Hypothermic or not hypothermic - that's the question



PÅ JOB: SYGEPLEJERSKER GÅR STUEGANG PÅ BARSELSAFDELINGEN SSAGADA BARSELSAFDELINGEN Spændende teglitteratur Hi kufferten

Kampagne sætter stopper for medicineringsfejl

KORT NYT Sønderjyske sygeplejersker protesterer i pressen

FORMANDSVALG Du skal vælge mellem 2 kandidater

3 lette øvelser giver energi

KLINISK SYGEPLEJE

Patienteme fryser på Operationsbordet Potilaat jäätyvät leikkauspöydällä

Disclosure

Pedersen, Carsten Michel, RN, CRNA, MSCN

Member of 3M European Temperature Management Advisory Board



Nurses' knowledge of inadvertent hypothermia Hegarty, Josephine, et al. AORN journal 2009

"Nurses identified a plethora of factors that prevent them from maintaining normothermia in their patients.

These factors mandate a need for educational interventions and the adoption of practice guidelines in the clinical area".

Nurses' Knowledge of Inadvertent Hypothermia

JOSEPHINE HEGARTY, PHD, MSc, RNT, BSc, RGN; ELLA WALSH, MSc, BSc, DIP NURSING, RGN; AILEEN BURTON, MSc, BSc, RGN; SHEILA MURPHY, RGN, RM, HDIP NURSING MANAGENEN; FIONUALA O'GORMAN, MSc ED, BSc, ENB 176, RGM, RGN; GRÁINNE MCPOLIN, HDIP ANAESTHETIC NURSING, BA, RGN

"n the perioperative environment, between 60% and 90% of patients inadvertently become hypothermic.1 Hypothermia not only has significant negative consequences for the health of the patient, but also incurs economic expense for society in terms of increased hospital stay and additional procedures and diagnostic tests. Thus, it is paramount that all perioperative nurses possess an in-depth understanding of inadvertent hypothermia, including risk factors, complications, and methods of prevention and treatment. It is only through use of this knowledge that nurses can effectively fulfill their roles in the assessment, treatment, and prevention of hypothermia.

A comprehensive literature review revealed a paucity of research pertaining to nurses' knowledge of hypothermia. We designed this study to gain an understanding of perioperative nurses' knowledge in relation to accidental hypothermia in the perioperative setting.

BACKGROUND

Accidental hypothermia in perioperative patients is associated with poor patient outcomes. At the very least, it subjects patients to an unpleasant sensation of cold.⁷ It also has much more significant negative consequences, which have been detailed in the literature (Table 1). The magnitude of these adverse consequences should alert all nurses to their important role in reducing and alleviating the occurrence of this problem.

DEFINING NORMOTHERMIA AND HYPOTHERMIA. The control of body temperature within a defined range is crucial in the maintenance of a stable environment in the human body, thus enabling optimal

function.2 The literature, however, presents varying definitions of normothermia (ie, normal body temperature). For example, the American Society of Peri-Anesthesia Nurses (ASPAN) clinical guideline for the prevention of unplanned perioperative hypothermia defines normothermia as "a core temperature range from 36° C to 38° C (96.8° F to 100.4° F)." Meanwhile, the National Institute for Health and Clinical Excellence (NICE) 2008 guideline for the management of inadvertent perioperative hypothermia in adults defined the expected normal temperature range of adult patients as between 36.5° C and 37.5° C (97.7° F to 99.5° F).4 Kiekkas et al' concur with this definition of normothermia.

Just as the literature presents varying definitions of normothermia, it also presents varying definitions of hypothermia.

ABSTRACT

Inadvertent hypothermia can have significant consequences in the perioperative setting. Knowing how to recognize and manage inadvertent hypothermia is an important aspect of perioperative nursing.

A quantitative, descriptive study was conducted at an annual perioperative nursing conference to evaluate nurses' knowledge regarding the prevention of inadvertent perioperative hypothermia.

Significant variations in responses regarding definitions of hypothermia and normothermia were noted. In addition, nurses identified a plethora of factors that prevent them from maintaining normothermia in their patients. These factors mandate a need for educational interventions and the adoption of practice guidelines in the clinical area.

