.

Modifications to CPR:

- Cardiac arrest commonly presents as PEA.
- Low $ETCO_2$ readings (below 1.7 kPa/13 mmHg) while performing high-quality chest compressions may support a diagnosis of pulmonary embolism, although it is a non-specific sign.
- Consider emergency echocardiography performed by a qualified sonographer as an additional diagnostic tool.
- Administer thrombolytic drugs for cardiac arrest when PE is the suspected cause of cardiac arrest.
- When thrombolytic drugs have been administered, consider continuing CPR attempts for at least 60-90 minutes before termination of resuscitation attempts.
- Use thrombolytic drugs or surgical embolectomy or percutaneous mechanical thrombectomy for cardiac arrest when PE is the known cause of cardiac arrest.
- Consider ECPR as a rescue therapy for selected patients with cardiac arrest when conventional CPR is failing in settings in which it can be implemented.

Coronary thrombosis

Prevent and be prepared:

- Encourage cardiovascular prevention to reduce the risk of acute events.
- Endorse health education to reduce delay to first medical contact.
- Promote layperson basic life support to increase the chances of bystander CPR.

- Ensure adequate resources for better management.
- Improve quality management systems and indicators for better quality monitoring.

Detect parameters suggesting coronary thrombosis and activate the ST-elevation myocardial infarction (STEMI) network:

- Chest pain prior to arrest.
- Known coronary artery disease.
- Initial rhythm: VF, pulseless ventricular tachycardia (pVT).
- Post-resuscitation 12-lead ECG showing ST-elevation.

Resuscitate and treat possible causes (establish reperfusion strategy):

- Patients with sustained ROSC
  - STEMI patients:
    - Primary percutaneous coronary intervention (PCI) strategy ≤120 min from diagnosis: activate catheterisation laboratory and transfer patient for immediate PCI.
    - Primary PCI not possible in ≤120 min: perform pre-hospital thrombolysis and transfer patient to PCI centre *(Figure 6.8)*.
  - Non STEMI patients: individualise decisions considering patient characteristics, OHCA setting and ECG findings.
    - Consider quick diagnostic work-up (discard non-coronary causes and check patient condition).
    - Perform urgent coronary angiography (≤120 min) if ongoing myocardial ischaemia is suspected or the patient is hemodynamically/ electrically instable.
    - Consider delayed coronary angiography if there is no suspected ongoing ischaemia and the patient is stable.
- Patients with no sustained ROSC: Assess setting and patient conditions and available resources
  - Futile: Stop CPR.
  - Not-futile: Consider patient transfer to a percutaneous coronary intervention (PCI) centre with on-going CPR *(Figure 6.8)*.
    - Consider mechanical compression and ECPR.
    - Consider coronary angiography.