

# INTRA-OPERATIVE TEMPERATURE CONTROL USING THE THERMOGARD™ SYSTEM DURING OFF-PUMP CORONARY ARTERY BYPASS SURGERY

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**BACKGROUND:** Maintaining normothermia during off-pump coronary bypass (OPCAB) surgery reduces metabolic derangements and contributes to improved clinical outcomes. Traditional temperature control strategies have been unsatisfactory. The purpose of this study was to examine the feasibility and efficacy of intra-operative temperature control using a novel endovascular heating system during OPCAB.

**METHODS:** Thirty-eight patients, undergoing OPCAB, were prospectively randomized to receive either conventional warming (operating room temperature 22°C, warmed intravenous fluids, and a convective forced air warming system) or the Thermogard™ system. The triple lumen temperature control catheter (Icy® Catheter, Alsium Corp) was inserted, prior to skin incision, in the common femoral vein using a Seldinger technique. Room temperature was kept at 19°C. The catheter was removed after all wounds were closed. The Thermogard™ was set to a target temperature of 37°C. Temperature measurements (bladder, naso-pharyngeal and blood) were recorded at 5-minute intervals from patient arrival to patient exit from the operating room.

**RESULTS:** Patient and hospital data are depicted below. Additional data measured include Body mass index  $30.1 \pm 6.2$   $29.8 \pm 6.8$   $0.88$ ; Parsonnet score  $10 \pm 6$   $12 \pm 9$   $0.40$ ; Operating time (min)  $108.1 + 43.7$   $150.3 + 123.4$   $0.12$ ; ICU LOS (d)  $1.6 \pm 1.4$   $1.2 \pm 0.5$   $0.22$ . Despite longer operative times (and significantly more bypass grafts), device patients required significantly less warmed IV fluids to help maintain normothermia compared to controls. Device patients warmed significantly better (start  $36.0^{\circ}\text{C} + 0.1.0$ , end  $36.7 + 0.4^{\circ}\text{C}$ ) compared to controls (start  $36.3^{\circ}\text{C} + 0.6$ , end  $36.5^{\circ}\text{C} + 0.7$ ,  $p=0.03$ ). All catheters were placed successfully on the first attempt. ICU LOS was nearly one half day less (25%) in the device group. There were no device related complications.

	Control (n=21)	Thermogard™ (n=17)	p value
O.R. Room temperature	22°C	19°C	N/A
Bypass Grafts	$2.6 \pm 0.9$	$3.4 \pm 0.6$	< 0.001
OR IV fluids (ml)	$2,012.3 \pm 723.1$	$1,557.0 \pm 547.7$	0.02
Warming rate	0.2°C	0.7°C	0.03

**CONCLUSION:** Endovascular warming is a safe and effective strategy. Endovascular warming is simple to employ and obviates the need for uncomfortably warm operating room temperatures. Significantly less intra-operative IV fluids may reduce hemodilution and the deleterious effects of over hydration. The Thermogard system compared favorably to conventional methods for warming during OPCAB.



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