Key words: inadvertent hypothermia, normothermia, practice guidelines. AORN J 89 (April 2009) 701-713. © AORN, Inc, 2009. Nurses' knowledge of inadvertent hypothermia Hegarty, Josephine, et al. AORN journal 2009

When asked to select the cut-off point for hypothermia, respondents were divided:

- 38.5% (n = 50) of participants chose 36° C
- 39.2% (n = 51) chose 35° C
- 11.5% (n = 15) chose 34° C
- 8.5% (n = 11) chose 33° C

Anaesthesia nursing 14,6 % (n=19) Recovery nursing 30 % (n=39) Intraoperative nursing 13,1 % (n=17) Or a combination of two or more 36,9 % (n = 48) Nurses' knowledge of inadvertent hypothermia Hegarty, Josephine, et al. AORN journal 2009



Are temperatures routinely monitored in clinical areas 42,3 % (n = 55) yes 43,8 % (n = 57) yes as required based on the assessment of the patient NICE National Patitute for Health and Care Exceller 8,5 % (n = 11) no Hypothermia: prevention and management in adults having surgery

Understanding Fever and Body temperature A Cross-disciplinary Approach to Clinical Practice

Ewa Grodzinsky, Märta Sund Levander, Palgrave Macmillan, Cham, 2020. 1-5.



Sites that can be used to estimate core temperature If core temp. is 36° C, this site is ... 1. oral (35.8° C)

- 2. axillary (34.5° C)
- 3. skin (33° C)
- bladder (36.3° C)(volume dependent)
- 5. rectum (36.5° C)

Hypothermia: Prevention and management in adults having surgery National Institute for Health and Care Excellence, 2016

Measure the patient's temperature using a site that produces either:

- a direct measurement of core temperature, or
- a direct estimate of core temperature that has been shown in research studies to be accurate within 0.5 C of direct measurement.

Do not use indirect estimates of core temperature in adults having surgery

Pulmonary artery catheter	NICE National Automation for Marca Automatic A
Distal oesophagus	guidefine
Urinary bladder	Hypothermia: prevention and management in adults having surgery
Zero heat-flux (deep forehead)	Clinical guideline Published: 23 April 2008 nice.org.uk/guidance/cg65
Sublingual	
Axilla	
Rectum	C NCC 2017. All lifts rear vol. Subject to Notice of Lifts & Popully-www.ko.org.uk/www.ard-condition/konte-of- rights]

"With regard to factors that prevent nurses from maintaining normothermia in their patients, it was surprising to see that in a health service that encourages nurses to be autonomous practitioners, one of the most frequently identified factors was surgeon preference".

> The lack of research examining nurses' knowledge of hypothermia provides a compelling impetus for further study in this area.



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Mild Perioperative Hypothermia

Sessler DI. Current concepts, New Engl J Med. 1997;336(24):1730-1737





Carsten Michel Pedersen



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Mild Perioperative Hypothermia

Sessler DI. Current concepts, New Engl J Med. 1997;336(24):1730-1737





Carsten Michel Pedersen

Thermoregulation: Normal Physiology, Anesthetic Effects, and Perioperative Considerations

Zaza, Khaled J., and Harriet W. Hopf. Elsevier, 2019

Characteristic Patterns of general anesthesia-Induced hypothermia

- An average core temperature drop 0,5-1,5° C and occurs in the first hour of general anesthesia
- 81% from core-to-peripheral heat redistribution known as redistribution temperature drop



Carsten Michel Pedersen

The management of inadvertent perioperative hypothermia in adult. National Institute for Health and Care Excellence, 2008. Updated 2016.



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Keep theater above 21 C until covered – especially for short cases.

Ambient temperature

Hypothermia: prevention and management in adults having surgery NICE. Clinical guideline Published date: April 2008 Last updated: December 2016

- In patients undergoing general, regional or combined anaesthesia, an increase in theatre temperature is protective of patients becoming hypothermic
- The ambient temperature should be at least 21°C while the patient is exposed
- Once forced air warming is established, the ambient temperature may be reduced to allow better working conditions

Effects of Ambient Temperature and Forced-air Warming on Intraoperative Core Temperature: A Factorial Randomized Trial Pei, Lijian, et al. The Journal of the American Society of Anesthesiologists, 2018

- 292 adults
- Randomized to ambient temperatures 19°, 21°, or 23°C, and to passive insulation or forced-air warming.
- The primary outcome was core temperature change between 1 and 3 h after induction.
- Ambient operating room temperature has no effect on core temperature for forced-air warmed patients, and only a small effect on unwarmed patients.

Ambient temperature

The management of inadvertent perioperative hypothermia in adult. National Institute for Health and Care Excellence, 2008 Last updated 2016.



