

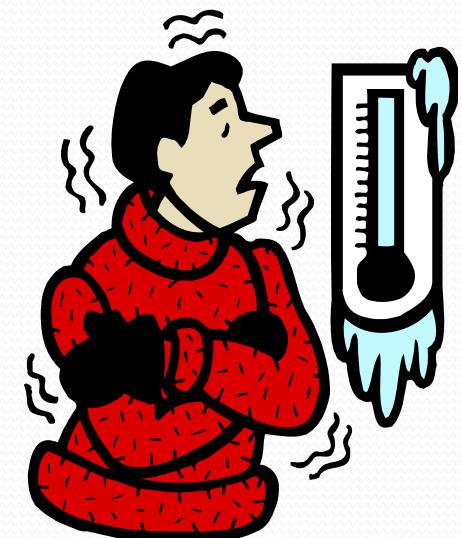


The Hypothermic Arrest

It's that time of year again...

Definition

- Mild: 32 - 35 °C
- Moderate: 28 - 32 °C
- Severe < 28 °C



Differential Diagnosis

- Environmental exposure
- Hypothyroidism
- Adrenal insufficiency
- Sepsis
- Hypoglycemia
- Thiamine deficiency

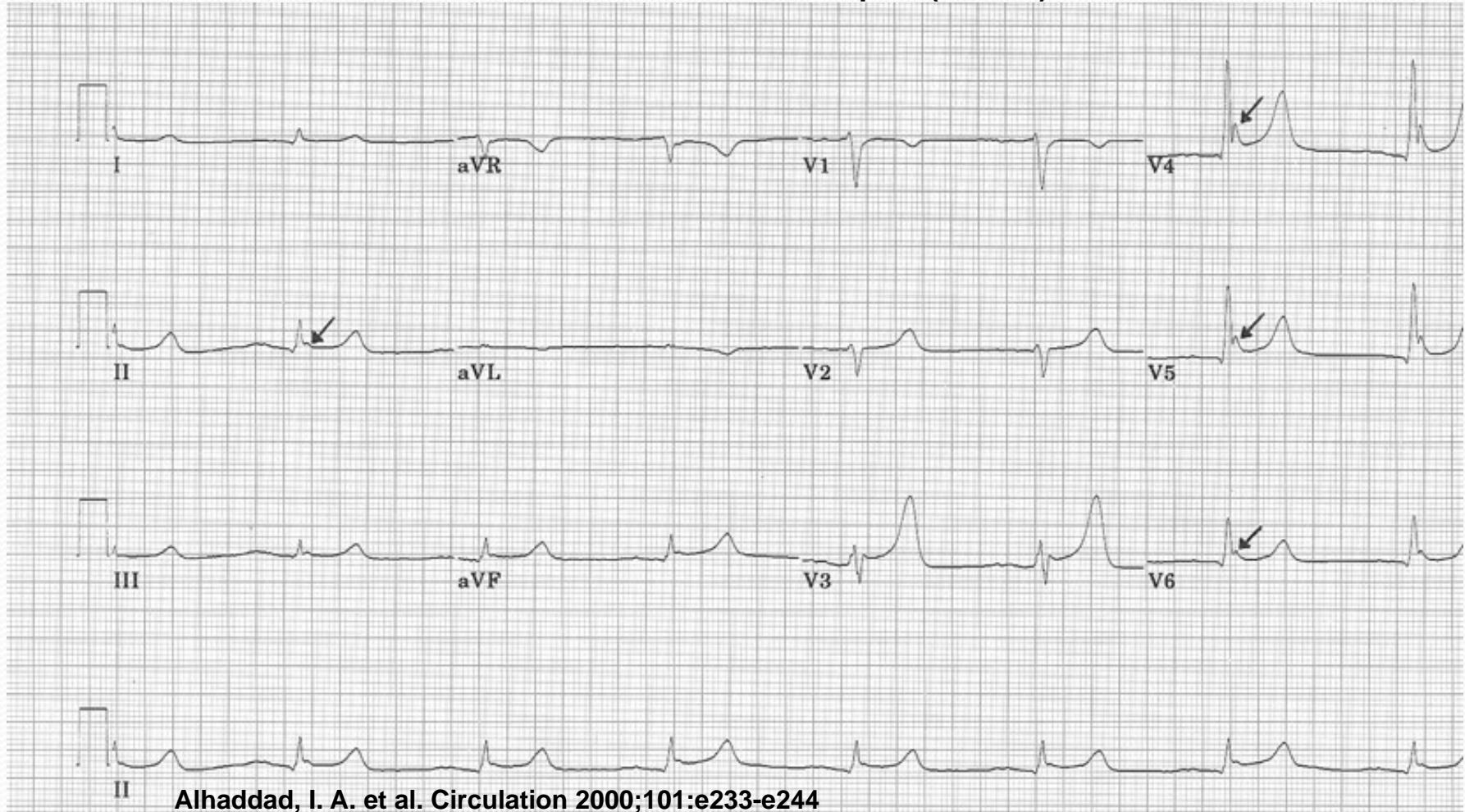
Progression

- Mild: tachypnea, tachycardia, ataxia, shivering, cold diuresis
- Moderate: bradycardia and reduced CO, CNS depression and hypoventilation, A. fib, junctional rhythm.
- Severe: coma, hypotension, bradycardia, ventricular arrhythmias and asystole.

Diagnostic Studies

- Hemoconcentration
- Inhibition of coagulation
- Prolonged PR, QRS, QT
- T inversion, Osborn J wave

A 12-lead ECG obtained at core body temperature of 85{degrees}F. Note Osborn waves, an extra deflection at end of QRS complex (arrows)



