

Intraoperative Temperature Management for Major Open Abdominal Surgery: A Comparison of Forced Air Warming to a Negative Pressure Conductive Warming Sleeve

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BACKGROUND

Intraoperative temperature management has become an increasing important measure for the Physician Quality Reporting Initiative (PQRI). Induction of anesthesia affects thermoregulatory control and leads to perioperative hypothermia¹. The prevention of perioperative hypothermia improves patient outcome². The primary objective of this study was to determine if a vacuum enhanced (<10mmHg) conductive warming system utilizing a single forearm warming sleeve, Dynatherm Medical vitalHEAT™ Temperature Management System (vitalHEAT) combined with an LMA PerfecTemp™ surgical table warming pad, is as effective as forced-air warming (Bair Hugger™) for maintenance of intraoperative body temperature in patients undergoing major abdominal surgery with general anesthesia.

METHODS

This was a single site, prospective randomized study where a total of 46 subjects were assigned to receive one of two intraoperative warming methods; the vitalHEAT System or the Bair Hugger System (control group/ standard warming method used at our hospital). All subjects underwent a major open abdominal procedure. Intraoperative temperature was recorded every 10 minutes and obtained from an esophageal temperature probe inserted at 30cm from dental occlusion. Sublingual temperatures were taken pre- and postoperatively.

RESULTS

The mean sublingual preoperative temperatures for the vitalHEAT and Bair Hugger groups were equivalent at 36.6°C with a p-value of 0.802 using the Mann-Whitney test (Table 1). The mean final intraoperative temperatures were 36.6°C for the Bair Hugger group and 36.4°C for the vitalHEAT group (T-test p=0.079). The mean PACU temperatures were 36.7°C and 36.3°C for the Bair Hugger and vitalHEAT groups respectively (T-test p=0.008).

Table 1: A Comparison of Patient Demographics, Pre-operative, Final Intra-operative, and Post-operative Temperature Measurements

	Bair Hugger	vitalHEAT	Test	p-value
Sample Size	23	23		
Age [mean (SD)]	55.8 (15.3)	52.9 (14.0)	t-test	0.506
Weight [mean (SD)]	86.8 (38.5)	76.1 (17.0)	t-test	0.224 (0.701)
Height [mean (SD)]	167.5 (12.7)	171.2 (12.0)	t-test	0.324
Gender- Male	34.8%	56.5%	Chi-square	0.139
Pre-op Temp [mean (SD)]	36.6 (0.43)	36.6 (0.31)	t-test	0.969 (0.802)
Final Intraop Temp [mean (SD)]	36.6 (0.5)	36.4 (0.4)	t-test	0.079
Post-Op Temp [mean (SD)]	36.7 (0.4)	36.3 (0.5)	t-test	0.008*

± Mann-Whitney results are in parentheses

* Statistically significant difference between the Bair Hugger and vitalHEAT groups with a p value of < 0.05.



vh200™ Warming Sleeve: The patient's upper extremity (hand/forearm) is sealed inside the Warming Sleeve, attached to the Control Unit via an umbilical connector. The Warming Sleeve includes an inner layer consisting of two warming pads encapsulated within an outer vacuum sleeve. The warmed fluid from the Control Unit flows through channels in the warming pads, and the heat is transferred to the hand and forearm. The vacuum sleeve seals around the warming pads, hand, and forearm to create a vacuum chamber.



CONCLUSION

According to the guidelines set by the Centers for Medicare and Medicaid Services, a normothermic temperature recording of ≥36°C for the last intraoperative temp or first PACU qualifies as proper temperature management. The vitalHEAT System is an efficient warming alternative to the forced-air warming method and might be preferable for cases in which the entire abdominal area and upper body need to be accessible.

REFERENCES

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