Morphometric influences on intraoperative core temperature changes Kurz, Andrea, et al. Anesthesia & Analgesia, 1995



- 40 ASA I-III patients
- Elective colon surgery.
- Age 59 +/÷ 14 yr
- 45 % male
- Bodyfat % 10
 - 10%-24% (n = 18)
 - 25%-35% (n = 11)
 - 36%-50% (n = 11)

Body morphology





Complications and Treatment of Mild Hypothermia

Sessler, Daniel I. The Journal of the American Society of Anesthesiologists, 2001

Consequence	Author	N	∆T _{core} (°C)	Normothermic	Hypothermic	Ρ
Surgical wound infection	Kurz et al.52	200	1.9	6%	19%	< 0.01
Duration of hospitalization	Kurz et al.52	200	1.9	12.1 ± 4.4 days	14.7 ± 6.5 days	< 0.01
Allogeneic transfusion requirement	Schmied et al.21	60	1.0	1.7 ± 0.31	2.2 ± 0.5 I 8 units	< 0.001
Morbid cardiac events	Frank et al. ¹⁸	300	1.3	1%	6%	< 0.05
Postoperative ventricular tachycardia	Frank et al.18	300	1.3	2%	8%	< 0.05
Urinary excretion of nitrogen	Carli et al.55	12	1.5	982 mmol/day	1,798 mmol/day	< 0.05
Duration of vecuronium	Heier et al.59	20	2.0	28 ± 4 min	62 ± 8 min	< 0.001
Duration of atracurium	Leslie et al.63	6	3.0	44 ± 4 min	68 ± 7 min	< 0.05
Postoperative shivering	Just et al. ⁸	14	2.3	$141 \pm 9 \text{ ml} \cdot \text{min}^{-1} \cdot \text{m}^{-2}$	$269 \pm 60 \text{ ml} \cdot \text{min}^{-1} \cdot \text{m}^{-2}$	< 0.001
Duration of postanesthetic recovery	Lenhardt et al.144	150	1.9	53 ± 36 min	94 ± 65 min	< 0.001
Plasma [norepinephrine]	Frank et al.20	74	1.5	330 ± 30 pg/ml	480 ± 70 pg/ml	< 0.05
Thermal discomfort	Kurz et al.73	74	2.6	$50 \pm 10 \text{ mm VAS}$	$18 \pm 9 \text{ mm VAS}$	< 0.001

Adverse effects

Active body surface warming systems for preventing complications caused by inadvertent perioperative hypothermia in adults. Madrid, Eva, et al. Cochrane Database of Systematic Reviews 2016.

- 589 adult patients
- Colorectal surgery (Kurz 1996);
- Clean (breast, varicose vein, or hernia) surgery (Melling 2001)
- Laparoscopic surgery for gastrointestinal cancer (Pu 2014)

 Active body surface warming system (ABSW)

VS

Standard (no active warming)

● Quality of the evidence (Grade) low ⊕⊕

Outcomes	Illustrative compara	Relative effect (95% CI)	
	Assumed risk Corresponding risk		
	Control	Active warming sys- tems	
Infection and compli- cations of the surgical		57 per 1000 (31 to 104) (0.20 to 0.66	
wound	Wound infec		ion

The effects of mild perioperative hypothermia on blood loss and transfusion requirement

Rajagopalan, Suman, et al. The Journal of the American Society of Anesthesiologists, 2008

Study	Sample size (<i>N</i>) N:H	Normothermic (N) mean (SD)	Hypothermic (H) mean (SD)	Outcome (N/H) mean (95%Cl)	
Schmied	30:30	1670 (32)	2150 (550)	0.79 (0.70, 0.88)	
Winkler	75:75	1531 (1055,1746)	1678 (1366,1965)	0.90 (0.82, 1.00)	
Widman	22:24	923 (410)	1068 (482)	0.87 (0.68, 1.11)	
Persson	29:30	186 (145)	308 (257)	0.62 (0.43, 0.89)	
Hofer	29:29	1497 (497)	2300 (788)	0.65 (0.55, 0.77)	
Bock	20:20	635 (507)	1070 (803)	0.58 (0.38, 0.89)	
Johansson	25:25	1047 (413)	1066 (441)	0.99 (0.80, 1.23)	_ _ -
Smith	31:30	423 (562)	159 (268)	3.14 (1.82, 5.42)	
Frank	142:158	390 (834)	520 (754)	0.56 (0.43, 0.73)	
Mason	32:32	111 (40)	157 (73)	0.73 (0.60, 0.89)	-0-
Casati	25:25	470 (170)	442 (216)	1.11 (0.89, 1.40)	
Murat	26:25	160 (61)	161 (100)	1.09 (0.84, 1.43)	
Hohn	43:73	660 (230,1870)	956 (340,5480)	0.69 (0.36, 1.34)	
Nathan	73:71	569 (356)	666 (405)	0.85 (0.70, 1.02)	
Summary			Treatmen	0.84 (0.74, 0.96) nt effect <i>P</i> = 0.009	
				$\left(\right)$	Favors Favors
				norm	nothermic / hypothermic
			Coagu	lopathy	

