

**Causes**

**Clinical  
Features**

**Investigations**

**Management**

**Basics**

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A person wearing a red helmet and dark outdoor gear is standing on a snowy mountain peak. The background shows a clear blue sky and more snow-covered terrain.

Hypothermia is defined as a **core** temperature of **less than 35°C**.

This can be measured at a number of sites (including esophageal, right heart, tympanic membrane and bladder).

Hypothermia is divided into three groups:

- mild (32–35°C),
- moderate (29–32°C) and
- severe (<29°C)

on the basis of measured **core** temperature.

- **Mild** : thermogenesis is still possible
- **Moderate** : progressive failure of thermogenesis
- **Severe**: adoption of the temperature of the surrounding environment and **an increasing risk of malignant cardiac arrhythmia.**



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Environmental	Cold, wet, windy ambient conditions
	Cold water immersion
	Exhaustion
Trauma	Multitrauma (entrapment, resuscitation, head injury)
	Minor trauma and immobility (e.g. #NOF, #NOH)
	Major burns
Drugs	Ethanol
	Sedatives (e.g. benzodiazepines) in overdose
	Phenothiazines (impaired shivering)
Neurological	CVA
	Paraplegia
	Parkinson's disease
Endocrine	Hypoglycaemia
	Hypothyroidism
	Hypoadrenalism
Systemic illness	Sepsis
	Malnutrition



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**Mild** hypothermia manifests clinically as **shivering**, apathy, ataxia, dysarthria and tachycardia.

**Moderate** hypothermia is typically *marked by a loss of shivering*, altered mental state, muscular rigidity, bradycardia and hypotension.

**Severe** hypothermia, **signs of life may become almost undetectable**, with coma, fixed and dilated pupils, areflexia and profound bradycardia and hypotension.

*The typical cardiac rhythm of severe hypothermia is **slow atrial fibrillation**.*



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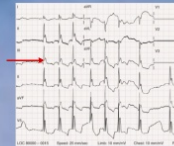
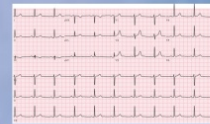
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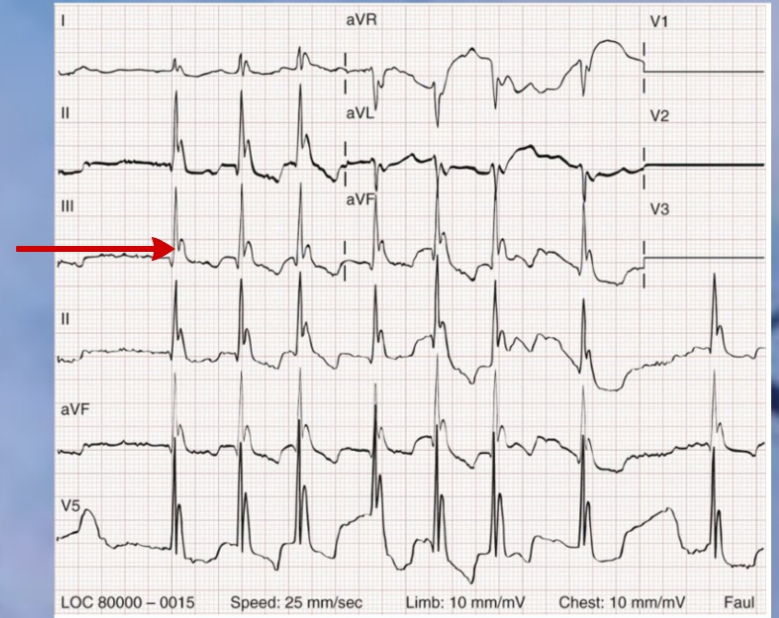
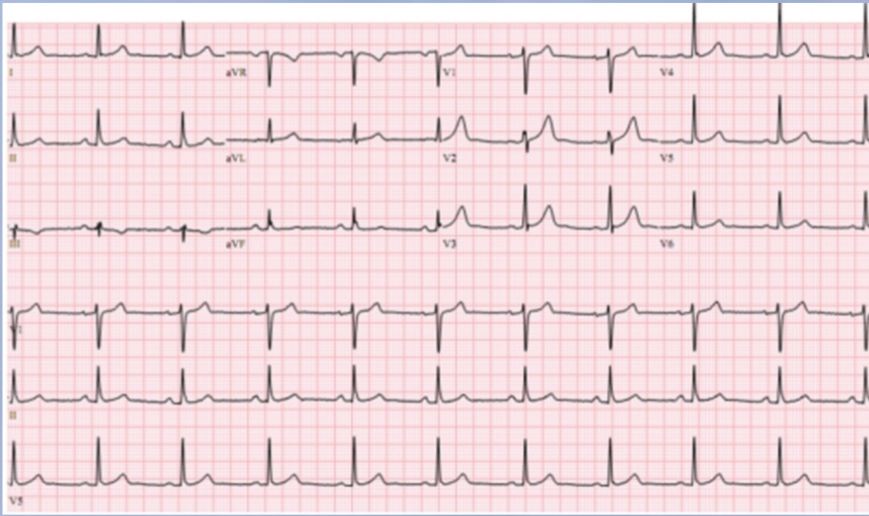
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**Mild hypothermia with shivering and without apparent underlying illness needs no investigation in the ED.**

