Hypothermia

This publication is designed to offer information suitable for use by an appropriately trained physician. The information provided is not intended to be comprehensive or to offer a defined standard of care. The user agrees to release and indemnify the American College of Surgeons from claims arising from use of the publication.
Primary
• Due to cold exposure — cold, wind, or water

Secondary
• Occurs when patient becomes cold despite an environmental temperature that normally would not cause hypothermia
  — Trauma
  — CVA
  — Medical conditions
### Hypothermia

#### Treatment Algorithm

<table>
<thead>
<tr>
<th>Stage</th>
<th>Core Temp</th>
<th>Symptoms</th>
<th>Rewarming Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>35–32 C</td>
<td>Shivering, tachycardia, tachypnea, dysarthria, impaired judgment</td>
<td>Passive</td>
</tr>
<tr>
<td>II</td>
<td>32–28 C</td>
<td>No shivering, stupor, hypotension, hypoventilation, brady/atrial arrhythmias, (j-waves)</td>
<td>Active external, Active core</td>
</tr>
<tr>
<td>III</td>
<td>28–24 C</td>
<td>Coma, apnea, acidosis, coagulopathy, v-fib</td>
<td>Active external, Active core</td>
</tr>
<tr>
<td>IV</td>
<td>24–15 C</td>
<td>Asystole, respiratory arrest</td>
<td>Active external, Active core</td>
</tr>
<tr>
<td>V</td>
<td>15 C</td>
<td>Death</td>
<td></td>
</tr>
</tbody>
</table>
• Thiamine deficiency
• Hypothyroidism
• Adrenal insufficiency
• Bradycardia
• Ventricular fibrillation
**Laboratory Evaluation** | **Complication of Hypothermia**
--- | ---
Basic metabolic profile | Renal failure, hyperkalemia (rhabdomyolysis), hypoglycemia
Coagulation profile | Coagulopathy *
Complete blood count | Thrombocytopenia
EKG/Monitoring | Arrhythmia (atrial, v-fib, j-waves)
Arterial blood gas | Acidosis
Thyroid function tests | Myxedema (possible etiology)

* Clotting abnormalities
Prolongation of clotting times due to inhibition of enzymatic process
Abnormalities in platelet function — reduced production of thromboxane B2
• Warm sheets and blankets
• Forced air warming unit
• Heated inspired gases (1°C/hr)
• Gastric lavage (1.5°C/hr)
• Bladder irrigation (1.5°C/hr)
• Warmed irrigation (40-42°C infusion solution of normal saline) through:
  — Peritoneal lavage (1-3°C/hr))
  — Chest tubes (8°C/hr)
• CVVH
• ECMO
• Cardiac bypass (1-3°C/3-5 min)

• The outcomes of hypothermia depend on both duration and etiology.

• Survival of primary hypothermia: 17%\(^1\)

• Survival of secondary hypothermia due to trauma: \(^2\)

  • T > 34° - 40%
  • T = 32° - 33 - 69%
  • T < 32° - 100%


Initiate ABC’s, EKG, CXR, Labs

Hypothermia?

Primary

T<35°C

Secondary

Initiate ABC’s, EKG, CXR, Labs

Status of circulation

Perfusing rhythm

T≥32°C

Active external rewarming

T<32°C

Active external and Core rewarming

No perfusing rhythm

CPR, Control surgical bleeding Active external and Core rewarming

Bolder text is clickable and a link to another page.