Relationship between hypothermia and blood loss in adult patients undergoing open lumbar spine surgery

Tedesco, Nicholas S., et al. The Journal of the American Osteopathic Association, 2014

- 174 adult patients
- Although mild to moderate hypothermia has some effect on the coagulation system, the clinical risk of bleeding associated with cooling appears to be very low.
- This will, however, increase significantly if the patient has moderate-tosevere acidosis.



Coagulopathy

Active body surface warming systems for preventing complications caused by inadvertent perioperative hypothermia in adults. Madrid, Eva, et al. Cochrane Database of Systematic Reviews 2016.

- 8 trials with 779 participants assessed the amount of blood products transfused during surgery, showing a consistent reduction in the amount of blood transfused
- 8 trials with 621 participants assessed the number of participants that received intraoperative transfusions, showing no difference
- Active body surface warming system
 vs

standard (no active warming)

 Quality of the evidence (Grade) moderate ⊕⊕

Outcomes	Illustrative compar	Illustrative comparative risks* (95% CI)		
	Assumed risk	Assumed risk Corresponding risk		
	Control	Active warming sys- tems		
Participants transfused	291 per 1000	259 per 1000 (163 to 413)	RR 0.79 (0.50 to 1.23)	
		Coagulopat	 าy	

Temperature Regulation and Monitoring

Sessler, DI, from Miller's Anaesthesia, Chapter 54. 8th Edition 2014.



Drug action

Mild hypothermia alters propofol pharmacokinetics and increases the duration of action of atracurium. Leslie, Kate, et al. Anesthesia & Analgesia, 1995

- 6 volunteers
- 34° C or 37° C
- Propofol blood concentrations averaged approximately 28% more at 34° C than at 37° C
- Hepatic blood flow decreased
 23% in normothermic volunteers
 during the propofol infusion, and
 33% in hypothermic volunteers

The influence of mild hypothermia on the pharmacokinetics and time course of action of neostigmine in anesthetized volunteers. Heier, Tom, et al. The Journal of the American society of Anesthesiologists 2002

- 7 volunteers
- < 34.5° C or > 36.5° C
- With hypothermia, the central volume of distribution of neostigmine decreased by 38%, and onset time of maximum effect increased (4.6 vs. 5.6 min).
- Hypothermia did not change the clearance (696 ml/min), maximum effect, or duration of action of neostigmine.

Drug action prolonged

Active body surface warming systems for preventing complications caused by inadvertent perioperative hypothermia in adults. Madrid, Eva, et al. Cochrane Database of Systematic Reviews 2016.

- 300 adult patients
- Coronary artery desease
- Active body surface warming system vs Standard (no active warming)
- Quality of the evidence (Grade) low $\oplus \oplus$

Outcomes	Illustrative comparative	Relative effect (95% CI)	
	Assumed risk Corresponding risk		
	Control	Active warming sys- tems	
Major cardiovascular complications (cardio- vascular death, non-fa- tal myocardial infarc- tion, non-fatal stroke, and non-fatal cardiac	63 per 1000	14 per 1000 (3 to 63)	RR 0.22 (0.05 to 1)
arrest)		Myocardial m	orbidity

Effect of Intraoperative Hypothermia on Surgical Outcomes after Colorectal Surgery within an Enhanced Recovery after Surgery Pathway

Lohsiriwat, Varut, and Panumat Jaturanon, Siriraj Medical Journal 2019

195 patients

150 (77%) in hypothermic group 45 (23%) in normothermic group

Rectal surgery with operative time > 3 hours

	Hypothermic group (n=150)	Normothermic group (n=45)	P-value
Overall complication	34 (22.7)	6 (13.3)	0.174
Complication excluding grade I#	19 (12.7)	3 (6.7)	0.265
Wound infection	9 (6.0)	3 (6.7)	0.870
30-day death	0	1 (2.2)	0.231
30-day readmission	5 (3.3)	3 (6.7)	0.389
Time to tolerate normal diet, days	2.0 ± 2.0	1.3 ± 1.3	0.023*
Time to first bowel movement, days	2.6 ± 1.1	2.6 ± 1.1	0.838
Length of hospitalization, days	5.7 ± 4.2	4.4 ± 2.6	0.048*

Recovery time prolonged

Active body surface warming systems for preventing complications caused by inadvertent perioperative hypothermia in adults.

