Warming patients before clean surgery reduced the incidence of postoperative wound infection

Melling AC, Ali B, Scott EM, et al. ***Effects of preoperative warming on the incidence of wound infection after clean surgery: a randomised controlled trial.*** *Lancet 2001 Sep 15;**358**:876–80.*

QUESTION: In patients having minor elective surgery, does preoperative warming reduce the incidence of wound infection after surgery?

Design
Randomised {allocation concealed}*, blinded (outcome assessor), controlled trial with 6 weeks of follow up.

Setting
A district general hospital in the UK.

Patients
421 patients who were having elective hernia repair, varicose vein surgery, or breast surgery that would result in a scar >3 cm in length. Exclusion criteria were <18 years of age, pregnancy, use of long term oral steroids, radiotherapy (to the incision site) or chemotherapy in the previous 4 weeks, or infection at the time of surgery. Follow up was 99% (mean age 50 y, 58% women).

Intervention
Patients were allocated to local warming (n=141), systemic warming (n=139), or standard treatment (n=141). All patients were given standard preoperative care. In addition, patients in the local warming group received >30 minutes of preoperative warming to the planned wound area using a non-contact radiant heat dressing, whereas patients in the systemic warming group received >30 minutes of preoperative warming to the whole body using a forced air warming blanket. Patients in the standard treatment group did not receive any active temperature control.

Main outcome measures
Wound infection (purulent discharge or painful erythema that lasted 5 days and was treated with antibiotics within 6 wks of surgery), wound ASEPSIS score (adapted), haematoma, seroma, wound aspiration, and prescribed postoperative antibiotics.

Main results
Analysis was by intention to treat. The overall rate of wound infection was 8%. The local and systemic warming groups each had lower rates of wound infection and prescribed postoperative antibiotics than the standard treatment group (p values < 0.05) (table); the local and systemic warming groups did not differ for wound infection. More patients in the local warming and systemic warming groups had ASEPSIS scores between 0 and 10 (table). The 3 groups did not differ for incidence of haematomas, seromas, or wound aspiration. When the results for the local and systemic groups were combined and compared with the non-warmed group, similar results were found.

Conclusion
In patients having elective hernia repair, varicose vein surgery, or breast surgery, preoperative warming using a local device or a warm air blanket reduced the incidence of wound infection after surgery.

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Local warming (LW), systemic warming (SW), and LW or SW v standard preoperative care (SPC) for reducing wound infection after clean surgery†

Outcomes at 6 weeks	Comparison	Event rates	RRR (95% CI)	NNT (CI)
Wound infection	LW *v* SPC	4% *v* 14%	73% (34 to 90)	10 (6 to 28)
	SW *v* SPC	6% *v* 14%	58% (9 to 81)	13 (7 to 101)
	LW or SW *v* SPC	5% *v* 14%	66% (33 to 82)	12 (7 to 30)
Prescribed postoperative antibiotics	LW *v* SPC	7% *v* 16%	59% (16 to 80)	11 (6 to 52)
	SW *v* SPC	6% *v* 16%	59% (16 to 80)	11 (6 to 50)
	LW or SW *v* SPC	6% *v* 16%	59% (26 to 77)	11 (6 to 32)
			RBI (95% CI)	
ASEPSIS score 0–10	LW *v* SPC	94% *v* 83%	14% (5 to 25)	9 (6 to 25)
	SW *v* SPC	93% *v* 83%	12% (3 to 24)	10 (6 to 41)
	LW or SW *v* SPC	94% *v* 83%	13% (5 to 24)	10 (6 to 23)

†Abbreviations defined in glossary; RRR, RBI, NNT, and CI calculated from data in article.

COMMENTARY

Previously, postoperative patient hypothermia (< 36°C) was considered an inevitable consequence of general anaesthesia and surgery, and the main adverse effect was thought to be patient discomfort. There is now compelling evidence that even mild hypothermia during the perioperative period increases the risk of various adverse outcomes.[1] The study by Melling *et al* adds weight to this growing body of evidence. The study is clinically important as patients receiving relatively minor, short duration, clean surgery were the focus. The study found no difference between forced air warming and local warming using a non-contact, radiant heat dressing. These findings will be of interest to nurses working in perioperative areas where there is already recognition of the need to maintain patients' body temperature. Although many institutions routinely use warming devices, they are rarely used preoperatively in patients such as those who would be regarded as low risk.

The ease and cost of changing practice must be weighed against the likely benefits for patients and health services. Nevertheless, the evidence in favour of thermoregulation is persuasive, and the American Society of PeriAnaesthesia Nurses has recently published clinical guidelines for the prevention of unplanned perioperative hypothermia in adult surgical populations. These guidelines recommend preoperative preventative warming and advocate warming devices other than forced air for normothermic patients and forced air convection warming for patients who are hypothermic.[2] The use of local warming devices may be easier to implement than forced air blankets. Obviously individual patient assessment is still required, and sometimes perioperative hypothermia is planned. Further research on patient warming is needed to assist in decision making, including exploration of cost effectiveness and patient outcomes such as comfort.

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1 Mahoney CB, Odom J. Maintaining intraoperative normothermia: a meta analysis of outcomes with costs. *AANA J* 1999;**67**:155–63.
2 Jeran L. Patient temperature: an introduction to the clinical guideline for the prevention of unplanned perioperative hypothermia. *J Perianesth Nurs* 2001;**16**:303–4.