A. Bräuer

Modern perioperative thermal management

Modern perioperative thermal management aims at the prevention of hypothermia during the perioperative process to protect the patients from all adverse outcomes that are associated with hypothermia. These adverse outcomes include increased blood loss and higher transfusion requirements, higher rates of morbid cardiac events and more surgical site wound infections.

Pathophysiology

Patients start to lose heat during the way from the ward to the operation room due to cold environmental temperatures in the hospital, insufficient insulation of the body and the influence of premedication. This heat loss is then aggravated in the operation room because patients are only minimally dressed and temperatures in the operation room are very low.

During anaesthesia anaesthetics reduce heat production of the body and impair thermoregulation. This leads to a redistribution of heat from the warm core of the body to the colder periphery. Surgical skin preparation and the use of unwarmed intravenous or irrigation fluids can further contribute to the development of perioperative hypothermia.

Components of a modern perioperative thermal management

A modern perioperative thermal management consists of three components.

- Measurement of core temperature
- Prewarming
- Warming during anaesthesia

All three components are important for success.

Measurement of core temperature

Measurement of core temperature should be performed before induction of anaesthesia and during anaesthesia. Early measurement of core temperature before induction of anaesthesia will identify patients that will need prolonged prewarming, whereas core temperature measurement during anaesthesia will show if the chosen thermal management is successful or not.

Prewarming

Intraoperative warming without prewarming is often ineffective. Without prewarming, the redistribution of heat after induction of anaesthesia often causes hypothermia and as a consequence these patients are hypothermic during the first hours of surgery.

Prewarming can be started on the normal ward, in a preoperative holding area, in an induction room or in the operating room. In Germany prewarming in the induction room is the preferred method because it is probably the most practical approach in many German hospitals. However, no single strategy suits all hospitals and all situations.

Warming during anaesthesia

Warming during anaesthesia should be started at the time of induction of anaesthesia. If prewarming is used in the induction room or in the operating room prewarming proceeds to warming therapy during anaesthesia. It is sensible to use the largest forced-air warming blanket that can be used during the operation, because the efficacy of forced-air warming is directly depending on the body surface that is warmed. If high amounts of intravenous fluids and blood products are necessary the additional use of a blood and fluid warming system is necessary.