Madrid, Eva, et al. Cochrane Database of Systematic Reviews 2016.

Comparison: Active warming vs control (no active warming) Outcome: Participant's thermal comfort (higher values = higher comfort)



Thermal comfort

Case, esophageal resection

- Esophageal resection
- Anaesthesia, combined general and regional (EPI)
- ASA grade III
- Conversion of a double lumen to single lumen tube.
- Postoperative temperature 34,8° C
- Uncontrolled internal bleeding 1,6 l.
- Tranfusion
 - 2 Fresh frozen plasma (FFP)
 - 1 Platelets
 - 1 Bicarbonate

Flow chart				
Date	Time	Temp	Incident	
Day 0	14:12	34,8	End OR	
	14:45	34,9	Arrival ICU	
	20:30	38,0	Re-admission OR	
	22:30	36,3	Arrival ICU	
Day 1	06:50	37,9	Extububation	
	09:00	37,5		





Hypothermia in trauma. Anaesthesia, Pain & Intensive Care, 2019

REGION

European guidelines

- Guideline of the Canadian Association of General Surgeons 2009, Evidence-Based Guidelines for the Prevention of Perioperative Hypothermia
- ASPAN Guidelines 2010, Evidence-Based Clinical Practice Guideline for the Promotion of Perioperative Normothermia
- German and Austrian Guideline 2015, Preventing Inadvertent Perioperative Hypothermia
- Australia 2010 (JBI) Strategies for the management and prevention of hypothermia within the adult periopeative environment
- Turkish 2013, The Turkish Anaesthesiology and Reanimation Society Guidelines for the prevention of inadvertent perioperative hypothermia
- Danish National Guideline 2014
- NICE Guidelines 2008, updated 2016, The Management of Inadvertent Perioperative Hypothermia in Adults
- Germany 2019 (under review) Vermeidung von perioperativ (Avoidance of perioperative hypothermia)

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Intraoperativ	NICE Guideline 2008	Canadian Guideline 2009	ASPAN Guideline 2010	Danish Guideline 2014	German and Austrian Guideline 2015
Technique of active warming	Forced-air	Forced-air	Forced-air	Forced-air, electric blankets or circulating water mattress	Forced-air, conductive blankets laid on top of the body
Infusion warming	> 500 ml.	Surgery > 60 min	Optional	> 500 ml.	> 500 ml/h



- In general, the guidelines rely on the same method and the same literature
- Therefore the results should be the same?

However, ...

- Different key questions were asked by the guideline groups
- Different years of publication

Some guideline groups asked a lot of questions, whereas others tried to focus on a few important questions

http://kliniskeretningslinjer.dk/retningslinjer/godkendteretningslinjer/respiration-og-cirkulation/kr-hypotermi.aspx

Aim

To provide recommendations for the use of non-pharmacological methods for the prevention of perioperative inadvertent hypothermia to adult patients (> 18 years) undergoing general or regional anesthesia.

CENTRE FOR CLINICAL GUIDELINES

Clearinghouse

Klinisk retningslinje for nonfarmakologisk forebyggelse af perioperativ utilsigtet hypotermi.

CENTER FOR KLINISKE RETNINGSLINJER

Dato:

Godkendt dato: 4. April 2014 Revisionsdato: 4. Oktober 2019 Udløbsdato: 3. April 2017

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dicin og Sundhedsteknologi rsitet : Vej 7 E4 *rg

LBORG UNIVERSIT





1.

- What is the evidence concerning **prewarming with Forced air warming (FAW) or electric blanket** compared with no warming to prevent perioperative inadvertent hypothermia?
- II. What is the evidence concerning warming of **IV fluids** compared to no warming to prevent perioperative inadvertent hypothermia?
- III. What is the evidence concerning warming of **blood products** compared to no warming to prevent perioperative inadvertent hypothermia?
- IV. What is the evidence concerning warming of **irrigation fluids** compared to no warming to prevent perioperative inadvertent hypothermia?
- V. What is the evidence concerning the **room temperature** in the theater contributes to the prevention of perioperative inadvertent hypothermia?
- VI. What is the evidence concerning warming with FAW, electric blanket or circulating water mattress compared to no warming to prevent perioperative inadvertent hypothermia?
- VII. What is the evidence concerning warming **insufflation gas (CO2)** compared to no warming to prevent perioperative inadvertent hypothermia?
- VIII. What is the evidence concerning passive warming with cotton blankets, reflective blankets, jackets and / or hats compared to no warming to prevent perioperative inadvertent hypothermia?