**Moderate or severe hypothermia mandates a comprehensive work-up to seek common precipitants and complications.**

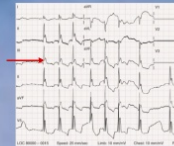
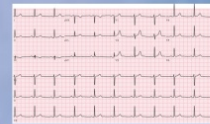






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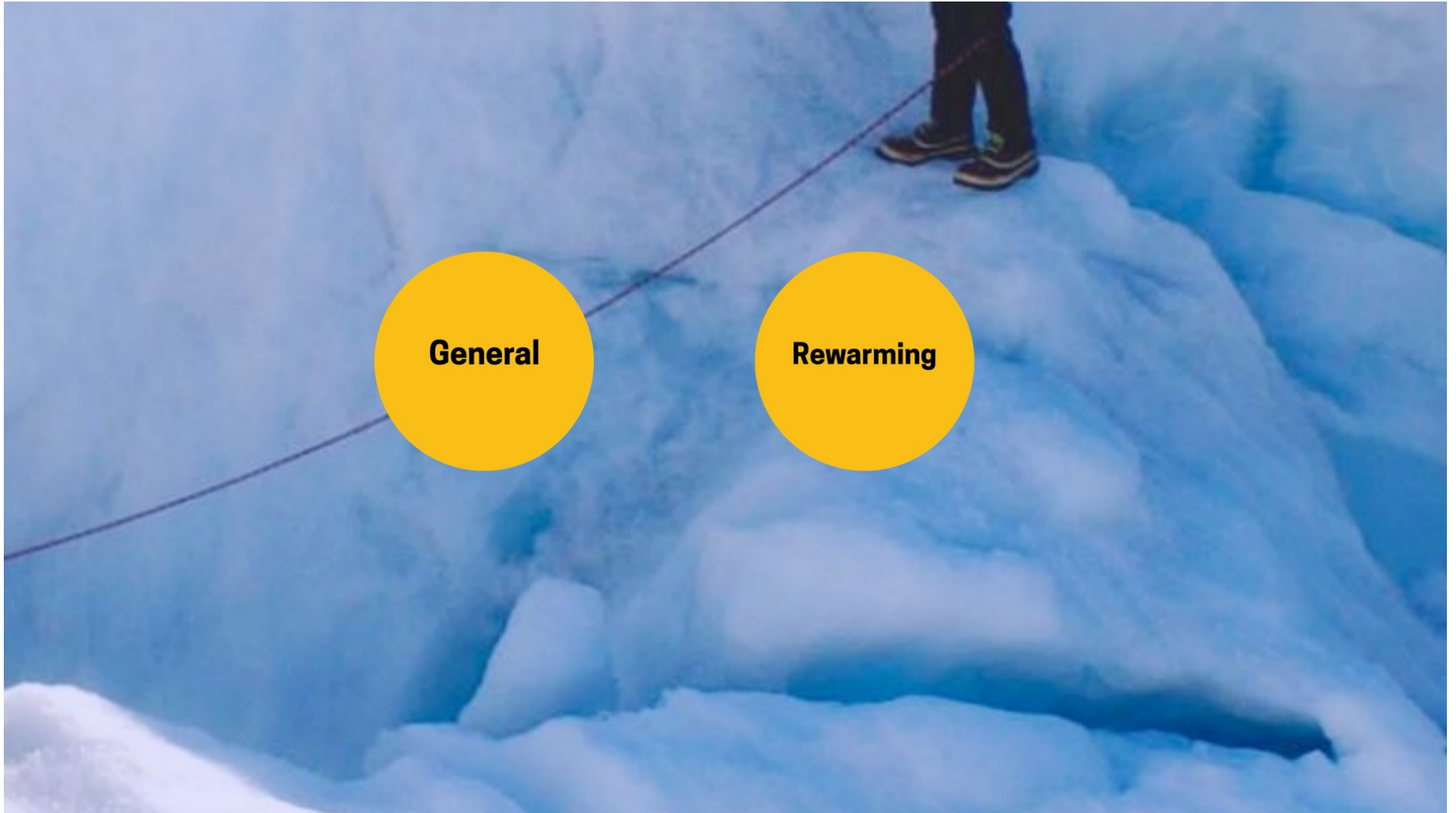
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The general and supportive management of hypothermia victims largely follows that of other critically ill patients.

The slow atrial fibrillation so common in more severe hypothermia is a **benign rhythm** and requires no chemical or electrical correction.

It will revert spontaneously with rewarming.

Pulseless ventricular tachycardia and ventricular fibrillation should largely be managed along conventional lines.

**Magnesium** may be the antiarrhythmic drug of choice in hypothermia.

## BOX 140-3

### Indications for Active Rewarming

Cardiovascular instability

Moderate or severe hypothermia ( $\leq 32.2^{\circ}\text{C}$ )

Inadequate rate of rewarming or failure to rewarm

Endocrinologic insufficiency

Traumatic or toxicologic peripheral vasodilation

Secondary hypothermia impairing thermoregulation



## Passive External Rewarming

Spontaneous, noninvasive and is the treatment of choice for mild hypothermia.

### External

- forced-air warming systems
- plumbed garments that recirculate warm fluids
- hot-water bottles
- heating pads
- radiant sources

## Active Rewarming

### Internal (core)

- Airway
- Peritoneal Dialysis
- Heat Irrigation (thoracic, mediastinal)
- Extracorporeal Blood Rewarming.





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