Alhaddad, I. A. et al. Circulation 2000;101:e233-e244

25mm/s 10mm/mV 150Hz 004A-004A 12SL 250 CID: 2

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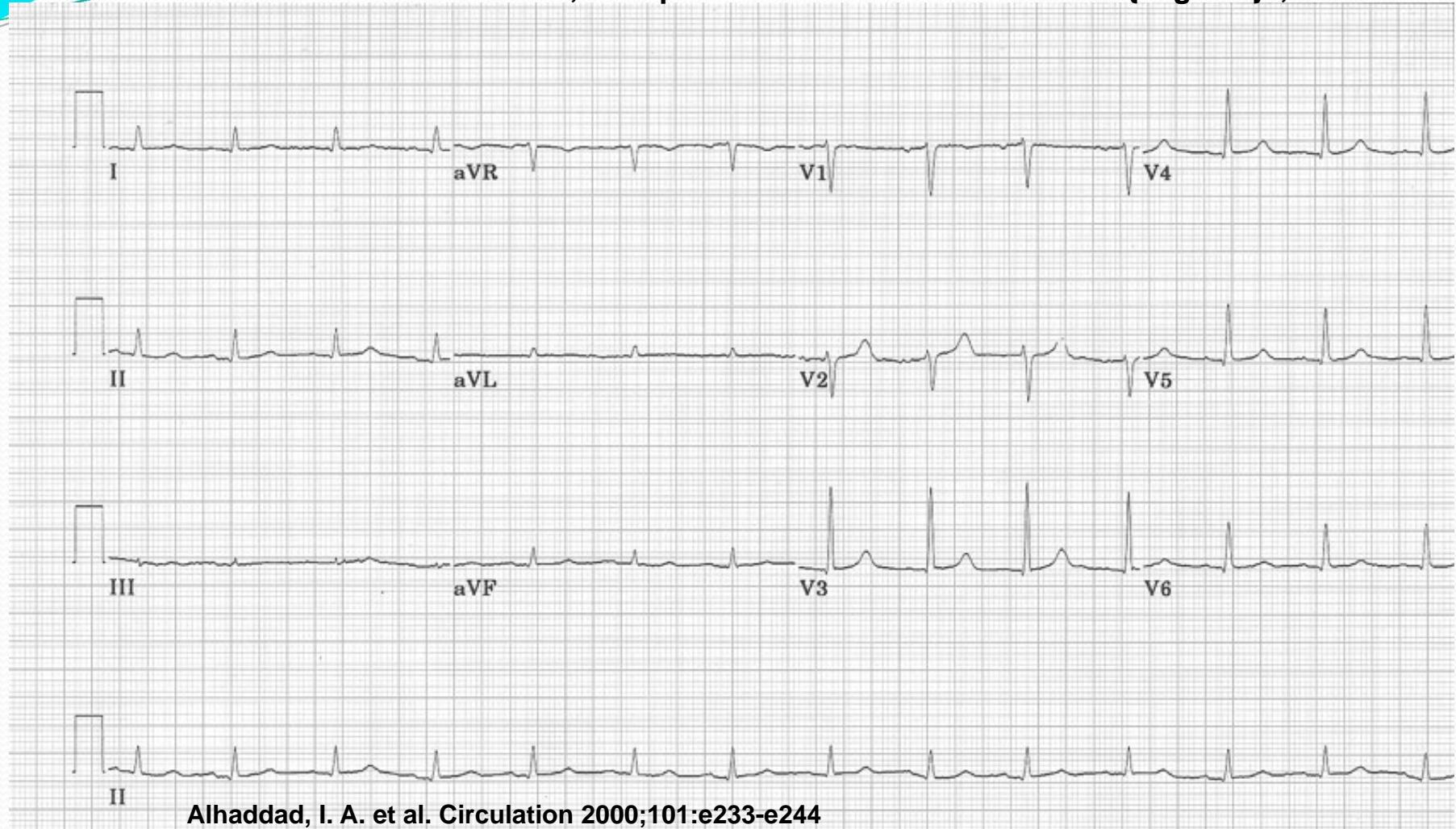


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A 12-lead ECG obtained 24 hours later, after patient had been rewarmed to 98{degrees}F, was normal



Alhaddad, I. A. et al. Circulation 2000;101:e233-e244

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Management

- ABC
- Treat dehydration: two large peripheral IVs; CVC – femoral preferred
- Monitor core temperature
- Protect against heat loss
- Avoid rough movements and excess activity
- Organized cardiac rhythm: evidence of life
- Start CPR if nonperfusing rhythm or no pulse (assess for 30 – 45 sec)

CPR

- Give 1 shock and resume CPR immediately
- $T < 30C$ (86F): withhold IV medications; limit to one shock for VF/VT
- $T > 30C$: Give IV meds as indicated but space longer than standard intervals. Repeat defibrillation as T rises

CPR

- Resume defibrillation and meds once T reaches 30 – 32C.
- Continue resuscitation until rewarmed
- Avoid pacing for bradycardia – will resolve with rewarming

Rewarming techniques

- Passive external
- Active external: warm blankets, heating pads, forced warm air devices, radiant heat, warm bath
- Risk of core temperature afterdrop if extremities and trunk are warmed simultaneously

Active Internal Rewarming

- Indicated in severe hypothermia (<30C per AHA guidelines) or hypothermia associated with VF/VT
- IVF 40 – 43C
- Warm humidified O₂ 42-46C
- Pleural and peritoneal irrigation
- Extracorporeal techniques: venovenous, arteriovenous, cardiopulmonary bypass, hemodialysis

Rewarming Rates

- Spontaneous 1.2C/h
- Spontaneous + shivering 3.6C/h
- Passive external: 0.5 – 2C/h
- Active external: 1-2.5C/h
- Body cavity lavage: 1-3C/h
- CPB: 1-2C/3-5 min
- CAVR: 1C/ 15 min

Source: RICU