	1a:	Systematic reviews (with homogeneity) of randomized controlled trials
A	1b:	Individual randomized controlled trials (with narrow confidence interval)
	1c:	All or none randomized controlled trials
2a:		Systematic reviews (with homogeneity) of cohort studies
В	2b:	Individual cohort study or low quality randomized controlled trials (e.g. < 80% follow-up)
	2c:	"Outcomes" Research; ecological studies
	3a:	Systematic review (with homogeneity) of case-control studies
	3b:	Individual case-control study
С	4:	Case-series (and poor quality cohort and case-control studies)
D	5:	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"

Recommendation

What is the evidence concerning **prewarming** with Forced air warming (FAW) or electric blanket compared with no warming to prevent perioperative inadvertent hypothermia?

Active warming with Forced Air Warming should be used for prewarming to prevent perioperative inadvertent hypothermia.

(Quality of evidence, A)

90% of the adult patients (> 18 years) undergoing general or regional anesthesia should be preoperatively warmed with Forced Air Warming.

Recommendation II

EGION

What is the evidence concerning **warming of IV fluids** compared to no warming to prevent perioperative inadvertent hypothermia?

IV fluid (> 500 ml) should be heated to 37 °C, intra-operatively in a thermostatically controlled cabinet, to prevent perioperatively inadvertent hypothermia.

(Quality of evidence, A)

90% of adult patients (> 18 years) undergoing general or regional anesthesia should have the IV fluid (> 500 ml) heated to 37 °C.

Recommendation VIII

EGION

What is the evidence concerning **passive warming** with cotton blankets, reflective blankets, jackets and / or hats compared to no warming to prevent perioperative inadvertent hypothermia?

Warming the patient with cotton blankets, reflective blankets, jackets and / or hats have little effect on core temperature and can not be recommended for the prevention of perioperative hypothermia.

(Quality of evidence, A)

Hypothermia algoritme (perioperatively)



PRE-OPERATIVE:

- All acute surgery patients should have monitored the core temperature (baseline)
- All elective surgery patients who feel cold should have monitored the core temperature
 - < 36.0 °C use FAW at 43 °C

> 36.0 °C cover the maximum of the patient in order to prevent heat loss

- Always use FAW by: ASA grade III-V Preoperative temperature < 36.0 °C Risk of cardiovascular complications Anesthesia, lasting > 30 minutes
- FAW can advantageously be used for prewarming the patient > 20 min. prior to the induction or to warm the operating table (comfort).

Hypothermia algoritme (perioperatively)



INTRA-OPERATIVE:

- Adjust the FAW to maintain a temperature of 36.5° C or prevention of temperature decrease of > 0.5° C from baseline.

- < 36.0 °C continue to use the FAW at 43 °C Measure the temperature continuously or every 30 min.
- > 36.5° C observing the patient remains comfortably warm Adjust setting on FAW to 38° C or 32° C Measure and document the temperature every hour.
- Cover patient adequately and expose only during surgical procedure
- Warm IV fluids (> 500 ml / h) and blood products to 37 $^\circ C$ in a thermostatically controlled cabinet
- Adjust, if possible, the room temperature to > 21° C
- Irrigation fluids should be heated to 38° C 40° C.
- FAW blanket must accompany the patient to the PACU

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Hypothermia algoritme (perioperatively)



POST-OPERATIVE:

- Measure and document the patient's core temperature on arrival at the PACU / ward.

- < 36.0 °C use start or continue FAW at 43 °C Measure the temperature every 30 minutes Patient should *not* be discharged being hypothermia
- > 36.0 °C observing the patient remains comfortably warm Turn off or adjust FAW to 38 °C or 32 °C Measure the temperature every hour
- Patient feeling cold should be covered adequately by blanket if necessary active warming.

- Warm IV fluids (> 500 ml / h) and blood products to 37 °C in a thermostatically controlled cabinet.

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Hypothermic or not hypothermic - is that a question

Thanks for listening - time for questions

WHAT