

Pediatric Heat Loss

Anesthetic Pearls: Mechanisms of Heat Loss: Neonate vs. Adult

1. **Radiation** – from the skin depends on the amount of skin exposed and the temperature differential with the environment.
2. **Convection** – air moving over the patient (laminar air flow operating rooms) increases heat loss. Still air is a good insulator.
3. **Conduction** – heat loss occurs through direct contact with cooler surfaces including **cold IV** solutions.
4. **Evaporation** – heat loss is proportional to the ambient humidity; occurs through the skin and from exhaled respiratory gases. Evaporative heat loss from the skin surface (in the absence of sweating) in adults is not terribly significant (contributing only 10 percent of heat loss). In neonates, evaporative loss occurs through the thinner skin can represent a substantial part of total heat loss.

Non-Shivering Thermogenesis (NST) is the most important thermoregulatory response to cold stress in neonates. This involves the metabolism of norepinephrine-dependent brown fat. Brown fat is stored in the inter-scapular area, back, and neck regions. NST either does not occur in adults or its magnitude is so small as to be clinically unimportant. Neonates can double metabolic heat production with NST when cold stressed. Clinically significant NST persists for the first 2 years of life.

