Intraoperative factors affecting the postoperative core body temperature in general surgery

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Differences in intraoperative factors between patients with hypothermia and normothermia

	Hypothermia	Normothermia	p
Duration of operation (min)	118.6±47.8	127.7±64.8	0.016
Heart rates	69.3±10.7	73.2±16.9	0.020
Midazolame	29 (40.8%)	15 (31.3%)	0.049
Propofol	50 (70.4%)	39 (8.3%)	0.004
Local anesthetics	20 (28.2%)	9 (18.7%)	0.012
Sugammadex	17 (23.9%)	7 (14.6%)	0.008
Atropine	1 (1.4%)	5 (10.4%)	0
Position of anaesthesia (trendelnburg)	4 (5.6%)	6 (12.5%)	0.049
Site of anaesthesia (subarachnoid)	14 (19.7%)	4 (8.5%)	0.005
Glucose levels	114.2±55.5	104.8±19.9	0.002
Creatinine levels	1.19±1.47	0.87±0.16	0.028

Background: The intraoperative hypothermia is associated with the drugs administered during anesthesia, the potential exposure to cold air currents into the operating room, the fluids (including blood) which are administered at a normal room temperature and the increased heat loss to the external environment due to the incisional or even the exposure of patient`s organs in the external environment. The intraoperative hypothermia often leads to postoperative hypothermia in ICU or in the post-anesthetic care unit (PACU), with a rate of 60%.

Goal of Study: The goal of the study was the investigation of intraoperative factors that affects the postoperative core body temperature in PACU.

Materials and methods: This was a prospective, randomized and controlled clinical trial conducted in a large general hospital of Athens, Greece. The sample of the study consisted of 119 patients who underwent different type of surgeries. Hypothermia was defined when the tympanic temperature of patients was under 36°C. The temperature of patients was measured at the middle of the surgery (intraoperative), at the admission in the PACU and before the discharge of the PACU. The statistical analysis of the results was performed by x² test and Student t test using the statistical package SPSS for Windows (version 21) and the statistical significance was set to p=0.05.

Results: Hypothermia rate of patients when admitted in PACU was 71.4%. Factors affecting the hypothermia (vs normothermia) rate in PACU were female gender (54.1 vs 29.4%, p=0.001), low weight (79.7±15.3 vs 81.2±23.7 kg, p=0.006), prolonged surgery (130.9±64.9 vs 120.2±52.3 min, p=0.026), and the subarachnoid anaesthetic technique (18.9 vs 6%, p=0.045). The hypothermia on discharge from PACU was affected by female gender (54.2 vs 36.1%, p=0.006), low weight (79.6±15.7 vs 81.5±23.1 kg, p=0.024), severity of surgery (77.1 vs 63.9%, p=0.008), prolonged surgery (138.3±62.8 vs 114.8±50.6 min, p=0.028), propofol (74.7 vs 86.1%, p=0.001), sugammadex (20.5 vs 30.6%, p=0.001), muscle relaxants (71.1 vs 80.6%, p=0.001), whether the patient was intubated or not during surgery (69.9 vs 76.5%, p=0.001), subarachnoid anaesthetic technique (18.1 vs 5.6%, p=0.001) and systolic blood pressure on discharge from PACU (130.7±22.9 vs 123.7±15.3 mmHg, p=0.024).

References

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Discussion: The incidence of perioperative hypothermia ranges from 44% to 60% (Karalapillai & Storrs, 2008). Studies have shown that low preoperative temperature and light weight are risk factors for hypothermia two hours after surgery and advanced age and low weight for hypothermia three hours after surgery (Kim & Yoon, 2014). Risk factors that have been found to be responsible for the intra-operative hypothermia include major surgeries (ie., abdominal, thoracic, spinal cord), blood transfusion, duration of operation over 2 to 3 hours, operating room temperature under 21.3°C and general anesthesia, advanced age, catecholamine levels, preoperative body temperature and physical characteristics of the individual, (ie. body fat and weight (Kasai et al., 2003).

Factors affecting patient`s temperature at PACU`s discharge.

	Hypothermia	Normothermia	p
Gender (Females)	45 (54.2%)	13 (36.1%)	0.006
Weight	79.6±15.7	81.5±23.1	0.024
Major surgery	64 (77.1%)	23 (63.9%)	0.008
Duration of operation	114.8±50.6	138.3±62.8	0.028
Propofol	62 (74.7%)	31 (86.1%)	0.001
Sugammadex	17 (20.5%)	11 (30.6%)	0.001
Muscle relaxants	59 (71.1%)	29 (80.6%)	0.001
Intubation	58 (69.9%)	26 (76.5%)	0.011
Site of anaesthesia (subarachnoid)	15 (18.1%)	2 (5.6%)	0.001
Systolic blood pressure at PACU	130.7±22.9	123.7±15.3	0.024

Conclusions: Female gender, weight, duration of surgery, anaesthetic technique, and the intraoperative administration of drugs (propofol, sugammadex, and muscle relaxants) influences the body temperature of surgical patients in the PACU. So, we recommend all patients in PACU to be warmed through forced air and warm blankets, in order to achieve normothermia.